Models of teacher information and communication technologies (ICT) professional development that empower multiliterate classroom practices.

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Statement

To the best of my knowledge and belief, the work presented in this thesis is original except as acknowledged in the text. This material has not been submitted in whole or in part, for a degree at this or any other university.

Sarah Prestridge
April 2007
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Publications

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2003 Progress Report on ARC Funded Research
Abstract

This thesis is concerned with examining principles underlying ICT professional development that can enable teachers to change their pedagogical beliefs and practices. In this study an ICT professional development model considered effective for its transforming potential is produced from the literature reviewed. This tentative theoretical model provides structure for the research design and analysis of data. An amended ICT professional development model that identifies a dynamic interplay of three professional learning activities within a core reflective process is presented as an approach to ICT professional development that enables teachers to see the transforming possibilities of ICT and guide changes in teachers’ beliefs and practices.

The research responds to an unmet need in the literature on ICT in learning and the concept of multiliteracies. Scholars in these fields acknowledge the impact of new technologies on contemporary education through discussion of new communication patterns that young people are engaging in, globalisation and cultural change, and the characteristics of today’s students who are growing up immersed in digital worlds. This has led to the realisation that teachers’ pedagogy needs to be transformed rather than making adaptations to teaching practices to accommodate ICT in learning. The study explores the idea of a transformed pedagogy that effectively infuses ICT in learning as an outcome of the implementation of an ICT professional development model. A transformed pedagogy requires ICT professional development to engage teachers with transforming intention. Models of ICT professional development have been found to focus on ‘re-tooling’ intentions, that is they intend to augment the existing curriculum by developing teachers’ competencies in ICT skills focusing on specific types of ICT applications. What is called for by the concept of multiliteracies and the needs of our digital clients is the move to a model that will enable teachers to see the transforming possibilities of ICT.

Working with teachers from the Suncoast Cyberschools, the implementation of the theoretical ICT professional development model was examined in two stages. In Stage 1 teachers were interviewed and observed to establish their existing beliefs and practices in regard to ICT in learning, multiliteracies and ICT professional development. These data had an informing role in the collaborative design of an ICT
professional development activity for implementation and examination through action research methods in Stage 2.

Conceptualising a transformed pedagogy and transformative ICT professional development are the purposes of this study. The desired outcome of ICT professional development is to enable teachers to transform their pedagogy. Indication of movement towards a transformed pedagogy was found when teachers embraced pedagogical beliefs and practices representative of three guiding ideas: mindset, bifurcation of literate practices and the infusion of ICT. Mindset refers to a particular way of thinking about and living with technologies. A teacher displaying a digital mindset understands the ubiquitous fashion in which today’s students access technology and caters for these different learning needs. The bifurcation of literate practices identifies the need for teachers to acknowledge students as users and creators of information rather than consumers and receivers of information. This is evident when teachers collaborate with their students to create knowledge through complex learning tasks. Lastly, the infusion of ICT refers to the way teachers use ICT in learning. The infusion of ICT was characterised by a learner-centred pedagogy that blends instructional and constructivist teaching approaches, where ICT are transparent to the learner and seamlessly integrated in learning experiences.

To enable a teacher to move towards a transformed pedagogy that effectively infuses ICT in learning, a dynamic interplay of three professional learning activities is required during ICT professional development. The three professional learning activities of investigation, reflection and constructive dialogue together form a core reflective process. This thesis argues that teachers can transform their pedagogical beliefs and practices when ICT professional development involves these activities within a core reflective process. It has been found that the greatest potential for pedagogical transformation is achieved when the interplay of the three professional learning activities requires a teacher to focus on pedagogical investigation, making ICT skill training contingent on classroom inquiry. Classroom investigation occurs simultaneously as teachers engage in verbal reflection supported by their written reflection. This can be actioned when required through critical discourse with peers and critical friends in collegial groups internal and external to the teacher’s classroom. Elements internal to the school such as leadership, school vision and structures, and
elements external to the school such as experts and workshops or events are linked to activities in the core reflective process.

The finding that a transformative approach to ICT professional development requires the dynamic interplay of three professional learning activities has important implications for the design of teacher ICT professional development. The capacity to enable teachers to transform their practice is reduced if any one of the three professional learning activities is not present during ICT professional development. The capacity for transformation is also reduced if teachers are unable to engage when required with each of the professional learning activities. The understandings that emerged in regard to defining a transformed pedagogy in which teachers effectively infuse ICT in classrooms provides scholars, educators and curriculum designers a further framework for thinking about ICT pedagogy. This study presents to classroom teachers a means of systematically changing their practice.
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Chapter One
Introducing the study

My research is concerned with understanding and conceptualising transformative teacher information and communications technologies (ICT) professional development. The study involves in-depth research to develop a conceptual understanding of what is required of teachers to implement the concept of multiliteracies. It then involves the design and implementation of a model of ICT professional development that is likely to result in transformative multiliterate classroom practices. This research seeks to provide insights into the question: *What models of ICT professional development empower teachers’ multiliterate classroom practices?*

1.1 Background

In the background section I provide the rationale for this study. Three perspectives are addressed including insights embodied within multiliteracies and ICT as reasons for the need to transform pedagogy; policy direction for ICT professional development and literacy education; and the move from the ‘retooling’ of teachers to transforming teacher outcomes within ICT professional development. In this research ICT are considered to embrace educational technologies and computer-related technologies.

1.1.1 The need to transform pedagogy: It has been repeatedly suggested (Gee, 2000; Hagood, 2000; Wright, 2000) that we are living in a rapidly changing world, to the extent that it has been termed ‘New Times’ (Luke, 1998; Luke & Elkins, 1998). Technology has played an important role in this acceleration of change (Lankshear & Knobel, 1997; Levy, 1997; Pelgrum, 2001; Thakkar, Bruce, Hogan, & Williamson, 2001) acknowledged by the phrase ‘the age of ICT’ (Kenway & Nixon, 1999). ICT has permeated our work places, our cultural practices and our private lives. Basic communication patterns and processes, even what it means to be literate, have changed (The New London Group, 1996; Unsworth, 2002). No longer is the printed word the focus for constructing and conveying meaning (Durrant & Green, 2000; Healy, 2000; Tweedle, 1995; Wright, 2000). ICT has enabled a multiplicity of communication channels, where images, icons, sounds and words together can create
dynamic texts that are not time or place dependent. With these changes has come the realisation that classroom pedagogy needs to be transformed (Lankshear, Snyder, & Green, 2000; Luke, 2000; Millard, 2003; Ramsey, 2000) to acknowledge and cater for the demands brought about by ICT for new learners, new workplace practices and new literacies.

The notion of transforming pedagogy is central to this research. The research literature explored in Chapter Two clearly indicates that to reach a stage where ICT are considered ubiquitous in the learning process, pedagogy needs to change from a traditional didactic approach to an approach that adopts learner oriented inquiry while blending in direct instruction when required. Pedagogy must also move beyond an assimilation of technologies into existing practices. Rather the whole notion of pedagogy needs to be reconstructed in line with social and cultural shifts for the infusion of ICT in learning. Transforming pedagogy also invites the symbolism of renewal, divergent pathways and continuous change also represented in technological advances. Pedagogy needs to be responsive to dynamic and currently unknown learning needs and teaching environments. Reasons for the need to transform pedagogy examined here include changes in literacy education and the emergence of a pedagogy of multiliteracies; globalization and cultural change; and the existence of a digital mindset.

**Pedagogy of multiliteracies**

The concept of multiliteracies presents pedagogy in new ways. The New London Group (1996) advocate that their pedagogy of multiliteracies is a transformative approach to the teaching of literacy. A pedagogy of multiliteracies was coined to focus on the emergence of a multiplicity of communications channels. ICT in this context is considered a reason to transform classroom practices. This is evident in statements such as “new communications media are reshaping the way we use language” (p.64). Multiliteracies is a term used to help teachers rethink literacy education in contemporary times. It is a complex concept that can easily be misinterpreted in a practical form as traditional literacy pedagogy that integrates ICT (Prestridge, 2005).
Luke & Elkins (1998) bring to attention the fact that many of the current literate practices in classrooms are products of the early 20th Century. The teaching of literacy genre is one such example, which provides a backbone to current literacy curriculum in Australia. Teachers structure units of learning around particular prose such as newspaper articles, persuasive text, autobiographies, poetry, reports, letters, ensuring that at each grade level these generic structures are developed from year to year and reproduced in some form. Are these practices relevant to a pedagogy of multiliteracies? New Technologies are transforming ‘older’ styles and producing hybrid texts. Unsworth (2005) identifies hybrid texts such as hypertext-narratives and game-narratives as requiring different reading and writing requirements, described by Luke (2003, p.399) as involving “parallel processing of multimodal text-image information sources”. These new literacy ideas raise questions about the validity of teaching traditional genres that may not exist in future work practices. What is the value of teaching the structure of a news report for a consumer society that typically does not ‘read’ the newspaper? Conversely, do children need to know a range of traditional genres to be able to produce hybrid texts or to read in these multimodal environments, therefore empowering them to critically examine the origins and structures that inform the new constructs? These questions are problematic within the reconstruction of current literacy education. However, the concept of multiliteracies and the “constantly changing world that continues to be shaped and mediated by the new information and communications technologies” (Snyder, 2002, p.173) strongly indicates a transformation as opposed to an adaptation of traditional pedagogical practice.

**Globalization and cultural change**

The issue of transforming pedagogy needs to be considered as responsive to the advent of globalization and cultural change. Today’s digital world is accessed with speed and ease by youth who dwell as ‘insiders’ within a digital culture. Globalisation has created new cultural, social, political, professional and technological contexts that require new ways of expressing oneself and interpreting others. The impact of ICT signifies a fundamental change in our life worlds. Spender (1995) points to similarities between the impact that the print revolution with the advent of the printing press had on society and the impact that the information revolution brought on by the internet and electronic media is currently having. What we are experiencing is a
bifurcation in social experiences, diverging towards users and creators of information rather than consumers and receivers of information. We have moved from a print-based culture that consumes knowledge for power and influence to an electronic generation that makes and uses information. In this multimodal world, educators are now advocating the need for responsive change in curriculum and teaching practices attuned to students being active creators of knowledge (Alvermann, 2002; Andrews, 2004; Chandler-Olcott & Mahar, 2003; Lankshear & Knobel, 2003b; Sefton-Green & Buckingham, 1998).

