THE ROLE OF ONLINE DISCUSSION FORUMS IN SUPPORTING LEARNING IN HIGHER EDUCATION

A Dissertation submitted by

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Certification of Dissertation

I certify that the ideas, experimental work, results, analyses, 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.

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ENDORSEMENT

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Abstract

This study investigates the contribution of asynchronous, online discussion forums to student learning in an Australian, online postgraduate course. The study of online forums is an emerging field of research and therefore calls for a methodology suited to the context where knowledge and application is still at the exploration stage. Grounded theory – an open, qualitative methodology – was chosen as an appropriate method to explore the nature of the interaction in the online forums.

The grounded theory analysis of the data revealed that participant interaction did generate instructional design knowledge across a range of conceptual levels. The study also showed that interaction was effectively facilitated through the use of asynchronous text-based forums, and that participants used the online interaction to build a learning community and to generate knowledge within the learning community. These findings, although from a small case study, help to justify the widespread use of discussion forums in higher education.

The research findings revealed that participant interaction was a key component that enabled the teachers and learners to build and participate in an online learning community. The subcategories that emerged from participant interaction – *teaching role, building a learning community* and *generating knowledge* – were all contributing categories to the core category: *interaction as a facilitator of learning*. Research revealed that the teacher had an important role in managing and facilitating the interactive online learning environment, through both design and implementation of the course. The teaching role was complex and integral in the building of a learning community and facilitating knowledge generation.

One outcome of particular interest for online researchers is that most of the categories that emerged from the data in this study strongly correlated to the categories in the Interaction Analysis Model (IAM); as well as categories identified by the Canadian Institute of Distance Education Research (CIDER), the research arm

of the Centre for Distance Education at Athabasca University. The grounded theory approach in this study generated similar categories to CIDER and IAM, despite the research being conducted without any reference to categories existing in the literature. The correlation between the CIDER, IAM and my categories provides credibility to each set of research outcomes. Also, it can be argued that the correlation between findings of independently conducted research studies means that these categories can be more confidently generalised to other online contexts. While the CIDER categories are now being applied in a number of empirical studies, I suggest that further research in a range of contexts is required to confirm whether these are "the" important variables in online interaction.

The grounded theory approach generated categories unique to this research and provided a framework for the design and implementation of interactive online learning. From these findings, the literature, and personal experience, recommendations are presented in regard to design principles, a design framework, and implementation strategies and tactics. The implications of online learning for institutional policy and practice are outlined, and a reflection on the online teaching role is presented – one that challenges some existing conceptions of a diminished role for online teachers. The debate surrounding the role of teaching in learning-centred pedagogy is an important discussion for higher education.

Keywords: online learning and teaching, interaction, computer-mediated communication, grounded theory

1 Introduction

1.1 Background

The internet has increased the opportunity for flexible approaches to learning. Many education institutions have responded by offering online or e-learning courses, or by using online learning as an adjunct to traditional modes of course delivery. In this study the term "online learning" is used interchangeably with "e-learning", which is defined as "learning facilitated and supported through the use of information and communications technology" (Joint Information Systems Committee study, 2004, p. 10). It can cover a range of activities that support learning, from blended or hybrid learning (the combination of on-campus and e-learning practices), to learning that is delivered entirely online, such as the course that provided the context for this research. Garrison and Anderson (2003, p. 33) define educational technologies as "those tools used in formal educational practice to disseminate, illustrate, communicate, or immerse learners and teachers in activities purposefully designed to induce learning". Much has been promised about the potential of technology to revolutionise learning. A Joint Information Systems Committee study (2004) identified six key dimensions of e-learning:

- Connectivity – access to information is available on a global scale
- Flexibility – learning can take place any time, any place
- Interactivity – assessment of learning can be immediate and autonomous
- Collaboration – use of discussion tools can support collaborative learning beyond the classroom
- Extended opportunities – e-content can reinforce and extend classroom-based learning
- Motivation – multimedia resources can make learning fun. (p. 7)

The increasing ease of access to internet technology and the use of learning management systems, such as WebCT and BlackBoard (acquired by WebCT since this study commenced), has led to an internet component being regarded as a standard feature in university courses. Online asynchronous discussion forums, that students can access at any time, are an often used component in higher education, and their widespread application at the University of Southern Queensland (USQ), the context for this study, warrants further research. Online forums are also used in conjunction with on-campus courses, in the belief that the forums will provide the context for participants to interact and build their knowledge of discipline areas. However, the assumption that the provision of online forums contributes to learning has not been researched in-depth, particularly in relation to courses that are deliver totally online.

This study used a grounded theory approach to study participant discourse in asynchronous discussion forums in an online postgraduate course at USQ. Based on these findings and on current literature, a theory regarding the characteristics that defined the interaction and the roles of participants is proposed, and recommendations for the design and implementation of interactive asynchronous forums are presented.

1.2 Significance of the research

In recent years, higher education worldwide has faced significant change as it responds to rapidly changing technology, a greater emphasis on lifelong learning, globalisation, and a move to a knowledge society. The impact of technology on the daily operation of universities and the easy access to information on the internet challenges universities traditional authority as the “fonts of knowledge”. Universities are also faced with the effects of economic rationalism, leading to a reduction in government funding which has, in turn, required universities to enter the commercial arena. To participate in the commercial arena, many universities use their application of technology as a marketing tool to promote themselves as innovative leaders in the education market (Daniels, 1998: Zemsky & Massy, 2003).

Laurillard (2002) suggests that universities should adapt to these changes and become leaders in the application of technology as a learning tool. While the application of technology in higher education is increasing, it creates both opportunities and challenges for educators. The application of technology can challenge existing approaches to learning, while also providing opportunities for online interaction among geographically remote learners (Berge, 1997; Garrison & Anderson, 2003; Harasim, Hiltz, Teles, & Turoff, 1995, Paulson, 1995). Laurillard (2002) suggests the use of a conversational framework for learning that captures the essence of university teaching as an iterative dialogue between teacher and student/s. She proposes that technology can be used to engage students by exploiting "the communicative, interactive, and adaptive capabilities of the technology" (p. 22) to facilitate this iterative dialogue. The provision of online conferencing systems that support interactive learning is viewed as a positive application of technology to learning (Laurillard, 2002, 2006) and is supported by educational theory, such as social constructivism. Palloff and Pratt (1999, p. 15) suggest that "in the online classroom, it is the relationships and interactions among people through which knowledge is primarily generated". However, Laurillard (2002) argues that:

> This is not a well-tested assumption as far as the research literature is concerned. Collaborative learning is undeniably important, and the communicative media are powerful enablers that match what is need for discussion and collaboration, but to what extent do they succeed in enabling learning? (p. 147-8)

The assumption that interaction will generate knowledge, and the increasing availability of technology to support online interaction, has resulted in the use of online forums in many USQ courses. Asynchronous discussion forums are often included in online courses to facilitate collaborative learning through learner discourse. Data from a research project completed at USQ (Postle, Sturman, Cronk, Mangubhai, Carmichael, McDonald, Reushle, Richardson &Vickery, 2003) showed that in all of the USQ online courses surveyed, asynchronous communication was the most commonly used form of communication.

The increasing use of asynchronous forums indicated the need for research, as the use of technology in higher education does not necessarily mean that there are improved learning outcomes, or a higher quality learning experience for the students. Laurillard (2002, p. 147) suggests that "the key issue is the quality and type of learning activity the communication media can support, and the role they play in the learning process as a whole". She suggests that the use of communications media in education is based on the assumption that students can learn through discussion and collaboration, even at a distance and asynchronously. The focus of this research was to investigate this assumption.

Research that informed the conceptualisation of this study

When this research study commenced (2001) the application of online technology in higher education was increasing, both for educational and economic reasons. However, online learning was relatively new to the educational field, so often the pedagogical aspects of online education were overlooked while institutions focused on implementing new technology (Laurillard, 2006; Zemsky & Massy, 2004). Literature suggests that higher education is still at the beginning of the e-learning experience and that we still have much to learn about online learning (Garrison & Anderson, 2003; Laurillard, 2006; Zemsky & Massy, 2004). The rapid adoption of the internet in higher education has seen a compression of the innovation process, with new technology implemented before educators and learners are prepared for the changed environment. A report on the failed uptake of e-learning in America, *Thwarted innovation: what happened to e-Learning and why* (Zemsky & Massy, 2004), suggests that the e-learning innovation cycle has stalled at the innovator and early adopter stages, rather than becoming mainstream. They argue that this is because the online initiative has not been developed into a form that can transform learning and teaching in higher education. Caplan (2004, p. 176) suggests that web-based teaching is still in its infancy and online educators are "blazing new trails in developing the essential elements and process that will lead to high-quality, active, online learning environments". When technology is introduced to education, it creates the opportunity to innovate, but also challenges and changes existing processes (Laurillard, 2006). Online teaching requires a significant shift in pedagogy

and practice for many teachers; consequently there is a need for research, such as this study, to contribute to theory development and inform learning and teaching practice.

In keeping with the grounded theory method (Chapter 3, Method), an in-depth literature review was not conducted before commencing the research. A preliminary review was conducted to develop sensitising concepts and provide a background to the study. The initial literature search revealed a number of studies and evaluations of online discussion forums (Bonk et al., 2000; Gunawardena et al., 1997; Henri, 1992: Mason, 1998; Mara, 2006; Stacey, 1998, 2002). Research into the use of online forums had explored social interaction, online participation patterns and roles, collaborative knowledge construction, group development, critical thinking, response complexity, social cues, and cognitive and metacognitive understanding. Henri (1992) developed a framework and analytical model for understanding the learning process in computer conferencing environments. She highlighted five dimensions of the learning process: participation (e.g. rate, timing and duration of messages); interactivity (e.g. explicit interaction, implicit interaction and independent comments); social events (i.e. statements unrelated to the content); cognitive events (e.g. clarifications, inferences, judgments, and strategies); and metacognitive events (e.g both metacognitive knowledge/person and task; and finally, strategy as well as metacognitive skill, evaluation, planning, regulation and self-awareness). Henri also offered a second cognitive model intended to examine the depth of processing, surface or in-depth, of information. While this framework was comprehensive and informative, some aspects of this approach (e.g. measuring metacognitive knowledge in online discussions) need further clarification (Hara, Bonk, & Angeli, 2000), and illustrate the need for further research.

Mason's (1998) review of existing research into online education found that surveys, user interviews, empirical experimentation, case studies and computer generated statistical measurements have been used to evaluate computer conferencing. However, she suggested that these methodologies did not provide much information about the quality of student learning taking place. She suggested researchers focus on examples of behaviour and written work through the analysis of online conference content, and present some conclusions about the educational value of the particular on-line activity. Mason (1998) called for evaluators to take up the

challenge of content analysis, both to increase the professionalism of the field and inform the educational value of the activity. Biesenbach-Lucas (2003, p. 25) also called for further research into the use of asynchronous technology, arguing that its use "has been instituted with little or no consideration of the impact on student learning". The initial focus of many online studies was to study a small online component of an on-campus course, so there is a need for research, such as this study, into the learning processes of courses offered only online.

The significance of this study is that few other studies have focused on researching the contribution to student learning made by the use of discussion forums within a totally online learning environment. Many studies have drawn on theory and methodologies used in face-to-face groups, and have often compared online and on-campus contexts. Rather than focusing on comparative research, further research is needed to establish the characteristics, participant roles and contribution to learning of online forums. The internet is increasingly used in higher education, so there is a need to research online learning in its own right, not just in comparison with other means of education. The literature indicates that the use of communications media in education is based on the assumption that students can learn through discussion and collaboration (Laurillard, 2002). This calls for further research into the educational value of online forums (Biesenbach-Lucas, 2003; Laurillard, 2002; Mara, 2006; Mason, 1998). The study aims to extend existing research into USQ's online initiative by focusing on the contribution to student learning of asynchronous discussion forums, one of the main applications of online pedagogy. This focus emerged from my roles as a teacher and instructional designer of online courses at USQ. The context of the study is presented in the following section.

1.3 Context of the study

The context of this study is an online, postgraduate course at the University of Southern Queensland (USQ), an internationally recognised leader in the provision of flexible learning. USQ services more than 24,000 students from every state in Australia and 30 other countries. It also provides on-campus education for approximately 5,000 Australian and international students. In Australia, a small

population spread over large geographic distances has seen traditional distance education experiences based on self-contained and predominantly print-based learning packages. Distance education courses were traditionally designed as a "stand-alone" learning package, based on the presumption that remote learners would be unable to access other resources or have easy contact with peers or teachers. In the stand-alone model students worked independently through course materials that were designed on the idea of "student/content", interactive approach (Anderson, 2003). They submitted assessment items and received feedback and grades, having minimum interaction with course leaders and fellow students unless an on-campus residential school or telephone tutorial was scheduled as part of the program. However, access to information and communication technologies and the growing application of constructivist pedagogy that is learning centred, rather than teaching centred, is changing the focus from a traditional independent learner model to one informed by social constructivism, collaborative learning and adult learning principles (McDonald & Mayes, 2005).

The use of technology and increased online access provides flexibility for all students, including on-campus students who can choose not to attend on-campus lectures and instead access online lecture notes and resources. It also supports distance and online learners through the use of computer-mediated communication. The use of online discussion forums provides opportunities for interaction between teacher/students and student/student, and is changing the way USQ approaches distance education. USQ delivered its first online course in 1997, and most USQ courses now include an online component, such as discipline content and discussion forums.

The impact of online learning and teaching at USQ is revealed in data from an Evaluations and Investigation Program (EIP) research project at USQ (Postle et al., 2003). Data gathered from eight USQ online courses revealed that approximately 80% of the learner interactions were on communication features, and that approximately 20% of the interactions were with the course content. The level of learner engagement with communication features is both a reflection of the design of the online course, and the ability of teachers to engage the learners in dialogue. It indicates that online interaction between course participants was a critical feature of

online teaching in those particular courses (Postle et al., 2003). Laurillard (2002, p. 146) says that the use of communications media in education is "based on the assumption that students can learn through discussion and collaboration, even at a distance and asynchronously". This assumption requires further research, which is the focus of this study.

The course that provided the context for this study was a postgraduate course offered by the Faculty of Education at USQ. It was designed specifically for online learning, with no face-to-face component or print media, and had an enrolment of both Australian and international students. Information communication technology (ICT) mediated all communication and provided the medium for group interaction within the course. The course was offered over a 14-week semester and was delivered using BlackBoard's Learning Management System (LMS), with asynchronous discussion forums a key component of the learning. Learning Management Systems such as BlackBoard and WebCT have been developed by commercial companies and can provide a complete delivery system for online courses, including administration structures, content organisation, and both synchronous and asynchronous text-based discussion boards. The data for this study were taken from an online asynchronous forum located on a BlackBoard LMS.

The course included a number of design features that reflected the learning and teaching philosophy of the designer/teacher, the characteristics of the learners and the organisational context. The theoretical background of these design principles will be discussed further in Chapter 2. The course design was based on the principles of constructivism and reflective practice (Dewey, 1933; Schon, 1983). The belief that online discussion forums would facilitate learning (Collis, 1996; Jonassen, 1998; Laurillard, 2002; Palloff & Pratt, 1999) led to the inclusion of reflective assessment activities in the design of the course. Critical reflection and discussion were important components of the course design and implementation. Learners were required to post comments to the asynchronous discussion forum on issues raised in the course and instructional design (ID) literature, and reflect on how these issues related to their professional practice. The forums were designed to encourage individual constructivism through private reflective practice, and social constructivism through sharing and debating posted ideas with fellow learners. All

learners were required to post a personal reflective assessment item to three discussion forums. The course designers believed that by assessing personal reflective items, learners would have to access the discussion forums, thus increasing the likelihood that they would read and respond to each other's reflections. This process was expected to provide opportunities for collaborative learning, critical reflection and feedback on the contributions of other learners. The assessment activities were based on the assumption that the sharing of reflections on ID theory and application on the online discussion forums would support social construction of knowledge for the learners. Researching this assumption by investigating the nature and function of the discussion in these online forums was the focus of this study. Learners were strongly encouraged to respond to reflections, and discuss and explore the ID theory presented in the course readings; however, this interaction was not given a grade.

When this research commenced there had been some research into the capacity of discussion forums to facilitate learning (Berge, 1997; Harasim et al., 1997; Hill, 1999; Paulson, 1995). Although Harasim (1990) began a theoretical discussion about the suitability of communication technology as a learning medium, there is still much research required to establish a foundation for theory building relating to online pedagogy. As noted by Laurillard (2002), the extent to which online discussion and collaboration succeed in enabling learning is not a well researched area, so there was an identified need for further research, particularly as it applied to totally online courses. The high levels of communicative interaction in USQ online forums (80% of course interaction) indicate that this was an activity where learners spent significant amounts of time (Postle et al., 2003). It therefore warrants further research to determine the nature and function of the interaction, the focus of this study. This study focused on online learning only, not other methods of flexible learning, such as on-campus with online component, print or CD distance learning. This study aimed to contribute to the body of research relating to the use of online discussion forums in postgraduate courses by researching the nature and functions of interaction in such forums; and based on the findings, generate theory to inform online learning and teaching practice. The questions that provided the focus for the research are presented below.

1.4 Research problem, questions and key assumptions

The purpose of this study was to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The anticipated contribution of the study was to inform the theory and practice of online pedagogy.

The primary research question was:

If asynchronous communication facilitates student learning in an online course, can the defining characteristics of the communication and the respective roles of participants be described and explained?

The secondary research questions were:

- What were the characteristics that defined the interaction in asynchronous online discussion forums in this study?
- What were the respective roles of learners and teachers in asynchronous online discussion forums in this study?

As previously mentioned, the course was designed on constructivist and reflective practice principles, and learners were required to post reflections to online forums. They were encouraged to respond to the reflections of others (although this was not assessed) in the belief that interaction would contribute to the building of individual and collective knowledge of the Instructional Design (ID) subject area. It was expected that the forum discussion about the knowledge of the discipline, and the issues involved with application in practice, would challenge and strengthen the knowledge of the learners. It must be acknowledged that this was an assumption that informed the design of the learning and assessment activities in the course. The research was designed to investigate this assumption and to examine the contribution of asynchronous discussion forums to student learning. Consequently, the primary research question was deliberately open-ended, providing room to investigate the contribution to student learning of the interactions in the online forums. The secondary questions were designed to structure reflection on the findings that

emerged from the primary question. Learners were advised of the research in the second week of semester and sent a personal email requesting consent to research the discourse in the online forums (Appendix A).

As online education is an emerging field of research, it calls for the application of an open, qualitative methodology, such as grounded theory, which is identified as a capable and suitable research approach to generate an understanding of the learning process within online discussion forums. Strauss and Corbin (1990) suggest that grounded theory is suited to an area where there is little known, as it is capable of drawing the interpretations into a beginning theory that is grounded in the data.

1.5 Method – grounded theory

Grounded theory is a qualitative approach that has been used extensively across a variety of social science disciplines, including education, nursing, and business, and is a suitable methodology for study of an emerging field, such as online education. Grounded theory is considered to be particularly appropriate when little is known about a topic and there are few existing theories to explain a particular phenomenon (Charmaz, 2002; Hutchinson, 1988). As defined by Strauss and Corbin (1990, p. 24) "the grounded theory approach is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon". The intent of the grounded theory approach is to develop an account of a phenomenon that identifies the major constructs, or categories, in grounded theory terms, their relationships, and the context and process, thus providing a theory of the phenomenon that is much more than a descriptive account (Becker, 1993).

The basic tenet of the grounded theory approach is that a theory must emerge from the data through an intensive investigation of a specific context, that is, the theory must be grounded in the data. Hence the approach claims to be inductive rather than deductive (Strauss & Corbin, 1990). Induction requires the researcher to use a ground-up (from practice to theory) approach and to be open-minded and flexible, so that the theory emerges from the data (Glaser & Strauss, 1967; Strauss & Corbin, 1990; 1998).

The traditional research approach of conducting an in-depth literature review before commencing the research is not employed in the grounded theory method. Instead, a preliminary review of the literature was undertaken prior to data collection to sharpen the research focus, and a detailed review of the literature was conducted after the data analysis, in order to minimise the influence of existing research on the findings in this study. As online learning is a relatively new field of educational research, I made a conscious decision not to use categories that existed in published research to inform my data collection and analysis. By using a grounded theory approach, the primary research question was deliberately kept open-ended, so all findings that emerged from the data were open to fresh scrutiny and not considered within a preconceived framework. However, my assumption that learning would be facilitated in the online forums must be acknowledged. Using the grounded theory method, it is possible to maintain a researcher stance and remain open to the findings that emerged from the data. It should be noted that the use of first person and personal pronouns is an accepted approach in grounded theory. Referring to myself in the third person (as the researcher), would be incongruent with the meaning-making essence of grounded theory research. A detailed discussion of the grounded theory methodology is presented in Chapter 3.

1.6 Strengths, limitations and key assumptions of the study

The design and implementation of the online discussion forums in this study were based on the belief that interaction would contribute to the building of individual and collective knowledge of the Instructional Design (ID) subject area. Although commencing the research with this existing assumption, which informed the design of the forums, the research was designed to investigate this assumption. It also aimed to tease out the contribution of asynchronous online forums to student learning and explore the characteristics of interaction and the roles of both learners and teachers.

A possible limitation of the research was that I was the course leader, co-course designer, and participated in the discussion forums. My involvement in the design and operation had the possibility of influencing my behaviour both in the operation of the forum discussion and the analysis of the data. In recognition of this possible

bias, strict care was taken to ensure that the course was conducted using a course structure and learning activities similar to those used in previous course offers. Inevitably, there was some evolution and modification to previous offers. Each teaching semester is informed by past evaluations and the current cohort of learners, but basically the integrity of the course structure was maintained, with facilitation modified during the semester in response to the demands of a different student cohort.

Learners were advised of the research in the second week of semester and sent a personal email requesting consent to research the discourse in the online forums. This could be viewed as weakness of the study, as learners were enrolled in the course and could have felt pressured to agree to a request by the course leader. However, the standard statements advising participants of their freedom to request information, leave the research at any time, and contact the USQ research committee were articulated in the permission letter (Appendix A). Only data from learners who consented were collected.

This study investigated the nature and function of asynchronous communication in facilitating learning in a course offered **only online**. This was a strength of the study as all course communication was mediated by communication technology and was available for review. The data collected in the text-based online discussion forums provided a rich and permanent record of participant interactions. Such data is usually not available in traditional learning contexts such as face-to-face lectures and tutorials. However, it must be noted that the text-based records of the participant interactions provided only one insight into the complex learning process that learners were experiencing. While forum discussions provided a rich data source, care was taken not to interpret the findings in relation to total online learning context, and to maintain the focus only on the asynchronous communication component of online learning. The online context provided a unique opportunity to study the forum interaction in an online-only course, to add to the existing research literature. As noted by Laurillard (2006), educators have not fully exploited the online forums as a medium that can transform education, as there are no historical precedents. Therefore the findings of this research will contribute to the knowledge base of online education.

This study was focused on an online, post-graduate education course at one institution within the Australian tertiary system; therefore the findings may not be generalisable to other contexts. Similar studies of courses in other disciplines and other educational institutions are required to establish and confirm critical variables.

1.7 Structure of the study

In summary, this chapter has introduced the context, purpose and structure of the study. Chapter 2, the literature review, provides a discussion of educational theory and pedagogical practice that informed this study. This discussion includes online learning, constructivism, and the concepts of reflective practice, collaborative learning and communities of practice. The grounded theory approach suggests that a detailed review of current literature should be conducted after data analysis has been completed, so that the findings in the literature do not influence the analysis process. This approach was followed; however, the separate discussion of literature that informed the course design and conceptualisation of the research is presented in Chapter 2, in order to retain the traditional thesis structure.

Chapter 3, outlines the method, research questions and focus of the research, and presents a brief review of the grounded theory approach used in this study. Chapter 4 presents an analysis of the findings that emerged from the data, and a comparison of these findings with relevant literature. Chapter 5 presents an initial theory regarding the use of discussion forums in online learning that emerged from the grounded theory approach to this study. A framework and recommendations for the design and implementation of asynchronous online forums are presented, as well as a discussion of implications for institutions of higher education, and areas for further research.

2 Literature Review

2.1 Introduction

The focus of this study is to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The literature suggests that educational online forums have the capacity to facilitate learner co-construction of knowledge, and this perceived capacity is one of the assumptions about the ability of technology to support the learning process (Laurillard, 2002; Stacey, 1997; 1999). It has been suggested that in the online context, it is the relationships and interactions among people through which knowledge is primarily generated (Palloff & Pratt, 1999). This assumption is embedded in emerging online educational practice that draws on a constructivist perspective, a perspective that has increasing support in the literature (Karagiorgi & Symeou, 2005). The literature that informed the design of the learning and teaching context in this study is reviewed in this chapter. However, in keeping with the grounded theory approach (Strauss & Corbin, 1998) an in-depth literature review of existing research that specifically investigates learning in asynchronous communication was not conducted until after the data were analysed. This will be discussed as part of the findings in Chapter 4. Much of the literature cited in Chapter 2 formed the basis of the preliminary literature review conducted to identify research issues, generate theoretical sensitivity and help sharpen data collection (Schreiber, 2001). In view of the expanding nature of online education, a review of current literature was conducted to inform the recommendations in Chapter 5.

2.2 The implementation of online technology in higher education

This study is located within the context of higher education that is operating within an environment of significant change. This changing environment is the

result of a number of influences: the greater emphasis on lifelong learning, the advent of the information age resulting in globalisation, and a move to a knowledge society. In addition, student cohorts have made further demands on universities for greater flexibility in the way they access programs and services (Laurillard, 2002). With the constant pace of change and the growth of information, people can no longer rely on their initial training or education to see them through their working life. There is a continual need for education and training, so institutions are faced with a variety of learners requiring access to flexible opportunities for learning. The traditional undergraduate student population who came to university straight from secondary school is now changing, as mature-aged learners access further study while they continue to work. Universities are also faced with the consequence of economic rationalism, leading to a reduction in government funding, which has, in turn, required universities to enter the commercial arena. The United Kingdom (UK) English Prime Minister Tony Blair announced recently that "with the demand for college graduates increasing rapidly, the costs of higher education can no longer be borne by taxpayers alone" (Blair, 2006). From September 2006, UK undergraduate fees increased to 3,000 pounds (Aus$5,000) from 1,1175 UK pounds, the previous year, and no fees before 1998. Blair (2006) argues that "to thrive and survive, universities cannot stand still. They must look outward to survive, compete and grow. There will be mergers and partnerships. Innovation will be an increasingly prized commodity". This changing environment means that educational practices must be adapted to meet the needs of learners and society.

As an increasing number of students have access to information and communication technologies; tertiary institutions have the opportunity to use that technology to reach students other than those physically located on-campus, and implement new learning and teaching approaches. Laurillard (2002) argues that universities must adapt to the changing environment, become leaders in the application of technologies as learning tools, and adopt strategies that facilitate active learning. The active, learning-centred approach challenges the conventional tertiary educational model where the teacher has the role of an expert delivering information to a passive learner. This model is based on a teacher-lead classroom setting where interaction between teacher and learners takes place synchronously,

that is, it occurs at the same time and place (Picciano, 2001). Apart from case studies of innovative online learning, to date online learning has been used effectively to enhance traditional forms of teaching and administration (Laurillard, 2006; Zemsky & Massy, 2003). For example, at USQ, technology provides web access to online courses through the use of course management systems such as WebCT and Blackboard to deliver educational content including PowerPoint lectures that mirror many aspects of traditional face-to-face classroom practice. Van Weigel (2003) suggests that "one basic fact of life cannot be escaped in grappling with pedagogical reform – our love affair with the lecture". Shrinking budgets and the use of online learning to "deliver" teacher-lead information indicates that online learning has yet to significantly change entrenched practice in higher education (Laurillard, 2006). If traditional practice such as lecture mode or print-based distance content is transferred to a web environment, online learning will have little impact on existing pedagogy. In their study of the failed uptake of e-learning in America, Zemsky and Massy (2004) suggest that "the hard fact is that e-learning took off before people really knew how to use it" (p. iii). While many institutions of higher education are adopting technology, it has been suggested that in most instances "the revolution proceeds without any clear vision or master plan" (Ikenberry, 1999). The next section will briefly review the potential of online learning and teaching in higher education.

2.2.1 Online learning and teaching in higher education

Online or e-learning is defined by Laurillard (2006) "as the use of any of the new technologies or applications in the service of learning or learner support". A more detailed definition is provided by Goodyear (2002), who describes networked, or online learning, as

> . . . learning in which information and communication technology is used to promote connections: between one learner and other learners, between learners and tutors: between a learning community and its learning resources. Such communication can be synchronous and/or asynchronous. It can be text-only or multimedia. It may involve learners who are geographically

> distributed and/or learners who spend much of their time at a common location. (p. 56)

Goodyear (2002) argues that, based on this definition, we need to understand learning as an individual cognitive achievement that also has a social dimension, rather than an individualistic or information-processing model. As outlined in the previous discussion, this definition points towards learning including a social process rather than a solely individual process. Both of these definitions are firmly focused on learning activities, rather than the use of technology or teaching activities. Online learning provides the vehicle to change the traditional model embedded in our understanding of education. It provides the means of moving education away from the traditional, place-based, teacher-centred model, to an active, learning-centred model, informed by constructivism and social learning theory. Laurillard (2006) argues that most eminent writers on learning have emphasised the importance of active learning. These writers and their educational ideas include "Dewey's inquiry-based education, Piaget's constructivism, Vygotsky's social constructivism, Bruner's discovery learning, Pask's conversation theory, Schank's problem-based learning, Marton's deep learning and Lave's socio-cultural learning" (Laurillard, 2006).

As mentioned in Chapter 1, much has been promised about the potential of technology to revolutionise learning, with benefits identified by the Joint Information Systems Committee study (JISC, 2004) in six key dimensions:

- Connectivity – access to information is available on a global scale
- Flexibility – learning can take place any time, any place
- Interactivity – assessment of learning can be immediate and autonomous
- Collaboration – use of discussion tools can support collaborative learning beyond the classroom
- Extended opportunities – e-content can reinforce and extend classroom-based learning
- Motivation – multimedia resources can make learning fun. (p. 7)

Of interest for this study is the application of communication technology that supports connectivity, interactivity and collaboration, that is, a social constructivist approach to learning and teaching. USQ research (Postle et al., 2003) revealed that 80% of learner interactions were within the communication features, making use of the interactive and collaborative capabilities of online technology. Research into the use of technology to support computer-mediated conferencing began in the 1990s, when educators realised it offered alternative learning opportunities to the traditional independent learning approach of distance education. Given the concentration of USQ learner effort in the online communication features, and calls for research into the assumption that students can learn though online discussion and collaboration (Laurillard, 2002), there is a need for this research into the contribution to student learning of asynchronous discussion forums.

2.2.2 Online learning through computer mediated communication

In the early 1990s Mason and Kaye (1990) outlined a new paradigm for distance education which made use of emerging communication technology to include the use of cooperative and collaborative methods of learning. Jones and Steeples (2002) suggest that this approach is now widely used, with Computer-Mediated Conferencing (CMC) and Computer Supported Collaborative Learning (CSCL) being two terms used to describe the technology and pedagogy that support cooperative and collaborative learning. CMC specifically uses communication media to bring people together for online discussion – it supports one-to-one, one-to-many or many-to-many discussion. Communication can be synchronous, using web based chat sessions, or asynchronous `. In synchronous discussions, participants log on at the same time and participate in “real-time” chat sessions, usually text-based, although audio and video software is available. Asynchronous communication methods include email, electronic bulletin boards, and online discussion forums that participants can access at any time. Research has highlighted the educational and social justice advantages of CMC (Stacey, 1999; Rourke, Anderson, Garrison, & Archer, 2001). It reduces the sense of isolation for geographically dispersed students, and provides an opportunity for students to respond thoughtfully in online discussions, without the time pressure of instant response required in on-campus discussions. This allows for in-depth reflection on issues, with an opportunity to

review previously posted comments, as well as time for second language students to prepare and edit contributions before posting to a shared forum. The CMC environment also means that physical appearance, gender and race are not evident, and participants can focus on the educational value of the communication, rather than judging the communicator (Mason, 1992).

CMC not only provides flexible access to students, research suggests that there are also some educational advantages over traditional classroom education. Thurmond and Wamback (2004) found students interacted as much, or more, in an online course, and their performance online was also better than their classroom counterparts. A study by Hiltz (1995) found that those students who actively participated in online discussions produced better results than students in a traditional classroom setting. A study by Carswell, Thomas, Petre, Price and Richards (2000) that compared undergraduate students in CMC and classroom components of a computer science course found that learning outcomes were similar for both groups, but the CMC group experienced increased interactions with fellow students and tutors. Australian research into the online collaborative learning process of three groups of postgraduate distance students found that the discourse in online discussion forum and sharing of resources supported the active construction of new ideas and concepts and enabled them to learn effectively. The collaborative behaviours of an effective learning environment also provided socio-affective support that motivated learning (Stacey, 1997; 1999). The educational benefit of using CMC to support a virtual community of inquiry which supports critical, collaborative learning is also articulated by Garrison, Anderson and Archer (2001).

A unique strength of CMC, for both education and research, is the capture of text-based dialogue as a permanent record participant discourse. The permanent written nature of online discourse means course participants can re-read, re-analyse, reorganise and retrieve past discourse in a way that is not possible in the transient nature of oral discourse, such as in an on-campus tutorial. Garrison (1997) argues that text-based, online forums are ideally suited to the higher education context, as "the asynchronous and precise nature of this means of communication is consistent with higher order thinking and cognitive development" (p. 5). Students using asynchronous text-based forums noted that "you have to be sure that you're being

clear . . . that there is no question about what you're asking or what you are saying. Online learning made me think a little bit more of how everybody interprets things differently" (Vonderwell, 2003, p. 86). Laurillard (2006) suggests that "the written medium had a transformational effect on an oral culture because it enabled the representation, analysis and reworking of information and ideas. Yet the excitement about information technology has been focused much more on the *access* than on the *processing* it offers". This supports previous research findings (Zemsky & Massy, 2004; Ikenberry, 1999) that argue that online learning has been implemented without clear educational vision and often mirrors traditional educational practice.

The design of the asynchronous online forums in this study address some of the issues raised in the literature, that is, the need to implement new ways of online learning and teaching using CMC. The forums were designed to facilitate a social constructivist learning experience, and the research is designed to investigate the learning that took place in the forums. The online discussion forums were located within the USQ BlackBoard learning management system (LMS). They provided an online discussion environment where learners could log on to the course to read and post text-based messages. The use of discussion forums to facilitate learning was informed by social constructivism (Jonassen, 1998; Lave & Wenger, 1991; Vygotsky, 1978). Course participants (learners and teachers) were able to engage in collaborative discussion about topics in the asynchronous forums. The discussion could extend over a number of days, or more, as the messages remained visible within the forum. Text-based dialogue made the thinking of each participant visible, as the dialogue was captured and stored on the CMC software. This provided the participants with continuous access to the dialogue, and time to reflect and prepare a reasoned argument before posting to the forum. It also provided a rich source of research data to investigate the learning activities in the online forums. Larson and Strehle (2001) suggest that "students' activities can be better tracked in Web-based learning environments and offer important opportunities for data mining, allowing for new analyses of students' learning activities, learning styles and knowledge acquisition" (p. 56).

Computer-mediated communication provides the means for learning communities to interact without geographical or time limitations. It creates an opportunity to

transform “place-based” education and implement social constructive pedagogy and foster online, learning communities. A review of CMC literature revealed that many studies investigated social interaction rather than knowledge construction and that the studies were often located in an on-campus context. This indicates a gap in the literature that is addressed by this study. To date there is only a limited amount of empirical evidence in the literature to suggest “that text-based communication used in computer conferencing can, in fact, support and encourage the development and practice of higher-order thinking skills” (Garrison et al., 2000, p. 7). Research into the nature of learning in online forums is required to inform practice and provide models of good practice that can be applied in higher education. Findings from such research can also provide information on the roles of learners and teachers in online learning, and ideas for the design and implementation of effective online learning environments.

2.2.3 Research in learning through computer mediated communication

In the grounded theory approach a detailed review of the relevant literature usually follows the data analysis phase of the research design, and literature is considered another form of data (Strauss & Corbin, 1998). Therefore an in-depth literature review of existing research that specifically investigates learning in asynchronous communication is not presented in this chapter, but will be discussed as part of the findings in Chapter 4. However, an overview of existing research was conducted to identify gaps in the research and research issues. It was established that there is an increasing amount of research into the effective educational application of CMC (Bonk, Hara, Dennen, Malikowski & Supplee, 2000; Garrison, Anderson & Archer, 2001; Gunawardena, Lowe & Anderson, 1997; Harasim, Hiltz, Teles & Turoff, 1995; Henri, 1992; Hillman, 1999; Marra, 2006; Newman, Web & Cochrane, 1996; Paulsen, 1995; Romiszowski & Mason, 2004; Rourke et al., 2001; Stacey, 1999, 2002).

Researchers interested in the use of CMC in online education have explored participation patterns and roles, collaborative knowledge construction, levels of argumentation, group development, critical thinking, response complexity, social cues, and cognitive and metacognitive understanding. Certain CMC studies offered

guidelines for effective online teaching. For example, Paulsen (1995) suggested strategies related to the categories determined by the teaching and learning communication functions of CMC. These categories are one-alone (e.g. online databases and journals), one-to-one (e.g. learning contract, email), one-to-many (e.g. lecture, symposium), and many-to-many (discussion, debate, group work). Henri (1992) developed a framework and analytical model for better understanding the learning process in computer conferencing environments. She highlighted five dimensions of the learning process: participation (e.g. rate, timing and duration of messages); interactivity (e.g. explicit interaction, implicit interaction and independent comments); social events (i.e. statements unrelated to the content); cognitive events (e.g. clarifications, inferences, judgments, and strategies); and metacognitive events (e.g both metacognitive knowledge/person and task; and finally, strategy as well as metacognitive skill, evaluation, planning, regulation and self-awareness).Henri also developed a cognitive model to assist teachers and researchers to examine the depth of processing of information (surface or deep learning). While Henri's focus on examining the cognitive nature of postings provided a significant advance on previous research that focused on descriptive statistics, some aspects of this approach (e.g. measuring metacognitive knowledge in online discussions) were highly subjective (Hara et al., 2000). The framework also reflected a teacher-centred paradigm, indicating the need for qualitative research attuned to constructivist pedagogy, such as this study.