**Digital mindset**

Advocates of new technologies have long described students in our classrooms as ‘aliens’ (Green & Bigum, 1993) or “the hackers and the crackers…they’re the natives” (Tunbridge, 1995, p.66). These students who, having grown up with new technology, are not only comfortable in cyberspace but are “in tune and largely at ease with the dizzy pace of change, with the development of new technologies and with social and economic shifts” (Lankshear & Bigum, 1998, p.18). These new clients work in different ways with technology and have different mindsets, a term evident in Lankshear’s work (Lankshear & Bigum, 1998; Lankshear & Knobel, 2003b; 2003c). These digital mindsets are different from those held by the educators controlling how technologies are used in schools. Research suggests that there is clear disparity in scale and nature between the way young students use new technologies in and out of school (Meredyth, Russell, Blackwood, Thomas, & Wise, 1999). This in school use of ICT is supported more recently by Becta (2004b, p.7) in a report on the research relating to ICT and attainment. The report states that many studies have shown that there was a limited range of ICT used in subject areas and that teachers’ pedagogy demonstrated an “inappropriate or superficial” use of ICT resources especially relevant to the age of the pupils. Both Lankshear and Bigum (1998) and Spender (1995) reiterate this generational divide, explaining that teachers who are generally over twenty-five, who have not grown up with new technologies and who are therefore print-reared, do not have the history and experiences to be able to understand virtual worlds, and are therefore challenged at providing realistic and relevant learning opportunity that incorporates ICT. They are considered as having an immigrant mindset, acknowledging that they can only ever migrate into a digital
world. This conflicting circumstance is a significant contributor to pedagogy that ‘adds-on’ ICT and is a significant issue for ICT professional development.

A pedagogy of multiliteracies, globalisation and cultural change, and a digital mindset substantiate the need to transform pedagogical practices rather than assimilate ICT into existing practices. Lankshear and Bigum (1998, p.12) have described pedagogical approaches that assimilate ICT as traditional teaching that has been “technologised”. They state that little has changed in teaching and learning since the 1970s and 1980s, where the traditional ‘project’ dominated and is now just being digitalised. In classrooms this may look like the established history or geography cardboard project with topics such as ‘The overland Australian explorers’ or ‘Countries of the world’ changed to a powerpoint presentation. The learning process where information is written under given topics remains the same, the use of technology provides a change in the publishing medium. This approach to integrating ICT has been labeled as “adding-on” (Prestridge, 2005, p.10) where ICT are assimilated into existing pedagogy. Spender (1995) believes that this traditional process is based on educational theory that is founded on a ‘body of knowledge’ principle in which teachers master information for the purpose of passing it on to their students. She believes that this teaching/learning model is out of ‘sync’ with the real world, irrelevant for students and fast becoming unworkable. Fabry and Higgs (1997) have claimed more directly that teachers characterised by this pedagogical approach have to radically change their teaching to use ICT effectively.

ICT professional development is perceived as an avenue for pedagogical change based on the notion that the implementation of ICT will signify subtle shifts in expectations of schooling in the 21st Century and that alternate modes of using ICT in classrooms can be modeled in deliberate approaches within professional development programs (Russell, 1999). O’Rourke (2001, p.13) supports this premise, but signifies that it is more effective to “focus on issues of pedagogy than on the technology itself” and that teachers’ “confidence in change…rather than evidence of competence” (Loveless, 2003, p.324) with ICT in continuing teacher professional development, has greater potential for transforming outcomes. Simplistically, for ICT to be used effectively in contemporary classrooms to its greatest potential, ICT professional development must focus on the transformation of pedagogical practices. In an
electronic age, education must cater for the “digital natives” (Prensky, 2004, p.1) or “net-age” children (Unsworth, 2005, p.1). It is no longer appropriate to believe that ICT competency training for teachers in computer applications so that they in turn, can up-skill their students, is an effective educational or professional development model especially when over ten years ago Mackey (1994, p.17) advised us that we already have “multi-media expertise” in our classrooms. What needs to be developed and implemented is an ICT professional development model that fundamentally changes a teacher’s pedagogical beliefs and practices to acknowledge and understand a digital culture, challenge pedagogy that is grounded in a print culture and provide opportunities to explore alternative approaches to working with students that will lead to the infusion of ICT in learning.

In this section I have provided a rationale for the need to transform a teacher’s pedagogy through ICT professional development. In the next section I examine the policy direction for ICT professional development and literacy education and its impact on teachers’ pedagogical practice. This will further substantiate the need for changes in teachers’ practice and indicate relevant issues associated with ICT professional development.

1.1.2 Policy direction for ICT professional development and literacy education: The demand for the integration of ICT into pedagogy has precipitated a worldwide concern for teacher professional development in ICT. The International Society of Technology in Education (ISTE, 2000) devised performance indicators for teachers based on a national consensus in the USA on what teachers should know and be able to do with technology. The National Educational Technology Standards project (NETS) was designed to guide educational leaders in recognising and addressing the essential conditions for effective use of technology, placing importance on type of outcomes and direction for ICT professional development. ICT professional development activities such as Train the Trainer workshops (ISTE, 2006) are currently supporting the implementation of these standards. The Centre for Educational Research and Innovation (CERI) study of in-service training and teacher professional development (OECD, 1998) revealed the need for a redefinition of the attributes required by both teachers and students as a result of the growing importance
of ICT and the acknowledgement that what currently passed for professional development was “fragmented and fleeting” (p.15). In a later analysis more focused on ICT professional development, CERI indicated that if ICT are to make an impact on the nature of school learning, in-service professional development is crucial (OECD, 2002). One of the major initiatives under the UK government’s ICT in Schools project, was to provide training for teachers to enable them to use ICT effectively in their work (OFSTED, 2002). Major findings indicate that the training was “unsatisfactory in its overall effect” (p.3) as it failed to build on teachers’ ICT skills or enable them to tackle pedagogical issues adequately.

In Australia, as elsewhere, rhetoric about ICT professional development has circulated since the 70’s. For example, a 1975 Australian document entitled Computers and Teaching in Australia recommended the training of both teachers and support personnel (Wearing, Carss, & Fitzgerald, 1975). Since then both Commonwealth and State educational bodies have been repeating similar messages. For example in (1984) the Commonwealth Schools Commission recommended that professional development activities should enable teachers “in a broad range of curriculum areas to develop skills and understandings in the use of computers … and their applications across the curriculum” (p.5). In (1986) the Department of Education, Queensland recommended “professional development to ensure that all teachers are computer literate and develop competencies in the instructional use of computers” (p.1). In 1995 they again noted that “teachers will require ongoing professional development to assess the potential of computer hardware and software when planning, implementing and evaluating classroom programs” (p.3) and in 1997 under their corporate identity as Education Queensland, they specified ICT skills that teachers must obtain in the areas of curriculum applications, school planning and student-centered learning.

More recently, documents such as Learning for the Knowledge Society (Australian National Training Authority, 2000), Quality matters, Revitalising Teaching (Ramsey, 2000) and Real Time: Computers, Change and Schooling (DEST, 1999) prioritise the need for ICT professional development that impact pedagogy, while others such as Raising the Standards (DEST, 2002) propose an ICT competency framework that can be used for ICT professional development purposes. The latest national ICT policy for both Australia and New Zealand provides a set of strategic principles for pedagogy
that embraces the opportunities for learning in an online world. It is titled ‘The Pedagogy Strategy’ (MCEETYA, 2005). The strategy links pedagogy with ICT as an innovative approach by stating:

Pedagogies that integrate information and communication technologies can engage students in ways not previously possible, enhance achievement, create new learning possibilities and extend interaction with local and global communities (p.2).

The Pedagogy Strategy reiterates the importance of professional development in ICT that was directed in Australia’s Teachers: Australia’s Future (2003) recommendations. These recommendations concluded that all teacher education programs must prepare prospective teachers for the digital age and that opportunities be created for teachers to upgrade their ICT skills and knowledge.

ICT are referred to extensively in educational reform policy documents that link multiliteracies to redefine education in new ways (Department of Education, 2000a; Education Queensland, 2000b). The first policy document The New Basics Project (2000b) requires teachers to adjust their teaching programs around the concept of ‘rich tasks’ that is drawn from the philosophical and psychological models of Dewey, Vygotsky and Freire, and which confronts the problems of unfocused pedagogy (Freebody et al., 1996), fragmentation and overcrowding of the curriculum, and limited transfer of training. The document employs the concept of ‘multiliteracies’ as defined by The New London Group (1996) as being appropriate for a networked society that requires the use and blending of various kinds of literacy simultaneously, the mastery of many different codes, and the capacity to switch between and blend these various literacies.

The second policy document Literate Futures (2000a) redefines ‘literacy’ in broad, future-oriented terms as:

Literacy is the flexible and sustainable mastery of a repertoire of practices with the texts of traditional and new communications technologies via spoken language, print, and multimedia (p.3).

This requires teachers to maintain their commitment to traditional standards of mastery with reading and writing while blending these with standards of mastery of new technologies, new literacies and new ways of expression and interpretation. In
this structure it is considered useful to think of literacy in terms of a ‘repertoire of practices’ that “like the skills of a musician or tradesperson, expand and develop as one faces new technologies, techniques, possibilities, problems and contexts” (p.3).

I have provided further validation for the need to transform pedagogy in this section. Evident in the policy direction for professional development in ICT and literacy education is the movement in emphasis from teacher’s competency gain to pedagogical change. Some of the issues associated with ICT professional development and literacy education are the movement towards the need for teachers to meaningfully integrate ICT into classroom practice, the requirement that teachers engage with the new concepts of ‘rich tasks’, ‘multiliteracies’ and ‘repertoires of practice’, and the integration of ICT as an integral part of current notions of learning.

In the final section I now discuss the move in the literature from a ‘retooling’ to a ‘transforming’ orientation for teacher ICT professional development.

1.1.3 Re-tooling to transformation in ICT professional development:

One of the perennial barriers to the integration of ICT into teaching and learning is considered to be that of teacher professional development (AAUW, 2000; Schofield, 1995; Sherwood, 1993; Zammit, 1992). The literature provides numerous examples of what are claimed as successful models of ICT professional development (see for example, Bottino, Forcheri, & Molfino, 1998; Holzberg, 1997; Taylor, 1997; Williams & Dundas, 1996). However, most of this professional development is driven by what Watson et al. (1999) described as ‘re-tooling’ intentions. That is, they intend to augment the existing curriculum by providing specific skills and competencies focused on specific types of ICT applications. Skill audits such as that discussed above (Meredith et al., 1999) and a similar UK study reported by Denning and Selinger (1999) are predicated on this re-tooling intention. Most of the current Australian teacher professional development documents with respect to ICT have this ‘re-tooling’ intention. For example, Queensland’s Schooling 2001 outlined above, is directed towards improving teachers’ ICT competency levels. NSW’s Technology in Learning and Teaching, Tasmania’s Learning Technologies Plan, ACT’s Plan for IT in Learning and Teaching and South Australia’s Plan for IT 1996-2001 all identify teacher professional development in their goals with a commitment to integrating ICT.
into the existing curriculum. This, in itself, is valuable in an introductory sense and as a confidence building exercise for teachers, and in fact Queensland teachers have applauded the specificity and clear guidelines for ICT professional development detailed in *Schooling 2001*, but it does little for transformation of pedagogy.

Currently, in Australia there are many school based initiatives that provide teachers with the opportunity to partake in ICT professional development. School based approaches manage the scope, form and extent of ICT professional development to meet the needs of local teachers. Many of these initiatives are funding dependent where government schools must provide documentation of teacher professional programs as well as future plans for ICT infrastructure (Education Queensland, 2004). Such focused ICT professional development, coupled with an increase in accessibility to better hardware and software that has occurred in schools in general over the past ten years, has still not yielded substantial evidence of transformation of pedagogy (DEST, 2001). Presently many teachers and schools are in the ‘adoption’ stage (Taylor, 1998) of an ICT professional development program where teachers adapt current intentions and practices in teaching and learning to a technology rich environment. In Taylor’s terms, they are integrating ICT into their existing teaching practices. If we have any hope of a transformative outcome as required by the transforming intention of *The New Basics Project, Literate Futures* and the concept of multiliteracies, and importantly for the connection needed with our digital students, ICT professional development intentions need to move from re-tooling with infrequent curriculum integration to a model that will enable teachers to see the ‘transforming’ possibilities of ICT.

In this background to my study I have provided clear reason for the need for ICT professional development to enable teachers’ to transform their pedagogy. These reasons include the changes in literacy education, globalization and culture, and the existence of a digital mindset; the focus of ICT professional development on pedagogical change; and the direction from literacy documents that require teachers to engage with new concepts that are redefining current notions of learning. ICT professional development needs to enable teachers to engage with the transforming
possibilities of ICT. In the next section of this chapter, I describe the research setting and my place within it.

1.2 Description of research setting

The intention of my research project is to provide insights into what is required from teacher ICT professional development to ensure that pedagogy is transformed. This research responds to changing expectations of the current teaching cohort in Queensland, Australia. The following description of the research setting provides details of the context for the study and the position of the researcher. The use of first person is warranted in this section as I am fully implicated as an agent in the study.

1.2.1 Research context: An Australian Research Council (ARC) Linkage Grant initiated the union with my school research context. The Industry partner for the ARC research grant was a coalition of schools called The Suncoast Cyberschools. The Suncoast Cyberschools are a group of twelve schools located on the Sunshine Coast, to the near-north of Brisbane. This group of schools is dedicated to supporting the independent learner in the 21st Century and its intention is to act as a catalyst for sharing, building relationships and development within school communities. In their promotional material, the Suncoast Cyberschools state that they are “committed to promoting the concept of lifelong learning, embedded in a seamless learning environment within their education system through the networking of the learning communities”. There are two state high schools and ten state primary schools in the cohort. Eight of the ten primary schools volunteered teachers for my research.

The stated purpose of the Suncoast Cyberschools Project is to establish an education model for communities of the future. This is to be approached in the following three ways: through the exploration of a curriculum that is embedded in authentic pedagogy and is aligned to a notion of community; the concept of a learning community; and enhancing teacher professionalism. The Suncoast Cyberschools have a formal memorandum of understanding with the University where I am a student. The purpose of the alliance is to promote: the concept of lifelong learning; a curriculum embedded in authentic pedagogy which aligns with community needs; and the professionalism of teaching. Under this memorandum, the Cyberschools are committed to providing 'an
opportunity to take part in programs for staff exchange, student support and research’ while the University has agreed to ‘audit courses, do research and take part in teaching programs’.

At the beginning of this research, the Suncoast Cyberschools were in their second year as trial schools for Education Queensland’s *New Basics project* (Education Queensland, 2000b). As outlined in the previous section, *The New Basics Project* requires deep engagement with the concept of multiliteracies and new pedagogical approaches to teaching and learning that both assume and specifically identify transformative teaching practices involving ICT (Education Queensland, 2000a). This research project dovetailed neatly with the professional development needs of the Suncoast Cyberschool teachers. A well researched ICT professional development model was needed to enable teachers to embrace multiliterate classroom practices where ICT was seen as integral.

The teachers in this research are the Principals, classroom teachers and computer coordinators within the eight primary schools of the Suncoast Cyberschools. An Anglo-celtic heritage where English is the first language, dominated this setting. The primary schools varied in size from a relatively small school with 94 pupils to the largest school with 414 pupils. There was also a school that catered for special needs students such as those with intellectual or physical handicaps. There were divergent philosophies driving student clusters such that one school had family grouping where children span three year levels in the one classroom; five schools were predominately composite groupings; while the other two schools employed traditional structures where children of the same age were placed in a single year level group. There was also divergence in the ways teachers connected, either in partnerships where planning and teaching were combined in a teaching team for a grouping or as an individual classroom teacher where planning was connected across the year level but teaching was independent. More specific analysis of the teaching demographic such as age, gender and teaching experience is provided in Chapter Four.

A description of the research setting must also take into account myself as the researcher as I am the instrument for data collection and analysis (Erlandson, Harris, Skipper, & Allen, 1993). In the remainder of this section I will provide some
background information on myself as I played an influential role with the teachers who participated in this study, in its direction and the motivation to investigate ICT professional development. Also covered in this section are the tensions that were generated by involvement in a partnership funded by industry partners and an external research agency.

### 1.2.2 The researcher and my research:

Background information includes the beliefs and understandings I hold in regard to ICT professional development and their implications. Tensions generated from the ARC linkage grant are discussed to provide the reader with information on further issues that had a bearing on this research.

#### Beliefs and understandings

My beliefs and understandings played a role in shaping this study. Lincoln and Guba (1985) support this pre-admission, acknowledging the fact that no researcher could begin completely value-free, signifying that pre-conceived notions or tacit knowledge pertaining to the study become part of the emergent process. This research is about ICT professional development. It seeks to provide insights into professional development processes that can support teachers’ professional growth and understanding about a complex issue (multiliteracies) with complex tools (ICT). It requires pedagogical change to occur in teachers evoking further complication and emotive responses. The research utilizes action research methodology collaboratively with teachers to design, implement and evaluate an ICT professional development program. My beliefs and understandings about ICT professional development impact on every facet of this research from the initial conception, the design, choice of method and analysis and even in the interpretation of the findings. The research is equally beneficial for my personal and professional growth and for the substantive theoretical output it provides.

My professional background reveals a career path from classroom teacher to a support role in ICT in learning as a school computer coordinator, an ICT curriculum advisor at a district level and as a tutor/lecturer for pre-service and postgraduate students. My experiences and understandings about ICT professional development have led me to believe that little is gained through one-off workshops or with a focus for ‘re-tooling’
teachers in computer literacy. Corcoran (1999) attaches value to workshops for promoting awareness of new practices or curricula but acknowledges little evidence of impact on practice. Ramsey (2000) succinctly states that:

"Approaches to teacher training which are primarily functionalist, giving teachers only essential skills of a mainly technical kind, are unlikely to bring about long-term change in classroom practice (p.208)."

What may be the case for this lack of transformation of knowledge and understanding gained from a ‘re-tooling’ model, is that the context and process of training is at odds with the view of teaching and learning that is present within current reform agendas (Prestridge & Watson, 2002). There may also be disparity with the pedagogical beliefs and practices presented in the professional development activity compared to those held by the classroom teacher. Mismatches such as these in needs, wants and intentions are not uncommon in any form of professional development, and hinder transformative potential.

I believe that competency training, a ‘re-tooling’ element, is an important part of ICT professional development. The need for some form of training in a software program or device may be a necessary component of ICT professional development. For some teachers with an immigrant mindset (discussed previously in digital mindsets) who need to gain confidence and experience technologies, some competency training is important. However, the focus of competency gain should be on learning how to approach and improve capacity with ICT applications through curriculum investigation. Importantly, ICT professional development must go beyond the link with classroom practice and the common advocacy of using computers to achieve curriculum goals or as Ramsey (2000, p.208) proclaims, to teach “technological literacy”. This term indicates the coming together of technology and literacy in a mechanical sense (Green & Bigum, 2003). This mechanical approach to integrating ICT and literacy suggests the accommodation of technologies in existing approaches to the teaching of literacy, meaning traditional approaches to teaching have just been technologised. It is the premise of this research to advocate beyond an adding-on approach. ICT must become infused or invisible within the classroom. The preposition used beside ICT, learning ‘with’ ICT, must be removed so that we assume them to be inextricably linked. The notion of digital mindsets assumes new forms of teaching and learning that are diametrically opposed to print reared teaching practices.
Furthermore, ICT professional development must empower teachers to be self-reflective critical practitioners who do not just accept technology for technology’s sake in their classrooms. If the best outcomes are sought for each student, then teachers need to be critical about their own practice, analyse the use of ICT in their classrooms, experiment and discuss outcomes in a professional manner and seek to unlock the educational potential within these innovations. Fullan (2001) supports this notion of professional development as part of daily practice by stating that:

professional development is not about workshops and courses; rather it is at its heart the development of habits of learning that are far more likely to be powerful if they present themselves day after day (p.253).