The Interaction Analysis Model (IAM) content analysis model developed by Gunawardena, Lowe, & Anderson (1997) was based on a constructivist paradigm and designed to detect evidence of knowledge construction. Their proposed model acknowledged Henri's framework but identified the model's basis in a teacher-centred learning paradigm as a weakness (Marra, 2006). Another content analysis model designed to measure critical thinking was developed by Newman, Webb and Cochrane (1996; Newman, Webb, Johnson, & Cochrane, 1997). Their model builds on Garrison's (1992) five-stage critical thinking model that included problem identification; definition; exploration; evaluation; and integration. "The researchers identified approximately 40 codes in categories such as relevance, justification, novelty, and ambiguities, each with a "+" or "-" appended to indicate whether the

coded statement contributes to ("+") or detracts ("-") from critical thinking development" (Marra, 2006, p. 251).

The use of CMC is increasing in online education (Postle et al., 2003; Romiszowski & Mason, 2004), however, Marra (2006) suggests that "even though many acknowledge the critical role CMC discussion forums can play in web-based courses, little empirical evidence confirms that text-based communication used in computer conferencing can facilitate higher-order and critical thinking". Such research is important, not only to inform learning and teaching in higher education, but also to inform the design of online learning for training purpose. A report on the e-learning training market estimates the corporate market in the US at $3.5 billion, and $5 billion globally, pointing to a $50 billion market by 2010 (Levis, 2002). The increasing ease of access to web technology and the creation of commercial course management systems for course delivery provide both opportunities and challenges for providers of education. These course management systems are marketed as providing a complete learning management system for the offer of online courses, including an asynchronous text-based conferencing system, which is the focus of this research. In order to provide a theoretical context for this study, educational and instructional design theories and principles that inform higher education practice are explored in the following sections of this chapter. The application of the theories in online learning and teaching is considered, with particular reference to how they informed the design and implementation of the learning environment in this study.

2.3 Theories and principles informing online learning and teaching

The learning theories of behaviourism, cognitivism and constructivism have influenced the way learning and teaching is conceptualised and implemented, and educators who are familiar with these theories can draw on a range of theoretical perspectives to inform and adopt their practice as appropriate for particular educational contexts.

2.3.1 Behaviourism, cognitivism and constructivism

Behaviourism

Behaviorist theory is based on the study of overt behaviours that can be observed and measured (Good & Brophy, 1990), and therefore views the mind as a "black box", as internal thought processes can not be observed. The theory suggests that active rather than passive response to instructional stimulus is necessary for learning to occur (Ormrod, 2004). Active engagement in online discussion forums is the key design principle that is being investigated in this study. The application of this principle raises some interesting questions about how to accommodate the preferences of different learners and the ideas related to individual and social constructivism – as discussed in section 2.3.2. Using feedback to shape learning outcomes and modelling by providing examples of expected outcomes are behaviorist strategies that can be used in the online environment. Saettler (1990) identified six areas that demonstrate the impact of behaviourism on educational technology in America: the behavioral objectives movement; the teaching machine phase; the programmed instruction movement; individualised instructional approaches; computer-assisted learning; and the systems approach to instruction. It is interesting to note that some aspects of online learning draw on individualised instructional approaches and computer-assisted learning, in particular the use of computer marked assessment (Zemksy & Massy, 2004). Once consideration was given to the idea of investigating the information processing activities of the brain that caused observable behaviour, cognitive theories gained momentum.

Cognitivism

Cognitive psychology emerged in the late 1950s with a shift from behavioristic practices that emphasised external behaviour to a concern with the internal mental processes of the mind and how they could be utilised to promote effective learning (Gagne, Briggs & Wager, 1992). Cognitive approaches to teaching retained many of the behaviorist strategies, such as repetition and the importance of reinforcement. However, it also focused on the internal process of learning such as knowledge coding and representation, information storage and retrieval, as well as the

incorporation and integration of new knowledge with previous information (Saettler, 1990). In order to assist information processing, the cognitive scientist would analyse a task, break it down into smaller steps or chunks and use that information to develop instruction that moves from simple to complex building on prior schema (Mergel, 1998). This approach led to the instructional systems approach to design, which is discussed in section 2.3.

Jean Piaget and Jerome Bruner are well known cognitive theorists (Driscoll, 2004; Ormrod, 2004). Piaget suggests that people actively process information, based on their prior knowledge and experience (Ormrod, 2004); an idea still current in educational theory and practice. Bruner advocates the idea of discovery learning and teaching, suggesting that activity facilitated successful learning, rather than the lecture approach in higher education that relied on passive transfer of information (Driscoll, 2004; Ormrod, 2004). Cognitive theories have had a significant influence on learning and teaching, instructional design and have informed constructivist theory. However, Goodyear (2002) suggests that the cognitive psychology model does not take account of the socially situated nature of human thought and action, and the messy improvisations and contingencies of real-world action. He argues that "much of what teachers mean when they talk about 'learning' is still missing from the models of information-processing in cognitive science" (p. 51). Constructivism emerged as a way to reconceptualise learning.

Constructivism

Constructivism is the dominant learning theory in the literature in the last decade (Karagiorgi & Symeou, 2005) and supports the idea of knowledge construction by the learner. This approach suggests that learners actively construct knowledge by building on prior knowledge and experience. The constructivist approach is based on the concepts of active, collaborative and learning centred activities, and the situated construction of knowledge that relates to authentic or practice-based situations (Bonk & Cunningham, 1998; Karagiorgi & Symeou, 2005). Constructivists believe that learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences,

mental structures, and beliefs that are used to interpret objects and events (Good & Brophy, 1990). Merrill (1991) outlines the assumptions of constructivism as follows:

- knowledge is constructed from experience
- learning is a personal interpretation of the world
- learning is an active process in which meaning is developed on the basis of experience
- conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning
- learning should be situated in realistic settings
- testing should be integrated with the task and not a separate activity.

Constructivism has a long history in cognitive psychology, based on the work of theorists such as Piaget and Bruner. They saw discovery learning and knowledge building as being the result of people building their own intellectual structures (Wilson, 1996). There is a range of views across the spectrum of constructivism - individual, social, cognitive and postmodern (Steffe & Gale, 1995). Most educators accept that learning operates as a heuristic or iterative process across the individual to social spectrum. For example, Mayes (2002) brings these strands together in his framework (discussed in section 3.3.2) that presents learning as a (re) conceptualisation cycle. In this cycle learners first make contact with other people's concepts in the process of conceptualisation (individual constructivism), then build understanding through the process of construction and dialogue (social constructivism). Garrison and Archer (2000, p. 11) also suggest that "learning in an education sense involves the complementary activities on individual construction of meaning and social enculturation". Current educational theory and practice values social and collaborative learning, as well as individual construction of knowledge. Mayes (2001) comments that never before has there been so much agreement about the pedagogical fundamentals of teaching and learning. He observes that,

> the shared theoretical assumptions are those of constructivism, and they result from two distinct shifts of emphasis - shift from a representational view of learning to a constructivist or constructionist view where learning is primarily

> developed through activity… The second shift is away from the focus on the individual, towards a new emphasis on social contexts for learning (p. 17).

The influence of constructivism has seen a radical transformation of the expected roles of learners and teachers. The traditional view that learning was a process of structuring and transmitting information from the teacher (expert) to learner (novice), has been replaced by the idea of the learner playing a more central role in constructing their own knowledge, and the teacher having a facilitating role in that learning. Learning is "an active process of constructing rather than acquiring knowledge" (Hung, 2001, p. 28). As we learn, our conceptions of phenomena change, and we see the world differently. The acquisition of information in itself does not bring about such a change, but the way we structure that information and think with it does. Thus, education is about conceptual change, not just the acquisition of information. In this context the role of the learner is pivotal both to the learning process and to the definition of what counts as knowledge (Harrison, Comber, Fisher, Haw, Lewin, Lunzer, McFarlane, Mavers, Scrimshaw, Somekh, & Watling, 2003). Biggs (2003) suggests that constructivist "learning is the result of students' learning-focused activities which are engaged in by students as a result both of their own perceptions and inputs, and of the total teaching context" (p. 20). Teachers support rather than control learning, with the focus on the student learning activities. When designing learning contexts, objectives and desired kinds of understanding are identified, and the kinds of learning and teaching activities required to teach these understandings are created and implemented. Biggs identifies this process as "constructive alignment", where the objectives, activities and assessment are all aligned in such a way as to ensure that students engage in the activities and assessment to achieve learning outcomes (Biggs, 1999; 2003).

The constructivist principles of active learning, participant interaction and the joint construction of knowledge related to authentic contexts provide a theoretical framework for my professional practice. These principles inform the design of many of the online courses at USQ, and are particularly evident in the use of online discussion forums to facilitate interaction (McDonald & Reushle, 2002; Postle et al., 2003).

2.3.2 Social constructivism and the construction of knowledge

Social constructivism is based on the idea of learning as a social rather than individual activity (Lave & Wenger, 1991; Jonassen, 1998). Lev Vygotsky (1896-1934) contributed the idea that human knowledge is socially constructed through the development of "dialectic theory", a social learning perspective that describes how children learn through interaction and dialogue with socialising agents such as family, peers and teachers (Vygotsky, 1978). The idea of guidance by more experienced adults is similar to the apprenticeship model that provided the initial context for Lave and Wenger's early research into communities of practice (Lave & Wenger, 1991). Social constructivism is based on the idea of the learner building on existing knowledge within a context of social and collaborative learning. It recognises the role that society plays in building knowledge through joint construction with other learners. Collaborative constructivism can be traced back to Dewey (1916), who argued that "meaningful and educationally worthwhile knowledge is a process of continuous and collaborative reconstruction of experience" (Garrison & Archer, 2000, p. 11). The emphasis placed on social interaction in a constructivist context, and the opportunities for interaction provided by technology, reflect the growing importance of collaboration and group knowledge construction in online learning and teaching. The application of communication technology has caused a significant shift from the independent learning mode of traditional print-based distance education courses at USQ, to the provision of online discussion groups to foster interaction between course participants. The design of the course in this study provided opportunities for both individual and social construction of knowledge. Learners could individually read and reflect on ideas presented in the course, and opportunities for social construction of ideas were provided in the asynchronous online discussion forums. When searching the literature for research into the learning outcomes from the use of discussion forums, a gap in the literature was identified, and it became evident that this was an area requiring research.

The constructivist approach of the learner individually and/or socially building on existing knowledge raises the question of "what is knowledge". It is difficult to define "knowledge"; however, there is agreement in the literature that it is more than information, and is dependent on human input and interpretation, which led to the

design of the learning activities located within the online forums. The Oxford Dictionary's definition of knowledge is "knowing, familiarity gained by experience, a person's range of information". Buckingham Shum (1999) says that

> Knowledge goes beyond structured data (information) by adding intangible, hard-to-quantify 'value'. When we speak about knowledge we are talking about creativity, timing, judging relevance and reliability, classifying problems and applying lessons learned. Human knowledge is evolving, multifaceted and embedded in social interaction within communities. Meaning and significance are
> context-dependent properties, not fixed attributes. (p. 5)

The idea of knowledge as context dependent is supported by Seimems (2005), who says that knowledge is "information in context (i.e. understanding the significance of information) or information with semantic meaning". He suggests that learning is actuated (or actionable) knowledge, in other words, doing something with the knowledge. The idea of knowledge being created by and embedded in social interaction was explored in the previous discussion of social constructivism. Little, Quintas and Ray (2001) say that "learning is a process of sharing and acquiring knowledge" and that we need to develop our understanding of knowledge itself. They suggest that "this means understanding the dynamic process of knowing, and the processes of knowledge creation, sharing, transformation and application" (p. 10). This study was designed to investigate if the "dynamic process of knowing and the processes of knowledge creation" was present in the online discussion forums. Doheny-Farina (1991, p. 8) notes "the theory of communication as information transfer separates knowledge from communication; treats knowledge as an object that exists independently of the participants". This is a similar concept to the transmission model of education that is sometimes referred to as the "big jug-little jug" idea of education. This approach describes students as little jugs into which the teacher pours water (information) during the semester. At the end of the semester, in the assessment process, the students put the water back into the big jug, leaving no trace behind (Theobald, 1997). More in keeping with the social constructivist model, Riva and Galimberti (1997) suggest that it is possible to communicate only to the extent that participants have some common ground for shared beliefs, recognise

reciprocal expectations and accept rules for interaction that serve as necessary anchors in the development of conversation. Such a context was created in the course in this study where guidelines for participation in discussion groups were presented at the beginning of semester, the teacher modeled the interactive process through postings and feedback, and the software provided a common context for the discussion forums. Interactions took place within the context of the course, thus the participants had a common interest in learning about the subject area, while desired learning outcome, learning activities and assessment were practice-based and constructively aligned (Biggs, 2003).

The discussion forums in the course provided a forum for learners to reflect on the subject matter presented in the course, in order to make explicit their understanding of the information, to share, debate and transform that information into knowledge that could be applied to their professional context. The discussion forums provided the context for learners to express tacit knowledge (knowledge within their heads) as explicit knowledge, which they articulated and documented publicly in their forum postings. Little, Quintas and Ray (2001) argue that "advances in our understanding of communication processes as social phenomena suggest an emphasis on the importance of context" (p. 11). Knowledge is created in specific contexts within particular communities and for particular purposes. This is similar to the idea of "situatedness" (Hung & Chen, 2001) and the fostering of learning within a community of practice (Wenger, 1998), which are discussed in following sections. The discussion forums provided an online context where this knowledge could be discussed within an online learning community. While the literature provides the rationale for the use of online forums to provide a context for the co-construction of knowledge, the nature of this process required further research.

2.3.3 Reflective practice

It has been argued in the literature that one of the key aspects of learning from experience is that of reflection (Boud & Walker, 1998). In his influential work "*The reflective practitioner: how professionals think in action"*, Schön (1991) suggested learning might be understood as making sense of experience through the process of reflection. He suggested a reflective approach should be taken to professional

education, based on the notion that much of the spontaneous behaviour of skilled practice does not stem from a prior intellectual operation but from a reflective practice process called “reflection-in-action”. This is the process of thinking about the action while one is doing it, rather than after the event. The ability to critically reflect on and make judgements on professional activity is an important skill, given the explosion of information and the rapid rate of change in society. It has been suggested (Brookfield, 1987; Boud & Walker, 1998) that critical reflection is the key to learning from experience. The process of guided critical reflection was a core learning strategy in the course in this study, with online technology providing the means for teachers to prompt purposeful learning through structured questions and activities, and for learners to share their reflections with peers. It was considered an appropriate learning and teaching strategy for this postgraduate course, as many participants were practitioners in education, training and/or instructional design fields, and the communication technology provided the vehicle for interaction and shared critical reflection. The purpose of this study was to investigate the contribution to student learning of the asynchronous discussion forums to ascertain if these forums did indeed provide an appropriate teaching strategy to support learning.

Garrison and Archer (2000) suggest that in the context of a knowledge society “the process of learning becomes one of constructing shared meaning and understanding” (p. 6). This assumes the acquisition of facts and information as the building blocks for learning, but relies on critical and constructive thinking to convert this information into knowledge. Sharing this knowledge with others means being able to engage in dialogue to explain personal meaning. Garrison and Archer (2000) suggest that “this process moves learners iteratively between the shared world of experience and the private reflective world of ideas” (p. 6). In this study the reflective forums were designed to enable learners to read information provided about instructional design theory and practice, construct a personal understanding in relation to their own experience, then share these reflections in the public forum. The sharing of ideas in the forum can confirm and validate knowledge, or participants may challenge or extend the personal understandings of others, thus building both individual and group knowledge. Garrison and Archer (2000) suggest that the educational experience should “explicitly focus on the reciprocal and complementary relationship between individual understanding and collective discourse” (p. 10). The

individual and social reflective process was a central design feature in the course in this study, and the research was designed to investigate how this process contributed to student learning.

2.3.4 Interaction as a key learning principle

Fundamental to all learning is the ability to communicate and interact (Picciano, 2001), and it is argued that interaction has long been a defining and critical component of the educational process (Anderson 2003). In education, the traditional Socrates approach is based on interaction between teacher and learner, and this approach forms the basis of the small group tutorial approach that has also been modified for classroom and lecture presentations in large-scale educational settings. Traditionally, the teacher prepares and leads the discourse, while students are able to ask questions and receive feedback to clarify issues. This educational model is embedded in our understanding of education.

Information and communication technologies provide the opportunities for this model of interaction to be applied outside the physical location of a university campus. In fact, the online environment creates opportunities for many types of interactions. Thurmond (2003) describes online interaction below.

> The learner's engagement with the course content, other learners, the instructor, and the technological medium used in the course. True interactions with other learners, the instructor, and the technology results in a reciprocal exchange of information. The exchange of information is intended to enhance knowledge development in the learning environment. Depending on the nature of the course content, the reciprocal exchange may be absent – such as in the case of paper printed content. Ultimately, the goal of interaction is to increase understanding of the course content or mastery of defined goals. (p. 4)

In a review of the literature, Muirhead and Juwah (2004) argue that interactivity is critical to underpinning the learning process in face-to-face, campus-based, and distance and online education. They say that interactions serve a diverse range of

functions in the educational process, which includes learner-to-learner, learner-to-content, learner-to-tutor and learner-to-technology. Thurmond and Wamback (2004) also identified these four types of interactions in a review of almost one hundred research studies on interactions in distance education. These interactions promote and enhance the quality of active, participative learning in an educational environment. Individuals and groups of learners actively build knowledge through individual and social construction of knowledge. The concept of interaction is a core element of the seven principles of good practice in education (Chickering & Gamsom, 1987). These practices include: encouraging faculty/students contact; developing reciprocity and co-operation; engaging in active learning; providing quick feedback; emphasising the amount of time dedicated to a task; communicating high expectations; and respecting diversity.

For online and distance education, the ability to communicate and interact remains fundamental to the learning process; however, alternative methods of face-to-face communication are used, such as text and multimedia content, audio and video conferencing and computer mediated communication (CMC). Data from an Evaluations and Investigation Program (EIP) research project at USQ (Postle et al., 2003) demonstrated that asynchronous communication was the most commonly used form of communication in the surveyed online courses at USQ. Case study research suggests that interactivity is the heart and soul of effective asynchronous learning (Pelz, 2004). Research conducted by the SUNY Learning Network since 1995 has consistently identified quantity and quality of student-student and student-professor interaction as strong positive correlates with student and faculty satisfaction (Pelz, 2004). Laurillard (2002, p. 148) mentions that research

> . . . showed that students valued the discussion environment for the alternative perspectives and explanations they encountered, for the opportunity to learn from others' mistakes and insights, and for the sense of community it offered.

The focus of this study was to extend such research by investigating the contribution to student learning of interaction in asynchronous forums in an online course.

2.3.5 Collaborative learning and online communities of practice

Constructivism and social learning theory inform the design of online collaborative learning environments, and the social interaction supported by communication technology facilitates collaborative learning. Collaborative learning has been defined as "the acquisition by individuals of knowledge, skills or attitudes occurring as the result of group interaction, with individual learning as a result of the group process" (Kaye, 1992, p. 4). Rather than being the central player in the learning process, the learner is part of a collective process of negotiating meaning within that particular context and community of practice (Lave & Wenger, 1991). Brown and Duguid (2000) suggest that the idea of communities and practice has become a main point of reference in online learning. This view is also supported by Jones and Steeples (2002), who say that the term "community of practice" has become widespread and is used to inform a variety of approaches to online learning.

The term "communities of practice" emerged from Lave and Wenger's (1991) study that explored the concept of "situated learning" in the apprenticeship model. In this process, the novice worker acquires knowledge and experience through working with a group of experienced practitioners. Through practice in the community, the novice moves from peripheral to full participation in the group activities. Lave and Wenger (1991) saw the acquisition of knowledge as a social process that was supported by a community of practice. Wenger, McDermott and Snyder (2002) describe communities of practice as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (p. 4). It has been argued that communities of practice play a key role in shaping how information is shaped and interpreted (Buckingham Shum, 1999). Investigation into how this happens is a crucial area for this and other research studies, given the increasing use of communities of practice in online learning. The planned building of a learning community was an important strategy of the pedagogical design that informed the design and implementation of the course, with participants contributing a range of academic and professional knowledge and experience. The course design was based on similar educational concepts as those articulated in Garrison and Archer's (2000) transactional approach to teaching and learning. The approach was built on two

foundational concepts – that a constructivist approach is necessary for learners to create meaning, and that collaboration is essential for creating and confirming knowledge (Garrison & Archer, 2000).

2.3.6 Summary of theories and principles informing online learning in higher education

The discussion in this section has provided an overview of educational theory that informed the design of the learning environment in this study. Constructivism provided a theory that is broad-based and empirically sound. It easily translates into practice, with a focus on the learner constructing knowledge rather than knowledge being imposed or transmitted by direct instruction. This was particularly appropriate for the postgraduate context of this study, as most learners were experienced education and training practitioners. In this study it was assumed that the discipline knowledge presented in the course would enable learners to build on existing experience and actively co-construct knowledge and meaning through dialogue and related learning activities.

When educators design learning environments they draw on their preferred pedagogical approach, based on their perspective on the nature of the learning and teaching. Within the context of educational theory discussed in this study it is possible to identify three broad perspectives, each making fundamentally different assumptions about how learning occurs (JISC, 2004). These are presented in Table 2.1, together with the identifying features and pedagogical approach associated with each perspective. The associative perspective reflects aspects of behavioral and cognitive theory. An individual and social constructive perspective is presented, along with the situated perspective, which emphasises learners developing their identity in a social context. The process of learners building their identity emerges in data analysis and is discussed in Chapter 4.

Table 2.1: *Defining approaches to learning – perspectives, assumptions and pedagogy*

Perspective	***Assumptions***	***Associated pedagogy***
Associative perspective	***Learning as acquiring competence*** Learners acquire knowledge by building associations between different concepts. Learners gain skills by building progressively complex actions from component skills.	• Focus on competencies • Routines of organised activity • Progressive difficulty • Clear goals and feedback • Individualised pathways matched to the individual's prior performance
Constructive perspective (individual focus)	***Learning as achieving understanding*** Learners actively construct new ideas by building and testing hypotheses.	• Interactive environments for knowledge building • Activities that encourage collaboration and shared expression of ideas • Support for reflection, peer review and evaluation
The constructive perspective (social focus)	***Learning as achieving understanding*** Learners actively construct new ideas through collaborative activities and/or through dialogue.	• Interactive environments for knowledge building • Activities that encourage experimentation and discovery of principles • Support for reflection and evaluation
The situative perspective	***Learning as social practice*** Learners develop their identity through participation in specific communities and practices.	• Participation in social practices of inquiry and learning • Support for development of learning skills • Dialogue to facilitate the development of learning relationships

Source: Joint Information Systems Committee, (2004). *Effective Practice with e-Learning*, p. 13.

Educational theory and assumptions about the nature of learning directly influence how educators design and implement learning and teaching environments. The following section will briefly review instructional design theory and practice and its application in the design and implementation of online learning environments.

2.4 Instructional design for online learning

This section provides a brief background to instructional design theory and practice to provide a context for the discussion of the design of the learning and

teaching activities in the course in this study.

2.4.1 Background of instructional design theory and practice

Traditional instructional design (ID) theory informs decisions about what comprises the instructional content and how it is to be sequenced and synthesised, taught and learned. The selection, sequencing, and synthesis of instructional content also take into account the nature of the content or task that is to be taught. ID includes making decisions about the match of selected content with learning and instructional strategies, the delivery system and assessment strategies. A cyclical method of evaluation forms part of the overall process. Smith and Ragan (2005) define the term "instructional design" as "the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation" (p. 2).

Underpinning instructional design (ID) is a broad theoretical stance on learning called associationism (Table 2.1). In this approach, knowledge is an organised accumulation of associations and skill components and learning is the process of connecting the elementary mental or behavioural units, through sequences of activity (McDonald & Mayes, 2005). Associationist theory requires subject matter to be analysed as specific associations, expressed as objectives, and discussed in relation to cognitive science. This kind of analysis was developed by Gagnė (1985) into an elaborate instructional task analysis of discriminations, classifications and response sequences. Learning tasks are arranged in sequences based on their relative complexity, with simpler components as pre-requisites for more complex tasks. Thus, sequences of instruction are designed for students to be able to learn in small and logically-ordered steps. This assumption – that knowledge and skill needs to be taught from the bottom up has long been the subject of controversy (Resnick & Resnick, 1991), but still underpins much ID theory and practice. The basic principle is that competence in advanced and complex tasks is built step by step from simpler units of knowledge or skill, finally adding coordination to the whole structure. Gagnė (1985) argued that successful instruction depends on placing constraints on the amount of new structure that must be added at any one stage.

Based on the associative perspective is a widely used ID methodology for developing education and training programs, the Instructional Systems Design (ISD). The ISD approach is described as the "reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation" (Smith & Ragan, 2005, p. 4). This model uses a linear process, where each step, Analysis, Design, Development, Implementation, and Evaluation (ADDIE), is based on the previous step. From the late 1960s cognitive theory informed ID practice, while more recently, constructivism has increasingly influenced ID theory and practice. Smith and Ragan (2005) note that current ID models are moving away from linear ISD approaches to models that acknowledge the complexity and iterative nature of all activities of design.

Instructional designers and educators may feel that with the emergence of constructivism they have lost the guidelines that provided structure for designing educational courses. Behaviourism and cognitive science provided a prescriptive theory of instruction, with predetermined objectives and outcomes (Jonassen, 1998); and these theories are strongly slanted to reflect a course-based approach to learning (Siemens, 2004). While not as structured as ISD, constructivism is based on a number of learning principles that provide models for designing constructivist learning environments. Jonassen (undated) provides guidelines based on broad constructivist principles, while Mayes (2002) provides a framework for implementing such a model at course or program level. Jonassen (undated) suggests that the constructivist model:

- Is Based on Internal Negotiation
    - a process of articulating mental models, using those models to explain, predict, and infer, and reflecting on their utility (Piaget's accommodation, Norman and Rumelhart's tuning and restructuring.)
- Is Based on Social Negotiation
    - a process of sharing a reality with others using the same or similar processes to those used in internal negotiation
- Is Facilitated by Exploration of Real World Environments and Intervention of New Environments

    - processes that are regulated by each individual's intentions, needs, and/or expectations
- Results in Mental Models and provides Meaningful, Authentic Contexts for Learning and Using the Constructed Knowledge
    - should be supported by case-based problems which have been derived from and situated in the real world with all of its uncertainty and complexity and based on authentic real life practice
- Requires an Understanding of its Own Thinking Process and Problem Solving Methods
    - problems in one context are different from problems in other contexts
- Modeled for Learners by Skilled Performers but Not Necessarily Expert Performers
- Provides an Intellectual Toolkit to Facilitate an Internal Negotiation Necessary for Building Mental Models
- Requires Collaboration Among Learners and With the Teacher
    - the teacher is more of a coach or mentor than a purveyor of knowledge

Source: Jonasson, D.H. (Undated). Thinking technology: Toward a constructivist design model. [On-line]. Available: http://ouray.cudenver.edu/~slsanfor/cnstdm.txt

When the instructional designer is designing learning environments, they will take the abilities of the learners and the learning context into consideration. Not every learning situation will suit a constructivist approach, so the designer will draw on a range of educational perspectives and associated pedagogies (Table 2.1) appropriate to the learning context, and make use of emerging technology tools. This design approach can be facilitated through the application of the Mayes (2002) framework that supports decision making regarding the application of technology to design and development constructivist learning environments. This framework will be explored in more detail in the following section.

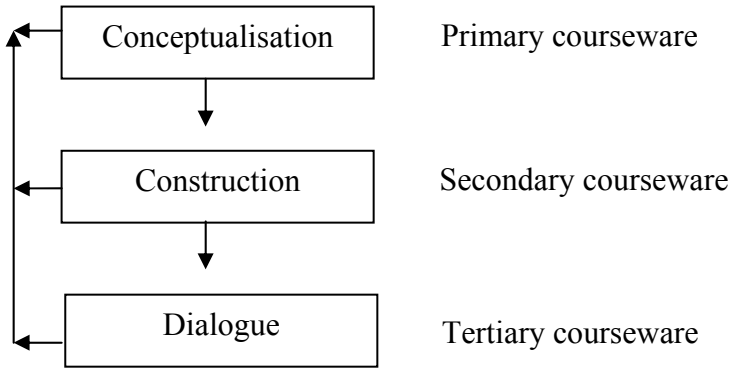
2.4.2 Applying the Mayes learning framework

The Mayes framework (2002) provided a conceptual toot for educators planning

to use technology to support learning and teaching. The internet and communication technology provides an opportunity to create learning environments and authentic experiences where students can explore and co-create knowledge, for example, through the use of online discussion forums. However, while technology gives learners fingertip access to vast stores of information, educators need to design environments that support learners in the task of turning this information into knowledge. Debate about the difference between information and knowledge is evident in the literature (Buckingham Shum 1999; Jonassen 2002) and is a concern for educators. There is a danger that information will be efficiently packaged and delivered by using the latest technology, and the packaged information will be viewed as knowledge. This approach would leave education locked into the transmission mode, with experts (teachers) preparing and delivering information, and the novice learners cast into a role of passive receivers of the information. Technology provides an opportunity for off-campus learners to co-construct knowledge though online communication. However, the availability of technology implies "some additional decisions for the practitioner: from the technologies available for use, which should be used, when and with whom?" (JISC, 2004, p. 11). The Mayes framework (Mayes, 2002) supports educators who are thinking about how to apply technology to support constructivist learning and teaching. In the higher education context, it is useful for designing and implementing programs and courses. The framework asks subject matter experts to put aside their tendency to think in terms of content coverage, and to start by identifying learning outcomes. These are matched with learning and teaching activities – what the students are actually going to do – which are placed at the centre of the design. The feedback learners will receive on their performance of these activities is an integral part of the activities themselves. It is when designing the feedback loop that the key principles of social constructivist thinking must be grasped.

The Mayes framework is made as user-friendly as possible for subject experts by identifying three stages of learning and representing them as a learning cycle. There is quite a long tradition in learning theory of doing this (Fitts & Posner, 1967; Kolb, 1984; Norman & Rumelhart, 1978). Mayes' contribution is to describe these in a way that makes it easy to map these stages of learning on to types of learning technology or courseware, as shown in Figure 2.1.

Figure 2.1: *The (Re)conceptualisation Cycle* (Mayes, 2002)



Source: Mayes, J. T. (2002). Pedagogy, lifelong learning and ICT. *Electronic Journal of Instructional Science and Technology, 5*(1).

• Conceptualisation refers to the user's initial contact with *other peoples' concepts.* This involves an interaction between the learner's pre-existing framework of understanding and a new exposition.
• Construction refers to the process of building and combining concepts through their use in the performance of meaningful tasks. Traditionally these have been tasks such as laboratory work, writing, and preparing presentations. The results of such a process are products such as essays, notes, handouts and laboratory reports.
• Dialogue refers to the testing and tuning of conceptualisations through discussion, argument and reflection. In education, the goal is testing of understanding, often of abstract concepts. This stage is best characterised in education as *dialogue*. The conceptualisations are tested and further developed during conversation with both tutors and fellow learners, and in the reflection on these (Mayes, 2002). It must be appreciated that the social aspects of learning bring into focus the extent to which an individual learner is part of a learning group, and the extent to which that group can be considered as an emerging community of practice. So, as well as feedback from tutors, the designer must think carefully about learned engagement with peers (McDonald & Mayes, 2005).

This approach is embedded in the design of the online discussion activities that are the focus of this study, and warranted in-depth research.

2.5 Conclusion

The significance of this study is that to date few studies have focused on the nature of learning supported by discussion forums within a totally online learning environment. Many studies have drawn on theory and methods used in face-to-face groups, and have often compared online and on-campus contexts. The educational use of online technology needs to be informed by rigorous research into the learning outcomes of the application of technology. A framework, such as Mayes' (2002), provides a synthesis and practical way to apply pedagogical theory to the design and implementation of technology for online learning. In keeping with the grounded theory approach, an in-depth literature review on the nature of interaction in CMC was not conducted until after the data were analysed. Existing research that specifically investigates learning in asynchronous communication will be discussed as part of the findings in Chapter 4. As online learning is an emerging field of research, it calls for a methodology suited to an area where knowledge is growing and which is capable of drawing the interpretations into a beginning theory that is grounded in the data. Although Mason and Kaye (1990) and Harasim (1990) began a theoretical discussion about the suitability of communication technology as a constructivist learning medium; to date no established theory has emerged for online communication as a learning strategy. The application of an open, qualitative methodology, such as grounded theory, is a capable and suitable research approach to generate theory from this study. This study used a grounded theory approach to document and analyse the learning processes present in online interactions. This research approach is presented in Chapter 3, Method.

3 Method

3.1 Introduction

The aim of the research was to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The use of online education is an emerging field of research that calls for theory generation through a qualitative research method such as grounded theory. The grounded theory method is well suited to research in the online context where knowledge and application is still at the exploration stage (Glaser & Strauss, 1967; Hutchinson, 1988; Strauss & Corbin, 1990; 1998). This chapter presents background information about the context, identifies the questions that framed the research, and presents a rationale for selection of grounded theory method. This is followed by a brief description of the grounded theory method and how the method was used to investigate the research questions in this study.

3.2 The research rationale and method

This section outlines the educational context, the learning and teaching issues that framed the research, and the rationale for selecting a grounded theory method to investigate the research questions.

3.2.1 Rationale for the research focus

This research was initiated to investigate the contribution to student learning of asynchronous discussion forums in an online course I had been involved as a teacher and instructional designer since 1998. This focus was justified by the importance placed on the discussion forum as a learning strategy in the course in this study and other online courses at USQ. Data from an Evaluations and Investigation Program

(EIP) research project completed at USQ, (Postle et al., 2003) demonstrated that in all of the online courses surveyed at USQ, asynchronous discussion was the most commonly used form of communication in relation to online forums. The analysis of course statistics (Postle et al., 2003) revealed

> a very high teacher and student communicative engagement, in particular in the case of students, compared with content engagement (accessing study materials) which suggested that a significant percentage of course content was generated through communicative interaction. (p. 2)

The USQ research revealed that 80% of learner interactions were within the communication features, such as on a/synchronous discussion tools (Postle et al., 2003). Online forums are commonly used at USQ and other universities to provide a means of communication and a context for collaborative knowledge building. Research (Postle et al., 2003) and anecdotal evidence gathered from USQ academics indicated that online forums were often added to courses without sound pedagogical design and implementation considerations. This adhoc use led to disillusion regarding the educational value of online forums by both teachers and students. Often an expectation of online interaction was created by the presence of forums, but an initial burst of enthusiastic interaction at the beginning of the course was not sustained, as the educational approach was poorly planned and the forum activity was unrelated to the course design. Despite the identified problem, USQ had a policy that online forums should be a component of every course offered to external students, so research into the contribution to student learning of online forums at USQ was, and still is, imperative.

3.2.2 The research questions

This study commenced with an open question aimed at exploring the contribution to student learning of the learning activities in online forums. This approach is supported by Glaser and Strauss (1967), Strauss and Corbin (1994, 1998), and more recently by Anderson and Kanuka (2003, p. 35), who argue that “the qualitative e-researcher interacts with the research using an in-depth inductive process and an emerging design that is identified during the research process”. Research studies

using grounded theory do not necessarily begin the study with a proposition or hypothesis to guide the study. Instead the approach allows the ideas to emerge from and be "grounded" in the data, with the aim, in this particular study, of generating grounded theory to inform the theory and practice of the use of asynchronous discussion forums in an online postgraduate course. This focus led to the research questions below.

The primary research question:

If asynchronous communication facilitates student learning in an online course, can the defining characteristics of the communication and the respective roles of participants be described and explained?

Secondary research questions:

- What were the characteristics that defined the interaction in asynchronous online discussion forums in this study?
- What were the respective roles of learners and teachers in asynchronous online discussion forums in this study?

3.2.3 Rationale for selection of grounded theory

The study of online education is an emerging field of research (Laurillard, 2006; Zemsky & Massy, 2004), therefore it calls for a method suited to this research context where knowledge and application is still at the exploration stage (Hutchinson, 1988). The research literature was explored and the grounded theory approach chosen as it builds theory grounded in the data, and provides a balance of flexibility within a rigorous process. As defined by Strauss and Corbin (1990, p. 24) "the grounded theory approach is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon". It is a rigorous method of data analysis and theory generation proposed and detailed by Glaser and Strauss (1967) and elaborated by them and their colleagues over succeeding years (Glaser, 1978; Strauss & Corbin, 1994, 1998). Millett (1998) suggests that

> . . . there are a number of reasons for using the grounded theory approach. The constant comparative approach, while giving tedious rigour to the method, provides a continuous process of questioning the emerging theory to the extent that any suggestion of early closure is readily challenged. It has the necessary rigour to develop theory from qualitative data. (p. 67)

Grounded theory has been used extensively across a variety of social science disciplines and is considered to be appropriate when little is known about a topic or there are few existing theories to explain a particular phenomenon (Hutchinson, 1988). It was considered suitable for this study into online discussion forums as it is an emerging research field. Strauss and Corbin (1990, p. 23) suggest that when using a grounded theory approach "one does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge". The application of a qualitative research was supported by Sherman and Webb (1998, p. 5), who also say "the aim of qualitative research is not verification of a pre-determined idea, but the discovery that leads to new insights". The application of an open, qualitative methodology, such as grounded theory, provided a suitable research approach to explore emerging educational practice in the online context of this study.

The findings from this study will contribute to the online literature through the generation of substantive grounded theory about the contribution to student learning of the learning activities in online forums. It will also identify the characteristics that defined the interaction, the respective roles of learners and teachers in the online discussion forums, and indicate areas where further research can extend understanding of findings and issues raised in this research.

3.3 Context, participants and ethical considerations

3.3.1 Context

This study was situated in an online, postgraduate course, FET5601 *Designing Instruction for Flexible Learning*, at an Australian university. It was a core course offered by the Faculty of Education in the online Masters of Education program. The course was offered twice a year and operated over a semester of 14 weeks. The course was a fully online, with no face-to-face component or printed media, and with learners and instructors spread across different countries and time zones. There were no prerequisite subjects, so learners brought a wide range of background knowledge and experience in the instructional design (ID) field to the course. One of the key design features of the course was the use of communication technology on the BlackBoard learning management system, such as asynchronous discussion groups, email, bulletin boards and virtual chats, to facilitate interaction and collaborative learning activities**.** The asynchronous online forums in the course were designed as a key component of the learning experience. The pedagogy of social constructivism, reflective practice and authentic assessment informed the design of the online forums. Garrison (1997, p. 5) argues that such online forums are ideally suited to the higher education context, as "the asynchronous and precise nature of this means of communication is consistent with higher order thinking and cognitive development . . . and in higher education writing is crucial to thinking about complex issues in a meaningful manner".