The notion of ‘habits of learning’ imparts a greater capacity for ICT professional development to unlock teachers’ beliefs so that idiosyncratic practices are exposed and tested for informed pedagogical renewal as part of what counts as teaching.

The beliefs and understanding about ICT and professional development discussed here have come from my professional practices and an interpretation of literature in the field. They are motivational in the sense that such ideas, if put into practice, may enable today’s digital students greater possibilities to engage with technologies seamlessly and creatively to challenge and extend thinking. These ideas may provide teachers with effective ICT professional learning opportunities that empower them to choose pathways and be intrinsically driven to direct change in their own beliefs and practices. These ideas also place value on the importance and divergence within the field of ICT professional development which has long resided under the professional development umbrella. In directing this research, these ideas have focused my attention on the kinds of literature that need to be reviewed; have motivated me to seek a method that is grounded in transformation and re-conceptualisation, one that would be flexible and responsive to diverse pathways; and have helped me bring to life the voices and accounts of real teachers that inform and design ICT professional development.

As the researcher, changes in my beliefs and understandings are inevitable. Lather (1986, p.263) explains that the research process can “enable people to change by
encouraging self reflection and a deeper understanding of their particular situation”. It is with this opportunity through self reflective processes embedded in my choice of method that growth in my knowledge of ICT professional development will occur. In Chapters Three, Four, Six, Seven and Eight of this dissertation, details of my collection and analysis of data are provided. It must be acknowledged from the start that as the researcher I am the ‘instrument’ of data collection and it is through me that data are analysed and interpreted. It is through researching itself, the questioning, exploring and the reflective processes that stimulate clarification, which development of further understandings occurs.

**Tensions within this research**

This section discusses the tensions that arose in managing an ARC Linkage research project and the implications it had for the research process. At the conception stage, tension was generated from three different avenues: the nature of the area of study; the qualifications of the researcher and the design of the research project. Each of these is discussed respectively.

**Nature of the area of study:** An ARC Linkage Grant provided funding for an Australian Postgraduate Award Industry (APAI) scholarship. This award essentially provided the funding for me to engage in research for this PhD dissertation. As Linkage Grant partners, the Suncoast Cyberschools were required to make a considerable financial contribution for the two years of its duration. As stated at the beginning of this chapter, this research is concerned with transformative models of ICT professional development that empower teachers’ multiliterate classroom practices. At the time of project conceptualisation, the schools were involved in the trial of curriculum, assessment and pedagogical reform called *The New Basics Project*, outlined previously in the research context. This approach to teaching and learning both assumed, and specifically identified, transformative teaching practices involving ICT. To implement this reform effectively, the teachers in the schools required extensive professional development that would result in transformative classroom practices. In addition, *The New Basics Project* included in its curriculum organisers, the concept of multiliteracies (New London Group, 1996). Multiliteracies is a complex term not well understood at the time. A lack of understanding about this concept, the requirement to work towards multiliterate classroom practices, as well as
confusion about how multiliteracies related to ICT contributed to the tensions for the teachers.

While the Cyberschools and I had a shared interest in the research topic, rather than creating commonality, tension was generated from the different perspectives and outcomes required from this research topic. From my perspective, this was a research topic that would enable the successful completion of PhD study. However, the schools, though supportive of this aim, perceived this research project as providing benefits in three ways: meeting the professional development needs of their teachers in ICT; the development of understanding about multiliteracies; and the prestige and recognition of being part of a research project from which I would publish at an international level. Brennan, Kenway, Thomson and Zipin (2002) note competing interests over “what counts as useful and worthwhile knowledge” (p.77) as a tension in educational research.

Qualifications of the researcher: A second significant tension from the perspective of the Cyberschools related to my qualifications and experience as the APAI recipient, and thus the person with whom they would have the most interaction. My identity was a significant factor in the schools’ willingness to be involved in the research and thus to sign the ARC grant application. My qualifications and expertise in ICT professional development formed an ideal bridge between the disparate interests of the parties in the research. At this early stage of conceptualisation, the tension between the researcher’s academic concerns and the need for practical outcomes for the Cyberschools was apparent but somewhat ameliorated by my qualifications and experience in both the academic and practical field.

Design of the research project: The third source of tension during the conceptualisation stage was the design of the research which required me to collect data initially and then implement an ICT professional development program. Tension was generated from two aspects of the research design. Firstly, as this project required the cooperation of the Cyberschools, the usual freedoms available to PhD students regarding pace and order of undertaking research tasks were somewhat curtailed. The schools were willing to be involved with the project because it dovetailed neatly with their professional development needs as trial schools in The New Basics Project.
referred to earlier. Because of the urgency of getting professional development under way it was necessary to prioritize identification of baseline understandings with respect to ICT and multiliteracies. This required data collection to begin almost at the same time as I commenced full-time study. The intensity of data collection left little time for literature and methodological review, and heightened tensions in regard to academic commitments associated with higher degree study. This tension caused by “competition between the industry partner and the university for the time, loyalty and identity of the researcher while at the same time seeking to reach a settlement satisfactory to both parties” was also noted by Brennan et al. (2002).

The other cause for tension came from the extent of the input required of the teachers. These teachers were not party to the original agreement that was brokered between the investigators and the principals in the Cyberschools. The mobile nature of the teaching profession, aligned with the time lapse in setting up the research partnership and applying for and being granted the research funding, mitigates against a desirable relationship between researcher and participant. Further, funding the necessary teacher release required for interviews, surveys, and incidental discussions as part of data collection, as well as for collaborative professional activities as part of the action research process, caused tension for some of the participating schools, even though both cash and in-kind support for activities such as these were detailed in the initial legal agreement. This tension was partially alleviated by frank financial discussions between the parties.

The effective management of these tensions was important to ensure the best possible outcomes for all parties concerned. The most effective way to manage the tensions arising in the project was to build a mutually respectful relationship between myself, as researcher, and the teachers through consistent contact in a face-to-face mode at the onset of the research project. Bridges were built through the initial collection of data. The tensions that initially were generated from differing needs and interests were reconciled by my consistent face-to-face presence even though ICT professional development (the major reason for the industry partner commitment to the project) was not provided during this time. The only negative point that arose from this consistent contact was competition for time, in this case, a limitation of the usual
freedoms to PhD students regarding pace and order of undertaking research tasks. Lastly, in the second stage of the research, when the design and implementation of an ICT professional development model occurred, the specific needs and interests of the Cyberschools were catered for. The competing roles I held as PhD student and professional development provider were able to merge by ensuring that when professional development was provided, data collection also took place. This dual role enhanced the supportive relationship between the teachers and myself.

This section has provided information I feel is important to this research. I have explained my beliefs and understandings about ICT professional development and have provided an explanation of the tensions that were occurring during the research and how these were managed. In the final section of this chapter I provide an overview of the organisation of this thesis.

1.3 Organisation of dissertation
My dissertation is an unfolding story of commitment to enabling teachers to unlock excitement within new digital worlds. It is about inspiring teachers to want to change, to be eager to learn and to understand the addiction and comfort levels their digital counterparts have with emerging technologies in the classroom. It’s about changing the way we think about ICT. Rather than as devices or tools to learn with, ICT must become infused with the space and dimensions that globalise learning. With the unimaginable learning opportunities available today, it is an exciting time to be a teacher, a time full of pedagogical potential. Through this story I offer teachers the ability to harness that potential.

This dissertation is organized to tell the story of the emergence of a transformative ICT professional development model. Like a story it starts at the beginning, the literature investigation (Chapter Two) into what makes ICT professional development transformative. Once the tentative theoretical model emerges, then a structure is put in place to investigate it (Chapter Three). The theoretical ICT professional development model provides the structure for the design of this study. Stage 1 of the model requires data to be collected and analysed to establish the existing pedagogical beliefs and practices of teachers. This is presented in Chapter Four. These data had an
informing role. They were used by the teachers and me as a research team, to design and implement an ICT professional development program guided by the theoretical model established in the literature review. This ICT professional development program was called an Inquiry Project. The Inquiry Project is described in Chapter Five. The data collected through the Inquiry Project (Stage 2 of the theoretical model) are analysed in Chapter Six, Seven and Eight. Finally, in Chapter Nine, conclusions are drawn. In this chapter, major outcomes that make contributions to knowledge and understandings in the field of ICT professional development are proposed. Further research suggestions are also made.

Lastly, a CD Rom accompanies this dissertation. The CD Rom contains audio visual material that I produced and the participating teachers and their students produced as celebrations of learning during the research project. As these are products of engagement with new concepts and new ways of teaching, they are an implicit part of the outcomes of this research. For my confirmation seminar early in my candidature, I made a multimedia presentation that depicted the relationship between ICT, multiliteracies and ICT professional development through initial data of audio and visual recording of interviews. Teachers with their students made multimedia products that demonstrated their understanding within a multiliterate framework. These products are available on the CD Rom.
Chapter Two
Reviewing three literatures

The development of an ICT professional development model that has the capacity to transform teachers’ beliefs and pedagogy is the focus of this research. In this instance it is an ICT professional development model which centers on helping teachers to achieve multiliterate classroom practices. The scope of the study therefore involves three distinct scholarly literatures, namely: ICT in learning, multiliteracies, and ICT professional development. Each of these areas is considered in order to identify the concepts and issues influencing the design and implementation of a transformative ICT professional development model that has the capacity to empower teachers in their use of multiliterate classroom practices. The major findings and ideas from these three areas are used to produce an ICT professional development model at the conclusion of this review.

2.1 ICT in learning

The first section of the review identifies and discusses key issues relating to three areas in the literature associated with ICT in learning: modes of integration of ICT in classrooms, pedagogy associated with ICT, and teacher beliefs about ICT. It also identifies implications for the design of a transformative ICT professional development model.