The course had several different asynchronous forums, for example, an introductory forum; an initial forum where the whole student cohort focused on discussing the role of technology in higher education; several small group reflection forums; and forums to discuss the assessment items and resources forum. As the semester progressed forums were added or archived to reflect to learning process and to maintain manageable download times. The forums that were the focus of this study were a series of reflection forums where the learners reflected on ID theory as presented in the course, and how it related to their own professional context. The design of these reflective forums was based on a constructivist approach to learning

and teaching that emphasised the social co-construction of knowledge through participant dialogue. These forum postings were part of the assessment of the course and provided a framework for the final assessment item, a project that employed ID theory in the design of a learning module related to the students' professional context. All students were required to log on to their designated reflection forum at least once to post an assessment item. Students were encouraged to respond to peer-posted reflections to discuss and explore the theory presented in the course readings; however, this interaction was not a set requirement and was not assessed. The reflection forum postings included both the threaded text transcripts of the group participants and the individual student assessment items. These reflective assessment items were expected to provide a window into the learners' internal discourse as they articulated their reflections on the application of ID theory to their professional context.

For the operation of the reflection forums, the students were allocated by alternate alphabetic order to personal tutor/teachers. Two tutor/teachers had a group of ten students each, while another two each had a group of thirty students. These two groups of thirty students were further divided into groups of ten students, also by alphabetical order. As course leader I regularly monitored the activity of all reflection forums and was the moderator of three groups of ten students. Students participated in the three reflection forums in allocated groups of ten and remained in these groups for the eight weeks of the reflection activity. The rationale for group allocation was emailed to participants, along with their designated group and tutor/teacher. The reason for limiting the group size was both pedagogical and operational. The rationale was explained in a forum posting: *the forums will not be "closed" so you are able, at any time, to drop into another forum and read the postings. The main aim of allocating you to a forum is to reduce the overload of postings in any one forum, and also to establish the sense of "community"*. As indicated, the different forums were open to peers from other groups if they wished to read or respond to postings in other forums.

The reflection forums were designed to provide an environment for collaborative group learning, where learners could actively exchange ideas and construct their knowledge within the context of an online learning community. As part of the course

assessment participants were required to read relevant ID literature, reflect on it in relation to their professional practice, and to post these reflections to the forums. Participants were encouraged to respond to these reflections (although this was not a set requirement) in the belief that this interaction would contribute to the building of their individual and collective knowledge about the theory and practice of ID. The course designers believed that this process and subsequent interaction with other participants would facilitate learning. As a fundamental element of the course design, this belief required further investigation; this research was designed to investigate if asynchronous communication facilitates learning in an online course.

3.3.2 Participants

Participants included the four teachers and seventy-eight learners who agreed to participate in the study. The teachers included two international teachers and two (including myself) who were located at USQ. Student participants who had enrolled in the course, paid fees and been given an access password were the only students logged into the course, thus ensuring that participants were correctly identified by their email address. Both national and international students enrolled in the course, and students came from a range of gender, age and educational and training backgrounds.

3.3.3 Ethical considerations

The participants were informed of the study by personal email and in Week 2 of the semester all participants were sent a consent form to be returned to researcher. This consent form is included as appendix A. Participants were informed of research processes in place to ensure the security and confidentiality of their information. Anderson and Kanuka (2003, p. 89) note that “assuring confidentiality and explaining the techniques to protect the anonymity of participants are important components of obtaining informed consent and building trust”. Participants were also notified that they had the right to withdraw from the study or to contact the researcher or USQ Ethics Committee for clarification of the study. A hard copy and digital copy of all consent forms will be stored confidentially by the researcher for the requisite seven years, as per USQ regulations. If consent was not given, data

relating to those participants was not collected. While the names of the participants could be identified in the raw data, participant names were coded as numbers during the data analysis process, thus protecting participant identity. For example, a particular student became student 1 (S1) in the coding process.

Ethical dilemmas could have arisen out of my dual role as course leader/teacher and researcher, and my role as teacher could have influenced the nature of research data and subsequent findings. As mentioned in Chapter 1, in recognition of this possible bias, strict care was taken to ensure that the course was conducted using a course structure and learning strategies similar to those used in previous course offers. Obviously there was modification to previous offers, as each teaching semester is informed by past evaluations and current cohorts of learners. Therefore, careful consideration was given to maintaining a similar course design and facilitation process, so that it closely mirrored previous course offerings and was not "enhanced" to skew the findings. For example, the assessment items and the use of reflective forums in the semester of study were consistent with assessment items in previous course offers. The grounded theory approach also has strategies to support a researcher stance, as detailed in section 3.6.

3.4 The grounded theory approach

The research question reflected my interest in designing effective online learning strategies to inform my practice and contribute to the wider research into online learning and teaching. I had been involved in the design and teaching of the course over several years, so the research was grounded in my online teaching experience and it was expected that the findings would have an immediate benefit for my role as online educator and instructional designer. Greene (1988) notes that this kind 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 [and] unaffected by the inquirer's vantage point or location in the world" (p. 175). The grounded theory approach enables the researcher to become immersed in the data and focus on findings that are grounded in the data, not relying on preconceived ideas brought to the data that could influence the

interpretation of the data. This is a quite different approach than that advocated in quantitative research where the researcher maintains an "objective" approach.

Another difference from quantitative research is that studies using grounded theory do not necessarily begin with a proposition or hypothesis to guide the study. Instead the approach allows the ideas to emerge from and be "grounded" in the data, through an iterative data analysis process. Strauss and Corbin (1990, p. 23) suggest grounded theory is

> . . . inductively derived from the study of the phenomenon it represents. That is, discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon. Therefore, data collection, analysis, and theory should stand in reciprocal relationship with each other. One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge.

The basic tenet of the grounded theory approach is that theory ought to emerge from the data through an intensive, iterative investigation of a specific context, that is, the theory must be grounded in the data. Hence, the approach claims to be inductive rather than deductive (Strauss & Corbin, 1990). Induction requires the researcher to use a ground-up (from practice to theory) approach and to be open-minded and flexible, so that the theory emerges from the data (Glaser & Strauss, 1967; Strauss & Corbin, 1990; 1998). Bogdan and Biklen (2003, p. 6) also say "the theory is grounded in the data . . . you are not putting together a puzzle whose picture you already know. You are constructing a picture that takes shape as you collect and examine the parts". The iterative, inductive coding process aims to reduce the data through abstracting ideas and seeking to discover conceptual codes and categories that are grounded in the data. Through the iterative grounded theory approach the relationship between the categories is established and interpreted, and the core category identified and saturated. It then becomes the centrepiece of the grounded theory (Punch, 1998).

Grounded theory entails the emergence of theory from the data, but this is not regarded as a series of separate processes. As the iterative analysis process unfolds the findings emerge from the raw data, and data is revisited to cumulatively build the emerging codes and categories. Data collection, analysis and theory formulation are reciprocally related, and the iterative approach incorporates procedures to guide this process. Research questions are open and general rather than formed as specific hypotheses, and the emergent theory should account for a phenomenon, which is relevant and problematic for those involved (Becker, 1993).

The purpose of this study was to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The anticipated contribution of the study was to inform the theory and practice of online educators at USQ. Wenger (1998, p. 9) describes a theory as "not a recipe: it does not tell you just what to do. Rather, it acts as a guide about what to pay attention to, what difficulties to expect, and how to approach problems". The intent of the grounded theory approach is to develop an account of a phenomenon that identified the major constructs or categories, their relationships, and the context and process, thus providing a theory of the phenomenon that is much more than a descriptive account (Becker, 1993).

3.5 The process of building grounded theory

The research process involved four iterative phrases, identifying research issues and context; data collection; data analysis; and literature comparison. Within these four phases a number of procedures for developing theory through analysis of the data were followed. These procedures were informed by the literature (Glaser & Strauss, 1967: Strauss & Corbin, 1990; 1998: Glaser, 1978; 1992; Strauss, 1987; Pandit, 1996; Dick, 2005) and evolved from my adaptation of the grounded theory process to suit the context and findings that emerged as the research proceeded.

Although the phases and processes are presented in a linear list in the table below, many of the data analysis processes happened concurrently or iteratively. The four

phases of the grounded theory approach used in this study, associated procedures and the research activity, along with the rationale are presented in Table 3.1.

Table 3.1: The Process of building grounded theory

Phase	Activity	Rationale
Identifying research issues and context		
Establishing the research ground, focus, design and theoretical sensitivity	Definition of flexible research question	Focuses research effort, while remaining open to emerging issues
	Selection of case	Identify theoretically useful case, uses professional experience
	Knowledge of the literature	Preliminary review to enhance theoretical sensitivity
Data collection phase		
Initial data collection	Hard copy transcripts collected from forum and organised	Demonstrates reliability of data collection procedure and increases construct validity
Data analysis phase		
Microanalysis	Open coding - analysing data into distinct elements, assigning conceptual labels	Develop concepts and categories. All forms of coding enhance internal validity
	Axial coding - categories refined, developed and related	Develop connections between categories and sub-categories
Constant comparison	Compare incidents, integrate categories, begin theory building	Generate theory rich in detail. Establish causal relationships
Memos	Record thoughts and theory development	Tools to capture ideas, abstractions and build theory. Demonstrates reliability
Selective coding and refinement of categories	Identifying core categories	Integrate categories to build theoretical framework.
		All forms of coding enhance internal validity
Theoretical sampling	Further data collection to test emerging theory	Compare categories and establish conceptual boundaries. Confirms, extends, and sharpens theoretical framework
Core categories identified	Continued review of categories, identifying core categories	Review transcript data to reconceptualise - based on emerging findings
Saturation	Sampling until no new theoretical concepts emerge	Process ends when marginal improvement becomes small
Validation	Present codes categories and properties for critical review	Validation of identified codes categories and properties

Literature comparison phase		
Comparison of categories with relevant literature	Review to support or confound emerging theory	Improves construct definitions, and therefore internal validity Also improves external validity by establishing the domain to which the study's findings can be generalised

Adapted from: Pandit, N. R. (1996). *The Qualitative Report*, *2*(4).

The four phases of my study, identifying research issues and context; data collection; data analysis; and literature comparison, align with the phases presented by Pandit (1996). He argued that these phases and processes could be evaluated against four research quality criteria: construct validity, internal validity, external validity and reliability. While these four research quality criteria are present, it is inappropriate to align or measure the grounded theory approach against the quantitative research approach. Goulding (2002) notes that "all too often qualitative research is assessed as being valid according to quasi-positivistic criteria" (p. 43). However, in my doctoral study, which used grounded theory method that may be unfamiliar to examiners, the relationships to familiar research quality criteria are presented. In this study the construct validity was established by the research phases and associated activities presented in Table 3.1, and outlined in the following discussion. Internal validity, which addresses the credibility or "truth value" of the study's findings, was enhanced by establishing causal relationships, whereby certain conditions are shown to lead to other conditions. Internal validity was demonstrated in the detailed description of the grounded theory process in Chapter 4, for example, the iterative analysis of the data, which gives credibility to the findings. In quantitative studies external validity requires establishing clearly the domain to which the study's findings can be generalised. In grounded theory this refers to analytic and not statistical generalisation, and transferring rather than generalising the findings to broader research areas. Finally, reliability requires demonstrating that the operations of a study, such as data collection and analysis procedures – can be repeated with the same results (Pandit, 1996). The description of the research process confirms the dependability of the process. The following section briefly outlines the processes of the grounded theory approach and explains how they were used in this study.

3.5.1 Phase 1 - Identifying research issues and context

Establishing the research ground, focus, design and theoretical sensitivity

This research aimed to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course I have been involved in both as a teacher and instructional designer since 1998. My professional role provided a focus for my research, thus establishing the research ground, while my professional experience and knowledge of the online education literature created theoretical sensitivity (Strauss & Corbin, 1990; 1998). This sensitivity informed the selection of a theoretically useful research focus for this study, investigating the contribution to student learning of asynchronous discussion forums in an online USQ course.

In the grounded theory approach theoretical sensitivity is described as the ability to respond to the subtle nuances of, and cues to, meaning in the data (Strauss & Corbin, 1998). Strauss and Corbin (1998) say "sensitivity means having insight into, and being able to give meaning to, the events and happenings in the data. It means being able to see beneath the obvious to discover the new" (p. 47). A distinction should be made between the identification of sensitising concepts based on professional knowledge, which can help sharpen data collection, and the use of concepts from the literature to impose an existing framework on the data (Schreiber, 2001). The theoretical sensitivity of the researcher is essential to conceptualise and formulate a theory as it emerges from the data. The researcher must have a temperamental bent for the research being undertaken; a theoretical insight into the area of research, and the ability to make something of the insights (Glaser & Strauss, 1967). As previously mentioned, this kind of research cannot be carried out by people who see themselves as detached, neutral observers, apparently unaffected by their role in the study (Greene, 1988). The researcher must not only observe the participant activity; they must also observe self-behaviour and so make visible their own preconceptions, values and beliefs (Hutchinson, 1988). While acknowledging that I used personal experience and empathic insight for the data selection and analysis, every effort was made to maintain a critical, self-reflective stance toward findings that emerged from the data. Consequently, the codes, memos, and categories

were grounded in the findings from the data, not influenced by categories identified in other research studies, and these categories were subsequently tested on other data sets.

In this study theoretical sensitivity was achieved by a number of contributing factors. I had taught online courses for a number of years and had also been involved in the instructional design of several online courses. I had also researched and kept up to date with literature in online learning and maintained a scholarly dialogue with other online educators at USQ. In grounded theory an initial review of relevant literature is used to identify general themes in the research area and sensitise the researcher to ideas that may emerge from the study. The standard doctoral study approach of conducting a full review of the literature is not commonly used in grounded theory. Grounded theory is often used in emergent studies so the researcher may not know which literature will later become relevant; therefore, literature is treated as data and accessed as it becomes relevant (Dick, 2005).

As a practicing instructional designer and online teacher, I had maintained a strong interest in designing online courses that effectively enhanced learning. The research questions emerged from these intertwined interests. These questions guided the design of the study and focused the initial data collection. Thus, my knowledge and practical experience of online learning and teaching sensitised me to possible meanings emerging from the data. Strauss and Corbin (1998, p. 47) note that "insights do not just occur haphazardly; they happen to prepared minds during interplay with the data. Knowledge, coupled with objectivity, does prepare an analyst to understand". In this study insights that emerged from the data were informed by my professional experience; however, care was taken to ensure that explanations already existing in the literature were not forced on the data.

3.5.2 Phase 2 - Data collection

The data for this study was collected from the participant discourse in the online forums. Reuven, Erlich, Ravid and Aviva (2003) suggest that use of text-based online discussion forums offer new possibilities for research that were not available in traditional learning models. The belief that the online education environment

offers opportunities for research is supported by Anderson and Kanuka (2003) who say that the internet is

> a researchers' dream come true, as the data collection is often integral and automatically gathered during online activity. Verbal discourse and a transcript of this interaction is routinely captured and stored on the Net as text files. The Net is capable of collecting valuable data that provides a unique window into human activity. (p. 7)

The data was collected from the three asynchronous reflection forum groups in FET5601, semester 1, 2002, and assembled as a hard copy file of the transcript. The three reflection forums were incremental assessment activities and provided a foundation for completion of the final assessment item, an instructional design project based on professional context. The number of postings ranged from approximately 50 to 60 for each forum group – depending on the activity of the participants. Postings in the discussion forum ranged from approximately five words to a full screen of text; and although the length of the assessment item was set at a 450-word limit, some posts were more than 1000 words. The personal reflection (assessment item) was usually posted to the forum as a file attachment.

The initial data was collected from the first of three asynchronous reflection forums, as it included a representative cross-section of participants; that is, male and female, national and international students of varying ages, and students from a range of professional backgrounds and experience. The data consisted of 63 postings, with 27 teacher postings and 36 student posts. The postings included the forum discourse between the teacher and students, between students, as well as the students' assessment reflections on the ID literature and its application in their professional context. This first forum provided the data that was used to generate the initial codes and categories. Subsequently, transcripts from the forum groups from each of the four teacher groups were collected for selective coding and theoretical sampling.

The selection of the reflection forums as the research focus was guided by the fact that these forums were a core learning and teaching component and part of the assessment of the course. All participants were required to post their reflection to the

forum, which ensured that the data was available from all students, not just those students who chose to actively participate in the online discussion.

3.5.3 Phase 3 - Data Analysis

The data analysis phase consisted of eight activities, many occurring concurrently, or iteratively, with validation the final confirmation of the findings from the analysis process. The activities were included:

- Microanalysis – open and axial coding
- Constant comparison
- Memos
- Selective coding and refinement of categories
- Theoretical sampling
- Identify the core category
- Saturation
- Validation.

Strauss and Corbin (1990, p. 57) said that these types of coding "represent the operations by which data are broken down, conceptualised, and put back together in a new way. It is the central process by which theories are built from data". Initial categories emerge from this coding process and form the basis of preliminary theory building. These activities form part of the iterative, grounded theory process.

At the proposal stage of the study, consideration was given to whether the forum discourse data would be analysed by hand or by using qualitative data analysis software such as N-VIVO. In keeping with the grounded theory approach, where findings emerge from the original data source, I decided to code by hand. It was considered that the hand coding process would enable me to view the data situated in its original context, thus allowing greater visualisation of the data and ease of movement between the original forum postings. While N-VIVO software would have created data that could be more easily manipulated, Buckingham Shum (1999) said that attempts to make tacit knowledge (as presented in the examples of individual

discourse) explicit would encounter a number of unpredictable risks. He suggested (1999, p. 15) that "the analytical process of studying complex behaviour provided the researcher with the vocabulary they needed to discuss it, but this symbolic representation was qualitatively different from the tacit, embodied skills being described". For example, the categories developed to structure the "messy" discourse information into accessible data, such as data in N-VIVO, may lead the researcher to "systematically filtering out critical, tacit, situated knowledge, simply because it is hard to systematise and formalise" (Buckingham Shum, 1999. p. 16). Given this caution, using the grounded theory approach, which allows the data to be studied intensively in its original context, should provide an approach that identifies findings that are a "true" representation of nature and function of the discourse.

The coding was done directly on to a hard copy of the forum postings. Different coloured highlighter pens were used to indicate phrases in the data that lead to the creation of the initial codes. These codes and memos relating to codes were documented on the hard copy of the data. I found this approach preferable to using data analysis software, as the physical integrity of the data was maintained, and codes, categories and memos were noted (grounded) with the original data.

Microanalysis – open and axial coding

Microanalysis involves open coding, or breaking open the data, to identify substantive codes and axial coding that refines and develops codes as theoretical codes and relates them to the main substantive codes (Strauss & Corbin, 1990; 1998). Open coding is the process of analysing the data into distinct elements, so that the researcher can identify, compare, conceptualise and categorise elements. The procedure entails using words that describe what happened in the field of study. Raw data are analysed, initially using line-by-line coding, to explore the data (Charmaz, 2000; Corbin, 1986). As the researcher becomes more familiar with the data and the concepts and categories being identified, coding can be done by sentence and, at times, by paragraph, in accordance with Strauss and Corbin (1990; 1998). If a new concept or category is identified, the researcher reverts to line-by-line coding, which, if done during the initial period of data collection, forces the researcher to

concentrate on the data and avoid undue influence by preconceived beliefs about the field of enquiry (Charmaz, 2000). Glaser (1992) said

> Open coding is the initial step of theoretical analysis that pertains to the initial discovery of categories and their properties. The mandate of open coding is that the analyst starts with conceptual nothing – no concepts. Open coding comes to an end when it yields a core category. This initial categorizing of incidents through the constant comparison method is the first basic analytical step into the data. During open coding the data are broken down into incident, to be closely examined and compared for similarities and differences, while constantly asking of the data the neutral question 'what category or property of a category does this incident indicate?' This question and open coding are the basic grounding approaches to the data and lead to emergent discoveries. (p. 39)

During the process of open coding a number of similar codes emerge and these are grouped into categories. Interactions that were found to be conceptually similar in nature or related in meaning are grouped under more abstract concepts termed 'categories' (Strauss & Corbin, 1998). Millett (1998) indicated that an important aspect of coding was that it fractures the data, thus freeing the researcher from description and forcing interpretation to higher levels of abstraction.

Axial coding is the process where categories are refined, developed and related. Strauss and Corbin (1990; 1998) introduced the technique of axial coding to provide a more detailed outline of the coding process. In this technique, the data are put back together in a different way, through categorising the data and making links between a category and its subcategories. The process requires inductive and deductive thinking, asking questions, and proposing and making comparisons with the data. Overall, a more concentrated and abstract approach takes place than in open coding (McCann & Clark, 2003). During axial coding the researcher develops higher level categories.

In the microanalysis analysis of the online forum discourse I identified units of meaning within phrases, sentences or paragraphs, and annotated a hard copy of the

forum postings. These units of meaning were selections of text that contained a discrete thought. I highlighted words and phrases that indicated discrete thoughts, coded each of these interactions and memoed initial thoughts relating to the codes. The initial open codes were very descriptive, often using the actual language of the participants to create the codes. Through the axial coding process, categories were identified using the codes that exhibited similar conceptual characteristics, for example several teacher related codes demonstrated similar conceptual relationships that led to the creation of a teacher specific category.

Constant comparison

Kerlin (1997) suggested that the constant comparative method was central to the data analysis in generating grounded theory. In this process, codes generated by the data are compared to identify similarities and differences among and within categories until the basic properties of a category or construct are defined. Hutchinson (1988, p. 135) said that "comparative analysis forces the researcher to 'tease out' the emerging category by searching for its structure, temporality, cause, context, dimensions, consequences and its relationship to other categories". Concepts have proven theoretical relevance when they are consistently present or consistently absent during the process of constant comparison. When these concepts are found to be of sufficient importance, they are given the status of "categories". A category is a classification of concepts, arising through a process of constant comparative analysis, grouping or clustering concepts together in a higher order, more abstract concept (Strauss & Corbin, 1990; 1998). In this way the process of constant comparison is intended to generate a theory rich in detail.

During the coding process I used the constant comparative method, as outlined by Glaser & Strauss (1967), to compare the codes and categories that emerged from the transcripts posted by different course participants. These codes and categories were refined, developed and related through iterative, open and axial coding, and constant comparison.

Writing memos

The writing of memos by the researcher is an important part of the grounded theory. It involves the researcher documenting thoughts as they emerge from the data analysis. The memos provide a permanent record of the emerging ideas that the researcher can access at any stage of the analysis process. Strauss and Corbin (1998, p. 110) define memos as "the researcher's record of analysis, thoughts, interpretation, questions, and directions for further data collection". Throughout the data analysis process the researcher makes notes to record thought processes relating to the finding emerging from the data, and development of theory. These memos are essential tools for capturing the idea; and for abstraction and theory development, which continues throughout the research (Charmaz, 2000; Glaser, 1978). McCann and Clark (2003) suggested that memos

> reflect the researcher's internal dialogue with the data at a point in time. Memoing is both inductive and deductive. It is inductive during the process of conceptualising the data, and deductive when the researcher assesses how the conceptual labels, categories and subcategories link together (Hutchinson, 1993). Memo writing provides the researcher with a way of analysing and questioning taken for granted aspects of the research process and preconceptions about the data. (p. 15)

Strauss and Corbin (1998) said there were several forms of memos, code memos, theoretical notes and operational notes. Code memos relate to the first reading of the data and contain the notes from the three types of coding – open, axial and selective. Theoretical notes contain the researcher's thoughts about emerging theory, theoretical sampling, emerging theory and other issues. Dick (2005) suggested that when using grounded theory method one assumed that the theory was concealed in the data for them to discover. While coding makes visible some of its components, memoing adds the relationships which link the categories to each other. Memos can also be used as operational notes with directions and reminders relating to the research process.

Although memoing is shown as happening after microanalysis and constant comparison in Table 3.1, it is part of the iterative grounded theory process and began as soon as I started coding. I used memos to document my thoughts on the hard copy of the raw data, and memoing continued throughout the analysis process. These memos provided a permanent record of the emerging ideas and the development of theory as it related to the codes and categories.

Selective coding and refinement of categories

Selective coding is described by Strauss and Corbin (1998, p. 236) as "the final step in analysis – the integration of concepts around a core category and the filling in of categories in need of further development and refinement". The process of selective coding aims to identify a core or central category, and attempts to establish links between this core category and other categories (Charmaz, 1990). Selective coding, like constant comparative analysis, is a cyclical process, moving from open to axial and then selective coding and, at times, simultaneously coding at several levels, to validate the relationships among concepts and fill in any categories that need further refinement. The main processes at this stage are theoretical coding and memo writing (McCann & Clark, 2003). Selective coding identifies the core category that ties all other categories in the theory together (Punch, 1998).

As part of the iterative grounded theory process, selective coding was used to compare the codes, categories and constructs that emerged from the initial data analysis with data from other groups of participants in order to further refine the categories.

Theoretical sampling

Strauss and Corbin (1990, p. 176) defined theoretical sampling as "sampling on the basis of concepts that have proven theoretical relevance to the evolving theory". Strauss and Corbin (1998, p. 202) said that the aim of theoretical sampling was "to maximize opportunities to compare events, incidents, or happenings to determine how a category varies in terms of its properties and dimensions". They suggested that comparisons needed to be made systematically on each category, ensuring that each

is fully developed and saturated. Theoretical sampling and constant comparison reflect cyclical processes, which are fluid and flexible, but at the same time they ensure that the analysis is planned (rather than haphazard), and well grounded in the data. Through this process a core variable is identified which explains most of the variation in the data.

Once the core category and its linked sub-categories began to emerge from the data in this study, I sampled a range of discussion forums to check for the presence of categories and concepts that emerged from the data analysis, and that had relevance to the emerging theory.

Identify the core category

The aim of grounded theory is to derive a core category that explains the phenomenon under investigation (Glaser, 1997; Glaser & Strauss, 1967). The core category begins to emerge only after methodical coding and analysis of the data, constant comparison and meticulous analytical thinking. The core category represents the main theme of the research as it has evolved from the iterative research process and represents an overarching explanation of the findings that are grounded in the data. Strauss and Corbin (1998, p. 146) note that "the central category consists of all the products of analysis condensed into a few words that seem to explain what this research is all about". Strauss and Corbin (1998) identify six criteria for choosing a central or core category:

1. It must be central, that is, all other major categories can be related to it.
2. It must appear frequently in the data
3. The explanation that evolves by relating the categories is logical and consistent. There is no forcing of data.
4. The name or phrase used to describe the central category should be sufficiently abstract that it can be used to do research in other substantive areas, leading to the development of the more general theory.
5. As the concept is refined analytically through integration with other concepts, the theory grows in-depth and explanatory power.

6. The concept is able to explain the variation as well as the main points made by the data. One also should be able to explain contradictory or alternative cases in terms of that central data. (p. 147)

The core category should represent the unifying concept that emerges from the data that is able to integrate and explain the relationship between the other categories that emerge. Once the core category has been identified, the researcher concentrates on modification of categories and integration of the theory with the categories and subcategories through the iterative coding and analysis. The core category or theory that is derived should contain two main characteristics: it should be dense but parsimonious (comprehensive without being unwieldy), conceptualising the links between open, axial and selective coding; and it should help to explain variations in the categories (Hutchinson, 1993). Strauss and Corbin (1998, p. 161) suggest that "the process of integration of the overarching category with the other categories is similar to axial coding, but requires a more abstract level of thinking, and is facilitated by explicating the story line". By relating this core variable to the various levels of codes already identified, the critical factors emerge and provide the basis for writing about the theory. In this study a core category emerged during the iterative coding and analysis of the data. The iterative process of selective coding was used to validate the relationships among concepts, codes and categories that emerged from the open and axial coding. At this stage of the analysis "interaction as a facilitator of learning" was shaping up as the core category that linked and explained the relationship between the codes and categories that had emerged from the data

Saturation

A category is considered saturated when data analysis and sampling yield no new or significant information to further develop a category, or its relationship with other categories. Glaser (1992) wrote;

> We look for patterns so that a pattern of many similar incidents can be given a conceptual name as a category, and dissimilar incidents can be given a name as a property of a category, and the compared incidents can be seen as

> interchangeable indices for the same concept. And when we get many interchangeable incidents we get saturation. That is, it is unnecessary to keep collecting more incidents which keep indicating the same pattern and no new properties of it. (p. 40)

Saturation is essential to ensure that the theory is conceptually complete (Punch, 1998). Once theoretical saturation is reached then the marginal value of accessing new data is minimal and a decision can be made to conclude data collection and coding.

In this study the data analysis focused only on the data collected in the online discussion forums, as selective coding and theoretical sampling of the online forums indicated that the core and supporting categories were saturated. Therefore no further data – such as subsequent participant interviews – were collected. Although this modification meant that the mythology did not follow the usual grounded theory approach of collecting further data through interviewing or surveying participants (Glaser & Strauss, 1967; Strauss & Corbin, 1990; 1998), it was considered appropriate for this professional doctoral study. Grounded theory is an evolving methodology, and with saturation of core and supporting categories achieved, I felt comfortable in modifying the approach as appropriate for this study, rather than slavishly following a particular approach expounded in the research literature. This adaptation is supported by Strauss & Corbin (1998):

> this is not a recipe book to be applied to research in a step-by-step fashion. Our intent is to provide a set of useful tools for analyzing qualitative data. We hope that through our examples, readers will come to realize the fluid and flexible approach to data analysis provided by this method. (p. xi)

Validation

The presentation of the codes and categories for external evaluation is a departure from the usual grounded theory method. However, as this was a doctoral study, validation of these categories and their supporting codes was sought from my principal supervisor and another doctoral candidate researching online learning, who

acted as a critical colleague. After discussion and analysis of the categories and the justification for their selection, it was suggested that I review the "teacher related" categories, as they indicated findings inconsistent with their online teaching experience. I returned to the original data to review the codes and categories and conducted another data analysis, informed by critical questions raised during the validation process. The review of the raw data led to some modification of subcategories, and confirmation of the validity of others. In a second validation session the modified categories were presented and confirmed as valid. I was then asked to prepare a table presenting categories, subcategories and examples from the raw data. This table (Table 4.4) was presented and accepted, and validation was completed.

3.5.4 Phase 4 - Literature comparison

In grounded theory an initial review of relevant literature is used to identify general themes in the research area and sensitise the researcher to ideas that may emerge from the study. This was previously discussed in relation to building theoretical sensitivity in phase one. The traditional research approach of an in-depth literature review before commencing the research is not employed in the grounded theory method. McCann and Clark (2003) suggest that

> . . . there is considerable confusion about the role of literature in grounded theory research. A preliminary review of the literature is undertaken prior to data collection and analysis to justify the need for the study, develop sensitising concepts and provide a background to the study. This avoids tainting the concepts and hypotheses that will emerge from the data. (p. 15)

Grounded theory is often used in emergent studies. The researcher may not know which literature will later become relevant, so literature is treated as data and accessed as it becomes relevant (Dick, 2005).

Literature is accessed after identification of the codes and categories to review the related literature that may support or confound the research findings. Reading related publications can also enhance the researcher's sensitivity to phenomena in their own

data. Comparisons can be made between concepts from the research and findings presented in the literature. The researcher is not only looking for confirmation of findings, but also for discrepancies that stimulate the researcher to question their own findings. Strauss and Corbin (1998, p. 51) suggested "that literature can be used as a secondary source of data . . . and quotations can be used for a researcher's own purposes". They also suggested that "bringing the literature into the writing not only demonstrates scholarliness but also allows for extending, validating and refining knowledge in the field" (p. 52). The research activity of this phase improves construct definitions, and therefore internal validity. It also improves external validity by establishing the domain to which the study's findings can be generalised. Validity and reliability of the findings of this study can be verified by their relationship (or not) to identified findings in the literature.

In this study, and in keeping with the grounded theory approach, a detailed review of the literature was not conducted until the data analysis was finalised and the core categories revealed, although the researcher already had knowledge of the literature as a practitioner and scholar in online education. Once the core and supporting categories were identified, they were compared to the findings in the literature. Research conducted over a number of years by The Canadian Institute of Distance Education Research (CIDER) was identified as having a significant relationship to the findings of my study, and this relationship is explained in detail in Chapter 4.

3.6 Reflection on the grounded theory approach

Grounded theory is a rigorous method of data analysis and theory generation proposed and detailed by Glaser and Strauss (1967), and elaborated by them and their colleagues in succeeding years (Glaser, 1978, 1998; Strauss & Corbin, 1990; 1998; Pandit, 1996; Bogdan & Biklen, 2003; Dick, 2005). If carried out methodically, grounded theory meets the criteria for "good" research (Strauss and Corbin, 1990, p. 27). Strauss and Corbin (1990) specify those criteria as significance; theory-observation compatibility; generalisability; reproducibility; precision; rigour; and verification. Implicit within rigorous grounded theory is that analysis will progress past the descriptive stage, and theory will be generated.

Grounded theory methodology has been built up and refined over many years (Glaser, 1978, 1992; Glaser & Strauss, 1967; Strauss, 1987; Strauss & Corbin, 1990, 1998; Pandit, 1996; Bogan & Biklen, 2003; Dick, 2005) and provides a comprehensive and rigorous research method. The strengths of grounded theory include allowing the researcher to:

- develop theory, and not merely to describe phenomena
- identify and isolate categories, or variables
- identify and explain core categories
- derive and explain a core social process which in turn explains the processes at work in the situation under investigation.

Other discussion of the strengths and weaknesses of grounded theory relate mainly to the issues of validity and reliability. It must be noted, however, that the criteria by which objectivist, positivist, quantitative research is evaluated are not necessarily appropriate for evaluating qualitative research, although these criteria are often applied to qualitative research such as grounded theory research (Strauss & Corbin, 1990; 1998). Stern (1995, p. 9) argues that "the strongest case for the use of grounded theory is in investigations of relatively uncharted water, or to gain a fresh perspective in a familiar situation", which is the case in this research into online, asynchronous discussion forums.

3.7 Summary

This chapter identified the research questions that triggered the study and presented a rationale for the selection of grounded theory as an appropriate method to answer those research questions. An overview of the context, participant details and ethical considerations was presented. A description of the grounded theory method and the approach taken by the researcher was provided. This approach will be elaborated in the next chapter, which details the data analysis process and presents the findings that emerged from the analysis of the data.

4 Findings

4.1 Introduction

This chapter presents the findings of the study and my interpretations of those findings in relation to the primary research question: "If asynchronous communication facilitates student learning in an online course, can the defining characteristics of the communication and the respective roles of participants be described and explained?" Data were also analysed to investigate the secondary research questions:

- What were the characteristics that defined the interaction in asynchronous online discussion forums in this study?
- What were the respective roles of learners and teachers in asynchronous online discussion forums in this study?

The following section outlines the grounded theory method and how the codes and categories emerged from iterations of the process.

4.2 Grounded theory data analysis: emerging codes and categories

The data analysis was an iterative process, incorporating the eight grounded theory processes outlined in Chapter 3. The processes were: microanalysis (open and axial coding); constant comparison; memoing; selective coding and refinement of categories; theoretical sampling; identifying the core category; saturation of the categories; and validation. The first analysis of the data was at a descriptive level, using the language of the participants to create the open codes. Subsequent analytic iterations were at increasingly abstract conceptual levels, generating memos, conceptual code, and categories.

4.2.1 Microanalysis: open and axial coding

Microanalysis of the data from the first reflection forum involved the identification of units of meaning within phrases, sentences, or paragraphs, which were then noted on a hard copy of the forum postings. These units of meaning were selections of text that contained a discrete thought, such as *"I am at a university and involved in teaching and management issues"* or "*looking forward learning from this group"* or "*I've started reading and am finding it useful to revise those forgotten theories".* Words and phrases that indicated discrete thoughts were highlighted, interactions were coded and each of these was memoed with my initial thoughts relating to the codes.

The initial codes were descriptive, often using the language of the participants to create a code. For example the posting "*I had technical problems when I posted my message to you on Friday"* was coded as "technical problems" and the category "technical" was created. An example of using a more general descriptive approach, rather than the language of the participants, was for the posting *"I am at a university and involved in teaching and management issues"* which was coded as "establishing professional background" and included in the "social presence" category as the post illustrated the sharing of professional background and building of a personal identity. A posting such as "*looking forward learning from this group"* was coded as "planned sharing" and "*here are some comments – and would appreciate any comments from others"* was coded as "asking other learners for input". These statements demonstrated efforts by participants to establish contact and interaction with other course participants, so a category titled "learning community" was created. The code of "conversational conventions" was used to code greetings such as "*Hi Jacquie"* and signing off at the end of a posting, and this became the category of "conversational conventions". Another posting "*Well, I'm here now . . . starting to get it together"* was coded as "indicate progress", which was included in the category of "procedural". Participants used the forum to verbalise their thought processes using statements such as "*I've started reading and am finding it useful to revise those forgotten theories",* which was coded as "personal thought processes".

Participants raised and/or responded to a number of questions about instructional design theory and practice. Some comments included: *"I'm struggling with how to relate this [constructivism] to learning in the area of financial markets and economics . . . any ideas to help me"*, and a section of the response included: "*I've tried to come up with an explanation to your question about constructivism. As you probably know, constructivists argue that meaning is always constructed by and unique to the individual and all understanding is negotiated . . . in other words . . .".* The initial comments were coded as "contextual shortcomings, plus ID application" and "request for information". The responding comments were coded as "negotiation of meaning" and "articulates guiding ID principle". These codes were included in the category "knowledge generation".

While teacher participation was recorded in the above categories, there were some more specific "teacher focused" interactions that generated several unique teacher-related categories. The categories created were "assessment guidelines", "teacher guidelines" and "teacher feedback on reflections". Examples of the codes that led to the "teacher specific" categories included:

1. *"Learners have asked for a more structured marking framework, so this rubric provides a guideline"* was coded as "comments on usefulness of rubric" and put into the category of "assessment guidelines".
2. "*As people post I suggest you return to the Introductory forum and check the introductions of the member of our group"* was coded as "suggested study strategy" and put into a category of "teacher guidelines".
3. *"You have successfully demonstrated the relationship between theory presented in the literature and your chosen project"* was coded as "positive feedback on reflection" and put into the category of "teacher feedback on reflections".

As the coding of different forum postings progressed, I found similar codes emerging from the postings of various participants. Through constant comparison of codes (Glaser & Strauss, 1967; Strauss & Corbin, 1998) I identified common denominators and grouped similar codes into clusters of related items, as explained in the following section. Consideration of the substance of these related codes led to the creation of a number of categories to reflect the concepts that emerged from each

cluster of open codes. As the codes emerged from the data, there was no need to establish a category for data that did not fit, for example, a category such as "other" that is used in research where the categories are established prior to data collection and analysis.

This first analysis of the data provided 127 codes and 12 categories. The categories were:

1. procedural
2. procedural teacher
3. conversation conventions
4. social presence
5. learning community
6. study rationale
7. teacher guidelines
8. teacher feedback on reflection
9. assessment guidelines
10. personal thought processes
11. technical
12. knowledge generation

Details of these categories and codes are shown in Appendix B. The postings to the shared forums and the assessment reflections were reviewed and the frequency of the codes in each of the categories is shown in Table 4.1. The postings listed in the table include the postings to the shared forum, and the student assessment postings, which are listed in the column titled "code frequency in assessment reflection".

Table 4.1: *Initial categories and frequency of codes from shared forum and assessment items*

Categories	**Code frequency in shared forum**	**Code frequency in assessment reflection**	**Total**
Procedural	25		25
Procedural teacher	32		32
Conversational conventions	29		29
Social presence	15	10	25
Learning community	30	2	32

Study rationale	3		3
Teacher guidelines	19		19
Teacher feedback on reflections	65		65
Assessment guidelines	42		42
Personal thought processes	53	17	70
Technical	17		17
Knowledge generation	57	232	239
Total	**387**	**261**	**648**

The frequency of postings for all categories was collated and is shown in the pie graph below.

Figure 4.1: *Frequency of postings in each of the initial categories*

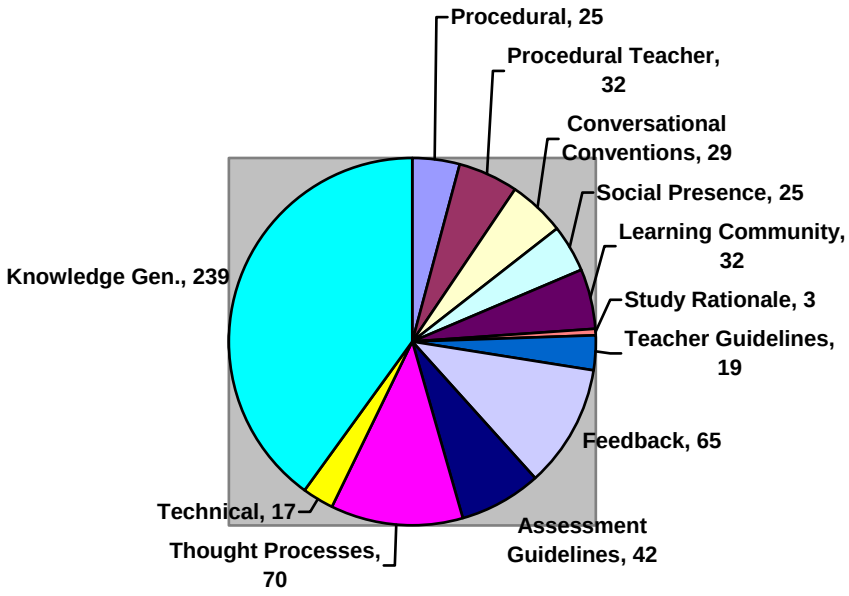


Figure 4.1 and Table 4.1 show that a relatively high number (239) of the initial postings were related to knowledge generation. Personal thought processes (70) and teacher feedback on reflections (65) were the other most significant contributions.

After personal reflection on the data and memos, further analysis of the data was conducted using axial coding where categories were refined, developed, and related. Strauss and Corbin (1990; 1998) introduced the technique of axial coding to provide a more detailed outline of the coding process. Axial and open coding are not sequential acts, but proceeded naturally together to add density and explanatory power to a theory by further categorising the data and making links between a category and its subcategories. The axial coding process assists the ability to "see" with analytic depth what information is located in the data (Strauss & Corbin, 1990).

4.2.2 Constant comparison

The constant comparative method is central to the data analysis in generating grounded theory (Kerlin, 1997). During the process of open and axial coding I used the constant comparative method to compare transcripts posted by different course participants. Using the iterative grounded theory approach, a second review of the data using open and axial analysis and constant comparison was conducted, and overlapping codes and categories were rationalised. This review of the data also identified the need for another category: "teacher guidelines: facilitating learning community".

Intensive review and comparison of the existing codes and categories through microanalysis and reflection on the memos resulted in the four existing categories of "learning community", "social presence" and "personal thought processes" being combined into one category "learning community", since they represented efforts by participants to build a learning community. The resulting teacher and learning community categories, subcategories, and examples of the discourse that generated the categories are presented below.

Table 4:2: *The teacher and learning community categories, subcategories and examples of discourse*

Categories	***Subcategories***	***Examples of discourse***
Teaching role: structuring learning	Course design	Refer to your study schedule, you will find in week two we are looking at front-end analysis
		The aim of allocating you to a forum is to reduce the overload of postings and establish the sense of community
	Study strategies	Now you are reflecting on… you can use this to evaluate and consider
	Effective use of forum	Use forum to post thoughts on literature, not just final reflection
		Consistently posting to the same forum will build on shared experience
	Solving technical problems	I do all my responses in Word then paste to the forum, so I don't lose text
Teaching role: facilitating a learning community	Building community	Anyone out there? As people post I suggest you return to the introductory forum and check the introductions of the members of our group
	Encouraging, confirming contribution	Sounds fine to me, although don't lose your constructive ideas. Your discussion demonstrates a constructive approach well suited to …
	Maintaining dialogue	I was referring to the… Hopefully others will log in tonight and add their reflections to the forum
	Reflecting on interaction	I wonder how other academics will deal with your action of …
		I'm interested to hear how your approach of…transfers to your context
Teaching role: promoting cognitive learning	Confirming learner approach	Yes, deal with x and related analysis first. If you read x you will have a picture of organic whole
		You have successfully demonstrated the relationship between…
	Providing knowledge	Re training for online moderators, are you familiar with…? I'll post some information to Resources forum
		x makes a similar comment when he says that… (reference provided)

	Focus questions	How do you plan to deliver…? How was front-end analysis used to…? Are you a mind mapper?
Building a learning community	Promoting group cohesion	Looking forward to learning with this group
		Well I'm here now… starting to get it together
		Does any of this language make sense to anyone?
		I can really relate to your posting, I have similar thoughts myself
		I look forward to sharing your respective contributions
		Nice meeting you
		Here are some comments, and would appreciate any comments from others
		I am sure that many things will emerge from the other participants in this course
	Projection of self	I have already discovered that I am an organic thinker

A review of codes in the knowledge generation category indicated a need to further refine the category. The iterative steps of grounded theory identified five subcategories that reflected the conceptual levels of discourse in the open codes. The subcategories and examples of the discourse that generated them are listed in Table 4.3.

Table 4.3: *Generation knowledge: subcategories and examples of discourse*

Category	**Subcategories**	**Examples**
Generating knowledge	Sharing knowledge, stating opinion, application of literature	I've found this article on learning theories and ID. You might find it interesting as it talks about…
		The online forum environment also allows more choice
		Learners need a lot more information before constructing anything new
		The ID process makes a lot of logical sense

	to me, but my experience has shown…
	Thus, I not only agree but can vouch for Wilson et al.'s conclusion that…
Challenging ideas and ID theory, dissonance, internal debate	In my opinion, current online live interactive sessions are not appropriate methods to…
Conceptual exploring of ideas, negotiation of meaning	I'm still struggling with how to relate this (constructivism) to learning in core subject I was immediately faced with a doubt, how effective ISD is to all situations… now read a few reflections and papers, trying to think through my understanding
	Anyone got any thoughts on ISD in different situations? I've come up with an explanation to your question about constructivism… I think this is what you mean by… The important question here is, I think…
	However, it seems to me that there are some subjects where this will be easier than other
	The first question to ask is… I could try a combination of these methods. At this point I am undecided
	I would also be most interested to hear an explanation of your term "organic thinker"
	Bates suggests there is… I agree with this. We have to move towards different models of instructional programs
Modification of ID strategies based on new knowledge	As we are coming to realize that flexible delivery is a survival model… we will have to move towards different models of instructional programs
	It had never occurred to me that instructions is not always the answer to a performance problem
	Some of my decision making on what to omit was based on… So the concept of critically has supported my decision making and I must admit I feel pleased about that . . .
Consensus and application of new ID knowledge	I agree with this, and would extend would extend his argument and suggest that…

4.2.3 Memos

Although memoing is listed after microanalysis and constant comparison, it was part of the iterative grounded theory process and commenced at the start of data analysis. As I began coding, I started documenting my thoughts as they emerged on the hard copy of the raw data, and memoing continued throughout the analysis process. The memos provided a permanent record of evolving ideas and reflections on the relationships between categories and the emerging of theoretical explanations for the codes and categories.

4.2.4 Selective coding and refinement of categories

Once the categories of teacher, learning community, and knowledge generation had been established I began selective coding to identify a core or central category and establish links between the core category and other identified categories. Selective coding was an iterative process that built on open and axial coding and then involved selective coding. Selective coding was used to compare the codes, categories and constructs that emerged from the analysis of the selected forum one with data from other first forums, in order to further refine the categories. This process validated the relationships among concepts and was used to refine all categories. At this stage of the iterative data analysis "interaction as a facilitator of learning" was emerging as the common theme or core category that linked and explained the relationship between the codes and categories that had emerged from the data. It was the one underlying category that emerged from each of the descriptive categories. Once "interaction as a facilitator of learning" was identified as the core category, I concentrated on the refinement of supporting categories through further iterative coding and theoretical sampling.

4.2.5 Theoretical sampling

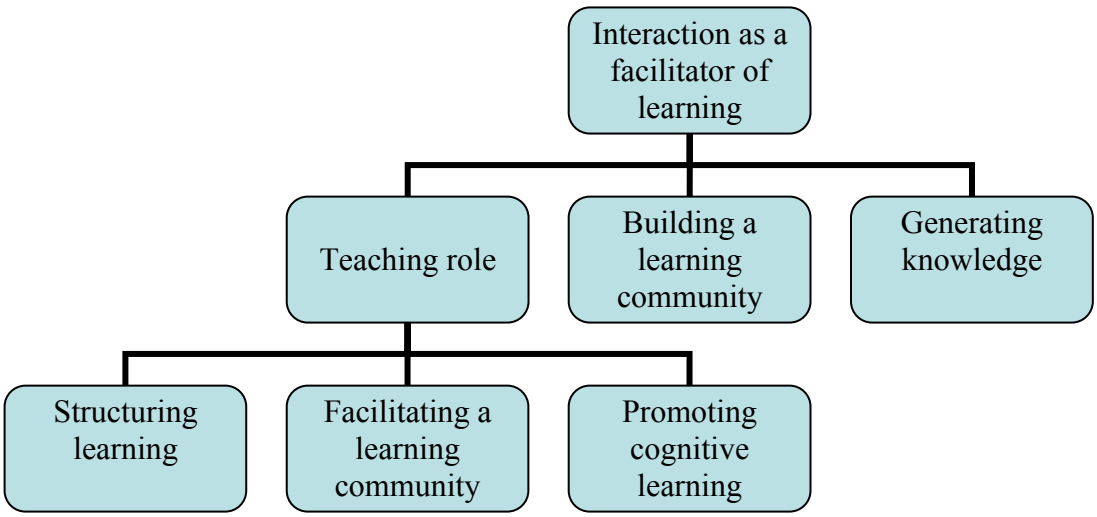
Once the core category and its supporting categories emerged from the data, I sampled the data from a representative range of eight reflective forums. Data were sampled from a week 3 (first reflective forum 1) and week 9 (third reflective forum) forum of each of the teacher/tutors. Theoretical sampling enabled me to check for the

presence of any new concepts and to compare and confirm the comprehensiveness of each existing subcategory. The selective coding and theoretical sampling of a range of forums indicated that the core and supporting categories were saturated. Through this process the core and supporting categories were confirmed as representative of the findings emerging from the data.

4.2.6 The core category and supporting categories

From the analysis of data the core category: "interaction as a facilitator of learning" and three supporting categories emerged. The supporting categories were "teaching role", "building a learning community" and "generating knowledge". The supporting category "teaching role" had three subcategories: structuring learning, facilitating learning community, and promoting cognitive learning.

Figure 4.2: *The core category and supporting categories*



4.2.7 Saturation of the categories

The initial codes and categories emerged from an in-depth analysis of the data from one participant group in the first forum. Through selective coding and theoretical sampling a representative sample of data from eight different forum groups was then analysed until the data produced no new information. Through this process I concluded that the initial source of data (the discussion forums) provided

sufficient information for this study as the codes and categories were saturated, with no new insights emerging. Therefore no further data – such as subsequent participant interviews – were collected. Once theoretical saturation was reached then the value of accessing new data was minimal and a decision was made to conclude data collection and coding.

4.2.8 Validation of codes and categories

Validation of the core and supporting categories was sought through their presentation to two informed colleagues: my principal doctoral supervisor and another academic researcher familiar with the study. After intense discussion of the analysis process and the resulting codes and categories, a review of the teaching role subcategories was implemented. The data were revisited and, informed by critical questions raised during the validation process, further analysis clarified the nature of the codes and categories that had emerged from the original data. The review of the raw data led to some modification of subcategories, and confirmation of the validity of others. In a second validation session the modified categories were presented and the validity of the five supporting categories and 18 subcategories was confirmed. These supporting categories and subcategories are presented in Table 4.4.

Table 4.4: *Supporting categories and subcategories*

Supporting categories	Subcategories
Teaching role: structuring learning	• Explaining course design • Outlining study strategy • Explaining effective use of forum • Solving technical problems
Teaching role: facilitating a learning community	• Building community • Encouraging, confirming contribution • Maintaining dialogue • Reflecting on interaction • Confirming learner approach
Teaching role: promoting cognitive learning	• Providing knowledge • Asking focus questions
Building a learning community	• Promoting group cohesion - sharing information, maintaining cohesion, reaching out, confirming (interactions/ideas) • Projection of self – cognitively, socially and emotionally

Generating knowledge	• Sharing knowledge, stating opinion, application of literature • Challenging ideas and ID theory, dissonance, internal debate • Conceptual exploring of ideas, negotiation of meaning • Modification of ID strategies based on new knowledge • Consensus and application of new ID knowledge

4.3 Comparison of categories with relevant literature

In the grounded theory approach a detailed review of the relevant literature usually follows the data analysis phase of the research design, and literature is considered another form of data (Strauss & Corbin, 1998). A review of the literature revealed the categories that emerged from my grounded theory approach confirmed and extended the findings of research conducted over a number of years by The Canadian Institute of Distance Education Research (CIDER) the research arm of the Centre for Distance Education at Athabasca University, a Canadian Open University. The CIDER research into critical inquiry into a text-based environment (Garrison et al., 2002) suggests there are three elements essential to an educational transaction: cognitive presence, social presence, and teaching presence. Their research also presented indicators (key words/phases) for each of these elements. It was clear that the indicators and categories generated in my research through the iterative coding process were similar, although not the same, as several of the categories identified in the CIDER research. For example, in the literature the element titled "social presence" (Garrison et al., 2002, p. 3) contained the categories of "emotional expression", "open communication" and "group cohesion". In my study the "learning community" category had three subcategories: sharing; promoting group cohesion; and projection of self - cognitively, socially, and emotionally. As far as the author is aware the last subcategory is unique to this study as it emerged from the course design that called for public postings of the self-reflection process as part of the assessment.

Other research into learning processes in CMC discussion forums were reviewed, including Henri's evaluation model (1992), the Interaction Analysis Model (IAM)

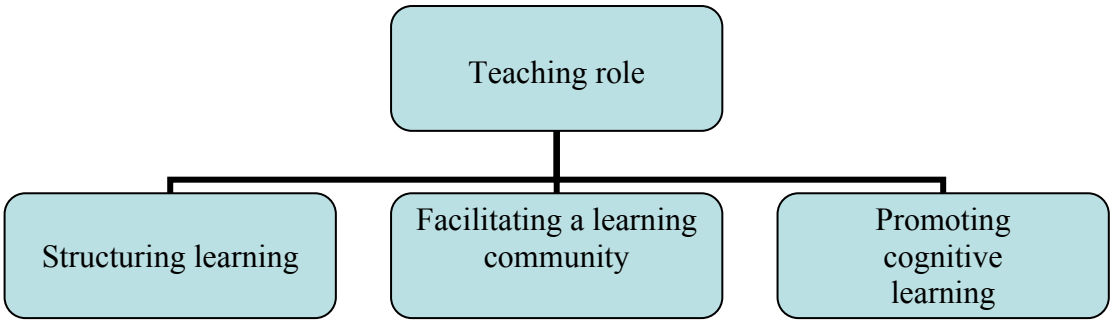
(Gunawardena, Lowe and Anderson, 1997) and Newman, Web and Cochrane's (1996) critical thinking model. These models were not as comprehensive as the CIDER findings as they were focused on researching the processes of critical thinking and knowledge co-construction. The relationship of these models to my findings will be investigated in the Generating Knowledge discussion, section 4.6.

The following discussion uses the grounded theory constant comparison approach to compare existing literature to the findings that emerged from the study. The following sections will discuss the core category, "interaction as a facilitator of learning", and each of the supporting categories and subcategories that emerged from the grounded theory analysis of the data. The discussion will begin with the teaching role, which emerged as central to the building and operation of an online learning community.

4.4 Findings and interpretations: the teaching role

In this study the data revealed that the teaching role was complex and could be defined in relation to three major activities - structuring learning, facilitating learning community and promoting cognitive learning - as illustrated in Figure 4.3.

Figure 4.3: *The teaching role*



The data revealed the importance of the teaching role, and this finding was supported by the literature, which suggests that the role the teacher plays in facilitating learning is a crucial aspect of the educational process in online contexts (Anderson et al., 2001; Cashion & Palmieri, 2002; Garrison & Archer, 2000;

McDonald & Reushle, 2002). To facilitate the effective operation of the forum, the teacher exhibited a range of teaching practices and expertise, as illustrated in the supporting categories and subcategories that emerged from the data and are documented in Table 4.2 "*The teacher and learning community categories, subcategories and examples"*. The literature that suggests the idea of the teacher as "guide on the side" (Airasian & Walsh, 1997; Jones, 2006) could indicate to some educators that the teacher no longer has a central role in students' learning activities, and should step back from a proactive teaching role. However, this was not the approach undertaken in the course in this study and the data indicated that the teacher played an active role in creating an effective learning environment. Each of the three subcategories of the teaching role: structuring learning; facilitating learning community; and promoting cognitive learning; are closely aligned. They were also intertwined with the two themes generated by all the participants: "building a learning community" and "generating knowledge". This created an interactive synergy between the learning and teaching activities and was an important finding of this study. One of the most important findings of this study was that the teaching role was critical in building and sustaining the learning environment where interaction facilitated learning – the core category. For example, both teacher and learners exhibited postings that were clearly aimed at building a learning community, with the teacher posting a comment such as "*hopefully others will log on tonight"*, and "*I'm interested to hear…"*, while students posted comments such as *"looking forward to learning with this group"* and "*I can really relate to your posting"*.

Sections 4.4.1 discusses the three subcategories that emerged from analysis of the data relating to the teaching role: - structuring learning; facilitating learning community; and promoting cognitive learning (Table 4.2); and represent the essence of the teaching. The discussion will begin with the teaching role of structuring learning.

4.4.1 The teaching role - structuring learning

In this section the teacher's role is articulated in the supporting category "structuring learning", which encapsulates the range of design and administrative roles that the teacher undertakes in the operation of the discussion forum. It includes

the subcategories of explaining course design; outlining study strategy; explaining effective use of forums; and solving technical problems (Table 4.2), which will now be discussed.

Explaining course design

This subcategory is defined by the activities of the teacher as she used the forum to explain the design of the learning experiences. This was an important component of the teaching role, as many participants were not experienced online learners. The teacher provided a conceptual framework of instructional design (ID) theory and practice through the use of a concept map, and structured topics based on the concept map. The course was designed to move from the big picture to a detailed study of parts of the framework, as suggested by Reigulth's elaboration theory (Reigulth, 1999). As students studied the course they were required to build their own understanding of ID theory and practice and apply that knowledge in the design of an ID project for their own context. As part of the role of structuring learning, the teacher notified students about the weekly study schedule that outlined the organisation of the learning and assessment activities of the course:

> The study schedule is the key document linking you, the learner, with the study materials and process. It sets out the timeline during which you are expected to read and reflect on the module materials and participate in various forms of activities, reading and assessment.

The expected timeline of participation in the discussion forums was noted on the study schedule to assist participants in the organisation of their study time and the scheduled completion of the learning tasks. For example, a specific forum would run for two weeks, learners were then directed to move on to the next discussion topic. As the reflection forums were designed to encourage the learners to share their reflections on instructional design strategies, it was desirable for participants to keep pace with the tasks so they were working on the tasks at the same time. The teacher also used the forums to bring the learners' attention to weekly learning tasks and how these tasks fitted into the "big picture" design of the course, by directing learners

back to the course graphic organiser (concept map) and the weekly study schedule. A typical example of a teaching comment is provided below.

> If you refer to your study schedule, you will find that in weeks 2 to 4 we are looking at the front-end analysis stage of instructional design… as you will have no doubt seen via the graphic organiser we have provided, located under the Introduction button - Course Content Overview.

Learners were also directed to the resources provided in the course and other sources of information related to the discussion topic. The reflection activities formed part of the preparation for the final instructional design project, the major assessment item for the course. The design of the final assessment project was based on the principles of authentic assessment and the alignment of learning to the participant's professional role. The explanation of the course design encouraged the participants to use the forums to discuss ideas generated from their professional practice, the course or the literature.

This subcategory, "explaining course design" is similar to "instructional management", one of the three categories Garrison et al. (2000) cited as an indicator of teaching presence. They used the term instructional management, saying it "addresses structural concerns such as setting curriculum, designing methods and assessment, establishing time parameters, and utilizing the medium" (Garrison et al., 2000, p. 24). As their categories were identified from a review of the literature and their own exploratory research, they are different from, but show some relationship to, the categories of this study that emerged from a grounded theory analysis. Their category of "utilizing the medium" is similar to the "outlining of a study strategy" category below, which was identified as different from the "explaining of course design" category, as it is more focused on identifying how a student would approach the learning task than on course design and management.

Outlining a study strategy

This subcategory is defined by the activities of the teacher, as she introduced the learners to instructional design principles and processes, directed them to relevant literature and web resources, and outlined the tasks designed to actively engage students in learning. The use of reflective forums to facilitate the sharing and building of knowledge about instructional design was a key design strategy in the course. One of the teaching tasks in structuring an effective learning environment was to alert students to the rationale for the use of the discussion forums. An example of a comment in this regard was:

> *You will be able to communicate with your instructor and student peers within a communication environment through the discussion board threads and electronic mail (follow these links for more information). This will give you the opportunity to seek, share and critically reflect on your individual and shared understanding of the issues presented in the literature.*

In these forums learners reflected on this information in relation to the issues raised in the course, their own experience and how these issues informed their professional practice. They posted these reflections to the discussion forums and other course participants were invited to read and respond to the postings. The reflective process was a core learning strategy in the course design, and the posting of the reflection to the forums was an assessment requirement. To explain the function and learning outcomes of the reflection forum the teacher posted a detailed description of the assessment task. The posting included information explaining the course design and outlining the reflective assessment items.

> *If you refer to the Assessment section of this course, you will note that you are required to contribute to 'reflection forums' on a regular basis (a total of three reflections worth 10% each = 30% of the total marks). Your responses to these are based on an examination of the literature and, if at all possible, your ability to draw upon a critical experience/episode from your workplace.*

The sharing of personal reflections and the collaborative building of knowledge in the reflection forum was central to the course design. Consequently, in the design of the course, the teacher included several strategies to ensure that learners had a clear understanding of the process of interacting in an online forum as reflective practitioners. These strategies included an initial discussion of the process of reflective practice and reference to the reflective practitioner literature (Andrusyszn & Davie, 1995; Schon, 1991) and a detailed explanation of the role of the reflection forum in the course design.

In order to promote effective participation in the reflective forums, learners had already been required to participate in an introductory forum and an educational "implementing technology issues" forum. These activities provided learners with experience and confidence in using online forums as a means of exchanging ideas. The introductory forum supported the creation of social presence by participants providing some personal and professional background. This will be discussed further in section 4.4.2 - facilitating a learning community.

Explaining effective use of the forums

This subcategory is defined by the activities of the teacher as she used the forum to explain the rationale and strategies for the effective use of the online forum as a learning tool. The teacher provided netiquette information and guidelines for the suggested length of the reflection. Learners were advised to try to keep within a 450-word limit per posting as past experience demonstrated that succinct postings encouraged others to read and respond.

Another teaching strategy used to ensure effective interaction though the use of the forum was to divide the class of 94 students into groups of ten and allocate each group to a teacher/tutor. Each of the two experienced teachers worked with three groups of ten. The allocation of ten students to a teaching group is based on practical experience of the teacher time required to support highly interactive discussion, and findings in the literature (McDonald & Reushle, 2002; Postle et al., 2003; Salmon, 2002). The rationale for the use of smaller groups was posted in a course announcement and further explained in the forum. Although students and tutors were

allocated to specific groups for the reflection activities, to reduce the number of postings to be read and create a sense of close-knit learning community, these groups were not closed. Students usually posted to their designated forum, although there were instances where the teacher needed to direct students to their personal discussion group, and other participants also took responsibility for this teaching role.

Solving technical problems

This subcategory is defined by the activities of the teacher, as she used the forum to solve technical problems. There were some instances in the discussion forum when technical issues needed to be resolved, such as attached files that could not be opened and messages being lost**.** Another problem the teacher responded to was when a student had typed a long response to a question, previewed and corrected the posting then had the whole post deleted when going back to post into the forum. The teacher commented that "*I do all my responses in Word (also checks my spelling) then paste to the forum, so I don't lose text"*. Other problems such as double postings and problems accessing the web browser were also technical issues addressed by the teacher. Students responded with comments such as *"computers can be frustrating! Thanks for your efforts"***.** Students also responded to technical questions, with one student solving access issues with the comment *"I managed to save the doc by adding a .doc suffix and choosing Word Document as the format. Then I could open the doc in my saved folder"***.** However, by the time the reflection forums commenced several weeks into the semester, most technical issues had been resolved or were dealt with in the especially established "technical forum," which was monitored by the commercial platform providers.

This section has discussed and provided examples of the role of the teacher in structuring learning. We will now turn to the teaching role of facilitating a learning community.

4.4.2 Teaching role - facilitating a learning community

The teaching role of facilitating a learning community is defined as the extent to which the actions of the teacher contributed to the building of a learning community. The data showed that this role supported building and sustaining participant interaction and engagement in the learning tasks. The online environment of the course offered opportunities for interactive, student-centred learning, which may have challenged pre-existing understandings of teacher and student roles. When implementing the course, the teacher played a proactive role in facilitating the building of the learning community, which also complemented the role of structuring the learning activities, as outlined in the previous discussion.

In this section the teaching role is articulated in the supporting category "facilitating a learning community". It includes the subcategories of building community; encouraging and confirming learner contributions; maintaining dialogue; and reflecting on learner interaction (Table 4.2). The subcategories and examples of facilitating a learning community are discussed in the following section, beginning with a discussion of building community.

Building community

This subcategory is defined by the activities of the teacher, as she used the forum to build a learning community. The course participants came from a variety of educational, professional and cultural backgrounds, so the teaching role of facilitating a learning community was challenging. It required the teacher to establish an environment where participants felt confident that they could contribute to the learning experience. The welcome announcement, which was on the first screen the students opened at the start of the semester, addressed many of the concerns students may have felt about studying online.

> For many of you this will be your first course of study at university, and it could also be the first time you have studied the subject of instructional design, or studied online. Further, it might also have been some time since you last undertook study, or you might have no previous experience of study

> by distance learning. For some of you it could be all of the above. We realise that you all bring different backgrounds and experiences to your study. Study by distance learning need not leave you isolated: discussion groups form an integral part of this subject. In addition, we have spent some considerable time and effort in designing offerings of this material to cater for the diverse needs of our students. We hope you find this course challenging and rewarding.

At the beginning of semester the teacher employed several strategies to facilitate the building of the learning community that were not captured in the forum data, but will be briefly outlined here as they provide examples of the subcategory "building community". Selective coding and theoretical sampling identified these strategies. They also provide a context for the discussion of the teaching role in facilitating the building of the learning community.

A strong teaching presence in this course was established in the opening screen of the course homepage by providing photos of the course leader and tutors, an audio and text-based introduction to the course leader and the course, and links to background information about the teaching staff. An introductory discussion forum was opened before the start of semester to enable participants to introduce themselves to other people in the course and become familiar with the design of the course. The introductory forum operated intensively for several weeks and participants were invited to introduce themselves to the group, share some of their personal and professional background and give a brief outline of what they wanted to achieve from their participation in the course.

This forum enabled participants "get to know" each other and created an environment where participants were able to tune into each other's personal and professional context. The teacher initiated the process of community building by introducing herself in a "model" introductory posting, welcoming students to the introductory forum and responding promptly to each posting. At the end of the first week an announcement prompted non-participants to introduce themselves in the introductory forum.

> Quite a few of you have successfully logged in to the forum discussion and posted a first or subsequent message. Welcome aboard to you all. The group is waiting to hear from the "non posters" so please take a few minutes to log on and send a brief message to let us know you are online.

The online environment of the course offered opportunities for interactive, learner-based pedagogy, which challenged traditional teacher and student roles**.** Also, many students were undertaking online learning for the first time and articulated feelings of anxiety about the use of the technology and the expectations of their role as online learners.

The teacher opened the forum by providing guidelines for posting to the forum, and modelled the process by submitting the initial posting and inviting others to respond and share their information. Participants did make use of this forum to share personal and professional context and learning aspirations, thus building a public identity and establishing a social presence. The idea of social presence, the ability to project your identity both socially and emotionally as a real person (Garrison et al., 2000), has been explored in the literature, and feedback from students indicated that they found this an important aspect of their satisfaction with the course.

The analysis of the forum data showed that the teacher postings helped to establish an interactive discussion environment by modelling social presence and making it a priority to respond to each introductory posting within a short time frame. The high level of teacher participation at the start of the semester was a deliberate strategy aimed at establishing a welcoming, collegiate environment, where participants felt capable and confident to articulate and debate ID theory and practice. Immediate feedback to initial student postings was considered an important strategy to encourage participation and to create a sense of social presence and engagement. The teaching role in establishing this environment is an important design principle that will be explored further in Chapter 5.

As noted in the previous discussion of the teaching role of structuring learning, students were divided into groups of ten and allocated to different teacher groups. The rationale for small groups was that sustained participation in a small group

would build an effective learning community, which would facilitate collaborative, rather than teacher-led, learning. The data showed that another strategy the teacher used to facilitate the learning community was to direct participants back to the introductory forum to check on the background of their group members.

Encouraging and confirming contribution

This subcategory is defined by the activities of the teacher, as she used the forum to consistently encourage and confirm participants' contributions, with a balance of social and cognitive comments. To ensure that participants felt confident to contribute to the discussion, the teacher encouraged engagement with comments such as "s*ounds fine to me, although don't lose your constructive ideas"*. From a cognitive focus, the teacher confirmed the ideas presented in student postings with comments such as *"your discussion demonstrates a constructive approach that is well suited to your context"*. The teacher had to maintain a delicate balance between encouraging and confirming participants by regularly responding to student postings and not dominating the discussion to the point where other participants awaited the teacher's response, rather than initiating their own response to the posting. Rourke et al. (2004, p. 14) suggests that "the importance of reinforcement to collaboration is supported by sociological theory… and is the object that fuels the development and maintenance of interpersonal interaction".

Maintaining dialogue

This subcategory is defined by the activities of the teacher, as she used the forum to persistently read and respond to postings in order to encourage and maintain dialogue to facilitate a learning community. Consequently, the interactions that generated this subcategory were focused on creating a climate of learning discourse, rather than maintaining general social interactions.

At the start of the reflection forums some participants were hesitant about initiating discussion. The data revealed that the teacher demonstrated a strong and positive social presence by prompting students to join the discussion with comments such as *"hopefully others will log in tonight and add their reflections to the forum"*.

The teacher also facilitated the exchange of dialogue by linking the postings of different participants with comments such as "*I was referring to the…"* thereby directing attention to previous posts and facilitating dialogue in the learning community.

Reflecting on interaction

This subcategory is defined by the activities of the teacher, as she used the forum to comment on student postings to facilitate a learning community. Comments such *as "I wonder how other academics will deal with your action of…" and "I'm interested to hear how your approach of… transfers to your context"* articulated the internal thinking processes of the teacher's response. The teacher's public articulation of internal reflections provided a model for the students' reflective process. The comments were designed to trigger both private reflective thought and public explanation of these thought processes from the posting student. As the comments were on the public forum, the teacher's comments were also designed to draw other participants into the discussion by extending or questioning identified issues.

The data revealed that through interaction the teacher played a proactive role in facilitating the building of the learning community, as well as structuring the learning activities, as outlined in section 4.4.1. The teaching role in this category included the social aspects of facilitating a learning community, and consequently overlapped with the social and cognitive "building of a learning community" theme that included all course participants. The data showed that the teacher's comments included in this category had more social focus than comments designed to promote cognitive learning. This will be discussed in the following section.

4.4.3 Teaching role - promoting cognitive learning

The third supporting category in the teaching role is "promoting cognitive learning". This category is defined by the activities of the teacher where she draws on her subject matter expertise to focus and facilitate the building of ID expertise by sustained dialogue with the students. Promoting cognitive learning is linked to the

previously discussed "designing and administrating" and "social themes", as the teaching role exhibited in these activities was directly related to creating the learning context to promote learning. The supporting category "promoting cognitive learning", subcategories and examples of the discourse were presented in Table 4.2. This category is closely related to the "cognitive presence" element identified by Garrison et al. (2000), and the relationship between my categories and this element will be outlined in the following discussion. The subcategories confirming learner approach, providing knowledge and focus questions are discussed in the following section.

Confirming learner approach

This subcategory is defined by the activities of the teacher, as she used the forum to provide confirmation of the learner' approach to exploring the ID issues raised in the course. The teacher was able to draw on her experience as an instructional designer and educator to confirm the students' learning approach with a comment such as *"yes, deal with x and related analysis first"*. The teacher's subject matter expertise meant she was able to confirm the students' understanding of ID concepts, diagnose knowledge gaps and provide timely guidance for further study, with suggestions such as "*if you read x you will have a picture of organic whole"*. Effective and timely feedback to students on assessment items, such as, *"you have successfully demonstrated the relationship between…"* allowed both the teacher and student to monitor and confirm the student's learning.

Garrison et al. (2000, p. 16) cited two studies that support the idea that the teacher's role of facilitating a learning community both increases student activity (Tagg & Dickinson, 1995) and supported higher-order thinking (Fabro & Garrison, 1998). Fabro and Garrison (1998) found that the presence of a teacher who models critical discourse and constructively critiques contributions is crucial to the facilitation of higher-order learning outcomes.

This subcategory is similar to "*building understanding*", one of the three categories Garrison et al. (2000, p. 25) cited as an indicator of teaching presence. They said that "building understanding" was concerned with the academic integrity

of a collaborative community of learners. It was a process of creating an effective group consciousness for the purpose of sharing meaning, identifying areas of agreement and disagreement, and generally seeking to reach consensus and understanding.

Providing knowledge

This subcategory is defined by the activities of the teacher, as she used the forum to provide an initial conceptual framework for learners to build their own discipline knowledge and, as the course progressed, draw on resources that related to and extended the issues raised by fellow students. The teacher's subject matter expertise meant that she was able to provide resources and draw on personal experience that targeted and extended the particular interests of students. Examples of the teacher providing such knowledge included comments such as *"re training for online moderators, are you familiar with… ? I'll post some information to resources forum"*. The teacher also provided references that extended the knowledge presented by students with comments such as "*x makes a similar comment when he says that…"* with the reference provided to allow the student to explore the ideas further. The need for the teacher to be knowledgeable in the discipline area was demonstrated by the context-specific comments that extended the student's knowledge in ID theory and practice.

Focus questions

This subcategory is defined by the activities of the teacher, as she used questions to focus students on key areas of ID knowledge, and its application in practice. In this study the teacher used questions such as *"how do you plan to deliver…", and "how was front-end analysis used to…"* to encourage students to move beyond the presentation of information about ID and focus on the higher level skills of analysis and application in context. Other focus questions, such as *"are you a mind mapper"*, encouraged students to clarify their learning strategies, which provided models of different approaches to learning for other students. The data showed that the teacher used the questions to extend and/or focus the discussion to ensure that the discourse

was directed towards the course learning objectives, while providing scope for individual learning goals.

This subcategory is similar to "direct instruction," one of the three categories Garrison et al. (2000, p. 25) cited as an indicator of teaching presence. They said that direct instruction "includes those indicators that assess the discourse and the efficacy of the educational processes". They also suggested that "through active intervention, the teacher draws in less active participants, acknowledges individual contributions, reinforces appropriate contributions, focuses discussion, and generally facilitates an educational transaction".

4.4.4 Teaching role – concluding comments

Many participants were new to online learning so an important component of the teaching role included explaining the design of the course and the structure of the learning experiences. The role of the teacher included persistently reading and responding to forum postings to encourage and maintain dialogue. As Anderson, Rourke, Garrison and Archer (2001, p. 7) suggested "the teacher's role is more demanding than that of other participants, and carries with it higher levels of responsibility for establishing and maintaining the discourse that creates and sustains the social presence". The commitment required by the teacher is demonstrated in the number of teacher postings recorded in the first reflection forum. In totaling the number of threaded posts, the teacher posted 27 times, while the students posted 36, giving a total of 63 postings in the forum. However, in keeping with the constructivist philosophy that informed the course design, the teacher had a facilitative, rather than a leading/controlling role in the forum. This is indicated by the small number of teacher-initiated threads compared to student-initiated threads. Table 4.5 shows the number of responses to student- and teacher-initiated threads. The teacher initiated 4 threads, while the students initiated 13 threads. While this quantitative data does not give any insight into the nature of the discourse, the total number of teacher postings (27) indicated that the teacher had an active role in responding to student-initiated posts.