2.1.1 Modes of integration of ICT in classrooms: Traditionally, in primary schooling, ICT have been used as a tool, tutor and as a tutee (Taylor, 1980) with low cognitive outcomes achieved by children using drill and practice software (Bayraktar, 2001/2002; Clements & Nastasi, 1993; Niemiec & Walberg, 1985) and more complex cognition with open-ended and computer simulated environments (Hopson, Simms, & Knezek, 2001/2002; Nastasi & Clements, 1992; Orabuchi, 1992; Tennyson, Thurlow, & Breuer, 1987; Wenglinsky, 1998). Interest in cognitive complexity and the different ways students engage with ICT is described by a number of authors (Jonassen, Carr, & Yueh, 1998; O'Rourke, 2001; Roblyer, 2005; Shelly, Cashman, Gunter, & Gunter, 2006). Of these authors, O’Rourke (2001) provides a graded perspective that describes how teachers engage student use of ICT: level one: technical- skills on how
to use specific software and hardware; level two: practical-using ICT for curriculum ends; and level three: critical- using ICT for unique expression and making sense of the world. A DEST (2001) report on models of ICT teacher professional development presents goals for integrating ICT into the classroom. These goals align neatly with O’Rourke’s levels of engagement and are summarised in Table 2.1.

Table 2.1 Goals of integrating ICT into the classroom (DEST, 2001, pp.23-28)

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<tbody>
<tr>
<td>A-</td>
<td>Acquisition of ICT skills as an end in themselves. Skills needed for employment. Skills continuum. Could be considered a subject.</td>
</tr>
<tr>
<td>B-</td>
<td>To enhance student’s ability with existing curriculum. A pedagogical tool- a tool that can improve learning or change how learning occurs, but leaves content unchanged. Different modes of integration varying in complexity.</td>
</tr>
<tr>
<td>C-</td>
<td>An integral component of curricular reform. Change in structure of learning and materials, classroom techniques and fundamental beliefs about the learning process. An example is making strong links with important community issues and mapping backwards to underlying theory. Transformative aspects of ICT as change in content and pedagogy.</td>
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What is significant here is the alignment amongst the authors. Both Taylor’s descriptors and O’Rourke’s technical and practical levels are synonymous with goals of integration in A & B (DEST, 2001) in Table 2.1. Goal C and O’Rourke’s critical level are aligned through transformative potential, the reference to ‘new’ or as O’Rourke advocates, a change in traditional pedagogical practices to “thoughtful, responsive and futures oriented teaching” (p.13). What can be implied from this literature is the distinction between the types of pedagogical practices required to integrate ICT into the classroom. To integrate ICT for skill acquisition and or as a tool for learning, traditional pedagogical practices suffice. A more critical approach, described as level 3 Critical (O’Rourke, 2001) or goal C New context/new pedagogy (DEST, 2001) requires teaching practices that demonstrate change in content and pedagogy. Further examination of pedagogy associated with ICT is reviewed in the next part of this section on ICT in learning.

2.1.2 Pedagogy associated with ICT: What are these new paradigms for pedagogy? What does it mean for teaching to be transformed? These ideas are
explored in this section to uncover effective and productive ways of teaching with ICT. Pedagogy from a multiliteracies framework is discussed within section 2.2, Multiliteracies.

The various modes of ICT integration indicate differing paradigms for pedagogy. Traditional pedagogy implies an instructional approach where teachers transmit knowledge and students recite understanding (Roblyer, 2004). Gibson (2001) calls this a teacher-centred model and asserts that the majority of teachers prefer variations of this style. Bigum (2002, p.133) describes this as “domesticating” the computer, where ICT are made to conform to requirements of the classroom rather than transform teachers’ practice. As indicated above, traditional pedagogy is indicative of goals A & B ICT integration, also termed technical and practical levels. What this means is that a teacher integrating ICT at these levels does so without changing his or her pedagogy. ICT are assimilated into a teacher’s repertoire as a tool or medium through which existing pedagogical practices prevail. This has been described as a ‘technologised’ approach (Lankshear & Bigum, 1998) or an ‘adding-on’ of ICT (Prestridge, 2005). Conversely, a teacher integrating ICT at a critical level (O’Rourke, 2001) or as in goal C (DEST, 2001) transforms his or her pedagogical practices in ways that enable effective use of ICT. This latter form of pedagogy could be considered a new paradigm for pedagogy infused with ICT.

The way pedagogy associated with ICT is constructed by a teacher indicates whether he or she employs traditional or transformative practices. To distinguish an expert teacher, Pierson (2001) builds on Shulman’s (1987) understanding of pedagogical-content knowledge, by adding “technological knowledge”, which is described as technical competency as well as the knowledge of “the unique characteristics of particular types of technologies that would lend themselves to particular aspects of teaching and learning processes” (p.429). This view still maintains the existence of traditional pedagogical practices, where technological knowledge is applied to established classroom teaching practices. It does provide, however, an avenue for ICT to be an instrument of change, in that using technology may in itself instigate some change in pedagogy (Becker & Ravitz, 1999; DEST, 2002). Sachs (1992, p.64), on the other hand presents her concept of ICT pedagogy as requiring a philosophy of change. She labels it a “critical pedagogy of technology” that works on two levels, as
micro applications for technical competency and as macro concerns for social and economic consequences of technology. These macro concerns ground this pedagogy within epistemology concerned with the production, circulation and consumption of knowledge which are at odds with a traditional view of pedagogy that is concerned with the what and how of teaching and learning. A critical pedagogy of technology invites practices that enable students to transform their own understandings, to question and frame experiences with technology that are relevant both inside and outside of the classroom.

Movement towards pedagogy associated with ICT is demonstrated when teachers’ competence and confidence with the classroom integration of ICT develops. A teacher’s pedagogy seems to move towards cooperative group work, long-term problem based exploration and greater use of application software (Baker, Gearhart, & Herman, 1994; Dwyer, Ringstaff, & Sandholtz, 1991). These types of classroom practices are characteristic of a constructivist view of learning (Roblyer, 2005), rather than drawing from an objectivist philosophy to guide pedagogical practices. Constructivist practices can be evidenced in what has been termed complex learning environments. Complex learning environments are characterized by autonomous learning, authentic tasks, an interdisciplinary focus, challenging collaborative work requiring complex problem solving and higher order thinking (Morgan, 1996; NCREL, 1999; OECD, 2002; Pelgrum, 2001; Roblyer, 1996; Wiburg, 1995/96; Yelland, 1999). ICT are considered tools to learn with (Davis et al., 1997; Jonassen et al., 1998) as engagers and facilitators of thinking and construction, where the student is viewed as an active creator and user of information rather than a passive consumer of knowledge. Meaningful learning is the outcome of ICT engaging students in “knowledge construction, not reproduction; conversation, not reception; articulation, not repetition; collaboration, not competition; reflection, not prescription” (Jonassen, Howland, Moore, & Marra, 2003, p.15). Teaching is directed towards the process of learning rather than its products (Scrimshaw, 1997) and is student-centred (Gibson, 2001). Pedagogy that is transformed to utilise ICT effectively, demonstrates teaching principles consistent with those found within complex learning environments and those described by O’Rourke at the critical level or as goal C new content/new pedagogy by DEST in Table 2.1. ICT are an implicit part of the learning dynamic.
supporting collaborative investigation of real life happenings within multidisciplinary contexts.

Rhetoric about ICT and pedagogy also presents snapshots that indicate fluency and invisible blends of learning with technology. Gibson (2001, p.57) proposes a “pedagogy of learning” as the most favourable style for the effective use of ICT. Pedagogy is focused on the learner and learning outcomes. A teacher would draw on both learning theories associated with knowledge instruction (objectivist) and knowledge construction (constructivist) to choose the best strategy to accomplish a learning outcome. Gibson states that the most effective learning environment is “that in which the teacher, the facilitator, the guide, the instructor is capable of selecting the most appropriate strategy” and that ICT must be “transparent to the learner and allow for ubiquitous learning opportunities” (p.56). Loveless, Burton and Turvey (2006, p.10) captured student teachers’ reflections on their conceptualization of their teaching practices that supported development of children’s creativity through the integration of ICT. These student teachers described their practices as involving “play as a starting point”, “giv[ing] permission to try things out”, “compromise and improvisation in responding to the children’s ideas” and “not wish[ing] to provide too much guidance which might ‘stifle’”. These student teachers were learning with the children in their groups, as facilitators of creative thinking, rather than as instructors of ICT functions.

These notions of ‘teacher facilitation’ and ‘transparency’ associated with ICT are evident in a recent report for the Australian Capital Territory Department of Education (education.au., 2005). This report titled Emerging technologies: A framework for thinking, identifies the need for a shift in pedagogical emphasis towards learning-centred pedagogy and personalized learning as a requirement to maintain quality and competitiveness for government schools in the digital age. Both learning-centred and personalized learning are based on the concept of “mLearning” (mobile learning) which is described as:

learning in the environment, community and workplace, and about learning directly in the course of real world engagement and in real world time frames. mLearning involves students interacting through their hand-held devices, portable PCs, mobile
phones, or GPS [global positioning system] devices as roaming learning activity managers (p.63).

The belief that students are ‘activity managers’ who use technological tools as extensions of themselves for purposeful learning indicates a linkage with Gibson’s pedagogy of learning and a required cultural and pedagogical shift for teachers.

Further to this relationship between ICT and pedagogy, Lankshear and Bigum (1998) propose a bigger picture view of a transformed pedagogy infused with ICT. They claim that teachers’ mindsets need to become more like their students in understanding and working with new technologies, advocating to “keep things open” (p.19), working with students in contexts that are part of their world. Spender (1995, p.107) advocates engagement for the electronic generation through computer games that challenge children intellectually by making them “think, assess, react, decide and act”. She believes that in an electronic society people are users, authors and creators of information rather than storers, re-callers or re-counters and that teachers need to acknowledge new models of learning that adopt principles of constructivism. These kinds of thoughts have been aired over ten years ago by Negroponte (1995) in the way he captures the essence of what good pedagogy looks like:

> Since computer simulation of just about anything is now possible, one need not learn about a frog by dissecting it. Instead, children can be asked to design frogs, to build an animal with frog-like behaviour, to modify the behaviour, to simulate the muscles, to play with the frog (p.199).