Table 4.5: *Responses to student- and teacher-initiated threads: Reflective forum 1*

Initial threads or posts	1	2	3	4	5	6	9
Student initiated		5	4	1	1	1	1
Teacher initiated	1		1			1	1

This data indicates that there was strong teacher presence as a facilitator, rather than director, to enable the building of a learning community. Garrison et al. (2000, p. 16) suggest that:

> The binding element in creating a community of inquiry for educational purposes is that of teaching presence. Appropriate cognitive and social presence, and ultimately, the establishment of a critical community of inquiry, is dependent upon the presence of a teacher. This is particularly true if computer conferencing is the primary means of communication for an educational experience.

This section demonstrated that my teaching role was crucial in creating the physical, social and critical learning community. The next section will discuss the findings that emerged from the data regarding the creation of a learning community by both the teacher and the learners.

4.5 Findings and interpretations: building a learning community

"Building a learning community" is the second category supporting the core category of "interaction as a facilitator of learning". This supporting category involved all participants (teachers and learners) in the activity of building a learning community. The category of building a learning community, along with the subcategories of promoting group cohesion and projection of self, plus examples of the discourse, were presented in Table 4.2. Based on the findings, the building of a learning community is defined here as the actions the participants take to create and sustain a cohesive learning community and to project their personalities into the online context. While education is moving from a teaching to a learning-centred

approach, Barab, Kling and Gray (2004, p. 3) suggest that "too little of the education literature provides clear criteria for what does and does not constitute community, [and] we also know little about the educational value of employing a community model for supporting learning". Reil and Polin (2004) offer the following definition of community.

> Community is a multigenerational group of people, at work or plan, whose identities are defined in a large part by the roles they play and relationships they share in that group activity. The community derives its cohesion from the joint construction of culture of daily life built upon behavioral norms, routines, and rules, and from a sense of shared purpose. Community activity also precipitates shared artifacts and ideas that support group activity and individual sense-making… A community differs from a mere collection of people by the strength and depth of the culture it is able to establish and which in turn supports group activity and cohesion (p. 18).

The discussion in this section will examine the interactions of the participants in the forum as they built their learning community.

The reflective forums were designed to promote interaction among course participants based on the teacher's philosophical belief that interaction is essential for effective learning. This assumption is embedded in educational practice based on a constructivist perspective, a perspective that has increasing support in recent educational literature (Karagiorgi & Symeou, 2005; Laurillard 2002; Mayes, 2002; Palloff & Pratt 1999). Palloff and Pratt (1999, p. 15) claim that "in the online classroom, it is the relationships and interactions among people through which knowledge is primarily generated". The building of a learning community was an important strategy of the pedagogical framework that informed the design and implementation of the course. This framework was informed by the transactional approach to teaching and learning (Garrison & Archer, 2000). This approach is built on two foundational concepts; firstly, that a constructivist approach is necessary for learners to create meaning; and secondly, that collaboration is essential for creating and confirming knowledge (Garrison & Archer, 2000). The reflective forum that provided the data for this study was designed to provide opportunities for both

personal reflection and collaborative knowledge building, and was an important strategy in the total learning experience. Garrison et al. (2000, p. 8) suggest that "collaboration is seen as an essential aspect of cognitive development since cognition cannot be separated from the social context" and argue that, "for Dewey (1959), education is a collaborative reconstruction of experience". While the online forums provided the technology to support collaborative learning, the text-based nature of the forums meant that students had to employ a number of strategies to overcome the lack of communication cues.

Rourke & Anderson (2002) suggest that the online literature has identified three consequences of the reduced repertoire of communication cues. The first is the lack of information concerning mutual attention and awareness (Short, Williams, & Christie, 1976). In the online context participants have no way of knowing if others are reading their posts until another person responds to a posting, unlike a face-to-face context where eye contact and body language give visual clues of responses. The time lag, or even total lack of response can leave students "feeling remote, detached, and isolated" (Bullen, 1999, p. 10). However this is changing, as software such as WebCrossing (http://www.webcrossing.com/Home/) and MOODLE (http://moodle.org/) has the capacity to show who else is online when users log on, and provides real time messaging on the same screen.

A second problem, also identified by Short et al. (1976) is the lack of immediate feedback, which can lead to anxiety about how the message is interpreted and, indeed, if anyone is actually taking the time to read the message. Feenberg (1989) observed that communicating online involved a personal risk, and "a response, any response is generally interpreted as a success while silence means failure" (p. 25). A third problem that is discussed in the literature is the difficulty in establishing a sense of group cohesion Rourke et al. (2002). In asynchronous, text-based computer conferencing, such as in this study, the teacher can implement strategies to facilitate an effective online learning environment, as discussed in the previous section. However, ultimately it is how the teacher and students act within that environment that will determine if learning occurs. If participants feel comfortable and confident to collaboratively explore and build knowledge, the online interactions should demonstrate evidence of the creation of a learning community. The data shows

evidence of the establishment of a dynamic learning community, which provided the framework for individual and collaborative knowledge building, the desired learning outcome for all course participants. In the forum data students exhibited a number of behaviours that demonstrated efforts by participants to promote group cohesion. These behaviours were identified in the subcategories of "promoting group cohesion" and "projection of self" and are discussed in the following sections.

Promoting group cohesion

This subcategory is defined by the activities of all participants as they used discourse to promote group cohesion. As noted in the discussion of the teaching role in structuring learning, the teacher implemented several strategies to promote a group learning environment. Early in the course the teacher alerted students to the importance of building a learning community through interaction in the discussion forum. Although the teacher had an important role in facilitating the creation of the learning community, this process was a collaborative activity, with all participants sharing the responsibility for community building.

The beginning of the reflective forums signalled the start of small group activities to replace the whole class interactions. Participants were divided into groups of ten and allocated to a teacher as first contact person for the completion of the reflection and assessment activities. When these reflective forums commenced, the course was already into the third week of the semester, so participants were familiar with the communication technology and the online discussion process, and had already interacted with a number of participants. However, students exhibited an initial reluctance to "jump into" this activity, so the teacher initiated the interaction with the posting of a call "*is anyone out there?"* This prompted a few tentative postings. The student who was first to post to the reflection forum sought clarification of the process, with the comment *"am I correct in thinking that we can exchange 'informal' comments prior to presenting our reflection?"* Once one student had posted and the teacher responded, other students felt more confident to join the discussion with comments such as *"well I'm here now… starting to get it together*". This initial reluctance, or "communication apprehension" (Rourke et al., 2002, p. 3) may have been the result of moving into a more challenging discussion context,

where ID theory was to be debated and personal understandings were open to group scrutiny. The sense of contributing in a challenging context meant it was important for students to feel confident in sharing their thoughts and that they felt supported by peers in their learning journey.

Participants demonstrated that they had a sense of building a learning community and sharing a learning journey with comments such as – *"nice meeting you"* and *"does any of this language make sense to anyone?*" Many students began or ended comments posted early in the first reflection forum with explicit invitations to others to respond, for example, *"I look forward to sharing your respective contributions"* and "*here are some comments – and would appreciate any comments from others*". The students demonstrated a positive expectation of undertaking a learning journey together, with comments such as "*looking forward to learning with this group*" and "*I am sure that many things will emerge from the other participants in this course"*.

Students used several text-based strategies to create a sense of community. These included the use of people's names, conversational conventions such as greetings and personal signing off at the end of post, emoticons, capital letters and bold text to draw attention to items, and, as noted in extracts above and below, comments that were both encouraging and inviting of group participation. Students supported and encouraged each other with comments such as *"I can really relate to your posting – I have similar thoughts myself"*. Several students sought to establish dialogue with others by explaining their progress and calling on others to respond. The following post is an example of the process of maintaining dialogue: "*I have read through the suggested readings, and found some more. Here are comments – and would appreciate any comments from others… by the way I sit and type into this forum at the end of a long day (as you all probably do) so please excuse typos!"* Other students responded with comments such as *"looking forward to reflecting on and sharing this experience with others in the group"*, or "*I'm here at last – just had a couple of days of feeling under the weather. Where you come home from work feeling that it was a real triumph to make it to and from work, let alone spend some time at a screen reading and reflecting*". These comments supported the development and maintenance of interaction, signalling to others that they are attending and supporting interactions. They also created a "human touch" in the forum by revealing personal difficulties, building a sense of comaraderie and a sense that everyone was facing

similar difficulties, such as long working hours, sickness and working at keeping up with the course readings while still working full time. Participants also used salutations and inclusive comments to promote group cohesion. Many posts addressed participants by name and created a sense of sociability by sharing general interest comments such as *hello (person's name), it's been hot, I've been flat out".* Inclusive comments such as "*we", "our" and "us"* helped to build a feeling of closeness in the group, and a sense of group identity and solidarity. Other researchers of online interactions also found that participants used text-based forums to create a supportive learning community. Rourke et al. (2002, p. 6) used fifteen social expressions to score social communication. These items were: "addressing others by name, complimenting, expressing appreciation, posting messages using the reply feature, expressing emotions, use of humor, salutations, expressing agreement, referring explicitly to the content of others messages, using software features to quote from others messages, asking questions of other students, using informal register, use of personal examples, chitchat, and self disclosure". The categories that emerged from a grounded theory approach in this study confirmed the taxonomy of social expressions listed by Rourke et al. (2002), as students in this study used all of the fifteen social expressions listed.

Projection of self

This subcategory is defined by the activities of all participants, as they used the forum to build an online identity. This behaviour was categorised as "projection of self – cognitively, socially and emotionally". Students posted comments that demonstrated examples of the projection of personal character traits that were clearly aimed at creating a personal online identity. The comments demonstrated that despite the use of a "lean" text-based medium, participants were able to create a social presence. The category relates to the social presence element identified in the community of inquiry research at CIDER. Rourke et al. (2004, p. 13) defines social presence "as the ability of learners to project themselves socially and affectivity into a community of inquiry". Rourke et al. (2004) cited empirical studies by Gunawardena (1997), Hara et al. (2000), Kanuka and Anderson (1998) and Zhu (1998) that found that educational applications of computer conferencing were perceived by students as sociable environments that supported interpersonal

interaction. Rourke et al. (2004, p. 13) argued that "the pervasive notion that asynchronous, text-based communications technologies are unable to support social interaction is becoming untenable in the light of mounting evidence to the contrary".

Some of the comments participants used to build an online identity were, "*I have already discovered that I am an organic thinker… not only am I a highly evolved organic thinker, I am analytic/synthetic too."* Other participants shared their professional background – "*I am at a university and involved in teaching and management issues, trying to find the time to increase my knowledge and skill in the field of flexible delivery"*, and "*I am in a dual sector environment."* Such sharing of personal traits was not exhibited in the previous forums where the total cohort of more than ninety students participated, so the smaller numbers may have contributed to the creation of an environment where participants felt confident about sharing personal characteristics. This behaviour confirms previous research (Garrison et al., 2000; McDonald & Reushle, 2002; Postle et al., 2003; Van Wiegel, 2003) that found that groups of approximately ten students per teacher were ideal for the projection of personal identity. This raises the issue of scalability, which will be discussed in Chapter 5.

The reflective nature of the forums provided an opportunity for participants to articulate personal thinking processes that were the foundation of their public postings. Comments from participants included:

- "*I've started reading and am finding it useful to revise those forgotten theories"*
- *"reflection is good, I do a lot of it"*
- *"I am back on track again and have made my first foray into the readings for weeks 2-4… I am encountering jargon that I've met in other contexts and now have to relate to a different environment"*
- *"I have enjoyed revisiting much of this information on analysis of learner needs".*

Such comments enabled students to project their personality and articulate their learning strategies, which helped create social presence and an online identity. Wenger (2005) commented that the building of a personal identity was an important

aspect in the development of communities of practice. He suggested that "technology creates new possibilities for learning, a journey of self, a social journey of moving through the world. Access to information is not the problem; access to ways of being is the central problem. The 21st century will be the century of identity" (Wenger, 2005, online final PowerPoint slide). The findings of this research suggest that establishing an identity is equally important in the online context.

Discussion of findings for the category - "building a learning community"

The beginning of the reflective forums signaled the start of different stage in the learning process, so the students' initial reluctance to initiate discussion may have been the result of moving into a more challenging discussion context. The teacher had explained the learning activity and educational rational in a detailed forum posting; however, more guidance on the expectations and processes of the group sharing reflections may have made participants feel more confident about exchanging ideas in the forum context. Jonassen (2000) suggested that while communication apprehension was not specific to computer conferencing, the environment may amplify existing insecurities and prevent individuals from participating openly and fully. This suggests that the teacher should take a more active role at strategic points during the implementation of the course, and this will be included in recommendations in Chapter 5.

Research has indicated that a moderate amount of social communication could accomplish climate setting task. Rourke et al. (2002) research revealed students made comments such as: "I felt a sense of relief when others expressed feelings of frustration because I was feeling the same way," or "it's been a good way to keep in touch especially since I'm on the East coast of the country" (2002, p. 7). Rourke et al. (2002) found that the majority of students rated the social environment of computer conferencing as "friendly, warm, and trusting," and a majority of students perceived the environment as "personal and disinhibiting" (p. 7).

One of the features of asynchronous communication is the lack of immediate feedback, which can lead to anxiety about how the message is interpreted, and if anyone takes the time to read the message. Several students had little feedback on

their reflections, particularly students who were late posting their reflection, so there was little incentive for them to spend the time initiating interactions. The tension between allowing student flexibility and responsibility with timelines, (an adult learning principle) and encouraging students to keep pace with activities, created a problem when trying to implement collaborative learning. Another factor contributing to lack of interaction was that no grades were assigned to the online interaction, so students may have judged that time was better spent on individual rather than collaborative activities. This will be discussed further in Chapter 5, where it is recommended that the goals and pedagogical principles of collaborative learning are reflected in the design of learning activities, and then made explicit, so that students are given a clear message about the pedagogy and learning goals of the course.

While text-based computer conferencing offers the technological means for students and teachers to interact with each other, lack of communication cues can leave students feeling isolated and/or anxious about participating (Feenberg, 1989). However, the data presented in this section showed that students were able to overcome these problems by creating a strong personal presence and building a learning community through rich professional discourse and social sharing of self through their online interactions.

Student comments generally expressed satisfaction with the discussion forum and indicated that they found the interaction in the reflective forums contributed positively to building a learning community. In a forum established for reflection on the reflection forums one student commented:

> *Just wanted to say how much I have enjoyed this course, and how important I feel the reflections have been. I loved the interaction and feedback (and the occasional opportunities provided to indulge my natural cheekiness). Indeed, I was really sad when the reflections stage of the course had finished. I did feel a little isolated thereafter and felt less involved. I'd recommend (certainly for learner types of my ilk) a strategy to encourage continued and active use of discussion boards in the post-reflection stages.*

The advantage of learning in a community was that participants contributed to the learning process, so the educational process was not exclusively dependent on the information provided by the teacher. Building a learning community supports the learning objectives of the course participants by creating an environment for sustained critical discourse, both private and public. The next section will examine the nature of this critical discourse in the category "generating knowledge".

4.6 Findings and interpretations: generating knowledge

The third category supporting the core category of interaction as a facilitator of learning emerged from a study of the data of all participants in the forum, and involved the process of generating knowledge. The ability of learners to develop higher order thinking skills and demonstrate high levels of understanding and application of knowledge is a desired outcome of higher education. In this study the term "generating knowledge" is defined as the ability of participants to construct meaning through personal reflection and public discourse.

The asynchronous reflection forums provided an opportunity for students to reflect in their own time, and then order their thoughts for written presentation to other participants. The reflective nature of the forums provided an opportunity for participants to articulate the thinking processes that were the foundation of their public postings. The data revealed that through this process of personal reflection and public sharing of ID knowledge, students presented and discussed their ideas at a range of cognitive levels. These cognitive levels are articulated in the subcategories in Figure 4. 4.

Figure 4.4: *Generating knowledge category and subcategories*

Generating knowledge	• Sharing knowledge, stating opinion, application of literature • Challenging ideas and ID theory, dissonance, internal debate • Conceptual exploring of ideas, negotiation of meaning • Modification of ID strategies based on new knowledge • Consensus and application of new ID knowledge

The categories that emerged in this study demonstrated a similar relationship to levels of knowledge and intellectual items as found in Bloom's taxonomy (Bloom 1956). The supporting category of "generating knowledge" along with the subcategories of "sharing knowledge, stating opinion, application of literature," "projection of self"; "challenging ideas and ID theory, dissonance, internal debate"; "conceptual exploring of ideas, negotiation of meaning"; "modification of ID strategies based on new knowledge" and "consensus and application of new ID knowledge;" plus examples of the discourse, are presented in Table 4.3.

Although the grounded theory categories generated in this study were developed independently from categories and discourse descriptors in the literature, several of these categories are similar to indicators of the cognitive presence element of the community of inquiry research into online discussion groups at CIDER (Garrison et al., 2002) and the Interaction Analysis Model (IAM) a content analysis model developed by Gunawardena, Lowe, & Anderson (1997). IAM was based on a constructivist paradigm and designed to detect evidence of knowledge construction. The IAM researchers used the transcripts of a multi-week online debate to develop a model that suggest that learners engage in each of these phases during the processes of negotiating meaning and knowledge co-construction in a collaborative online discussion environment (Gunawardena et al., 1997). The IAM phase definitions are presented in Figure 4.5.

Figure 4.5: *Interaction Analysis Model (IAM) phase definitions*

Phase I. Sharing/comparing of information: statement of observation or opinion: agreement between participants. ***Phase II. Discovery/exploration of dissonance/inconsistency amongst participants:*** identifying areas of disagreement; asking and answering question to clarify disagreement. ***Phase III. Negotiation of meaning/knowledge co-construction:*** negotiating meaning of terms and negotiation of the relative weight to be used for various arguments. ***Phase IV. Testing/modification:*** testing the proposed new knowledge against existing cognitive schema, personal experience or other sources. ***Phase V. Phrasing of agreement and application of newly constructed meaning:*** summarizing agreement and metacognitive statements that show new knowledge construction.

Source: Marra, R. M. (2006). A review of research methods for assessing content of computer-mediated discussion forums. *Journal of Interactive Learning Research*. *17*(3), p. 249).

The IAM phase definitions in Figure 4.5 illustrate significant similarity to the five subcategories in the "Generating Knowledge" supporting category in this study. The relationship between the categories of this research and other findings in the literature will be explored in the following discussion of each relevant subcategory.

Sharing knowledge, stating opinion, application of literature

This subcategory is defined by the activities of participants, as they used the forum to build an understanding of ID theory and practice by sharing knowledge, stating their opinions, and discussing the application of ID literature to practice within their own professional context. The forums were designed to provide an opportunity for participants to work collaboratively online to arrive at an understanding of the principles of instructional design. This learning outcome was presented in the course specification and articulated by the teacher in the reflective forum guidelines.

The course was designed to expose learners to a number of different sources of knowledge, ranging from ideas presented in the course and from the literature, to ideas presented by fellow course participants. The discussion forums were designed to provide the context for learners to collaboratively explore this new knowledge and build on their existing knowledge. This approach was informed by constructivist literature, Garrison and Archer's (2000) transactional approach, and Barab and Plucker's (2002) approach of creating "smart contexts" where knowledge and ability is actualised through dynamic transactions.

The data analysis revealed that the students used the forums to share knowledge, state their opinions and discuss the application of ID literature. As discussed in the previous section on building a learning community, students engaged in critical discourse with others by responding to the postings of others or initiating discussion. These interactions demonstrated a knowledge-sharing focus, rather than simply developing a "feel good" community. These postings were used to contribute resources that related directly to the interest or questions articled by other students. An example was, "*I've found this article on learning theories and ID. You might find it interesting as it talks about…"* Learners were also comfortable about stating their

opinions, with comments such as, "*the online forum environment also allows more choice*" and "*learners need a lot more information before constructing anything new*" and "*the ID process makes a lot of logical sense to me, but my experience has shown…*".

The course presented learners with a range of ID concepts to enable them to build their conceptual understanding of instructional design. They were then encouraged to use personal reflective practice to create links between these ideas and their own professional practice, and then use the forums to discuss and extend the ideas presented in the course. Data showed there were several interactions discussing the application of ID literature, with a student responding to such discussion with the comment "*I not only agree but can vouch for Wilson et al's conclusion that…*".

The level of discussion in this category relates to Bloom's (1956) knowledge level, where learners were exploring the knowledge of the discipline and where information about the ID discipline was gathered and exchanged. In the Mayes (2002) framework this learning is called "conceptualisation" and refers to the learners' initial contact with other peoples' concepts. It involves an interaction between the learners' pre-existing framework of understanding and a new knowledge. Conceptualisation builds foundation knowledge for the integration of new understandings and a framework for the testing and exchange of ideas. While there is an advantage of learning in a community, where participants contribute to the learning process and the educational process is not exclusively dependent on the information provided by the teacher, there is a danger that learning could stall at this conceptualisation level. Kanuka and Garrison (2004, p. 3) suggest that:

> Empirical research indicates that the use of group discussions can often result in keeping both instructors and learners in their comfort zones, resulting in missed opportunities to expand learners' thinking and learning in significant ways (Collette, Kanuka, Blanchette, & Goodale, 1999). Similarly, research also indicates that online discussions typically result in a trivialized (e.g., sharing, comparing, and agreeing) group conversation (Klemm & Snell, 1996).

While the level of discussion in this category could be described as "merely" a basic exchange of ideas and resources, providing little extension of previous knowledge, it does allow learners to acquire an understanding of ID knowledge at a basic conceptual level. This approach was outlined in the associative perspective (Table 2.1) as it is where learners acquire knowledge by building associations between different concepts. For learners new to the ID discipline, this knowledge provides an essential foundation for knowledge building. The interaction between the learner's pre-existing framework of understanding and a new knowledge then provides the foundation for higher level thinking.

Thus it is argued that discourse at this level allows the students to build an understanding of ID theory and practice by sharing knowledge and opinions, and discussing the application of ID literature to practice within their own professional context. This is an important step in the development of critical discourse within the community of learners, particularly in this study, as participants had a diverse range of background experience. Some participants had a teaching or training background and were unfamiliar with ID theory, while others were very knowledgeable in the ID field and were seeking formal accreditation. Despite the diversity of participant experience, and the need for some participants to build their foundation ID knowledge, an examination of other subcategories in the following sections will reveal that students did use the forum to generate higher level knowledge of ID theory and practice. This level of discussion was identified as phase 1, sharing/comparing of information: statement of observation or opinion: agreement between participants, in the IAM content analysis model developed by Gunawardena, Lowe, & Anderson (1997).

Challenging ideas and ID theory, dissonance, internal debate

This subcategory is defined by the activities of participants, as they used the forum to debate the ideas presented in the ID literature and articulate the dissonance that resulted from the ideas that challenged their existing knowledge and practice. The ideas presented in the course were designed to extend and challenge the existing practice of the learners, and participants also contributed comments about how ideas challenged their own practice or posted ideas that challenged accepted practice. An

example of the dialogue that illustrates this activity was, "*in my opinion, current online live interactive sessions are not appropriate methods to…*". Such ideas created a dissonance, prompting learners to question their practice, and moving them out of their comfort zone. These findings relate to the issue raised by Kanuka and Garrison (2004) that in some online discussion groups, teachers and learners operate within their comfort zones, and do not extend their knowledge. However, the data in this study revealed that the learning tasks did challenge learners' thinking and triggered private and public debate that generated learning at a significant range of conceptual levels. The following section, which outlines the conceptual exploring of ideas, demonstrates that the online environment enabled participants to engage in collaborative discussion that challenged participants and lifted the levels of expertise.

The reflection activities were designed to challenge participants to reflect on the ideas presented in the course through the static or dynamic content, and then consider the application of these ideas in their everyday practice of instructional design. The categories and examples of discourse in this section illustrate that participants were thinking critically about the ideas presented in the course and reflecting on how these ideas related to their practice. These findings are closely related to phase II, discovery/exploration of dissonance/inconsistency amongst participants: identifying areas of disagreement; asking and answering question to clarify disagreement, in the IAM content analysis model developed by Gunawardena, Lowe, & Anderson (1997). The critical thinking process outlined in this section relates closely to the triggering event in the practical inquiry model presented by Garrison et al. (2000). In that model critical thinking is seen as a holistic multi-phased process associated with a triggering event. The application of the practical inquiry model will be discussed further in Chapter 5.

The text-based forum and reflective activity provided a vehicle for participants to publicly articulate the critical thinking involved in their self-reflection. This process of dissonance, reflection and application to personal practice was demonstrated in the comment "*I'm struggling with how to relate this to learning in (constructivism) to learning in core subject"*. The reflective task set as an assessment item required the students to reflect on the ideas presented in the course in relation to their own practice, then post these reflections to the public forum for discussion by the group.

Existing research (Garrison et al., 2000) supports the idea that the reflection process should be embedded within a domain-specific context, for example, the instructional design domain of this study. The collaborative environment provided the necessary supportive environment for participants to feel confident and comfortable about articulating their internal thought processes. Examples of the dialogue that illustrates these activities were "*I was immediately faced with a doubt – how effective ISD is to all situations… now read a few reflections and papers… am trying to think through my understanding"*. The design of the reflective forum provided an opportunity for learners to articulate their internal debate, and view and discuss the reflections of other participants. This provided a unique insight into the thinking process that would normally reside inside the heads of individual learners. The relationship between personal reflection and public discourse in the promotion of critical thinking is articulated by Garrison et al. (2000), who suggest that:

> Critical thinking and inquiry is not purely a reflective process internal to one mind. The model presented here assumes an iterative and reciprocal relationship between the personal and shared worlds. That is, there is a synergy between reflection and communicative action. Critical thinking is the integration of deliberation and action. This reflects the dynamic relationship between personal meaning and shared understanding (i.e., knowledge). Purposeful thinking and acting are essential to the educational process. (p. 19)

The asynchronous, text-based reflective forums captured the articulated internal debate of participants through the assessment reflections, and provided an opportunity for thoughtful feedback from other participants.

Conceptual exploring of ideas, negotiation of meaning

This subcategory is defined by the activities of participants, as they used the forum to negotiate meaning and explore ideas relating to ID theory and practice. The discussion in this category extended the discourse of the previous category through the collaborative exploration of ideas that emerged from the dissonance caused by a trigger thought, or issues raised in reflective task, either by the teacher or other participants. An example of the dialogue that illustrated the exploration of ideas was,

"I would also be most interested to hear an explanation of your term organic thinker," where a student asked for further explanation of the term "organic thinker" mentioned in a previous posting. Data showed that participants were keen to take advantage of the knowledge of other students, or test their understanding against the ideas of other participants. This is evident in a posting such as *"has anyone got any thoughts on ISD in different situations?"*

The joint negotiation of meaning of ID theory and practice as participants engaged in collaborative discourse is evident in the response to the posting, "*I'm still struggling with how to relate this (constructivism) to learning in core subject".* Students demonstrated that they were keen to take up the challenge presented by such questions posted other students. For example, one student responded to the comment posted about constructivism with several paragraphs of explanation beginning with, *"I've come up with an explanation to your question about constructivism".* The response was not just a dumping of information gathered from the literature, but was carefully crafted to respond to the issues raised in the initial posting, as demonstrated by the comment, "*I think this is what you mean by…The important question here is, I think…".* Other participants also responded with suggested applications in practice and comments such as, *"however, it seems to me that there are some subjects where this will be easier than others".* Data showed that participants used this exchange to collaboratively explore the idea of constructivism and reflect on how it could be applied in the participant's particular professional context.

Participants also used the forum to extend the negotiation of meaning by citing examples from their experience or the literature that contributed to the issues under discussion, for example, *"one of the most pertinent sentences I read… was in… which identified the concept of . . ."*. Participants felt confident about contributing to the shared exploration of ideas as illustrated in the comment *"the first question to ask is…",* and by suggesting a number of solutions to a problem, such as *"I could try a combination of these methods".* The forum provided an environment that supported an open exploration of ideas, where participants felt confident enough to voice their own uncertainty in a public forum, as illustrated in the comment, "a*t this point I am undecided".* As part of the supporting category of teaching role discussed in section

4.4.1, the teacher made it clear at the start of the course that ID was an ill-structured discipline, where there were no absolute right answers. The data showed that participants used the forum to explore ideas and negotiate meaning within a supportive, collaborative learning community. These findings are similar to phase 111, negotiation of meaning/knowledge co-construction: negotiating meaning of terms and negotiation of the relative weight to be used for various arguments, in the IAM content analysis model developed by Gunawardena, Lowe, & Anderson (1997).

Modification of ID strategies based on new knowledge

This subcategory is defined by the activities of participants, as they used the forum to discuss how they planned to modify some of their own professional ID strategies, based on the new knowledge gained in their study. This is represented in the dialogue as follows, "*it had never occurred to me that instructions are not always the answer to a performance problem"*. The comment shows that the learner had reflected on a triggering event and had a "light bulb" moment where he realised that there was another strategy (beside instruction) to consider when deciding ID solutions in professional practice. Another participant outlined the rationale for a change in their ID strategies: "*some of my decision making on what to omit was based on…"* and then outlined their decision-making process for other members of the group.

Students articulated how the ideas presented in the course became part of their ID "tool kit", supporting and validating their decision-making in professional practice. This is revealed in the comment, "*so the concept of criticality has supported my decision-making and I must admit I feel pleased about that*". Another student commented that there was a need to modify ID strategies to meet the requirements of flexible delivery, "*as we are coming to realize that flexible delivery is a survival model…we will have to move towards different models of instructional programs"*.

The codes and categories that provide the foundation of this section are similar to the "*integration"* category in the practical inquiry model (Garrison et al., 2000). They suggest that during this phase students begin to test the application of ideas as they relate to discipline knowledge and suggest that this category is the most difficult

to detect from a teaching or research perspective. In this study the data generated in the task set for the reflective forums provided an insight into how students were planning to modify their ID strategies. These findings are also similar to phase 1V, testing/modification: testing the proposed new knowledge against existing cognitive schema, personal experience or other sources, in the IAM content analysis model developed by Gunawardena, Lowe, & Anderson (1997).

Consensus and application of new ID knowledge

This subcategory is defined by the activities of participants, as they used the forum to arrive at a consensus and to discuss the application of new ID knowledge in their professional context. Some examples of comments that illustrate these activities are, "*I agree with this, and would extend his argument and suggest that…"* and "*Bates suggests there is…I agree with this. We will have to move towards different models of instructional programs".* The data revealed that students used the forums to debate ideas and arrive at consensus about the application of ID knowledge. The personal reflections and comments on the public forum also articulated how the participants planned to apply this new ID knowledge in their professional context. These findings are also similar to phase V, phrasing of agreement and application of newly constructed meaning: summarizing agreement and metacognitive statements that show new knowledge construction, in the IAM content analysis model developed by Gunawardena, Lowe, & Anderson (1997).

Discussion of the knowledge generation findings

The grounded theory analysis of the forum discourse produced categories which demonstrated that students were critically discussing ID theory and practice, and that the text-based discourse did indeed generate knowledge at a range of conceptual levels. This is an important finding, as much of the research into computer-mediated communication (CMC) has focused on social interaction, and few studies have investigated the effectiveness of online forums to promote higher level discourse. Comparative research into deep and surface approaches to learning and thinking in face-to-face and computer-supported group learning context by Newman, Johnson, Webb, and Cochrane (1996), found that face-to-face groups were more creative and

higher volumes of interaction than computer conference students. However the computer conference students demonstrated a higher level of critical thinking. So while the face-to-face groups had the perceived benefit of physical social presence, the text-based interactions of the computer supported group may have been a factor in fostering higher level thinking. In their discussion of the difference between oral and written communication, Garrison et al. (2000) commented that,

> Some of the literature suggests that written communication is very closely connected with careful and critical thinking (Applebee, 1984; Fulwiler, 1987; White, 1993). These authors suggest that it is the reflective and explicit nature of the written word that encourages discipline and rigor in our thinking and communicating. In fact, the use of writing may be crucial when the objective is to facilitate thinking about complex issues and deep, meaningful learning. The broad-brush strokes, then, indicate that there is a probable connection between the use of text-based communication and the achievement of higher-order learning objectives. (p. 6)

Garrison et al. (2000, p. 7) found that "there is only a limited amount of empirical evidence to suggest that text-based communication used in computer conferencing can, in fact, support and encourage the development and practice of higher-order thinking skills". It is significant then that this study supports the findings by Newman et al. (1996) that student discourse in online forums demonstrates a high level of critical thinking, thus making an important contribution to the body of knowledge.

4.7 The core category - interaction as a facilitator of learning

From the grounded theory analysis of the forum data the core category "interaction as a facilitator of learning" and three supporting categories, "the teaching role", "building a learning community" and "generating knowledge" emerged. The data analysis revealed that interaction was the key component that enabled the teacher and learners to build and participate in a learning community. Interaction has long been a defining and critical component of the educational process, whatever the classroom context (Anderson 2003). The data does show the

reflective activities enabled and encouraged participants to interact, and the participants made good use of the forum to share and build knowledge and test out their understanding of instructional design. The unique features of the online asynchronous environment triggered several interesting interactive strategies. The findings revealed that the participants made considerable effort to establish an online presence and identity, and to encourage others to attend and respond to their posts. For example, comments such as, "*is anyone out there",* or "*I look forward to hearing from others"* and "*hope you have some comments*" represented efforts to engage others in discourse. These postings illustrated a unique feature of this asynchronous environment: the need to initiate a number of text-based strategies to engage others. There could be a feeling of talking into a void, which does not happen in face-to-face or synchronous forums, where you know others are present, either by physical presence or in synchronous forums where there is a "roll call" as members log into the forum. Software, such as WebCrossing and MOODLE, have a facility that shows who is logged into discussion when a user logs on, and if this feature becomes more common, it could help to address one social presence issue. Participants demonstrated that they were able to use the discussion to test and build their ID knowledge at a range of cognitive levels. Their personal assessment reflections demonstrated that they applied this knowledge when reflecting on their own professional practice. The transfer and application of knowledge between private and public reflections was also demonstrated in their postings to the discussion forum, where participants usually grounded their discussions in their practical, professional context.

In a review of the literature, Muirhead and Juwah (2004) argued that interactivity was critical in underpinning the learning process in face-to-face, campus-based and distance and online education. They suggested that interactions serve a diverse range of functions in the educational process, such as learner-to-learner, learner-to-content, learner-to-tutor, learner-to-technology, tutor-to-content, tutor-to-technology and content-to-content. These interactions promote and enhance the quality of active, participative learning in a learning environment. This is supported by the findings of Thurmond and Wamback's (2004) review of the literature on interaction in distance education. Zirkin and Sumler's (1995) review of literature on the use of computers in distance education also found that interactivity was a common element to learner

success, and "the more interactive the instruction, the more effective the outcome was likely to be" (p. 100). My study focused on researching interaction between learner-learner; learner-teacher; learner-content and my findings revealed that interaction was the core activity that facilitated the building of a learning community and knowledge generation within the online forums.

As discussed in the previous sections, the core category and three supporting categories emerged from the grounded theory data analysis. The study showed that that interaction was effectively facilitated through the use of asynchronous text-based communication software. Data also showed that participants used the online interaction to build a learning community and to generate knowledge within that learning community. As previously discussed, the grounded theory analysis generated a number of subcategories from the forum data, and these subcategories revealed the nature of the interactions that were present in the asynchronous discussion in this study. The kinds of interactions were listed as subcategories in Table 4.4, and illustrate significant similarity to the IAM phase definitions in the Interaction Analysis Model (IAM) content analysis model developed by Gunawardena, Lowe, & Anderson (1997). The subcategories are also closely related to the findings of the research conducted by the Canadian Institute of Distance Education Research (CIDER), the research arm of the Centre for Distance Education at Athabasca University, a Canadian Open University. The research from CIDER has identified social, cognitive and teaching presence as the key elements of a community of inquiry. The relationship between the findings of this study that emerged from a grounded theory approach and the elements of the practical inquiry model are presented in Figure 4.6 below.

Figure 4.6: *Comparison of categories*

McDonald	**Practical inquiry model**
The role of the teacher	Teaching presence
Building a learning community	Social presence
Generating knowledge	Cognitive presence

4.8 Conclusion

This study was designed to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The data revealed that knowledge was generated in the online forum, as presented in the discussion in section 4.6: generating knowledge. The grounded theory analysis of the data also addressed the secondary research questions about the characteristics that defined the interaction in asynchronous online discussion forums in this study, and the respective roles of learners and teachers in asynchronous online discussion forums in this study. The characteristics were identified in the proactive role of the teacher and in the interactions of the participants as they built a learning community and generated knowledge. The implications of these findings and recommendations for the design of asynchronous communication components of online courses will be discussed in Chapter 5.

5 Discussion, Conclusions and Implications

5.1 Introduction

This study set out to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. The growing use of online asynchronous discussion forums in higher education (Garrison & Anderson, 2003; Laurillard, 2006), and in particular their application at the University of Southern Queensland (Postle et al., 2003) meant that further research was warranted. This topic is of interest because discussion forums are included in many online courses at the University of Southern Queensland (USQ). They are also used in conjunction with on-campus courses, in the belief that the forums enable participants to interact and collaboratively build their knowledge about the discipline area. However, there is only limited research into the assumption that online interaction facilitates learning, particularly in courses delivered completely online. This led to the primary research question: *if asynchronous communication facilitates student learning in an online course, can the defining characteristics of the communication and the respective roles of participants be described and explained*? As discussed in Chapter 4, the grounded theory analysis of the data identified the nature of learning that defined the interaction, plus a number of characteristics that defined the interaction in the discussion forums in this study. The core category "Interaction as a facilitator of learning" emerged from the data as the common theme or core category that linked and explained the relationship between the codes and categories. This core category was supported by three other categories; Teaching role; Building a learning community; and Generating knowledge. These categorical findings related to the primary research question, and the secondary research questions: *what were the characteristics that defined the interaction in asynchronous online discussion forums in this study*, and *what were the respective roles of learners and teachers in asynchronous online discussion forums in this study*? These

characteristics were revealed in the activities of the participants as they undertook teaching roles and worked together to build a learning community and generate knowledge about discipline-specific knowledge.

This chapter discusses the findings, implications and recommendations in relation to the study, and how they can inform the design and implementation of online discussion forums. These findings, my instructional design practice and research since this study, and the literature have informed the generation of a framework for designing interactive online learning. Based on these principles and the suggested framework, recommendations for designing and implementing asynchronous discussion forums are presented. Finally, the implication of these recommendations for higher education institutional policy and practice is discussed, along with the significance of the research and some suggestions for further research.

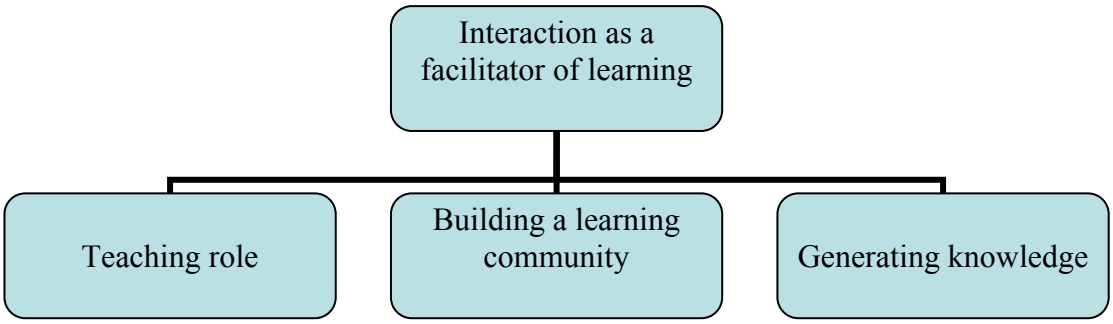
5.2 A review of findings

E-learning, and particularly the application of social constructivist education supported by communication technology, is transforming higher education (Garrison & Anderson, 2003; Laurillard, 2006). If educational contexts are well designed and facilitated, e-learning can support and promote learning by enabling participants to work collaboratively and engage in critical thinking, which are all desired outcomes of higher education. The context of this study provided an opportunity to investigate the contribution to student learning of asynchronous discussion forums in an online postgraduate course. While "good teaching is good teaching" (Ragan, 1998) whatever the context, this study has focused on teaching and learning in asynchronous, online discussion forums.

The design of asynchronous discussion forums in the online course in this study was based on the belief that these forums would promote learning. The research findings revealed that participant interaction in the online forum did address the planned learning outcomes of the course through discourse about the discipline area. The data analysis revealed that interaction was the key component that enabled the teacher and learners to build and participate in a learning community. Thus the core

category, “Interaction as a facilitator of learning”, was the overarching category that synthesised the research findings. “Teaching Role”, “Building a learning community” and “Generating knowledge”, were the three supporting categories that emerged from the analysis of the data. The relationship is shown below in Figure 5.1. The core category, supporting categories and subcategories were presented in more detail in Chapter 4 in Table 4.2.

Figure 5.1: *The core and supporting categories*



This finding, although from a small case study, helps to justify the widespread use of discussion forums in higher education. In this study the data revealed that interaction was crucial in facilitating learning, and shed some insight into the nature and function of that interaction. This finding supports the findings of Zirkin and Sumler (1995, p. 100), who also found that interaction was a common element to learner success: “the more interactive the instruction, the more effective the outcome was likely to be”. Garrison and Anderson (2003) suggested that at the core of the e-learning context was a collaborative constructive transaction – what this study identified as interaction. The research found that high-level discourse from participant interaction was a key factor in generating knowledge. To achieve this outcome the course should be learning centered, rather that teacher centred: the first key principle of this study’s finding. The focus here is deliberately on the learning activities, not the learner.

Although the data analysis focused on the text transcript of online discussion forums, it was clear that the design of the learning activities that generated that discourse had a major impact on the interactive learning process. The data analysis

revealed that the teacher's pre-active and interactive decisions facilitated participant interaction. This was demonstrated in the participant discourse and generated the core category of "Interaction as a facilitator of learning". Thus, one of the key finding of this study was the central role of the teacher in pre-active and interactive course decisions that facilitated and nurtured a learning community. The teaching role was complex and integral in the two other supporting categories-Building a learning community; and Generating knowledge; although these categories involved the interactions of both the teacher and learners. As discussed in Chapter 2, the debate surrounding the role of the teacher in learning-centred pedagogy is an important discussion in higher education. It leads to the second principle of this study's finding, which is that the teacher plays a key role in course design and implementation.

The data revealed that the educational philosophy of the teacher and how that philosophy manifested in the design and implementation of the course had an important bearing on the experience of and outcomes for the learners. This is noteworthy if Biggs (2003) is correct in his assertion that educators frequently do not question or reflect on their educational philosophy, so their courses are often designed and implemented based on unchallenged, traditional educational theory and practice. So while constructivism, lifelong learning and the knowledge society have created new educational pedagogies, and technology could be employed to create innovative learning environments, many teachers still practice traditional, transmissive modes of education (Laurillard, 2006; Zemsky & Massy, 2004). Kimball (1998, p. 2) argues that "distance learning is not about taking our old lesson plans and transposing them for delivery using new media. Rather, it's about expanding our available tools to create new learning dynamics aligned with the best thinking about adult education". Academics in higher education are increasingly aware of the pedagogical discussion around constructivism, the implementation of graduate attributes and the need for lifelong learning, and pay lip service to these ideas. Institutional support for the implementation of learning-centred pedagogy is essential, if academics are to access to the knowledge and resources that will enable them to provide learning-centred education. Reflection on my research findings suggest that the actualisation of the educational philosophy of the course designer and facilitator in the design and implementation of the course was a key factor in

determining the planned environment and experience of the learners. A third principle of this study's finding is that the philosophical and pedagogical goals of the course should be articulated and subsequently implemented in the course.

5.2.1 Principles and guidelines for the design and implementation of online forums

The research in this study found that three key principles underpin the design and implementation of online asynchronous forums, each principle having its own set of guidelines. These principles are informed by reflection on the nature of the online learning context, the findings of this study and my post study research, and my professional instructional design practice. The three key principles and their enabling guidelines are presented below.

Principle 1: Articulate and execute the philosophical foundations of the course.
Guidelines:

- Provide a rationale based on discipline content and context
- Ensure constructive alignment (Biggs, 1999) in the application of philosophy
- Clarify roles and responsibilities of learners and teachers

Principle 2: The teacher plays a key role in course design and implementation.
Guidelines:

- Design and nurture a learning environment that facilitates interaction
- Design and nurture a community of inquiry (Garrison et al., 2000)

Principle 3: The course should be learning-centred rather than teacher-centred.
Guidelines:

- Facilitate individual and social constructivism
- Encourage reflective practice
- Foster adult/self-directed learning
- Implement authentic assessment – grounded in practice

These principles and guidelines support the approach outlined in constructivist literature. However, the findings reveal the importance of the teaching role, which can be downplayed in literature that focuses primarily on the role of the learner. Based on the findings of this study, it is argued that the teaching role is central to achieving the planned learning outcomes of the course. A suggested framework for the application of these principles is presented in the following section.

5.3 A framework for designing and implementing interactive online forums

The research findings showed that interaction was a key activity that enabled the teacher and learners to build and participate in a learning community. The teacher can create an interactive learning environment through pre-active decision making, and then support a critical learning community by adopting a pro-active facilitation role once the course is operational. In this study data revealed that the teaching role was closely intertwined with the two categories generated by all the participants, Building a learning community; and Generating knowledge. Data also showed that participants used online interaction to build a learning community and, through that interaction, generate discipline knowledge. The challenge then is to design and facilitate an online learning environment that incorporates the three essential components for learning-focused interaction – the proactive teaching role; a supportive learning community; and planned learning activities.

Analysis of the data in this study showed that interaction was the component that enabled the teacher and learners to build and participate in a learning community. The findings also revealed that the teacher played a key role in supporting interactive learning, so in order to create a framework for designing and implementing interactive online learning, the central teaching role will be aligned with the other two supporting categories. These supporting categories, Building a learning community; and Generating knowledge; form the horizontal axis of the table, while the pre-course design, and implementation and facilitation teaching role form the vertical axis. This alignment of categories with the teaching roles provides a design

and implementation framework for interactive online learning – as presented in Table 5.1.

Table 5.1: *A framework for designing and implementing interactive online forums*

Teaching role – facilitating interactive learning	Building a learning community	Generating knowledge
Pre-active course design		
Implementation and facilitation		

The framework presents a structure that course designers can use to conceptualise, design and implement interactive learning in online courses. Within the context of this study the emphasis of the discussion about the use of this framework will be on recommendations and guidelines for designing and implementing asynchronous discussion forums within an online course. The recommendations are based on the findings and principles that emerged in this study and their relationship to other online research. The following sections provide guidelines, recommendations and practical examples for each of the cells in the framework, starting with pre-course design implications and recommendations. Strategies and tactics are included in the tables at the end of sections 5.4 and 5.5. A strategy is a broad-brush description of plans to achieve certain educational objectives. Tactics provide a more detailed description of how the strategies will be implemented (Steeples, Jones, & Goodyear, 2002). The focus will be on strategies that facilitate interaction – the key to facilitating learning in online forums.

5.4 Pre-active course design and recommendations for online educators

The proposed framework is built around the teaching role, as the data showed that the teacher played an important role in both the pre-course design and interactive aspects of the course. The teaching role was not authoritative or directive; rather it was a supportive, challenging and mentoring role. While it is argued here that the teacher has a key role in ensuring that students achieve planned learning outcomes, the focus of the teaching role is on facilitating the activities of the learner to ensure

that appropriate learning takes place. As early as 1949, Tyler (1949, p. 63) said that learning "takes place through the active behaviour of the student: it is what s/he does that s/he learns, not what the teacher does". However, designing and implementing the environment where students are actively engaged in the learning can be a challenge for both learners and teachers. A focus on transmission of content - and teacher-centred approaches is well entrenched in institutional administrative procedures and learning and teaching practice. In many instances this approach has been transferred to the online context as 'shovelware' (Anderson and Garrison, 2003), where existing on-campus or print-based distance education content is shoveled into an online course. Laurillard (2006) also argues that online has been used very effectively in university teaching for enhancing the traditional forms of teaching and administration. The challenge for the online teacher is to reconceptualise face-to-face approaches to teaching and embrace the opportunity for student-centred learning now possible in the online context. This can be risky for teachers, as it means letting go of a content-driven approach and creating more open-ended, cognitively challenging learning activities, and engaging with learners in a dynamic learning experience. Anderson et al. (2000, p. 7) suggests the "teacher's role is more demanding than that of other participants, and carries with it higher levels of responsibility for establishing and maintaining the discourse that creates and sustains the social presence". A learning-centred approach creates both opportunities and challenges for teachers and learners, and the changing roles will be discussed in the following sections. The learning centred approach focus on the activities that engage the learners to achieve the learning goals of the course, rather than focusing on learner characteristics, as can happen in the learning styles literature. This learning-centred approach is supported in the literature, which now suggests that pedagogy (which is the teaching of children), moved to andragogy (educational experiences for adults, Knowles, 1975; 1990) and should now move on to the concept of truly self-determined learning, called heutagogy (Hase & Kenyon, 2000). Malcolm Knowles could be considered the founding father of adult learning or andragogy). Andragogy assumes that there are significant differences between adult learners and learners under the age of eighteen. These differences, according to Knowles, relate to an adult learner being more self-directing, having a repertoire of experience, and being internally motivated to learn subject matter that is based on, or can be applied to practice (Knowles, 1975; 1990). Hase and Kenyon (2000)

suggested that heutagogy is appropriate to the needs of learners in the twenty-first century, particularly in the development of individual capability. The framework (Table 5.2) shows that while the teacher retains an important educational role, that role is no longer the centre of educational activity, as the teaching role is now focused on facilitating interactive learning, rather than the teacher being the main player in the educational context.

The proposed framework provides an organising structure that teachers can use to design and implement asynchronous online learner-centred environments. The research findings that emerged from the data analysis (Chapter 4) suggest that if the teacher is able to create a learning environment that focuses and motivates learners, then it can be expected that they will engage in the designed activities and work to achieve the planned learning outcomes. Biggs (2003, p. 20) suggests that "learning is the result of students' learning-focused activities which are engaged by students as a result both of their own perceptions and inputs, and of the total teaching context". The strategies and enthusiasm required by the teacher to achieve this outcome mean that the teacher is active in both the design and implementation stage, but in a manner designed to engage, rather than dominate, the activities of the learners. While the teaching role creates and facilitates a dynamic learning community, it is the learning activities of the students that are important. This last statement seems commonsense, even bland, but the implications for the design and implementation of effective learning and teaching environments are profound. The educational focus now moves from the teacher to the learning activities.

As online forums were the focus of this study, the discussion relating to the teaching role will focus on the teaching activities designed to facilitate purposeful learning, as they relate to the asynchronous discussion forums. The following sections present recommendations for pre-active decision-making undertaken in the teaching role to facilitate purposeful learner activity to build a learning community. A summary of suggested strategies and tactics is presented in the framework at the end of each sub-section.

5.4.1 The pre-active teaching role in building a learning community

Online learning creates an environment that has the potential to support new roles for both learners and teachers. The relatively new technically mediated environment, and the fact that participants are uncoupled from the traditional on-campus context, provides an opportunity to replace the teacher dominated transmission mode of education. The teaching strategies required to build an online learning community will be different from those used in face-to-face, real time communities, which have both visual and verbal clues to support interaction. Creating an online environment that facilitates the building of a learning community is a complex and creative process. It requires the teacher to have a sound knowledge of social constructivist theory and apply the principles of this approach when designing the learning activities. The pre-course teaching activities include a range of design activities that implement the first principle, "articulate and execute the philosophical foundations of the course". Activities include articulating the course philosophy, implementing that philosophy through constructive alignment of the learning and assessment activities, clarifying roles and responsibilities of learners and teachers, and designing a learning-centred environment to facilitate interaction. Each of these activities will now be discussed.

Articulate and execute the philosophical foundations of the course

The research findings revealed that the teacher had a central role in course design, thus the educational philosophy of the teacher, consideration of the over-arching institutional philosophy, and how those philosophies manifested themselves in the course, had an important bearing on the educational experience and outcomes for the learners. Many teachers do not have a well thought out educational theory (Biggs, 2003), so they tend to rely on traditional transmissive modes of teaching that they feel comfortable and confident in using. However, as outlined in Chapter 2, current educational theory is based on a constructivist approach that recommends active learning. It is recommended that teachers embrace current theories and practice when planning online courses and implement learning activities that use the interactive capabilities of the medium.

It is important that the teacher clarifies and articulates the philosophical foundation of their educational practice, thereby alerting learners to the learning and teaching approach in the course. Ideally this philosophy will be based on current educational theory and practice, with the focus on interactive learning. All teachers have an implicit theory of teaching, even if it is just a notion of "what works", based on their own educational experience. However, in order to activate that theory in practice, teachers need to reflect on and articulate an explicit theory. Research shows that students adapt their approach to the learning environment created by the teacher (Gow & Kember, 1993), so it is critical that the environment actually reflects the philosophy espoused by the teacher.

The educational philosophy informing the overall program and operational course design should be clearly articulated in order for learners to have a clear idea of the philosophy and the expectations of how they will engage in the course activities. Ideally, this information will be available at entry point to the program in the program descriptor and reconfirmed at course level in the course specification in the university handbook; in this way expectations are identified before the learners enrol. The philosophy can be articulated again at the start of the course, with an opportunity for discourse between participants to clarify expectations of how both learners and teachers will participate in the course. Articulating the principles and values that underlie the course design and emphasising the need for openness, honesty, and empathy in collaborative learning, helps to establish the tone for constructive interaction. Thinking about the kind of ambience needed to create the desired learning interactions and experiences is an important design process (Kimball, 1998). It is recommended that the teacher identifies and articulates a personal teaching philosophy and ensures that this is implemented in the course design.

Ensure constructive alignment in the application of philosophy

Teachers should aim for consistency between the learning and teaching goals and outcomes, and the actual design and implementation of the learning activities of the course. This approach is articulated in depth by Biggs (1999, 2003) in his idea of constructive alignment. Constructive alignment is based on the premise that within a constructivist approach the alignment of objectives, learning and teaching activities

and assessment will lead to deep learning (Marton & Saljo, 1976) by the students. In this study the philosophical and pedagogical goals of the course were made clear in the course objectives and operationalised through the learning activities and assessment. However, designing activities does not mean that students will actually do the activities, so they should be structured in such a way as to ensure that the students do undertake the planned activities. Cowan (1998) defines teaching as "the purposeful creation of situations from which motivated learners should not be able to escape without learning". This definition supports the constructive alignment approach (Biggs, 1999; 2003), where the objectives, activities and assessment are all aligned in such a way as to ensure that students engage in the activities and assessment to achieve learning outcomes. The assessment tasks then determine the extent to which students have achieved the learning objectives, thus objectives, learning and teaching activities and assessment are all aligned and encourage deep engagement in the learning activities by the students.

Clarify roles and responsibilities of learners and teachers

The online learning environment provides an environment that creates new roles for both learners and teachers, and in a constructivist learning environment they have a joint responsibility to contribute to the learning enterprise. Students undertaking online learning for the first time may find that the online environment and learning expectations of the course challenge their existing understanding of their role as students. Anderson et al. (2001, p. 5) note that:

> Teachers and students come to conventional higher education having already learned well-defined roles through years of common educational background and experience in the formal education system. During online learning this background and prior experience are less relevant to the context, which can invoke feelings of anomie. This forces teachers and students to explicitly define or redefine their functional roles. They must rely less on predefined roles and behavioral expectations.

While the teacher plays a crucial role in the design of the course, the design should have a focus on learning-centred activities, with the teacher taking a

collaborative learner role rather than acting as "the expert" transmitting information to passive learners. These changed roles may challenge the expectations of some students, who expect the teacher to lead all the activities while they passively soak up information and recall that information for assessment items. However, if the design of the assessment supports passive learning, no amount of teacher facilitation will change the students' approach from passive to active learning. Kimball (1998, p. 1) suggests that "faculty need to learn to manage critical dimensions of the new environment in which their courses are taking place, dimensions like metaphor, meaning, culture, roles, time, awareness, and collaboration". It is recommended that the philosophical and educational approach be clearly articulated at program level, and that this approach should reflect the learning and teaching philosophy of the institution. The values and policies of the wider institution may have an impact on assessment strategies, and this will be discussed in Section 5.6, *Implications for policy and practice*. Ideally, the program team will be committed to implementing the philosophy so that a similar student learning experience is sustained throughout the program; however, each teacher will have a personal interpretation of the philosophy; therefore the course team and program head will need to regularly review and evaluate the program. In a social constructivist approach the teacher does not assume the role of knowledge expert in control of all information transmitted to students. Instead the teacher designs the learning environment where all participants contribute to learning. In conclusion, the roles of the learners and teachers are best clarified at the start of the course.

Designing the learning environment to facilitate interaction

The design and presentation of the course can be used create a welcoming environment at the first point of contact. This establishes a context conducive to the building of a learning community, and an opportunity to state explicitly the kind of learning environment the teacher plans to create. Establishing an environment that values contributions and provides a safe context to freely reveal professional doubts and openly explore ideas, without the danger of put-downs or censorship, can commence with the first announcement. The home screen can contain a personal welcome and photo of the teacher/moderators, audio or video introductions and overviews of the course, and visual images that create a sense of personal presence,

e.g. location maps and staff photos, or links to the university web site. Provision can be made for students to create their own pages, or link to personal web pages and photos to create an online identity. Designing an online course that will create an environment that supports a learning community requires some creative flare. While learners are coming to terms with what may be a new online environment, the creation of learning spaces with familiar names will help create comfortable spaces for learning. This approach is supported by Kimball (1998) who also suggests using metaphors to create spaces for different learning experiences. These could include the coffee shop or water cooler for informal discussions, the kitchen for creative working context, the porch for quiet reflective discussions, and a library to access and collect digital resources. While these physical spaces are important, it is essential to establish the tone for participant engagement by articulating the principles and values that underlie the course design, and emphasising the need for openness, honesty, and empathy in collaborative learning. If the course is part of an online program it is assumed that essential online skills such as the technical capabilities of the software, strategies for effective use of discussion forums and netiquette will be covered in the foundation course, and not need to be repeated in every course, even though links to that information should be included in every course in the online program.

The teaching role includes structuring activities and facilitating an online environment where participants feel confident to engage in critical discourse and jointly negotiate and build knowledge. This is where the Mayes' (1999; 2002) framework provides a solid conceptual framework for designing learning activities at course and lesson level. In this framework the focus is on the activities the learners undertake to construct their own conceptual understanding rather than on the "conceptualisation" component (static content) where they are introduced to the ideas of others. In the Mayes framework three stages of learning are identified-conceptualisation, construction and dialogue, which are all components of an iterative learning cycle.

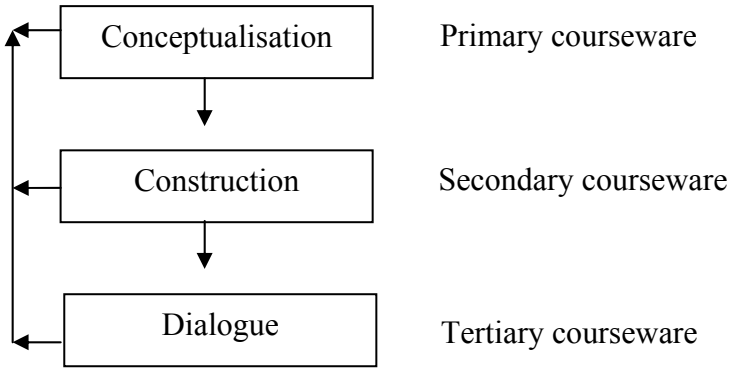


Figure 5.2: The (Re)conceptualisation Cycle, Mayes, J. (2002)

The iterative nature of the Mayes framework is effectively illustrated in Figure 5.6.

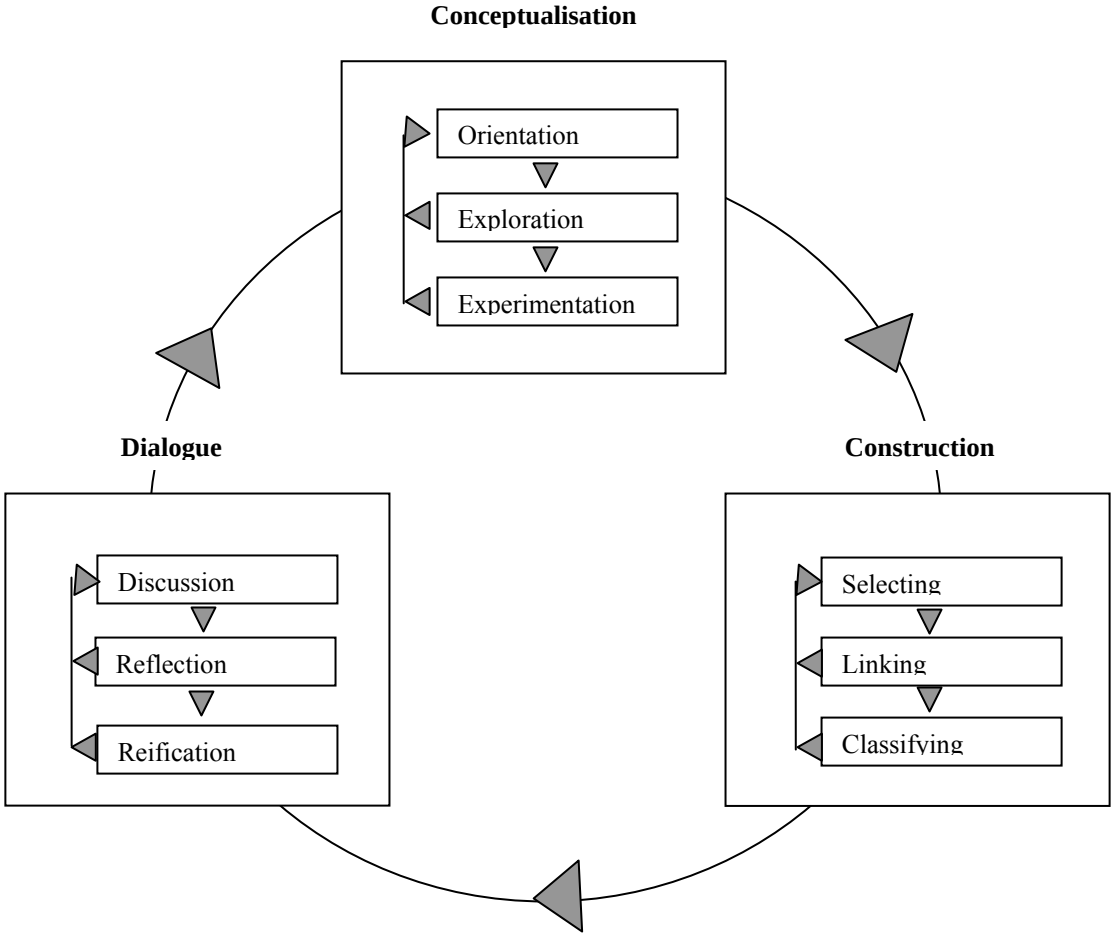


Figure 5.3: The (Re)conceptualisation Cycle, Mayes (2003), Technology Event, Kuala Lumpar.

The Mayes framework was discussed in Chapter 2 and its application in designing to facilitate knowledge will be further discussed in Section 5.4.2, as it is particularly

relevant to the design of learning activities. The teacher can design activities to promote community building in each of these phases. For example, in the conceptualisation phase where the students come into initial contact with the discipline, specific concept activities can be designed to support critical discourse about the concepts. This can be achieved through the use of asynchronous discussion forums to provide a context where participants can co-construct knowledge. Weekly topics, which encourage students to reflect on and discuss the key discipline ideas introduced in the course, can be introduced in the forums to provide an organising structure for learning. The design of these activities can create an environment conducive to the creation of a learning community by focusing on a learning-centred approach and fostering the social presence of participants.

The importance of social presence

The findings of this study and the literature suggest that creating and supporting a dynamic learning community requires more than cognitive-based activities. It also requires social presence; that is, the ability of the teacher and student to project their identity socially and emotionally as a real person. Rourke and Anderson (2004, p. 13) define social presence as "the ability of learners to project themselves socially and affectivity into a community of inquiry". The data analysis showed that participants engaged in social interaction to create and support a climate where they were motivated and confident about working with other virtual participants. Examples of these expectations are comments such as, "looking forward to learning with this group, I can really relate to your posting – I have similar thoughts myself, and I look forward to sharing your respective contributions". Establishing relationships and a sense of belonging is important, and it is suggested that the building of a learning community has a positive influence on the cognitive activities of online groups (Hillman, 1999). For example, Hillman (1999) found that relevant personal vignettes, anecdotes and experiences encouraged trust among participants and reduced anxiety. He suggested that this "fosters a receptive learning environment, enhancing the climate for motivation, creativity, brainstorming, and risk-taking" (p. 17).

As well as articulating the benefits of creating a supportive, collaborative learning community, the teacher can create a sense of social presence through the use of photos, audio or video introductions to the teaching team. It is recommended that an introductory forum be established in the first week of the course to enable participants to share personal and professional information to build social presence and create a sense of belonging to a learning community. It is also suggested that the teacher model the process by posting a personal introduction to start the process, welcome students and model appropriate responses. These design strategies create the beginning of a social context for the teacher and participants to build a learning community. The findings of this research show that students can overcome the lack of non-verbal clues through the projection of self and by using a range of text-based activities that promote interaction and group cohesion. These finding are consistent with other research that demonstrates a capacity for a high level of socio-emotional interpersonal communication in text-based e-learning (Rourke et al., 1999). Table 5.2 outlines the pre-course strategies and tactics to operationalise the principles underlying the building of a learning community.

Table 5.2: *Operationalising the principles underlying the building of a learning community*

Teaching role-facilitating interactive learning	**Operationalising the principles underlying the building of a learning community**
Pre-active course design	**Strategies** • Implement philosophical and pedagogical goals at program and course level • Apply principle of constructive alignment by ensuring that course objectives, learning activities and assessment are aligned to facilitate interaction **Tactics** • Articulate a well-structured philosophy of learning and teaching, based on current educational theory and practice • Challenge pre-existing understandings of teacher and student roles by outlining expected behaviour • Design a welcoming environment through the use of photos, audio, video and personal introductions • Create comfortable learning spaces in the online environment by using analogies to familiar spaces such as the water cooler for informal discussion, kitchen for group work, porch for reflection and library for accessing resources • Establish an introductory forum to build social presence • Provide links to online skills information, e.g. netiquette • Design assessment to foster collaborative learning

The social, affective aspects of building a learning community support, and are supported, by the other two sub-categories identified in this study: the teaching role, and knowledge generation; which move the community from a social network to a critical learning community. The following section will discuss the pre-course teacher role to facilitate knowledge generation.

5.4.2 The pre-active teaching role to facilitate knowledge generation

One of the benefits of access to technology is the ease of access to the vast resource on the Internet. The information-rich capability of the Internet could lead to a view that, as it provides students with such a huge resource, the teaching role is diminished. However, it is through the structured activities of the teacher that education-based learning becomes more than unfocused net surfing, and is structured into a coherent pursuit of discipline knowledge. The pre-course activities of the teacher in this study included a range of discipline-specific and pedagogical activities such as selecting, conceptualising, preparing and validating the content and resources. This included designing the learning activities appropriate for the instructional design discipline and the expected target audience, also judging the appropriate depth and breadth of content and learning activities, and their logical sequence throughout the semester. The research findings revealed that participant interaction in the online forums did indeed generate instructional design knowledge, a planned outcome of the course. The following section will discuss a number of pre-active decisions the teacher must undertake to facilitate knowledge generation. These activities relate to Principle 2, where the teacher plays a key role in course design and implementation to create a learning environment to facilitate interaction and nurture a community of learners. The activities include using discipline expertise to design the learning experience, establishing a course context conducive to knowledge generation, and applying the theory of social constructivism to course design.

Using discipline-specific expertise to design the learning experience

The teacher requires sound discipline-specific expertise to be able to focus and facilitate the building of discipline expertise through sustained dialogue with the

students. This knowledge of the subject area ensures that the teacher can provide relevant feedback and extend student knowledge via supplying challenging or supporting points of view, contribution of resources and drawing on the views of other discipline experts. Garrison and Anderson (2003, p. 86) argue that "critical thinking is content specific and needs to be lead by a facilitator with content as well as context expertise". While the importance of the teacher having sound discipline knowledge may seem obvious to anyone involved in education, there has been a sense of negating or diminishing the role of the teacher in some online and constructivist literature. For example, Dolence and Norris (1995) suggest that teachers have input into the design of the course, but subsequently act as course managers, and less qualified people actually implement the course. Dolence (cited King, 2001) suggests that:

> A significant number of our academic staff should stop teaching and marking, and become managers of educational delivery, including the training and supervision of sub-contracted staff, perhaps from other countries who can do these things - that is an absolutely essential component of any scaleable approach to e-business in universities. Academics should authenticate the content of courses and manage quality assurance processes but not be responsible for delivering those courses intended for mass overseas markets. (p. 48)

However, my research showed that the discipline-specific knowledge of the teacher informed both the pre-course design and interactive operation of the course. My data showed that the teacher consistently used her discipline expertise to respond to and extend issues raised by students. This demonstrates the value of the teacher having a high level of expertise in the content area in order to relate learner presented ideas to literature and practice, extend discussion by contributing knowledge relevant resources, and correct any misconceptions.

While the teacher plays a crucial role in the design of the course, the design will focus on learning-centred activities, with the teacher taking a collaborative learning role rather than acting as the expert, transmitting information to passive learners. Laurillard (2002, p. 22) suggests a "conversational framework" approach to learning,

where the essence of university teaching is an "iterative dialogue between teacher and student(s)". As demonstrated in the data from this study, the online forums provide the means of facilitating iterative dialogue, a different approach to the transmission mode of teaching. Rather than assuming the role of expert and leader, the teacher becomes a co-participant in the learning experience (Jonassen, 1998). The teacher does not assume the role of knowledge expert in control of all information transmitted to students. Instead the teacher designs the learning environment so that all participants contribute to knowledge generation, and online discussion forums provide the vehicle for participant interaction.

One of the teacher's pre-active course design responsibilities then, is to create a learning environment where students can interact to generate, reflect upon and clarify discipline knowledge to ensure that they construct a meaningful understanding of the discipline area of the course. It is recommended that the design incorporate meaningful learning tasks, grounded in student experiences, and include authentic assessment activities. This enables learners to construct meaning by drawing on personal practice, and facilitates the transfer of knowledge to their professional context.

Design activities to establish a course context for knowledge generation

Providing guidelines for managing the learning activities in the course will assist learners to achieve the desired learning outcomes. The introductory section of the course should explain the rationale and strategies for the effective use of the online forum as a learning tool. For example in the course in this study the teacher provided netiquette information and guidelines for the suggested length of the reflection.

The text-based nature of the asynchronous forums provides a unique learning environment that requires thoughtful pre-active design decision making. Suggested strategies to engage other online students should be presented and modeled by the teacher. These would include use of communication conventions such as salutations, referring to comments/issues raised in previous posting before adding critical comments or extending the discussion. Advising learners to keep within a suggested

word limit encourages succinct postings, thus limiting the amount of on-screen reading and making it more manageable for others to read and respond to.

Establishing an introductory forum to enable participants to share personal and professional information not only begins the process of building a learning community, but can also start the knowledge generation process by asking participants to articulate their reasons for enrolling in the course and their planned learning outcomes. Reflecting on desired learning outcomes focuses the learner's attention on the learning task and gives the teacher (and other participants) an insight into the knowledge and expectations of the students. It also enables the teacher to make any adjustment to learning activities to meet learner expectations and address emerging themes.

Designing for private reflection and public discourse

In order to build a community of inquiry in the short timeframe of one semester, the learning activities must provide the opportunity and motivation for participating in a learning community. An effective design strategy in this study was the use of reflective forums to facilitate the sharing and building of knowledge about instructional design. The individual, reflective component posted to the forums was assessable, and the sharing of these reflections provided the mechanism to create a community of inquiry through a focused learning activity and critical discourse surrounding these reflections. Students were required to participate in a number of reflective activities over several weeks, and this provided an opportunity for participants to build and critically reflect on individual and shared understanding of the instructional design issues presented in the course.

The sharing of personal reflections and collaborative discourse in the reflection forum was a critical element for knowledge generation. Consequently, in the design of the course, the teacher included several strategies to ensure that students had a clear understanding of the reflection process. Recommended strategies include establishing a discussion forum to clarify the process of reflective practice (Schon, 1991) and providing a detailed explanation of the role of the reflection forum in the course design, with web links to reflective practitioner literature. It was desirable for

participants to keep pace with the set learning tasks in order to facilitate group discourse on the tasks. Presenting the sequence of learning activities in a weekly study schedule will provide students with clear guidelines regarding the timing of activities, and promote interaction, as students are concurrently engaged in the learning activities.

Explaining the rationale for interactive forums

In order to achieve knowledge generation through the use of online forums, the educational rationale, plus guidelines regarding levels and tone of critical discourse, should be articulated. These guidelines will focus the participants' attention on the goal of collaboratively building discipline knowledge through critical discourse. This is usually the rationale for using online discussion groups, but is often implicit in the course design rather than being made explicit. Articulating the rationale focuses the energy of the group on achieving the key learning outcomes and sets the tone for critical discourse. The explanation should make clear that the idea of engaging in critical discourse is to constructively critique ideas, not the person presenting the ideas. It is about extending or challenging ideas to deepen understanding, providing support for opinions from the literature or practice, and collating and extending ideas presented in the forum discussion. This type of critical discourse is an espoused graduate attribute, but it cannot be presumed that students will already have such skills, so guidelines, annotated examples from previous course offers and web links to critical thinking resources should be provided. The teacher has an essential role of targeting the entry level critical discourse skills of students, providing resources to scaffold the process and designing activities appropriate for the educational context (discipline and target audience).

Designing for social constructivism

Courses that use a social constructivist approach focus on interaction and the joint construction of knowledge. As interaction, or social construction, is central to achieving learning outcomes, the design of the learning activities and assessment need to guarantee that students will interact with other participants. However, specifying that interaction is an essential requirement and linking it to the assessment

raises a number of issues much debated by online educators regarding the wisdom of allocating grades for participation in discussion forums. Firstly, we need to consider if "forcing" students to participate by linking interaction to assessment is a pedagogically sound approach. Adult learning principles articulate the principle of self-directed learning, so forcing participation denies the student the right to practice their right to choose their own learning approach. Secondly, if grades are to be allocated, how are the contributions to be graded? If marks are awarded for a number of postings per week, some students may make token postings to meet the assessment requirement, but not engage in discourse at a meaningful intellectual level. The rationale for interaction should be clarified and interactive guidelines provided, as articulated in the previous discussion.

Guidelines for assessing online interaction

The guidelines for participation in the online forums should be presented in the assessment guidelines and include suggestions regarding how to critically response to ideas presented in participant postings. The guidelines can make explicit the expected number and intellectual level of student contributions. There are existing examples of marking guidelines (Dabbagh, 2000) and expected student contributions to asynchronous forums (Levine, 2002) that provide models for online educators. Dabbagh's (2000) sample framework is shown in Table 5. 3.

Table 5.3: *Evaluation criteria for facilitating an online/class discussion*

Criterion	Excellent	Good	Average	Poor
Timely discussion contributions	5-6 postings well distributed throughout the week	4-6 postings distributed throughout the week	3-6 postings somewhat distributed	2-6 not distributed throughout the week
Responsiveness to discussion and demonstration of knowledge and understanding gained from assigned reading	very clear that readings were understood and incorpo-rated well into responses	readings were understood and incorporated into responses	postings have questionable relationship to reading material	not evident that readings were understood and/or not incorporated into discussion
Adherence to online protocols	all online protocols followed	1 online protocol not adhered to	2-3 online protocols not adhered to	4 or more online protocols not adhered to
Points	9-10	8	6-7	5 or less

Source: Dabbagh, N. (2000). The challenges of interfacing between face-to-face and online instruction. *TechTrends for Leaders in Education and Training*, *44*(6), 37-42

Applying the Mayes pedagogical framework

When implementing the principle of social constructivism the teacher needs to do more than include some discussion activities in the course. The course activities should be designed to enable participants to jointly negotiate knowledge and create their own "dynamic" content through interaction, rather than loading up the course with existing or "static" content. While the teacher will provide the learning framework, including critical concepts and resource, the focus must be on the knowledge generated by the activities of the learners, rather than on the information provided by the teacher. As previously discussed, the Mayes framework (2002) identifies three stages of learning-conceptualisation, construction and dialogue, which are all components of an iterative learning cycle (Figure 5.6 and 5.7). Conceptualisation refers to the user's initial contact with other people's concepts – or static content. This involves an interaction between the learner's pre-existing framework of understanding and a new exposition. In the social constructivist approach the construction and dialogue components of the framework are critical. The focus is on the activities the learners undertake to construct their own conceptual understanding rather than on "conceptualisation" component (static content) where they are introduced to the ideas of others. Construction refers to the process of building and combining concepts through their use in the performance of meaningful

tasks. Dialogue facilitates the testing and tuning of conceptualisations through discourse, argument and reflection. The conceptualisations are tested and further developed during conversation with both teachers and fellow learners through private reflection and public dialogue. It is recommended that the pre-course design process ensures the provision of essential concepts, but focuses on creating the construction and dialogue component of the Mayes framework to create a learning-centred course design.