Negroponte moves us from learning about the frog to engaging with the frog in the learning process. Learning is about being an active participant, creating, doing things with knowledge and experiences to build new ideas and pathways. ICT have the ability to support this process if learners’ interaction is seamless. This in turn has the potential to change classroom context and pedagogy. It is this potential as a catalyst for pedagogical change that needs to be harnessed in ICT professional development to ensure that pedagogy is responsive to learning with ICT in contemporary times.

The key ideas presented on pedagogy infused with ICT are discernible within an innovative approach to teaching called Productive Pedagogies that is part of a current educational reform in Queensland, Australia. The reform called The New Basics
Project (Education Queensland, 2000b) is founded on a futures direction, preparing students for new workplaces, technologies and cultures. It consists of three components that have a reciprocal relationship: curriculum organisers, productive pedagogies and rich tasks. Productive pedagogies are “classroom strategies that teachers can use to focus instruction and improve student outcomes” (Department of Education, 2000b, p.5). There are twenty strategies categorized under four dimensions of ‘Intellectual Quality’, ‘Relevance’, ‘Supportive Classroom Environment’, and ‘Recognition of Difference’. There is an indication that productive pedagogies draw on constructivist principles (Prestridge & Watson, 2002) with a move to inquiry based methods where problem based tasks are cognitively complex, draw on transdisciplinary combinations of knowledge, confront the learner with substantive real world and real life problems to solve, while the teacher acts as mentor, scaffolding and supporting the learning process.

In summary, the literature reports a movement from traditional instructional practices towards more open, flexible and collaborative activity where teaching is focused on facilitating students’ interest and their construction of knowledge and understanding. ICT are viewed as seamless to learning and teaching. The literature also indicates a change in role or mindset of teachers. Terms such as facilitator or activity manager reinforce the move towards a learner centred pedagogy that acknowledges and takes advantage of the digital competencies of students and the need for the delivery of flexible learning pathways. The following final section on ICT in learning explores the impact of teachers’ beliefs about ICT on pedagogy.

2.1.3 Teacher beliefs about ICT: The relationship between teacher’s beliefs and the integration of ICT has been explored considerably through the literature. Loveless (2003, p.323) in her research of primary teachers’ perceptions of ICT and their pedagogy, found that teachers’ perceptions of ICT are fashioned by their “identity and participation in wider cultural and social spheres which influence the professional arenas and settings in which they practice”. She grouped teachers’ perceptions of ICT into three categories: ICT in society: teachers’ talked about the “Information Society” and its impact on children’s future working lives; ICT capability: teachers’ talked about the ICT skills or ‘information literacies’ children
require as a subject and as a cross curricular tool; and ICT in schools: teachers’ talked about how ‘new’ technology is in schools and the lack of resources influencing its integration. Loveless states that these perceptions reflect ongoing negotiations of the meanings of ICT in teachers’ work and that seeing them as sources of tension rather than as sources of anxiety is more constructive for continued meaning making.

In research on teachers’ use of ICT, Veen (1993) found that teachers’ beliefs about the nature of a given subject and the associated pedagogical practices greatly influenced their use of ICT. Jacobs and Clements (1999) found two distinct epistemologies that were either conducive or obstructive to the implementation of ICT. A constructivist epistemology “believing that students learn best when they are given projects and guidance to help them construct mathematical concepts for themselves” (p.243) was found to be conducive, whereas a reductionist epistemology, “where concepts are viewed to be passed along one at a time to students” (p.244) was found to be obstructive. Howard, McGee, Schwartz and Purcell (2000) developed a scheme to represent the underlying beliefs of objectivist/constructivist learning models, indicating that a sophisticated epistemology engenders principles of constructivism. The learning theory of constructivism can be indicated by a high cognitive load, a learner centered focus, authentic tasks and the knowledge construction process (Ashman & Conway, 1997; Jonassen, 1991; McInerney & McInerney, 1994). From this perspective, a teacher would believe knowledge to be complex and uncertain, learnt gradually through analysis and reasoning, and to be acquired or developed by the learner (Howard et al., 2000). Linkage with these beliefs can be made to pedagogy explored in the previous section. As stated there, pedagogy that effectively infuses ICT demonstrates teaching principles consistent with constructivist learning theory.

In support of these authors, Ertmer (2005) also looks towards teacher beliefs as an indicator of how and why teachers use ICT in the classroom. Ertmer (2005, p.25) emphasizes the importance of acknowledging teachers’ beliefs as a barrier to the integration of ICT, but warns that change in teacher beliefs is “riskier” for teachers and “more difficult to achieve” in professional development programs. Beliefs are considered second order change - change that is irreversible, routine and habit forming (Brownlee, 2000). In earlier research, Ertmer et al (2001) found that teachers’
beliefs about ICT did not always match their classroom practices. This suggests that sorting through a teacher’s beliefs is required to determine which beliefs are influencing actions. Consequently, Ertmer (2005) directs professional development programs to involve the examination of teachers themselves and the beliefs they hold about teaching, learning and ICT.

Dwyer, Ringstaff and Sandholtz (1991) devised a model of instructional change that represented the evolution of teachers’ integration of ICT in their classroom practices. Their model links teacher beliefs with teaching practices that use ICT. It is a developmental continuum of instructional change that is presented through the analogy of climbing a mountain (see Figure 2.1). A teacher may move from an Entry or beginning stage to a stage of Invention, where the teacher is innovative with his or her use of ICT in learning.

![Figure 2.1 Model of instructional change (adapted from Dwyer et al. 1991, p.49)](image)

The critical stage in teachers’ transformation of their pedagogical practices and associated epistemological beliefs lies in the progression from the stage of Adaptation to the Appropriation stage. This is represented in Figure 2.1 by the upward arrow. Dwyer et al. state that the progression “hinges on each teacher’s personal mastery - or appropriation - of the technology” (p.48). Movement by a teacher into an Appropriation stage is significant, as they have greater inclination to reflect on their teaching, challenge old practices and seek reasons for changes to working
relationships in the classrooms. The Adaptation stage and the two precursor stages reflect modes of integration discussed previously as goals A & B (DEST, 2001) in Table 2.1, and technical and practical levels (O’Rourke, 2001), whereas the Appropriation stage moves towards goal C or a critical level where the mode of integration of ICT requires transformation in a teachers’ pedagogical practices. In focusing on beliefs, at the Appropriation stage and beyond, teachers were found to be demonstrating a more sophisticated epistemology, verbalising beliefs about knowledge being “more as something children must construct and less like something that can be transferred intact” (p.50).

This supports findings discussed above by Jacobs and Clements (1999) and Howard et al. (2000) on the influence of a constructivist epistemology on the integration of ICT. It is suggested here that teachers’ pedagogical change will only occur if their beliefs about knowledge and how children learn correspondingly change. Ertmer (2005) also validates the Appropriation stage as significant as she suggests that change in teachers’ beliefs about integrating ICT will only occur if opportunities arise that enable teachers to become dissatisfied with their existing beliefs. Such opportunities exist when beliefs are challenged or new beliefs cannot be assimilated into existing beliefs. What is important to ICT professional development is the stage or circumstances required to enable teachers to move from the Adaptation stage to the Appropriation stage where they are enabled to transform their practices, as indicated in Dwyer’s et al. research. This implication is explored further in the section on ICT professional development.

2.1.4 Summary of ICT in learning: This section has described key issues associated with ICT in learning, including modes of integration of ICT in classrooms, pedagogy associated with ICT, and teacher beliefs about ICT. These three areas are intricately related, indicating that the mode of integration and the teaching practices a teacher utilizes are informed by their beliefs about how students learn. The learning models offered by objectivist and constructivist theory explored in this discussion present two distinct approaches to the integration of ICT in learning. From an objectivist perspective, traditional pedagogy is presented as technical or practical modes of ICT integration suggesting the accommodation of technologies in existing
teaching practices. From a constructivist perspective, content and pedagogy require a critical level of integration of ICT that is more open and cognizant of students’ worlds. What is evident in the literature for pedagogy that effectively infuses ICT is movement towards teaching practices characteristic of a constructivist view of learning that acknowledges instructional needs though a blending of teaching practices. Changes are evident in the role of the teacher, the role of the student and the focus of pedagogy.

The literature on ICT in learning suggests implications for a transformative ICT professional development model. Essentially this literature points to the importance of how a teacher’s beliefs influence the pedagogical practices used to integrate ICT into the classroom. Therefore an ICT professional development model that seeks to transform classroom practice needs to start with teachers’ existing pedagogical beliefs and practices. An ICT professional development model should also acknowledge that within a cohort of teachers, there will be different beliefs and pedagogical practices associated with modes of ICT integration. In turn, teachers’ beliefs and practices could inform and shape an ICT professional development model that ultimately seeks to provide an environment in which these beliefs and practices can be confronted and explored.

There seem to be three major implications for ICT professional development stemming from the literature reviewed on ICT in learning. These are symbolically displayed in Figure 2.2. Firstly, teachers’ existing pedagogical beliefs and practices associated with ICT should be made known at the beginning of an ICT professional development sequence. In Figure 2.2 teachers’ existing pedagogical beliefs and practices are placed at the beginning of the professional development sequence. An arrow then leads into ICT professional development processes that are bounded by a circle to represent ICT professional development activity. The second implication displayed in Figure 2.2 is the availability of alternative pathways within ICT professional development. Teachers’ existing pedagogical beliefs and practices associated with ICT suggest various pathways and flexibility within a program to cater for all participants.
Lastly, an indication of change in teachers’ pedagogy is required as an outcome of ICT professional development. Movement towards beliefs and teaching practices characteristic of a constructivist view of learning, understanding of a digital mindset, the blending of instructional approaches and seamless use of ICT are suggested to indicate transformation in teachers’ pedagogical beliefs and practices. This is represented in Figure 2.2 by the star shape at the end of the professional development sequence. This star shape indicates different directions for evolving pedagogical beliefs and practices. The angles of the star also represent an underlying capacity of ICT professional development to redirect further professional development such that professional development becomes a reformation process to empower teachers to continuously transform their own pedagogical beliefs and practices, as an ongoing development process.