Focus on learning centred design

The research findings in this study revealed that there was a focus on primary or static courseware that negatively impacted on the time students could spend in active knowledge construction and dialogue. Kimball (1998) notes the tension between delivering content resources which are essentially one-way communications (articles, books, videos and expert lectures) and providing the two-way interaction around that material which makes it meaningful to learners. The focus on conceptualisation in the pre-active design stage lead to the inclusion of a large amount of reading, or static content, and this was one of the issues that participants identified in their postings in this study. Comments such as *'this is an overwhelming amount of reading'* led another participant to respond, *'I can really relate to your posting – I have been having similar thoughts myself; trying not to feel overwhelmed by the readings'.* These comments highlight the need to achieve a balance between the static and dynamic content of the course, and keep the focus on activities to help learners interact to construct knowledge. There needs to be some conceptualisation activity or "static content" such as overviews of theory and practice, readings and related web resources to introduce learners to knowledge of the discipline (Postle, McDonald & Cleary, 2003). The volume of this static content should not be so copious that participants focus mainly on covering it and feel there is not enough time to interact in the online discussion. Key readings and key passages from them can be identified and integrated into the dynamic learning process through questions and activities, thereby linking static content to the active learning process.

If the teacher is articulating the social constructivist approach of using discourse to build knowledge, but loading up the courses with too much static content,

participants can be overwhelmed by the amount of reading and have little time for online discourse and collaborative learning, a planned learning strategy. It is suggested that the volume of static content be kept to a minimum by focusing on important ideas and concepts of the content as it relates to the learning process. This will help students understand that content is a means to an end not an end in itself. The teacher can model the concept that "more" information is not "better" by asking more questions instead of offering more resources. Resources that are provided should be linked to interactive questions rather than static content. It is recommended that, when designing a course, content be constantly linked to process, so that learners do not separate static content (readings and study material) and dynamic content (discussion forum). A concept map showing key concepts presented in the course can be provided and students encouraged to adapt it to their learning needs.

As mentioned, the static content is located in the conceptualisation section of the Mayes (2002) framework, where students come into contact with the foundation information about instructional design. In making decisions about the breadth and depth of conceptualisation material to be included in the course is an important teaching design task (Taba, 1962). The discipline expertise of the teacher and knowledge of the target audience would inform decisions regarding content. The focus of the conceptualisation material is on key ideas of the discipline, not on providing large amounts of factual information. The teacher will draw on discipline expertise to select and organise the key concepts to provide a framework around which discipline-specific knowledge can be build through participant interaction. One of the advantages of the online context is that students can be directed to online resources if gaps are identified in foundation knowledge, so there is no need to overload the course with static content.

Implementing the practical inquiry model as a pre-active course design strategy

In this study critical thinking and knowledge generation were facilitated by the reflective assessment activities. This approach was based on educational research and practice outlined in the online literature. The design of the online forums in this study intuitively mirrored the practical inquiry model (Garrison et al., 2000), which

crystallises the teaching and learning transaction articulated by many educators (Dewey 1933; Kolb, 1984; Mezirow, 1990), and is presented in Figure 5.4.

Figure 5.4: *Practical inquiry model*

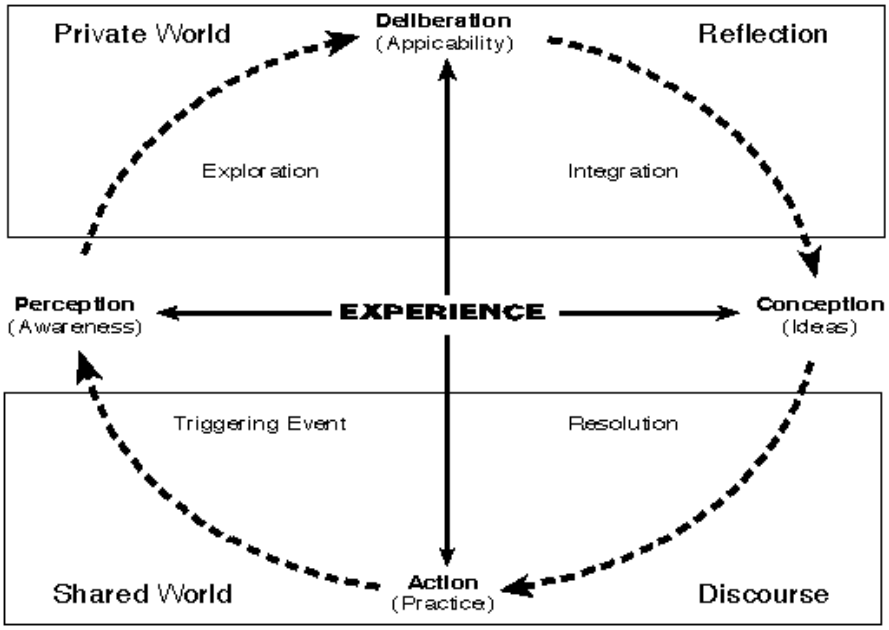


Figure 2: Practical inquiry model
(Adapted from Garrison et al. 2000, The Internet and Higher Education, 2(2-3), 1-19)

The model includes four phases (trigger, exploration, integration and resolution) and incorporates the ideas of private reflection and public discourse, grounded in experience. The four phases provide an iterative learning cycle that can sit inside the construction and dialogue stages of the Mayes (2002) framework. The phases can be used to structure and inform a series of knowledge-generating activities. This process will be discussed in more detail in the following sections. It is recommended that the practical inquiry model be presented early in the course to provide students with a meta-cognitive overview of the learning strategy used in the design of the course and to encourage reflection on their own learning strategies.

Using small groups to facilitate interaction

The use of small groups was another design strategy used to ensure effective interaction. A suggested allocation of about ten students to a teaching group is based

on practical experience of the teacher time required to support highly interactive discussion, and findings in the literature (Postle et al., 2003; Salmon, 2002; McDonald & Reushle, 2000). This approach of one teacher to ten-student ratio is also the policy at the University of Phoenix, where they limit their online classes to ten students (Van Weigel 2003). Small groups provided an opportunity for participants to build an online identity and social presence within an identified group. They also supported sustained dialogue by limiting the volume of postings to a manageable number.

Small groups based on similar professional interests could create a community of practice among peers with similar interests. For example, in this study students came from a range of educational contexts – secondary, tertiary and training - who could focus on theory and practice as it applied to their professional context, then share their perspectives with the larger group of students. In some learning contexts, especially post-graduate courses, peer learning and student moderators could actively support the teaching role. The data in this study had examples of students taking teaching roles, for example, advising other students about their group membership, responding to requests for technical assistance, sharing discipline-specific resources and engaging in critical discourse. Table 5.4 below outlines the pre-course strategies and tactics to operationalise the principles underlying the generating of knowledge.

Table 5.4: *Operationalising the framework for designing interactive online learning*

Teaching role-facilitating interactive learning	**Operationalising the principles underlying the generating of knowledge**
Pre-active course teaching role	**Strategies** • Teacher draws on sound discipline expertise to design appropriate depth and breadth of learning activities • Design a social constructivist learning environment through the use of discussion forums • Design authentic assessment and learning activities • Use the Mayes (2002) framework to design an effective balance between conceptualisation, construction and dialogue • Use practical inquiry model to design learning activities **Tactics** • Articulate the rationale and strategies for the effective use of the online forum as a learning tool – practical inquiry model • Align assessment with course objectives • Articulate in program and course specifications that interaction is expected and assessed

	• Provide guidelines and exemplars for reflective activities and critical discourse • Provide a concept map of the course • Limit static content in the course to allow for creation of dynamic content through interaction • Design introductory activities to begin the learning process, as well as building social presence • Establish small groups of students per teacher/facilitator

5.5 Implementation implications and recommendations for online educators

This section builds on the foundation provided in the discussion of the teaching role in the design of the course. The following discussion presents recommendations relating to the teaching role once the course is operational. During the implementation of the course the teacher aims to facilitate purposeful learner activity to build a learning community and generate knowledge. A summary of suggested strategies and tactics is presented in the framework at the end of each sub-section.

5.5.1 The interactive teaching role in building a learning community

The data revealed that the teacher played a proactive role in facilitating the building of the learning community and this activity was closely intertwined with participant interaction. The participant activities involved in building a learning community helped to create a sense of belonging to a shared learning enterprise, while establishing and projecting an online identify. The grounded theory analysis of the data found that the teaching role included encouraging and confirming learner contributions, maintaining dialogue and responding to and reflecting on learner interaction. Participant activities included promoting and sustaining a learning community by sharing information, reaching out to others through questions and comments, confirming the interactions and ideas of others through comments and feedback on postings, and the projection of self or identity, cognitively, socially and emotionally, though online postings. While section 5.4.1 discussed design strategies to create an environment conducive to building a learning community, this section discusses how the learning community can be facilitated by an interactive teaching role once the course is operational. Discussion will consider the clarification of

participant roles and responsibilities, and the public and private interactive teaching role in building a learning community.

Establish participant roles and responsibilities

The online environment of the course offered opportunities for interactive, student-centred learning, which potentially challenged pre-existing expectations of teacher and student roles**.** The course was designed to support learning centred activities, with the teacher taking a collaborative learner role, rather than acting as "the expert" transmitting information to passive learners. While articulating that learners need to assume greater responsibility for their own learning, thus shifting responsibility for learning from teacher to student, the teacher still needs to actively support that process. The learning environment and activities should be very supportive of students making the transition from a teaching to a learning-centred environment. The approach was explained by Einstein who said, "I never teach my pupils; I only attempt to provide the conditions in which they can learn". The asynchronous forums were designed to encourage students to reflect on content, relate to personal experience and engage with others in critical discourse.

As discussed in 5.4.1, the teacher has the responsibility for the design of the course and can outline the philosophical foundation, learning strategies and planned outcomes of the course in order to make these clear to the students (Principle 1**)**. At the start of the course a dedicated discussion forum can be established to provide the course participants with an opportunity to engage in discussion about the pedagogical features and clarify expectations about the roles and responsibilities of both learners and teachers. Student engagement in this discussion will make the design decisions transparent and increase participant ownership and input to the learning process. The focus of the discussion will depend on the course context, for example, whether students are under or post-graduate; and consideration of the chosen learning approach, such as problem-based learning or reflective practice. It is recommended that a consensus about roles and the nature of interaction be reached in the first two weeks of the course offer. The interactive teaching role in building a learning community also includes both public and private interactions with the learners.

The public interactive teaching role in building a learning community

Once the course is operational, the teaching role includes a number of public interactive strategies to cultivate an environment conducive to interactive learning and encouraging of student participation. As previously discussed, in the pre-active course design stage the teacher structures discipline knowledge and learner activities to support knowledge construction. In the interactive stage the teacher facilitates and participates in knowledge building through consistently modeling the construction and negotiation of meaning through interaction. Modeling the process of reflective practice, connecting with and sponsoring student discourse, and facilitating the building of discipline knowledge, are interactive teaching roles. Experience demonstrates that a high level of teacher interaction in the first weeks of an online course is an essential part of building a collaborative learning community. While the structure and pacing of learning activities are outlined in the design process, once the course is operational the teacher can use the forums to bring the learners' attention to weekly learning tasks and explain how these tasks fit into the big picture design of the course. The teacher can facilitate student engagement through a process of "rolling presence" (Kimball, 1998) through course announcements of planned weekly activities in the study schedule, and by providing guidelines to help students organise their study time and keep pace with the learning activities. Teachers should not presume that all students are confident or skilled in the online environment, so strategies to manage the discussion forum, such as archiving forums, and authoring posts offline should be explained at the beginning of the course. By monitoring the student posts, or lack of posts, the teacher can identify students who lack confidence or need support to manage technology of the online environment. The teacher also manages the learning process by making expectations of learner behaviour explicit. Expected participation in collaborative activities, social behaviours, submission of assignments, adherence to timelines and communication protocols should be outlined (Postle, McDonald & Cleary, 2003). Rolling presence also allows the teacher to manage the online activities to direct student learning, capitalise on emerging learning opportunities and maintain a critical presence in the discussion.

In a collaborative learning context, monitoring student activity and keeping the group working together is important. If students are unable to post their reflections

within the allocated time-frame, they miss out on an opportunity to receive feedback from other participants, who will have already moved on to the next activity. This means they miss out on the chance to engage in discourse with other participants, and therefore are not able to benefit from group interaction. Keeping up with the set activities creates a sense of working together as a group on a shared learning enterprise, an important component of community building. There may be a number of reasons why students are not participating in the public discussion. Students new to online learning may lack confidence and play a watching and waiting game to see how others are interacting. This creates its own problems, as those students are then unsure about when to join the discussion and, as the group discussion gains momentum, non-posters may never find the "right time" to join. The teacher can implement a number of strategies to sensitively bring reluctant participants on board. The use of analogies can create the ambience to help participants evoke images to put them in a mind space conducive to learning (Kimball, 1998). The analogy of a gangway to a ship that provides the mechanism for students to "come on board" to start the learning journey could be used to prompt participation. A visual image showing the layout of the course and illustrating various avenues to participate in the learning journey is recommended. The "learning journey" analogy could be applied by having the course depicted as a ship, with the various components of the course accessible by web links and roll over information boxes. Within the ship analogy, examples could include the lounge for social chat, engine room or kitchen to work on assigned tasks, library for resources, and cabins for private reflection. A ticket office could be provided with alternative access routes for reluctant travellers. One approach designed to encourage reluctant participants by providing some alternative routes to participate is located on the front screen of a community web site at the Rural Net site as shown below.

Do you have problems with joining the debate?

- *You have no time to read through all this*
- *You have ideas to contribute, but no time to write them up and post?*
- *You are scared to ask a question because you don't know if it has already been discussed?*
- *You are scared because your English is not good enough?*

No problem, we'll help you. 'Click here'

Source: Rural Net: Skills Development in Rural Areas: A debate among practitioners, policy makers, programme designers

The “click here” is linked to information regarding strategies to effectively keep track of interaction through a synthesis of issues and access moderator support regarding preparing and posting contributions.

In the early stages of implementing the online course it is crucial that the teacher actively welcomes and facilitates interaction. Initially the teacher will be proactive in responding to postings and publicly and privately encouraging interaction. However, in order to free up teaching time for knowledge-building activities, students or mentors can be given the opportunity to act in this role, the equivalent to social secretary in a community group. Negotiation of this social support role could be conducted in the front-end philosophy and roles forum. If students take up this role marks should be allocated to acknowledge both the value of the role and the time commitment. Alternatively moderators or even students from previous course offers could fill this role.

Commercial platforms such as Blackboard and WebCT have data collection facilities that track access patterns to different sections of the course. Accessing this data enables the teacher to monitor student access on a weekly basis, and it is recommended that a spreadsheet is created to record the activities of individual students at key activity indicator points in the course. These indicators could include posting of an introduction, contributing to different discussion forums, as well as posting assessment items. This data provides a quantitative weekly overview of interaction patterns and, if needed, the teacher can use the public announcement facility to prompt participants. It is recommended that the teacher assume a self-reflective and evaluative approach to online teaching, regularly monitoring learning activity and discourse, and modifying or re-directing learning activity as required. The online context facilitates this process through the data captured in the asynchronous, text-based environment and the LMS data collection facility.

Establishing an introductory forum to enable participants to share personal and professional information to begin the process of building a learning community was

discussed as a pre-active course design activity in section 5.4.1. This study and other research into online communities (Garrison et al., 2000; Gunawardena & Zittle, 1996) show that building of social presence supports online learning communities. The teacher can model both social and critical discourse through actively participating in the discussion forums.

Building a social environment to support interaction can be facilitated through an icebreaker activity or introductions. Most students are time poor so they need to feel that posting to the introductory forum and reading other introductions is time well spent. As mentioned in 5.4.1, the introductory task has both a social and cognitive focus. In the course in this study, the students were asked to link their planned learning outcomes articulated in the introductory forums, to a set reflective activity at the end of course. This provided an intellectually challenging task, and signalled a meta-cognitive approach to learning.

While the technology provides the physical context for the asynchronous forums, and the design strategies create the supportive learning framework, it is the interactions of the teacher and participants that are essential for the creation of a supportive learning environment. The data in this study revealed that the teacher had a key role in facilitating and sustaining the learning community. In order to establish the feeling of a welcoming environment, responsive to learners, the teacher should proactively respond to each posting in the introductory forum, thereby establishing the interactive, “interested in you as an individual”, tone for the course. Although this level of interaction is time consuming, intense activity by the teacher at the start of the course motivates student participation and creates a sense of being welcomed to a collaborative learning group. The teacher plays a critical role at the beginning of the course, with high levels of interaction and timely and thoughtful responses to student posts signaling the value placed on interaction. It also provides an opportunity for all participants to start building their online identity. The participant introductions provide an insight into the knowledge and expectations of the students, and it is recommended that a spreadsheet of each student’s personal and professional information be created and updated during the semester. This information allows the teacher to provide personalised comments with feedback, and to flag students who have skills that can contribute to the course activities, such as leading a discussion on specific topics, or moderating forums. In the first week the introductory forum will

be the focus of activity. Towards the end of the week the teacher could set up special interest groups, based on professional activity, and invite students to join and introduce themselves and one other participant with a similar background. This will encourage students to scan the introductions, thus gaining an overview of the interests and professional backgrounds of people in the course. Provision could also be made for students to set up their own personal interest groups.

Both teacher and participants actively contribute to building the learning community. However, initially the teacher will take the lead to foster the community building process, posting messages clearly aimed at building a learning community, such as "*hopefully others will log on tonight",* and "*I'm interested to hear…"* The discussion about student role flagged that students needed to be proactive in community building. In this course students posted comments, such as *"looking forward to learning with this group"* and "*I can really relate to your posting"*, that invited others to join the discussion, and confirmed group solidarity. The teacher can model the process of establishing an online identity as a "real person" by using the text environment to reveal personal character traits and thought processes. Thinking aloud by adding personal reflections to posts provides a window into thought processes and makes the text-based discussion "softer" and more personal. The process of "emotional bracketing" (Collie, Mitchell & Murphy, 2000) can help to compensate for the lack of nonverbal/visual clues that are available in face-to-face contact. This is achieved by presenting the emotional information that readers could not otherwise glean from the text in square brackets. For example, a post such as "Shirley, I was pondering your comments on constructivism [it always puzzles me]" or "we tried our best to implement the design strategy but failed because of … [very frustrating]". Such techniques help to build an online identity and to establish a natural, interpersonal communication tone for the course.

The use of salutations and comments that acknowledge individual contributions creates a welcoming environment and promotes group cohesion. In this study many postings addressed participants by name and created a sense of sociability by sharing general interest comments such as "*hello (person's name), it's been hot, I've been flat out"*. Inclusive comments such as "*we, our, us"* create a feeling of closeness in the group, and a sense of group identity and solidarity. Other researchers of online

interactions (Rourke et al., 2002) also found that participants used text-based forums to create a supportive learning community. Feedback from students in this study indicated that they found this an important aspect of their satisfaction with the course.

The private interactive teaching role in building a learning community

While the course is operating in the public domain opportunities there are also opportunities for private contact between participants. Wenger, McDermott and Snyder (2002) suggest that a common mistake in community design is the focus on public activities. While this comment concerns face-to-face communities it is also relevant for online communities. The teacher (community coordinator) needs to maintain community cohesion by privately contacting non participating students, checking on unexpected technical problems and providing a private as well as public rolling presence (Kimball, 1998; Postle et al., 2003). These informal "back channel" discussions (Wenger et al., 2002, p. 58) help orchestrate the public activities and build a strong sense of belonging to a community. Although private interaction data was not analysed for this study, there was considerable private email contact between the teacher and students. If the spreadsheet data shows lack of interaction in the public forums, a personal email to the student may be all that is needed to prompt participation.

One suggested approach to encourage interaction is to email a brief "getting started" questionnaire to all students at the end of the first week. This is ideally sent individually to each student, rather than sending a group email, to help build personal contact. This contact will remind students of the course activities, provide information on any student access problems, and provide an opportunity for private contact with the teacher regarding course issues. If supportive emails fail to prompt interaction, tasks can be set for non-participants such as summarising discussion, or requesting a public response to a point made in the public forum. Private email support for these activities, for example, inviting the student to email the planned post for feedback before posting to the public discussion, may be all the support a non-participant needs to become an active participant. The process of rolling presence (Kimball, 1998; Postle et al., 2003) can be applied by using mini surveys to

gain insights into student concerns. The mini surveys would contain up to five questions about specific weekly activities. For example, asking what students thought of a learning activity, was it useful, not useful, why and suggestions for improvement. This rolling presence demonstrates interest in student needs and caring for student concerns which will help foster a sense of joint learning enterprise. It also provides essential feedback to the teacher that can be used to modify course activities on the fly, provide research data and information for continuous quality improvement.

Consideration should be given to the provision of private spaces for students to interact, such as the interest groups mentioned in the previous section, or personal learning logs or portfolios. The participants should discuss and clarify issues of personal and group privacy and anonymity. The learning management system may have a facility for private breakout discussions; students can also use other communication technology outside the course. The suggested interactive teaching strategies and tactics to operationalise the principles underlying the building of a learning community are listed in Table 5.5.

Table 5.5: *Operationalising the framework for designing interactive online learning*

Teaching role-facilitating interactive learning	**Operationalising the principles underlying the building of a learning community**
Interactive teaching role	**Strategies** • Provide an opportunity for course participants to engage in discussion about the course learning and teaching philosophy • Participants jointly clarify roles and responsibilities of learners and teachers • Teacher assumes a co-learner and facilitator role through public and private interaction • Create a climate supportive of collaborative learning by building social presence and fostering critical discourse **Tactics** • Actively promote interaction through public interactions- weekly announcements, public forum postings and pacing activities • Provide prompt feedback to participant postings • Maintain a spreadsheet of student personal and professional data to track and pro-actively facilitate interaction • Use back channelling to draw in non-participants and maintain a channel for private discourse • Delegate social secretary roles • Use weekly mini surveys to monitor the course activity

5.5.2 The interactive teaching role to facilitate knowledge generation

Through the dual roles of pre-course design and interactive facilitation the teacher aims to create a climate supportive of a learning community that will in turn facilitate learner knowledge generation and application. In previous sections it was argued that the creation of an educational learning community was important in that it provided the context for interaction to achieve planned learning outcomes. In this study the data revealed that through the process of personal reflection and public sharing of discipline-specific knowledge, participants discussed their ideas at a range of cognitive levels, thereby generating discipline knowledge. Previous discussion of the interactive teaching role in building a learning community (section 5.5.1) argued that social presence was an important element in an online learning community. However, a central goal of education is fostering life-long learning, and, at a course level, developing discipline-specific knowledge and expertise. To achieve these educational goals the teacher needs to move the interactive focus from "warm and fuzzy" social chat to interaction that supports deep thinking and knowledge generation. The data revealed that the interactive teaching activities that supported knowledge generation in this study included sustained dialogue with the students, asking questions to focus or extend students' learning activities, providing discipline-specific knowledge, and confirming the learner contributions through feedback on forum postings and assessment. Teacher interaction was critical to the creation of a collaborative learning environment and the fostering and nurturing of discourse that supported knowledge generation.

While the interactive teaching role is crucial to generating knowledge, the teaching role is focused on facilitating the activities of the learners. The teacher aims to create an environment that supports and stimulates discipline-focused learning through social constructivist activities. The data showed that during the course in this study the participant interactions demonstrated a range of knowledge-generating activities. The activities included sharing knowledge, stating opinions, citing literature to support ideas, challenging ideas presented by other participants and ID theory, voicing dissonance and internal debate, exploring ideas, negotiating meaning, modifying ID strategies based on new knowledge, arriving at consensus

and applying new ID knowledge in their own professional context, shown in Table 5.6.

Table 5.6: *Knowledge generation sub-categories*

Generating knowledge	• Sharing knowledge, stating opinion, application of literature • Challenging ideas and ID theory, dissonance, internal debate • Conceptual exploration of ideas, negotiation of meaning • Modification of ID strategies based on new knowledge • Consensus and application of new ID knowledge

The discussion of the role of the teacher to facilitate knowledge generation will start with the teaching role that is at the heart of the online educational experience, nurturing a climate where learners work collaboratively to build discipline-specific knowledge and life-long learning skills.

Nurturing a climate for knowledge generation

As mentioned in the previous sections, the establishment of a course philosophy and pedagogy forum provides an opportunity for students to discuss the articulated course pedagogy and the expected roles of teachers and online learners. The teacher can explain the rationale of the social constructivist approach, outline the practical inquiry approach (Garrison & Anderson, 2003), and signpost the potential for interdependent and interactive learning. The social constructivist approach may signal a significant role adjustment for students if their previous educational experience has been a more traditional competitive and independent learning approach. The asynchronous forums present crucial changes from the way face-to-face tutorials operate. They provide an opportunity to implement the principles of adult and self-directed learning, as students have a large degree of control over the timing and level of their interaction. The teacher also has a change of role as there are no set office hours, and while the interaction is asynchronous, the immediacy of the online environment can create an expectation of an instant (24x7) response. The expectations of students can be managed by establishing protocols for participation

(Postle, McDonald & Cleary, 2003), such as outlining a suggested timeframe for responses and the number of times the teacher plans to participate in the discussion. An "office open" time can be identified to put a boundary around the times the teacher is available for synchronous chat or immediate feedback. This will help counter the expectation that online teachers are always available. The recommended pedagogy forum provides an opportunity to negotiate expected levels of interaction, with at least three times a week the suggested number of times that students participate in the online forum. In order to create a climate where learners feel confident to engage in critical discourse, the teacher, through negotiation with course participants, can establish "rules of engagement". These would include providing previously mentioned netiquette guidelines, or the basic expectations of how to behave appropriately in an online environment that would be established early in the program of study. The rationale for guidelines, such as advising learners to keep within a suggested word limit to ensure succinct postings, can be openly discussed so that students have insight and input into the decision-making process. The opportunity for discussion and negotiation clarifies roles and expectations and creates a sense of ownership of the learning process, thus providing a strong foundation for the learning community. These discussions need to be balanced against the assessment guidelines and learning and teaching goals of the course. Establishing guidelines for expected student participation was discussed in Section 5.4.2, and outlined by Kimball (1998) in her discussion of managing the critical dimensions of distance learning, metaphor, meaning, culture, roles, time, awareness and collaboration. Being open to negotiation about these guidelines, rather than taking a prescriptive approach, is one of the role adjustments that teachers face in an online context.

Modelling and supporting critical discourse

In this study the data revealed that the teacher was proactive in modelling the online interaction to create a climate where intellectual interaction was supported and valued. The ability to model critical discourse and engage participants in dialogue is an important teaching skill. Fabro & Garrison (1998) found that the established presence of a moderator who modelled critical discourse and constructively critiqued contributions was crucial if higher-order learning outcomes were to be facilitated.

The teaching role includes setting the scene through introductory activities and explaining what the course is about and outlining learning strategies. The teacher can also establish expectations of the teaching role by articulating the process of rolling presence, and noting that they would always monitor the discussion forums, but would not respond to every post. Channels for interaction with the teacher outside the public forum should be explained. For example, the teacher may nominate a regular time slot to be available for consultation via synchronous chat. An "office open" time can help transcend the feeling of alienation some online students may experience, as they know that at a certain time each week they can hop online and chat to the teacher. These chats and other back channel activities provide the teacher with another insight into student progress and concerns. The teacher in a role of co-learner and reflective practitioner will constantly monitor the unfolding fabric of the course and adjust the learning activities to align with student needs and planned learning outcomes.

The teacher can model the strategies negotiated in the course philosophy and pedagogy forum by staying within suggested word limits, thus restricting the amount of on-screen reading and encouraging others to read and respond in a timely manner. The teacher can create a context for collaborative knowledge generation by indicating that while the discourse aims to engage in critical debate of ideas, it is not judgmental at a personal level. The goal is to create an environment that supports an open exchange of ideas, where students feel safe to take risks by posing different ideas, or engaging in rigorous debate. Statements such as "there is no such thing as a dumb question" and by advising students that all contributions to group learning are valued, will help to foster a climate that supports risk-taking and critical inquiry. The teacher can also encourage alternative viewpoint by posting "what if" questions, or responses.

Given that the asynchronous, reflective forums provide a context supportive of deep thinking, the teacher has an opportunity to actively facilitate interactive learning once the course is operational. This approach was used in the online course in this study. The text-based forums provided the teacher with an opportunity to see how the students were constructing their knowledge. By reading the student posts and analysing their strengths and weaknesses, the teacher had a rich data source to inform

decisions about how the course activities can be managed to meet the unique needs of the student cohort. Attending and responding to the views of others is the key to promoting effective use of the asynchronous forums to generate learning and prompting students to function at a higher order level of thinking. Teachers are able to read, then critically reflect on student postings, and respond to individuals to correct misconceptions and provide prompts, extension questions and resources. The teacher can model critical discourse and support and acknowledge knowledge generation by students to promote the learning process. Careful consideration should be given to the use of humour, sarcasm and cultural nuances, as the lack of physical clues that are present in face-to-face interactions may mean that humour or sarcasm is misinterpreted. One of the advantages of text-based forums is that contributions can be carefully crafted and edited before being posted to the public forum.

Facilitating knowledge generation in asynchronous online forums

In the online context, the text-based, asynchronous environment is conducive to both private reflection and public discourse, and it is recommended that a balance of these activities be factored into the design of the course. The asynchronous element provides an opportunity for measured, private reflection, rather that the spontaneous, less reflective communication engendered by synchronous or face-to-face discussions. Asynchronous, online forums, with a text-based communication medium, provide time for reflective thinking and the preparation of a well considered, written response, thus providing an ideal context for deep thinking.

It is suggested by a growing body of educational literature on text-based, computer-mediated communication, that written discourse provides support for deep thinking (Fabro & Garrison, 1998; Feenberg, 1989; Garrison & Anderson, 2003; Garrison, Anderson & Archer, 2000). The text of the online discourse is captured in the asynchronous forum as a permanent record that can be revisited and debated at will. It also provides a window of opportunity for the teacher to view, analyse and support student learning. Course participants are able to reflect on the written discourse, prepare a measured response and contribute to a critical debate that can run for several days or weeks.

Using the practical inquiry model in asynchronous, online forums

As outlined in the discussion of the pre-active teaching role, the online discussion forums provided the physical means of interaction, and the reflective assessment tasks provided the context and motivation for learners to interact to negotiate shared meaning and understanding of the discipline. In this study data analysis showed that critical thinking and knowledge generation were facilitated by the reflective assessment activities. This approach intuitively mirrored the practical inquiry model (Garrison et al., 2000). As outlined in Section 5.5.2, the model (presented in Figure 5.7), includes four phases - *trigger, exploration, integration and resolution* - and incorporates the ideas of private reflection and public discourse, which is grounded in the experience of the learners. Recommendations for this approach, illustrated by examples of discourse from the course in this study, will demonstrate how the teacher can apply the model to facilitate knowledge generation in asynchronous online forums.

The triggering event

The "triggering event" can be a teacher-posed question or problem, or a question or issue generated by the students. Every context will have different triggers. In this study the trigger was a number of questions concerning issues relating to instructional design and how the issues related to the professional practice of students. The teacher can promote interaction by posing questions, clarifying any issues raised by students and motivating engagement through the creation of relevant and challenging dilemmas or scenarios.

The exploration phase

In the exploration phase the students explore the issues raised by the trigger, using resources provided by the teacher, such as literature, invited speakers or experts, other participants or the Internet. The students will search for, and reflect privately on, information, then post their reflections to the public forum where they can interact collaboratively to explore issues through public discourse. Garrison and Anderson (2003) suggest that this interaction is the essence of a true community of

inquiry. This stage calls for divergent thinking, and the teacher can support creative thinking by acknowledging ideas, providing resources and posing extension questions. Students can be encouraged to relate their suggestions to professional practice and extend or challenge ideas. During the exploration phase, the teacher can monitor student interaction to ensure students remain focused on educational outcomes, while encouraging creative and unexpected ideas. Through sustained or iterative dialogue (Laurillard, 2001), the teacher and students can provide feedback and extend knowledge via challenging or supporting points of view, contributing resources and drawing on the views of other discipline-related experts. Teacher feedback and reflective comments on participant discourse confirm or challenge student postings, and references to other student posts encourage students to interact with peers, not wait for teacher comments. The sub-categories that emerged from the data relating to this phase included sharing knowledge, stating opinion, application of literature and challenging ideas and ID theory, dissonance, internal debate. An example from the study was "*I've found this article on learning theories and ID. You might find it interesting as it talks about…*" When the contributions begin to dry up the teacher can post a message to signal the transition from the exploration to the integration phase.

The integration phase

In the integration phase the group task is to integrate ideas raised in the exploration phase. This requires more focused and structured discourse. The teacher can refer students back to the triggering event and ask them to synthesise ideas in relation to initial issues and questions. Both private reflection and public discourse are critical at this stage, as students engage in individual and social constructive activities to integrate disparate information into knowledge. Students can work in interest groups, such as groups based on similar background (all primary, secondary, and tertiary or industry educators) or self-selecting groups exploring similar approaches, such as problem-based learning. The asynchronous, text-based environment supports deep thinking and provides insights into the thought processes of participants as articulated in the forum posts. This gives both students and teachers an opportunity to reflect on, extend and challenge ideas. The teaching role includes correcting any misunderstandings, directing attention to ideas raised by the students

to build consensus and resolve the dilemma. To support the learner centred approach the teacher could nominate or call for student volunteers to integrate issues raised in the discourse. The sub-categories that emerged from the data relating to this phase included conceptual exploring of ideas, negotiation of meaning and modification of ID strategies based on new knowledge. An example of a statement in this phase is "*Bates suggests there is… I agree with this. We will have to move towards different models of instructional programs"*.

The resolution phase

The fourth phase is the resolution of the dilemma and its application in practice. In the course in this study, students were asked to apply their knowledge in an authentic assessment task, an instructional design project relevant to their professional context. The interaction in this phase would critically assess possible solutions and reflect on the application of these solutions in practice. The sub-category that emerged from the data relating to this phase was consensus and application of new ID knowledge. The application and evaluation of the solution triggers a new cycle of inquiry; thus sustaining the process of continuous learning.

In summary, the practical inquiry model provides a framework to guide critical thinking within the interactive learning process, and the text-based environment provides the teacher with an insight into student thinking through proactive tracking of the student discourse. The challenge for the teacher is to ensure that the learning goal is achieved through critical discourse. In this context the teaching role is more of an art than a science. Judging when to guide the discussion and when to hold back, so that students do not wait for the teacher to step in to provide all the answers, calls for close monitoring of the online discussion, and application of "on the fly" educational judgement. Despite the possibilities for deep learning provided by asynchronous, text-based forums, Garrison and Anderson (2003) suggest that there is a tendency for discussion to become entrenched in the exploration stage, and not move on to the more advanced phases of inquiry. They suggest that this is probably due to the democratic nature of the medium and the lack of a strong teaching presence. My research also demonstrates the importance of a strong teaching presence, for both the pre-course design and implementation process, to foster and

sustain interaction and critical discourse. The teacher could use the practical inquiry model as a personal meta-cognitive prompt for overseeing the flow of the learning task and to scaffold student learning. It is also recommended that the teacher refer students back to the practical inquiry model at the transition of each phase to highlight the change of activity and signal the thinking processes required in the subsequent phase. This would provide students with an understanding of the critical thinking process and how the group is collaboratively working towards achieving the learning goals of the course. It is also suggested that the knowledge generation sub-categories presented in this study (Table 5.7) provide the teacher with some general indicators of the levels of student thinking. By adopting the "teacher as researcher" approach mentioned earlier, the teacher can use these indicators at each phase of the learning activity as a meta-cognitive tool to evaluate the cognitive level of student discourse and actively focus discourse on planned educational tasks and outcomes.

Research at CIDER established descriptors and indicators that correspond to each phase of the practical inquiry process (Garrison, Anderson & Archer, 2001). These also provide useful indicators to assess the student discourse. Suggestions regarding the application of to my research findings in relation to CIDER research are included in the discussion of future research.

Reflecting on the importance of interaction.

Interaction has long been a defining and critical component of the educational process, whatever the classroom context (Anderson, 2003). It is argued here and in the literature (Dewey, 1933; Garrison & Anderson, 2003; Wenger et al., 2002) that both private reflection (individual constructivism) and public discourse (social constructivism) support critical thinking. Given that higher education aims to prepare knowledgeable and articulate graduates, providing them with both interaction and active engagement in critical learning communities is desirable.

The social constructivist approach aims to engage all course participants in interaction; however, there are occasions when some students are unwilling or unable to participate in online discussion. This is a vexing issue for both educators and fellow students. None, the less, the constructivist approach ranges from individual to

social constructivism, and there is support in the literature for a range of learning approaches, so consideration of individual constructivism is required. Consideration of adult learning principles and flexibility to cater for adult learners who may wish to be autonomous and self-directed (Merriam & Cafarella, 1999) are recommended design considerations. Fowler & Mayes (1999) suggest that those who do not actively participate could benefit from reading the discussion of others through a process called vicarious learning. The community of practice literature suggests that there is a role for legitimate peripheral participation (Lave & Wenger, 1991), where community members can have a legitimate role while operating on the periphery of the community. From a less positive perspective this processes is labeled "lurking" (McDonald, Atkin, Daugherity, Fox, MacGillivray, Reeves-Lipscomb, & Uthailertaroon, 2004). Online learning communities generate a range of resources or digital artifacts (Wenger, 1998), including the text record of discourse, that are available to all community members. Mayes (2002) suggests that the interactive dialogue can be captured and provide a learning resource for subsequent offers of the course. However, while an individual can access and reflect on these resources (individual constructivism), testing one's understanding in a community of learners is an effective way to legitimate that knowledge in a social sphere (social constructivism).

The pre-course teaching role can be used to ensure that students do participate in the discussion forums through the constructive alignment of objectives, learning activities and assessment. Biggs (2003, p. 27) suggests that "constructive alignment makes the students do the real work; the teacher simply acts as broker between the student and a learning environment that supports the appropriate learning activities". The suggested interactive teaching strategies and tactics discussed in this section can be used to operationalise the principles underlying the generating of knowledge, as outlined in Table 5.7.

Table 5.7: *Operationalising the framework for designing interactive online learning*

Teaching role - facilitating interactive learning	**Operationalising the principles underlying the generating of knowledge**
	Strategies • Actively participate in discussion forums and use back channeling

Interactive teaching role	to support a social constructivist learning environment • Provide an opportunity for course participants to engage in discussion about the learning and teaching philosophy • Participants jointly clarify roles and responsibilities of learners and teachers • Use categories from this study and CIDER research to monitor interaction and foster critical discourse • Use the practical inquiry model to organise activities and critically reflect on discourse **Tactics** • Explain the rationale and strategies for the effective use of the online forum as a learning tool • Explain that interaction is expected and assessed • Provide guidelines for learning activities • Facilitate the building of discipline expertise by focused, sustained dialogue with/by the students • Encourage and confirm learner contributions • Provide prompt feedback to support interactive learning • Provide opportunities for learners to assume teacher or facilitation roles • Model critical discourse

The pre-course and interactive teaching role: concluding comments

A number of recommendations have been presented for the teaching role in pre-course design and interactive facilitation of learning activities and assessment to encourage interactive learning. This research found that discourse generated by the interaction of the participants contributed to building an online learning community that generated discipline-specific knowledge. This finding, although from a small case study, helps to justify the widespread use of discussion forums in higher education. Garrison & Anderson (2003) suggest that at the core of the e-learning context is a collaborative constructive transaction – what this study identified as "interaction".

5.6 Online learning: implications for policy and practice

E-learning creates new possibilities for interactive learning across cultural and geographic boundaries, and there is hardly a course leader anywhere in higher education who is not considering enhancing their teaching by the introduction of e-learning in some form (McDonald & Mayes, 2005). However, Zemsky and Massy

(2004) suggest that the e-learning innovation cycle has stalled at the innovator and early adopter stages as the initiative has not been developed into a form that can transform learning and teaching in higher education. This section will consider the political and organisational implications of online learning; the learning and teaching implications; and the tensions created by the introduction of online learning in higher education.

5.6.1 Political, organisational and administrative implications

Political considerations

Universities are educational institutions within a larger, free enterprise society, and the demands of society influence the resourcing and focus of university activities. Changing conditions surrounding higher education include the need for adult and continuing education, a government expectation that universities will generate their own income in an increasingly competitive higher education market and the impact of technology on education. Higher education is now a global enterprise and, within a climate of economic rationalism, university management is under increasing pressure to market "their wares" and promote their institution within a competitive global market place. In an effort to establish market leadership many universities have established e-learning courses to attract international students and to promote the university as innovative and technically savvy. In several cases the adhoc start-up process has resulted in failure (Caplan, 2004; Zemsky & Massy, 2004). Perhaps the most striking example of the gap between e-learning rhetoric and the reality of implementation was provided by the expensive failure of the UK e-University (House of Commons Education and Skills Committee Report, 2003). These failures have demonstrated that online education is not a cheap alternative or a simple addition to on-campus education. It needs to be clearly conceptualised, strategically implemented and well resourced.

There is a growing interest in how universities are addressing the needs of life-long learning in a too-much-information age. In Australia educational debate surrounds the Australian Government report, *Backing Australia's future, Higher Education review process, striving for quality: Learning, Teaching and Scholarship*

(2004), which focuses on universities' obligation to demonstrate a strategic commitment to learning and teaching, and the degree to which they are able to meet the needs of contemporary Australian society. The successful implementation requires leadership, administrative and organisational restructuring, and pedagogical realignment.

Organisational implications

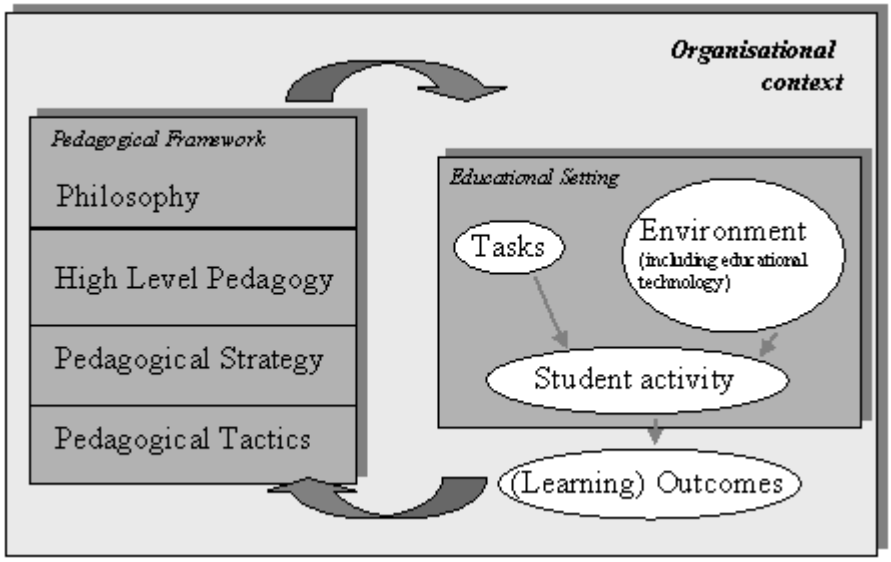
E-learning has been adopted by most universities, but in most instances "the revolution proceeds without any clear vision or master plan" (Ikenberry 1999, p. 58). There are existing models, such as the framework developed at the Open University to provide guidelines for the implementation of technology. While the "Technology Strategy for Academic Advantage" was initially conceived in 1996 (Daniels, 1996), it still provides useful guidelines for the development and implementation of an institution-wide technology strategy that could usefully inform the implementation of online learning at both a policy and implementation level. Implementing effective e-learning institution-wide will depend on vision and leadership by senior managers and the application of a well-planned change management process. Setting clear expectations, structuring short term wins and providing ample communication are critical steps (Floyd, 1999). It is suggested that e-learning initiatives engage the support of middle management level to ensure that e-learning becomes more that senior management rhetoric. Based on my fifteen years instructional design experience of implementing pedagogy for flexible learning with academics and work-based trainers, I believe that working collaboratively with middle management is an effective strategy to foster the implementation of new pedagogy. Consultation with all stakeholders is critical to ensure that relevant concerns are aired and incorporated into strategic plans. Garrison and Anderson (2003, p. 107) suggest a range of topics to be included in an e-learning policy document and strategic plan.

- Vision
- Needs and risk assessment
- Educational principles and outcomes described
- Implementation initiatives and strategy

- Infrastructure
- Infostructure
- Support services
- Budget and resources
- Research and development framework
- Benchmarking.

A model for implementing online pedagogy in an organisational context has been suggested by Steeples, Jones and Goodyear (2002). Their model (Figure 5.5) includes a pedagogical framework that links a philosophical approach to educational pedagogy and related strategies and tactics for teaching and learning. The pedagogical framework informs the design and implementation of e-learning within an educational setting consisting of a learning environment and specific learning tasks. Together, the environment and tasks influence learner activity, which leads to learning outcomes.

Figure 5.5: *Pedagogical framework*



Source: Steeples, Jones & Goodyear, (2002). Beyond e-learning: A future for networked learning. In C. Steeples & C. Jones (Eds.), *Networked Learning: Perspectives and Issues* (pp. 323-342). London: Springer, p. 331).

In relating this study to the pedagogical framework in Figure 5.5, the organisational context of this study was the University of Southern Queensland

(USQ). The educational setting was the online course that was part of USQ's mainstream educational offer. Within this educational setting was the environment within which the course took place; it was hosted on a Blackboard learning management system, and the environment included pre-course design features of the course and an interactive climate created by the teacher and students. The learning tasks were the learning and assessment activities designed by the teacher, while the learner activity was learning itself.

The elements within the educational setting are informed by philosophy and pedagogy located within an institutional pedagogical framework. The pedagogy is informed by the educator's philosophical beliefs about learning and teaching, which should be aligned with institutional philosophy and mission statements. At an operational level, these philosophies and pedagogy inform the teachers approach to teaching and learning, which influences the pre-active design decisions (pedagogical strategy), and the interactive facilitation (pedagogical tactics). The pedagogical framework aligns the practical teaching and learning strategies and tactics with the philosophy and pedagogy of the institution. This alignment encompasses both broad initiatives, such as development of cohesive program-wide pedagogical approaches, and more specific aspects of learning programs or individual courses, such as assessment tasks and learner support mechanisms. The model (Steeples et al., 2002) provides a useful framework for implementing organisational philosophy and pedagogical principles at institutional, program and ultimately at individual course level.

Zemsky and Massy's (2004) report on the failed uptake of e-learning in America, *Thwarted Innovation: What Happened to e-Learning and Why,* suggests that the promised boom in e-learning did not eventuate as expected because e-learning took off before people really knew how to use it. When a new technology is introduced, such as online education, it creates the opportunity to innovate and change existing processes; however, with online learning, the compression of the innovation process meant that new technology was introduced before educators and learners were prepared for the changed learning environment. Online teaching requires a significant shift in pedagogy and practice for many teachers. Principles for good teaching practice, such as the standards created by the Western Interstate

Commission for Electronically Offered Academic Degree and Certificate Programs (1999), and Chickering and Gamson's (1987) seven principles for good practice in undergraduate education, can be adapted to provide educational standards appropriate to institutional context. Obviously, student support is essential as students move into the online environment. This should include access to online orientation and demonstration materials before and during semester, and continual access to technical support via e-mail and/or through a dedicated forum during semester.

These institutional changes mean that leadership in framing online philosophies and pedagogy, plus the provision of professional development and training of both academic and administrative staff is essential. Institutions need to implement a well resourced, incremental approach to establishing online education that builds on existing strengths, while promoting and adopting new online learning strategies.

Administrative and infrastructure implications

The implementation of an e-learning strategy requires essential technology and administrative support. However, Hunt, Eagle and Philip (2004, p. 75) suggest that the rush to embrace technology "as the new saviour of education" has lead to an over-enthusiastic, and largely uncritical application of technology, that has tended to neglect the impact of change on the students. Many online courses are designed and delivered within the framework of a commercial learning management system (LMS) such as WebCT. Zemsky and Massy (2004) note that learning management systems and computer marked assessment software seem to be the two big financial winners that have emerged out of the push for online education. Too often technology dictates which options are available to practitioners using e-learning (Smart, 2005). The commercial focus of learning management systems means that educators and learners have to work within a generic structure or "one-size-fits-all" technology that allows software providers to market a cost effective program. The generic template may restrict the flexibility educators have when designing an online learning environment. Within the learning management system every course is constrained by the software template, and this has an important impact on the way

online courses are designed and delivered. One of the major problems of the learning management systems is that they reflect instructivist pedagogy, with the focus on delivery of content, and instructor controlled learning activities**.** Before institutions purchase a commercial learning management system, evaluation should ensure that it has the capacity to support learning activities consistent with social constructivist pedagogy. For example, at USQ an across faculty and section Information and Communication Technology (ICT) Business Advisory committee has been formed to con consider the needs of students and staff, and investigate a range of ICT options. In the United Kingdom, the Joint Information Systems Council (JISC) is conducting research in this area, and emerging open source software, for example MOODLE, is transforming the technology infrastructure available for online education.

Decisions about the selection, development and implementation of online learning systems should be informed by criteria consistent with the educational philosophy and mission of the university, and a clear vision of the practical application of online learning within that context. The use of frameworks such as Mayes (1999; 2002) keep the decisions making firmly focused on the activities of the learner. Morrision & Oblinger (2002) suggest that

> Ultimately, information technology is not about technology; it is about what happens to people as a result. We have to remember that education is a very human endeavour and that students are terribly important people. Although technology plays a central role, people still come first (p. 5).

The institutional systems required to support the implementation of an online initiative will include a combination of technological infrastructure, administrative and training support, and professional and social support through a user community of practice. Administrative systems in the university will need to be aligned to the educational opportunities created by online learning. The technology supports access to higher education by new kinds of students, typically off-campus, and the ability to communicate across geographic and time boundaries. Institutional policy and procedures are often managerial rather than academic, so part of the process of implementing e-learning will be the alignment of administrative systems with pedagogy. At USQ the integration of online administration capabilities, student

records, a digital "frequently asked questions" automatic response system, library represents an integrated system of administrative and student support systems (Taylor, 2002).

5.6.2 Learning and teaching implications

In this study it has been argued that interaction, based on social constructivist pedagogy, and high levels of teacher input are important components of online discussion forums. Sufficient workload time must be allocated to teachers to enable them to effectively moderate online discussion groups as critical learning communities. The operation of small groups to facilitate high levels of critical discourse raises resource issues regarding cost effectiveness and sustainability in a context of reduced funding for higher education. If social constructivism and high levels of teacher input are deemed important in attaining deep learning, then such approaches should be resourced. These resources should include professional development in the pedagogy of online teaching, technical training and support to operate the technology, and sufficient allocation of time to engage in online moderation. Often the need for these resources to support the interactive nature of online education is either not acknowledged, or can not be resourced by management and financial decision-makers in many institutions.

Costs and value of supporting interactive learning

Online learning and distance education have been promoted as a means of achieving competitive advantage and economies of scale, by increasing access to large numbers of external students (Daniels, 1996; Twigg, 2003). However, as early as the mid-nineties it was argued that "the major perceived weakness of correspondence education is the [lack of] extent and immediacy of interaction" (Daniels, 1996, p. 57). Attempts to increase interaction reduced economies of scale and placed constraints of time and place on the students. Mayes suggests one can argue that there are two basic pedagogies associated with ICT (Information and Communication Technology) in education (McDonald & Mayes, 2005). One is the *delivery of* information - this is predominately the pedagogy of multimedia and the web, and emphasises the 'I'. The second is the pedagogy based on the *tutorial*

dialogue and involves conversations between tutors and students, and mainly emphasises the 'C'. Between the two extremes is a range of computer-supported activities, which vary in their combinations of I and C. Of course, successful teaching is underpinned by both I and C, but the real problem is that I is cost-effective and C is not (McDonald & Mayes, 2005). Supporting interactive learning negates the suggestion that online learning can reduce costs by saving on expensive physical infrastructure, or the delivery costs of print-based distance learning materials. Therefore educators need to make the argument that online education has the potential to provide increased student access and that value adding through increased learner interaction is an important educational advantage of resourcing interactive online education.

This study shows that one of the factors that contributed to high levels of dialogue and knowledge generation was the low teacher/learner ratio. So, in terms of pedagogic effectiveness, the communication rather than information component of technology is more effective in promoting learning. If there is an institutional commitment to taking advantage of communication technology to create online learning communities, then this highly interactive approach must be resourced. An example is the approach adopted by the University of Phoenix, which targets working adults, has a teaching and learning model that puts a great value on small class size (typically kept to about nine students per class) and stipulates that class participation is mandatory. Interaction is conducted asynchronously, through threaded discussions, which place a high emphasis on learner participation and interaction. The university covers the high student/tutor ratio by charging more for online courses than campus courses. The course completion rate is 97% and graduation rate is 65% (De Alva & Slobodzain, 2001). If social constructivism and high levels of teacher input are deemed important to attaining deep learning, then such approaches should be resourced. But what does this resource-heavy approach mean for educational and, indeed, societal outcomes? Does it mean that high levels of interaction in online courses are only for those who can afford to pay, thus creating an elite model of quality online education only for the wealthy? This approach would create a digital divide between those who can afford to pay for high levels of conversation between tutors and students and those who rely on the "delivery of information" or transmission model.

A number of leading researchers in the educational field suggest that dialogue is an important component of effective learning, including Laurillard's (2002) conversational framework, Mayes (2002) framework with dialogue as a key feature, and the practical inquiry model (Garrison et al., 2000). Implementing these interactive approaches in a climate of economic rationalism is a challenge for both educators and learners. One solution to reducing the variable costs of online delivery is offered by Taylor (2002, p. 10) who suggests the use of "academic productivity tools such as reusable learning objects' databases and associated automated response systems". This approach appears to focus on the information rather than communication aspect of technology, as outlined in the previous Mayes discussion of ICT. Other options include models based on McKendree and Mayes' (1997) vicarious learner project; and the "Virtual Participant" project of the Knowledge Media Institute (Masterton, 1998) of the Open University in the United Kingdom. The Knowledge Media Institute project, the result of several years of research, involves intelligent agents that autonomously participate in electronic conference and discussion group activities. The Virtual Participant helps to gather ideas that appear and reappear over several semesters of discussion activities. It can be likened to telling stories from the past, stories it has learnt from other people, and using these stories to support current activity. As Masterton (1998, p. 265) noted, "the Virtual Participant is intended as a tutor's assistant. There are a number of tasks that tutors do that could be augmented or even automated by such a system".

A differentiated staffing model may also provide some solution to the issue of balancing high quality online learning interactions with sustainable teaching workloads. This model is used at USQ for online classes of more than twenty-five students and has the content "expert" leading a course and "managing" a number of tutors who maintain facilitation and mentoring roles within the course (McDonald & Reushle, 2002). The operation of small groups to facilitate high levels of critical discourse raises resource issues such as how cost-effective is this approach when funding to higher education is being cut back. Economic rationalism by many government bodies has seen the withdrawal of funding from education, and a requirement the universities cut costs and create their own sources of income. An Australian newspaper article (The Australian Higher Education, 2005, p. 26) noted

that Commonwealth funding for higher education had fallen by 24% since 1996 in most Australian states, and by 37% in the state of Victoria. Cost cutting leads to increased teacher-student ratios, thus reducing the time teachers have to interact with individual students. Increased teacher workload also means that there is less time for professional development, so teachers are unable to maintain currency educational literature. Research into the implementation of online learning in the United Kingdom suggests that even when the potential advantages of e-learning have been recognised, the how, when and where to implement e-learning in conjunction with established practice has still not been fully explored (JISC, 2004). Evaluation of a course redesign project (Twigg, 2003), involving grants of $200,000 each to thirty American higher education institutions showed improved student learning in twenty of the thirty projects, with the remaining ten showing no significant difference, while preliminary results show that all thirty institutions reduced costs by about 40 percent on average, with a range of 20 percent to 84 percent. Further research and evaluation of such projects is required to foster the implementation of online learning. For many educational practitioners, e-learning brings with it as many questions as answers. Online learning initiatives need resourcing and support at both the practitioner and institutional level.

Supporting professional development

The institution must provide the incentives and support structures for teachers to enhance their teaching (Caplan, 2004), and, most importantly, involve individuals through their normal departmental teaching role to improve educational quality. To move the online learning initiative beyond the innovators and early adopters the culture of the whole institution should facilitate good teaching within the whole institution. Biggs (2003) suggests that professional development cannot be left to the sense of responsibility or to the priorities of individual teachers. Twigg (2003, p. 38) suggests that:

> Currently in higher education, both on campus and online, we individualize faculty practice (that is, we allow individual faculty members great latitude in course development and delivery) and standardize the student learning experience (that is, we treat all students in a course as if their learning needs,

> interests, and abilities were the same). Instead, we need to do just the opposite: individualize student learning and standardize faculty practice.

Staff development centres can act as a catalyst for online learning initiatives through the provision of workshops and resources. However, it is usually left to individual teachers to decide whether or not to attend. Staff development should focus on teaching within the whole institution, not on those individuals who present themselves at voluntary workshops, and who are likely to be the good teachers anyway (Biggs 2003). In order to address this issue at USQ, a range of professional development workshops are offered by the central Learning and Teaching Support Unit, and Faculties or Discipline departments can request workshops tailored to their contexts and needs. As previously discussed, an effective strategy is for staff development personnel to work with middle management at department level. It is important that universities maintain staff development centres to provide professional development and improve teaching practice and learning outcomes; however, staff development is steadily being reduced in many universities.

Professional opportunities created by online learning

Embracing online pedagogy may challenge many teachers; however, it also provides an opportunity for teachers to become innovators of new practices and to take an active researcher approach to consistently reflect on and improve practice. The data captured in the text-based discussion forums provides a rich source of permanent data that the teacher can use to analyse student discourse and reflect on the effectiveness (or lack of) of teacher intervention. It allows teachers to track the cognitive growth of both the individual student and the process of group learning. It is certainly a different experience from face-to-face lectures, where there is often little or no student interaction, and such interaction is not captured for later research. The teacher as researcher is consistent with Boyer's (1990) philosophy that research, teaching and scholarship are interrelated and enrich each other. Online teachers will benefit from building their own online learning community of practice, where they can share information and build knowledge about online pedagogy and practice.

5.6.3 Tensions created by the introduction of e-learning

Tertiary institutions today have access to a range of information and communication technologies, which is creating exciting new learning and teaching opportunities and challenging existing practice. Online learning is now part of mainstream higher education and innovative learning approaches have the potential to transform the industry. It is suggested that we are at the beginning of the e-learning experience and have much to learn about the new "learning ecology" (Brown, 2000; Garrison & Anderson, 2003; Laurillard, 2006; Zemsky & Massy, 2004). However, there is a danger that "new wine" will be put into "old bottles", with teachers using the new technology of online learning to recreate traditional learning experiences. McLuhan (1995) suggests that new media often copies old media without recognising the unique potential of the new media. Thus the innovative educational possibilities created by new media are lost as the old pedagogy is "delivered" in the new medium. For example, lectures are delivered online, with what Garrison and Anderson (2003, p. 113) term "the additive novelty of computer-based media". Simply using the capabilities of the communication technology to deliver traditional transmissive styles of learning misses an opportunity to engage educators and learners in interactive and collaborative learning. Many online courses are simply print-based courses delivered online, with interactive add-ons, such as a chat facility or discussion forum. These add-ons are often of little pedagogical value and are therefore ignored by students. The potential for interactive learning is lost.

This study revealed that asynchronous forums provide both the physical and educational context to support online collaborative learning communities. These learning communities provide a foundation for life-long learning and an opportunity to transform the learning and teaching experience offered by institutions of higher education. Laurillard (2002; 2006) argued that universities must adapt to this change, become leaders in the application of technologies as learning tools, and adopt strategies that facilitated active learning. This would require the creation of courses that were open, distributed, dynamic, globally accessible and interactive (Elliot & McGreal, 2002). The implementation of online learning requires significant change in both pedagogy and practice in higher education. The different requirements of

online education and traditional educational systems create a new set of tensions, which will be addressed in the following section.

Tension arising form the different requirements of online and traditional education systems

The online environment creates an opportunity for new modes of teaching and access to different cohorts of students with different needs and expectations from on-campus students. Garrison and Anderson (2003, p. 106) suggest that "online learning is a disruptive technology in traditional institutions of higher education because it threatens the sustaining technology – the lecture". E-learning can fundamentally change the traditional transmissive approach to education, so its adoption creates a complex set of challenges for practitioners as they embrace new pedagogies, develop new technical skills and adjust to changes in their teaching role. Caplan (2004, p. 182) goes so far as to suggest that "many of the skills faculty had honed in face-to-face setting no longer apply online; and some teachers must 'unlearn' certain teaching methods as much as they need to learn new ones". A sound understanding of learner-centred pedagogy, how the capabilities of the technology can support that pedagogy, and an awareness of the uniqueness of each learning community are essential tools for the online educator. In this study the data revealed that well designed and moderated online discussion groups could operate as critical learning communities, and that the teacher played several key roles in establishing and maintaining the critical learning community. Some pre-course design issues were also revealed, with the lack of constructive alignment between the objectives, learning activities, and assessment moving the focus of constructivism from social to individual for the final project. Given the central teacher role, there is an urgent need to engage teachers in meaningful professional development and reflective practice to tease out what it means to be teacher in the new millennium, how a learner is defined and what learning environments support these defined roles. The changed teacher role requires "a consequential shift from the person culture typified by the academic freedom and lecture autonomy, to a role culture" (McDonald & Postle, 1999, p. 10). Online teachers are often required to work in teams to design and implement online courses, which means course development timelines are often taken out of the hands of the course leader, and ownership of intellectual property can be an issue. The

online course is in the public domain, open to scrutiny by peers, which is quite different from the more transient and relatively private nature of on-campus lectures. These tensions created by online education can be addressed through effective institutional planning and staff professional development.

Tension between interactive and independent learning

In online learning there is a tension between possibilities for interactive and collaborative nature of learning supported by communication technology, and the flexibility and independence offered by the online learning environment. Current e-learning theory is based on a constructivist philosophy (Jonassen, 1999) and social learning theory that focuses on learner centred, collaborative and practice-based pedagogy (Hung & Chen, 2001; Lave & Wenger, 1997). Constructivism recognises the dual nature of learning based on the learner constructing knowledge through individual reflection and social interaction. This approach challenges the traditional institutional, teacher-centred, transmissive pedagogy. While, the educational value of using a social constructivist approach is supported in educational literature (Jonassen, 1999; Garrison & Anderson, 2003), individual constructivism and self-directed learning (Merriam & Cafarella, 1999) are is also valid educational strategies. Achieving an educationally appropriate balance between individual and social constructivism as applied in practice, i.e. requiring participant interactions, or allowing independent learning, or a mixture of both approaches, is an important area for future research.

5.7 Significance of the research

The online learning environment offers an opportunity to reconceptualise traditional approaches to higher education (Garrison & Anderson, 2003; Laurillard, 2006; Twigg, 2001) and warrants further research. Online discussion forums are included in many online courses, or used in conjunction with on-campus courses, in the belief that the forums will provide a vehicle for participants to build knowledge about the discipline area. When this study began, literature such as Garrison et al. (2000, p. 7) suggested that “there is only a limited amount of empirical evidence to

suggest that text-based communication used in computer conferencing can, in fact, support and encourage the development and practice of higher-order thinking skills". In view of the identified gap in the literature and the high level of use of discussion forums at USQ (Postle et al., 2003) this study was instigated to investigate the nature and function of asynchronous communication in an online post-graduate course at USQ.

Studies by Newman, Web and Cochrane (1996), Gunawardena, Lowe and Anderson, (1997) and Garrison et al. (2000) found that that student discourse in online forums demonstrated a high level of critical thinking. The findings outlined here support those studies, and make a significant contribution to this body of research. This study adds to the body of research as it was conducted in a course designed specifically for online learning, while many studies cited in the literature were based on courses that were a blend of on-campus and online delivery.

My recent research suggests that the discussion forums in blended (combination of on-campus and online) courses generate different kinds of interactions than those interactions in purely online courses, as the forum discourse is additional (rather than integral) to physical face-to-face interactions (McDonald, Birch, Gray, Gururajan, Hingst, & Maguire, 2005). In online-only courses all interaction is facilitated by technology, while on-campus students have other opportunities for interaction outside the online discussions, as noted in the following student comment.

> *Well even if you're having trouble you bump into someone in some corridor who you also have in class, you say 'oh having a bit of trouble here I can't quite suss this one out. How did you take it', and because you're taking your relationships from the class outside, it's another source if you encounter any difficulties along the way, you can just fall back on* (McDonald et al., 2005, p. 410).

It is suggested then, that the online interactions from a blended course do not represent the full complexity of interactions that are present in this study, where online interaction was the only means of communication. Thus it is argued that the data from the online forums in this study provided insight into how the participants

used the discussion forum to support their learning in an online-only context. This study provides an insight that is different from other studies that used data from on-campus courses, and therefore contributes to the online literature.

Another important contribution to the research is the use of a grounded theory approach that ensured that the findings were unique to this study. I used a grounded theory approach to guarantee that the codes and categories emerged from my data, rather than adopting a less time-consuming approach of applying categories generated in other studies. Thus the data collection and analysis was not influenced by the application of categories that may not be pertinent to the data, nor were existing codes and categories forced to "fit" the study. Consideration of findings of other research

Finally, the categories that emerged from my grounded theory approach independently confirmed and extended the findings of research conducted by The Canadian Institute of Distance Education Research (CIDER), the research arm of the Centre for Distance Education at Athabasca University, a Canadian Open University. One of the outcomes of interest for online researchers is that most the categories that emerged from the data in this study strongly correlated to the categories that are the focus of the CIDER research group and the Interaction Analysis Model (IAM) content analysis model developed by Gunawardena, Lowe, & Anderson (1997). The correlation was discussed in detail in Chapter 4 so will not be repeated in this section. These findings confirm the exsisting research (Garrison et al., 2002; Gunawardena et al., 1997) and demonstrate the knowledge building capacity and potential of asynchronous online forums to foster learning in higher education. Issues arising from these findings are discussed in the following section on further research.

5.8 Further research

Online learning has the potential to transform higher education and support global learning communities that can change traditional "place-based" education. However, online learning is still in its infancy and further research, such as this study, is required to investigate its learning potential and inform educational practice.

In this study the primary research question focused on investigating the contribution to student learning of asynchronous discussion forums in an online postgraduate course. Data were also analysed to investigate the secondary research questions regarding the characteristics that defined the interaction in asynchronous online discussion forums in this study and the respective roles of learners and teachers in asynchronous online discussion forums. This study showed that interaction in online, asynchronous forums did facilitate deep learning and knowledge generation. The grounded theory approach generated categories that in some instances, were unique to this case study, and provided a framework for the design and implementation of interactive online learning. One of the outcomes that is of interest for online researchers is that most the categories that emerged from the data in this study strongly correlated to the categories that are the focus of the CIDER research group and the Interaction Analysis Model (IAM) phase definitions (Figure 4.5). The existing CIDER and IAM categories were not used in this study, as online learning is still a new research field. I believed that those categories required validation from further research before being accepted as the defining categories for research into online discourse. I did not want the ease of using existing categories clouding my discovery of important variables that may have existed outside the defined categories. Therefore, a grounded theory approach was used to generate categories unique to this case study.

Also of interest to online researchers is that the grounded theory approach in this study generated the similar categories to those created by CIDER and IAM, despite the research being conducted without any reference to the CIDER categories. The correlation between the CIDER, IAM and my categories provides credibility to each set of research outcomes. It could be argued that the correlation between findings of independently conducted research studies means that these categories can more confidently be generalised to other online contexts. The categories and subcategories that emerged from this study, the IAM research (Gunawardena et al., 1997) and the practical inquiry descriptors and indicators (Garrison & Anderson, 2003), provide a means to assess the qualitative nature of learner discourse in asynchronous discussion forums. While the CIDER categories are now being applied in a number

of empirical studies, I suggest that further research in a range of contexts is required to confirm if these are "the" important variables in online interaction.

Further research in wider educational contexts is needed to extend this study regarding the effectiveness of online, asynchronous forums, given the limited size and time frame of the study. The use of research-based frameworks will provide structure to the research process and a common language for researchers. The effectiveness of design and facilitation models, such as the framework presented in this study, the Mayes (2002) framework; or the practical inquiry model, (Garrison et al., 2000) in achieving deep learning require further evaluation in a range of learning environments. The pedagogical framework, Figure 5.8, (Steeples et al., 2002) informs the design and implementation of online learning within an educational setting and could be used to provide an organising structure for research at an institutional level. It is suggested that research and application of online learning at institutional and practitioner level be conducted within a local community of practice, with links to wider national and international communities of practice.

This study identified a number of tensions created by the use of interaction in online asynchronous forums, which require further research. These research questions include:

- Does online learning constitute a new pedagogy or a modification of current pedagogy?
- Is online learning appropriate for all discipline areas, all levels of study or all contexts?
- Can online learning be offered in a way that is both educationally effective and cost efficient?
- What are the benefits and costs of requiring all students to engage in online discourse?
- Does it "add" to the traditional distance education experience through greater opportunities for interaction, or diminish the flexibility and accessibility?
- What educational approaches can solve the dilemma of conflicting demands between interactive, interdependent learning and individual learning pathways?

Research work in a range of e-learning initiatives is being conducted worldwide, for example JISC and CIDER. As previously suggested, educators should become innovators of new practices and adopt an active researcher approach (Boyer, 1990) to consistently reflect on and improve practice. Online teachers will benefit from building or joining an online learning community of practice where they can share information and build knowledge about pedagogy and practice.

5.9 Conclusion

This study revealed that an online learning community, fostered by teacher design and facilitation, created purposeful interaction that fostered and generated learning in the discipline area. The context created by asynchronous discussion provided an opportunity for both private reflection and public discourse, with the text-based discourse making visible and facilitating the critical learning processes of individuals and the student community. This research confirms the findings of CIDER in relation to the importance of the teacher's role and social and cognitive presence in creating communities of critical inquiry. Based on these findings, a framework for designing and facilitating interactive online learning, and recommendations and strategies for its implementation were also presented.

This study provided a practical example of the innovative learning capabilities of online learning. However, I believe we are only experiencing the beginning of exciting educational possibilities yet to be generated by e-learning. By supporting interactive learning across geographic and cultural boundaries and by facilitating critical learning communities, online learning can transform teaching and learning in higher education. It represents a new "learning ecology" (Brown, 2000) that is building communities of learners across the world. It is not about using new technologies to make existing practice more interesting by adding a bit of "techno gee whiz". It is about how to use technology to leverage resources and group dynamics in new ways in order to make fundamental changes in every part of the learning process (Kimball, 1998). The issue for teachers and learners is how to design and facilitate online learning environments to foster critical learning communities and engage in purposeful individual and social learning.

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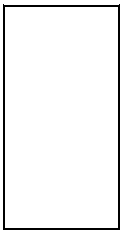

Appendices

A Appendix Letter: Consent of Participants

Date

Dear Participant in FET5601,

As the use of online learning is a relatively new development in education, research and reflection on the process is required explore the effectiveness of the online learning process in order to ensure high quality experiences for learners.

I have been personally involved in teaching online for several years. During that time the principles and practices I use have been changed or modified through constant consideration and review of my teaching. I have been able to do this because I have been able to reflect on the data generated each time I have taught my courses.

I am carrying out a research project to investigate the use of discussion forums for knowledge generation in FET 5601, *Designing Instruction for Flexible Delivery*. The project is focused on learning processes in the reflection discussion forums. In approaching you for permission to use the data generated in this course, I must make it clear that anonymity of all participants would be preserved at all times if any papers or reports are published in the public arena. Any information collected will be given coded identities, and your name will not be used once the original data has be collected and coded.

As previously mentioned, the goal of this research is to ensure high quality experiences for learners so your participation will be greatly appreciated. If you agree to participate in the project, please response by email, indicating that you agree to participate in the research project in the section at the end of this letter and insert your name and date. Alternatively, just hit 'reply email' and put 'agree to participate' in the header.

If you agree, then wish to withdraw from the project, you are free to do so. You are also free to refuse to participate, with no negative impact on your involvement in 81522. If you have a concern regarding the implementation of the project, you should contact me, or contact The Secretary, Human Research Ethics Committee USQ or telephone +61 7 46312956.

If you require any further clarification on this research project please contact me by email at mcdonalj@usq.edu.au

Jacquie McDonald

I agree or disagree to participate in the research project – please insert you name and the date.

B Appendix: Initial Twelve Categories and One Hundred and Twenty Seven Codes

Procedural

- Start thread
- Explain process
- Respond
- Indicate progress
- Request for information
- Confirm
- Strategy to deal with workload

Procedural Teacher

- Explain course design and learning process
- Strategy to deal with workload
- Suggested study strategy
- Indicates participant is ready to progress
- General message to learners
- Indicated intended follow up action
- Questions next step for learner
- Rationale for word limit
- Shared task
- Effective use of forum

Conversational Codes

- Communication convention
- Maintaining interaction
- Maintaining sense of community
- Maintaining sense of camaraderie /shared aims

Social Presence

- Sharing personal background
- Sharing professional background
- Indicating shared interest

Learning Community

- Confirming similar ideas
- Confirming similar thought processes
- Responds to call for others to participate
- Asking other learners for input
- Request for confirmation

Study Rationale

- Reasons for studying
- Expected outcomes

Teacher Guidelines

- Suggested study strategy
- Directed study strategy
- Confirming approach
- Indicates participant is ready to progress
- General message to learners
- Indicated intended follow up action
- Questions next step for learner
- Explains lack of interaction – late posting
- Rationale for word limit

Teacher Feedback on Reflection

- Positive feedback on reflection
- Positive comments on transfer of ID theory to context
- Positive comments on ID theory discussion
- Confirms relation to theory and practice
- Identifies key ID areas
- Directs learner to relevant literature
- Confirms presented ID analysis
- Confirms solid framework for project

Assessment Guidelines

Describes project
Comments on usefulness of the rubric

Personal Thought Processes

- Articulates thought processes
- Articulates own focus/interest
- Self label e.g. organic thinker
- Meeting of minds
- Sharing own learning strategies e.g. mind mapping

Technical

- Notes technical problem
- Problems with USQOnline
- Lost data
- Articulates frustration with system
- Confirms shared frustration
- Presents strategy to deal with technology

Knowledge Generation

- Share thoughts on theory
- Examples of theory in practice
- Shares examples of theory in own practice
- Application of theory in different contexts
- Example/non example
- Agree with learner argument
- Provide evidence of support
- Provide expert reference
- Shares ID resource
- Reflection on theory in practice
- Articulate own experience
- Articulate ID process
- Explain ID process in context (TAFE)
- Critique ID process
- Generalize from own experience to wider context
- Projection of ideas to new context
- Influence of individual on theory application
- Speculation of possible application
- Agreement with ID theory & practice
- Qualifies conditions of agreement with ID theory & practice
- Agreement with expert viewpoint
- Articulates guiding ID principle
- Articulates personal educational philosophy
- Explains application of personal philosophy in context
- Specifies chosen ID theory
- Specifies ID resources
- Specifies instructional strategies
- Specifies outcomes form application of instructional strategies
- Specify context
- Restricted by word limit
- Articulates benefits of ID theory in context
- Provides/presents contextual example of benefit of ID process
- Contextual shortcomings, plus ID application
- Presents solutions to contextual shortcomings
- Limited application of ID theory in broad context
- Changing education context creating need for ID

- Raises issues for application of ID – need to consider
- Presents suggested solutions
- Suggested suitable application of theory
- Articulates benefit of ID process
- Applies ID process, e.g. FEA
- Provides/presents contextual example of benefit
- Reflects on ID experience – relates to ID theory
- Articulates problems caused by lack of FEA
- Reflects on how ID knowledge is gained
- Articulates own approach to ID & relates to theory
- Reflects on context and its impact on application of ID theory
- Articulates guiding ID principle
- Articulates ID theory and its limitations in context
- Reflects on theory and practice nexus
- Judges worth of theory
- Justifies approach by referring to related ID theory
- Planned further application of theory
- Presents other ID theory to support argument
- Identifies ID concept
- Explains application of ID concept in practice
- Articulates context
- Discusses nature of learning
- Discusses differences between traditional and flexible learning environments
- Explains contextual constraints
- Cultural considerations when applying DI theory and practice
- Technology capability of the context
- Personal technology expertise
- Reflections on needs analysis of context
- Proposes approach to needs analysis
- Evaluates course readings
- Shares ID resources