Literature pertaining to ICT in learning has been reviewed. The second body of literature important in this study, multiliteracies, is now presented.

2.2 Multiliteracies

This section identifies the major concepts within the New London Group’s (1996) conception of multiliteracies, presents broader conceptions of contemporary literacy pedagogy, and discusses the relationship between ICT and multiliteracies. A conceptual framework for pedagogy is drawn from this review as the major
implication for the design of an ICT professional development model that has the capacity to enable teachers to implement multiliterate classroom practices.

2.2.1 A pedagogy of multiliteracies: The term ‘multiliteracies’ arose out of the 1994 discussions of ten academics who comprised the New London Group (NLG), so named because they met in New London, New Hampshire (USA) to reflect on the changing state of literacy pedagogy. Multiliteracies is presented as a transformative approach to literacy pedagogy. It is transformative in the sense that it is responsive to (a) “the increasing salience of cultural and linguistic diversity” in a contemporary society with pervasive change in working, public and personal lives and (b) “the multiplicity of communication channels and media” associated with information and communication technologies (Cope & Kalantzis, 2000, p.5). These two arguments signify the rapid change in the very nature of the subject of literacy pedagogy, from what the NLG describe as a transformation from an “authoritarian kind of pedagogy” to a “different kind of pedagogy, one in which language and other modes of meaning are dynamically representational resources, constantly being remade” (1996, p.64).

In forming a pedagogy of multiliteracies the NLG sought to “re-open two fundamental questions,” one related to what “students need to learn” through literacy pedagogy and the other related to how or “the range of appropriate learning relationships” in literacy pedagogy (p.73). The what and the how of a pedagogy of multiliteracies are discussed respectively in the following section.

The ‘what’ of a pedagogy of multiliteracies
Considered as the ‘what’ of a pedagogy of multiliteracies are the concepts of design and metalanguage. The term design has a “felicitous ambiguity, it can identify either the organizational structure of products or the process of designing” (The New London Group, 1996, p.73). Design intends to broaden the reliance on the grammar of language to include for example, grammars of film, digital environments or gesture (The New London Group, 1996). In conjunction with design, a metalanguage provides “a language for talking about languages, images, texts and meaning-making interactions” (The New London Group, 1996, p.77). The NLG suggest that any
semiotic activity inclusive of technological media involves ‘available designs’ (linguistic, visual, audio, gestural, spatial and multimodal designs) to engage in ‘designing’ and eventually ‘the redesigned’ described as transformed meaning. The designing process described by the NLG advocates transformation:

Designing transforms knowledge in producing new constructions and representations of reality. Through their co-engagement in Designing, people transform their relationship with each other, and so transform themselves…Transformation is always a new use of old materials, a re-articulation and recombination of the given resources of Available designs (The New London Group, 1996, p. 76).

As an ongoing active process the redesigned becomes a new available design to continue transforming knowledge in the student who is considered an active designer. Metalanguage provides the designer with the tools to critically analyse the forms of meaning represented in available design and the redesigned.

Tweedle (1995, p.6) projected that a curriculum for literacy of the future would be driven by the fact that “literacy depends not upon knowledges of texts but upon knowledges about texts and that children should be taught not just to read texts but to read against them”. The concept of design provides the process through which children as designers actively engage with texts. Engagement involves participation, production and transformation of texts to make traditional, blended and hybrid forms valued for their replication and their innovation. Design also emphasises critical framing to enable engagement at higher cognitive levels rather just consuming texts for basic comprehension.

A large proportion of the ‘what’ of a pedagogy of multiliteracies has been devoted to emphasising the generation of a language to analyse the different modes of meaning making independently and for the multiple interconnections that present themselves within different cultural contexts and within different media of representation as well as a language for the processes of design itself. The concept of design exemplifies the interaction of content and process rather than providing a given set of skills or competencies. Here lies the complexity and confusion of this concept, as it cannot be simplified in terms of isolated outcomes. Rather it is literacy pedagogy that empowers children to engage with texts at critical levels, enabling them to construct new hybrid texts that in turn build their personal repertoires and new meaning making resources.
The ‘how’ of a pedagogy of multiliteracies

How to explore and support the various aspects of the design process is argued by the NLG (1996, p.83) as a “complex integration” of four teaching practices- Situated Practice; Overt Instruction; Critical Framing and Transformed Practice. The power of this pedagogy lies in the interplay of these teaching practices, as Kalantzis and Cope (2000, p.242) explain its non-sequential trait: “one aspect in greater focus in the foreground but with the others still in the background…the shift in focus can happen in all sorts of order”. This dynamic interplay of teaching practices highlights the changing nature of the classroom and the way children of today learn in light of their rapidly changing social world.

The notion of a complex integration or dynamic interplay of teaching practices caters for limitations within each practice. Situated Practice, is founded on an immersion approach that engages language learners in authentic, meaningful, problem based activities. The NLG acknowledged that when teachers implement Situated Practice it does not necessarily develop capacities in the learner for conscious control and awareness of what one knows, metacognition or the ability to action knowledge. However, the NLG indicate that the complementary supplementation of Overt Instruction with Critical Framing caters for these inadequacies. Overt instruction can make concepts and processes explicit for learners while Critical Framing can help learners reflect on new knowledge and map it to particular social, cultural, historical and political contexts. The fourth teaching practice, Transformed Practice provides the opportunities for learners to transfer knowledge gained from one context to another. Consequently, the power of the ‘how’ of a pedagogy of multiliteracies lies in the teacher’s ability to action particular teaching strategies as a response to the needs of the learning group, at any given time.

Kalantzis and Cope (2004) apply the theory of a pedagogy of multiliteracies by developing a practical framework that provides teachers with the language to capture and talk about multiliterate teaching and learning experiences. Titled a ‘Learning Design Language’, four knowledge processes: experiencing, conceptualizing, analysing and applying, are used as concept tags, that identify the different parts or stages of a multiliterate learning experience. These processes are documented in
order. However, like the teaching practices of the how of a pedagogy of multiliteracies, the order is not rigid nor sequential and should be responsive to a given situation. Kalantzis and Cope say that these pedagogical processes “lie at the heart of a transformative curriculum” (p.60). Of significance is this reference to a transformative curriculum, which they describe as “cater[ing] more consciously, directly and systematically to difference amongst learners” than a traditional or constructivist approach, by building on the strength and weakness of these two learning models (p.51). This practical framework has been trialed in a professional development context. A group of primary and secondary school teachers used the learning design language framework to structure, discuss and document what they termed “multiliteracies projects” (Neville, 2004, p.20). Teachers are experimenting with and forming conceptions about a pedagogy of multiliteracies.

Two fundamental principles evident through Cope’s and Kalantzis’s and the NLG’s conceptualization of a pedagogy of multiliteracies are the importance of enabling a sense of belonging for all students and perceiving learning as transformative. Both of these fundamental principles are responsive to diversity in cultures and diversity in learners, and continuous developments in ICT. Contemporary learning is perceived as less about acquiring knowledge and skills and more about shaping individual capacities, such as being able to problem solve, work collaboratively, further oneself and the team, and create knowledge.

This section has discussed the what and the how of a pedagogy of multiliteracies. The what of a pedagogy of multiliteracies identifies the concept of design and situates the learner as an active participant who uses available design to redesign and transform knowledge. The how of a pedagogy of multiliteracies provides the teaching strategies that enable teachers to implement multiliterate learning experiences. The next section of the literature to be reviewed under multiliteracies seeks to further understand the NLG’s concept of a pedagogy of multiliteracies by reviewing broader conceptions of contemporary literacy pedagogy and their application of multiliteracies, as well as the role ICT play in the contemporary construction of literacy pedagogy.
2.2.2 Broader conceptions of contemporary literacy pedagogy:

Literature that explores an approach to literacy that takes account of new textual engagements emphasizes distinct facets of literacy education or literacies that are context based, engendering the term ‘multiple literacies’ (Kellner, 2001; Rassool, 1999; Unsworth, 2001). Rassool (1999) advocates social literacies, cultural literacies, vernacular, local or community literacies, formal literacies and computer literacies. From a functional linguistic perspective, Unsworth (2001) includes visual literacies, curriculum literacies, cyber literacies and critical literacies. Kellner (2001; 2002) reiterates the importance of print within conceptions of print literacy, media literacy, computer literacy and multimedia literacy. Splitting literacy into separate fields signifies the influence of ICT through the emergence of computer literacies or cyber literacies and the changes in our social worlds. Underwriting each of these scholarly works is a transformative dimension. For example, Unsworth categorises literate practices in three facets - recognition literacy, reproduction literacy and reflection literacy. Reflection literacy is about transforming knowledge and as Unsworth states “reflection literacy is critical engagement as a basis for reworking knowledge and, as such, means schooling for producing new knowledge” (p.227). New dimensions of literacy have emerged. A multiplicity of practices and purposes are evident for inclusion in contemporary literacy curriculum with an orientation to context driven literacies.

In response to “splintering literacies” as she describes it, Tyner (1998) suggests that putting them back together and studying where they converge and overlap is a more productive and informative approach than using an all-encompassing term such as multiliteracies. She believes that multiliteracies would be better conceptualised as elements “subsumed under the broad and flexible umbrella of literacy” (p.66). Tyner provides substantial emphasis on the “tumultuous changes in technology” (p.68) as reasoning for new approaches to literacy teaching and learning. However, she believes that multiliteracies have not been researched well enough to “link them to the ground breaking concept of multiple intelligences…or the related uses of digital communication to leverage the preferred learning modalities of individuals” (p.64). The concept of multiliteracies and its relationship to ICT has significant implications for this research and is discussed in depth in the following section.
Millard (2003) puts forward the term ‘literacy of fusion’ to describe literacy education that is responsive to new technologies and children’s interest in popular culture. In a practical fashion, Millard describes her interpretation of current literacy in regard to multiliteracies as focusing on “transformative pedagogy” and the merging of “children’s cultural interests” (p.3) in and out of school. She describes six features of transformative pedagogy that enable a literacy of fusion. These include:

<table>
<thead>
<tr>
<th>The teacher:</th>
<th>Feature</th>
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<tbody>
<tr>
<td>Deciding what might be worth studying in a particular class of children- access to whose meanings</td>
<td>Access</td>
</tr>
<tr>
<td>Creating an appropriate context for learning- who will be the audience for children’s writing?</td>
<td>the Arena</td>
</tr>
<tr>
<td>Enabling children to explore identities and features of text on their own terms</td>
<td>Agency</td>
</tr>
<tr>
<td>Understanding and integration of multiple modes of communication</td>
<td>Affordance</td>
</tr>
<tr>
<td>Helping children make their selection of which modes and genres are most suitable for a given task</td>
<td>Appropriateness</td>
</tr>
<tr>
<td>Being attentive to children’s interests and skills and being able to develop children’s capacity to transform their own learning</td>
<td>Accountability</td>
</tr>
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</table>

Literate practice is evident in textual engagement where ICT provide the vehicle for popular text. Redesigning processes are used to re-invent traditional genre to produce hybrid texts that are blends of old text forms in new technological contexts.

Lastly, Hagood (2000) claims that the concept of multiliteracies proposed by the NLG is from a sociocultural approach to literacy learning that focuses on the way people construct meaning in a given context. She explains that the literacies used in a particular context are dependent upon what is valued by participants. Hagood employs discourse analysis to understand the multiliteracies used in social practice. She uses three categories: (1) indoctrination into learning an academic discourse; (2) negotiation between home/community and school literacies and discourse and (3) navigation of multiple secondary discourse that includes various forms of personal, home/community and school-based literacy practices. Hagood capitalises on different literate practices in various contexts such as school-home and personal-social, highlighting the relationships and or disparity between these as her perspective on multiliteracies. She concludes with an emphasis on the impact of ICT by stating that
“preservice teachers need to become well versed in technological multiliteracies [that] students use and to develop ways to incorporate these literacies into classroom practices such that students become critical and reflective thinkers” (p.324). The importance of ICT is recognized by her unification of the terms ‘technology’ and ‘multiliteracies’ as well as the transformative role of pedagogy in making learners critical, innovative users of language.

From the Arts domain, preference for the applications of particular modes of literacies is indicated. Wright (2000) advocates multimodal learning which can begin with any modes such as the visual, audio, spatial and or kinaesthetic, and does not necessarily have to relate to print based forms of understanding. Wright states that the Arts have always played “a significant role in integrating the various modes of meaning making and celebrate the important supraverbal, abstract and symbolic contributions that the Arts make towards multi-modal learning and communicating” (p.6). Thwaites (1999, p.11) suggests that we are living in a “post-textual age” defined by Wright (2000, p.6) as indicating “that [it] does not mean words or written text must always be the basis for making relationships with other modes of learning”. This perspective differs from the NLG’s emphasis on a metalanguage that singles out the importance of the textual mode in relation to the other modes of meaning.

Another perspective from the Arts domain is that current literacy education must be broadened to acknowledge more than cultures and subcultures but “different knowledge forms such as music, dance, technology and health” (Thwaites, 1999, p.10) and the part they play in assisting students to interpret and create non-textual and print based texts. Wright (2000, p.6) advances this argument by suggesting that education of the future “must take stock of the significance of integrating the intuitive-artistic with the discursive–scientific components of learning” so that all modes of meaning are explored in multiple domains thus ensuring a more holistic, multi-disciplinary approach to learning. This perspective situates literacy within all fields of study, emphasizing connection across disciplines.

Conceptions of contemporary literacy pedagogy present the identification of contexts for literacies such as computer literacies or community literacies as well as approaches that direct the convergence or fusion of literacy. Perspectives within the
Arts domain view literacy pedagogy through multimodal learning, where meaning begins with modes other than written text and within a multi-disciplinary approach. Contemporary literacy pedagogy and multiliteracies are both responsive to cultural diversity and the impact of ICT and emphasise students thinking critically and transforming knowledge as part of staying literate. The last body of literature to be reviewed focuses more closely on the connection between multiliteracies and ICT. The relationship between these two fields is important to this research as it informs the framework for pedagogy adopted for a transformative ICT professional development model seeking to enable teachers to implement multiliterate classroom practices.

2.2.3 Relationship between ICT and multiliteracies: An unequal relationship between ICT and multiliteracies is presented when understandings of ICT are formed within the domain of literacy. For example, Bruce (1997, p.304) maintains ICT as “technologies of literacy” that “are not optional add-ons, but are part of the definition of every form of literacy”. This section examines the contentious relationship between ICT and multiliteracies by analysing the integration of literacies and technologies, drawing from each field, to present a greater understanding of each and their influence on literacy pedagogy in modern classrooms.

From an ICT perspective, literature in this domain explores the nature of electronic literacies and how they “allow communication in new languages and dialects” (Warschauer, 1999, p.156); generation of new language codes and scripts (Mar, 2000); how multimodality effects reading and writing (Corbel, 2000; Levy, 1997; Luke, 1997; Moore, 1996; Thurstun, 2000; Warschauer, 1999); hybrid forms of communication and hypertextuality (Archee, 2000; Green & Bigum, 2003; Luke, 1997); and the comparison of multiliteracies to ambiguous terms such as ‘cyber literacies’, ‘media literacies’ and ‘technological literacies’ as they denote a “plural and broader term than computer literacies [which] implies a fixed skill that can be learned once” (Kenway & Nixon, 1999, p.466). This literature contributes to literacy education in the ICT products and processes students engage in within the digital mode, as well as indicators for a change in what and how students learn to communicate.
In understanding this relationship, there has also been a considerable body of literature that inter-connects the terms literacy and ICT. Authors of terms such as ‘technoliteracy’ (Lankshear et al., 2000), ‘technological literacies’ (Lankshear & Knobel, 1997), and ‘technological multiliteracies’ (Hagood, 2000) have analysed the influence of ICT on literacy education, rendering substance to literacy education as the foundational subject, with ICT seen as an ‘add-on’. Green and Bigum (2003) suggest the reason for this is that literacy and ICT have been brought together mechanically. This mechanical approach to integrating ICT and literacy suggests the accommodation of technologies into existing approaches to literacy pedagogy, meaning traditional approaches to teaching have been ‘technologised’. Snyder (2000) has called for a transformative approach to the teaching of literacy that has been influenced and shaped by new technologies. Rather than the mechanical merger of multiliteracies and ICT the following discussion of context, complexity and pedagogy that are present in both fields is presented as a means of thinking about multiliteracies and ICT equally. These three organizing ideas are discussed to further unpack the relationship between ICT and multiliteracies.

Context
Ideas of context bind ICT and multiliteracies. In one sense, a social context defines a literate practice and institutes a technology within a cultural frame, and in another way a new technology creates a new social context in which existing and new literate practices are developed (Lankshear & Knobel, 2003a). In the second instance, multiliteracies can be considered the result of an ICT imbued world. Globalisation has created new cultural, social, professional and technological contexts in which new literacies have emerged. ICT have influenced the plurality of literacy enabling multiple modes of meaning expressed through new text forms within new contexts. What are considered ‘new’ computer mediated environments such as email, wikis, chat, blogs and 3D virtual worlds require different modes of social interaction (Hilton, 2006; McNeely, 2005; Siemens, 2005). These contexts per se are defining the relationship between multiliteracies and ICT as re-conceptions of literacy based on new technologies (Durrant & Green, 2000).
Complexity
Scattered through the oratory of multiliteracies are terms such as multimodality, hybridization, intertextuality, multimedia, multiplicity. These terms have been created to express the complexity of the concept of multiliteracies and the embedded capacities of ICT. Multimodality, hybridization and intertextuality are discussed to illustrate the way these terms engender complexity.

Multimodal design which “represents the patterns of interconnection” (The New London Group, 1996, p.78) among the different modes of meaning identified as linguistic design, visual design, audio design, gestural design and spatial design, is both significant and complex. It is significant as it is technologically determined and complex as it has been created to signify connectivity. ‘Hybridity’ (Kellner, 2001; Luke, 2000; The New London Group, 1996) is complex as it defines a process and product that is an amalgam of old and new. Hybridity draws on the inherent concept of design, where individuals create meaning and innovate conventional practices, participate in and transform text and combine and restructure genre and discourse to make hybrid forms that respond to real contexts. A final example that denotes complexity is ‘intertextuality’ (The New London Group, 1996; Unsworth, 2001). Intertextuality draws attention to the potentially complex ways that meanings are constructed in relation to other text types and modes of meaning. Multiliteracies is presented as complex through these interrelated concepts that blend ICT.

Pedagogy
A pedagogy that looks equally towards literacy and ICT advocates the empowerment of students to transform their learning. Carmen Luke, a member of the NLG (2000) sees the influences of new technologies changing our classrooms, the ways children learn and the development of new kinds of texts. She explains that “the shift from print to paper to electronic textuality, the proliferation of information resources and databases, global knowledge and social networks, requires very different – multimodal and multimedia – social and literacy skills” (p.81), clearly highlighting the inadequacies of a linear print literacy only approach. What has been advocated here is a change in the media children interact with, for example, the use of the computer or mobile phone as well as the need for different skills, implying an inadequacy within traditional social and literacy skills. Kimber, Pillay & Richards
exploit the concept of design within multiliteracies and advance the notion of “teacher-as-designer” as part of the literacy-technology connection. They advocate the need to reclaim teacher agency by emphasizing teacher capacity in designing tasks with computers. Snyder (2002) also argues for more cognitively complex interactions with and within electronic forms emphasising imagination as the guiding premise that enables literacy educators to “welcome the new without ignoring what is important from the past” (p.181). This linkage is powerful for those who believe in the ‘old gold’ literacy value as it replaces the notion of ‘supplanting’ the new with the old.

A transformed pedagogy was also discussed in the previous section on 2.1 ICT in learning. A transformed pedagogy infused with ICT symbolized teaching through images of fluency and invisible blends of learning with technology where teachers drew on both knowledge instruction and knowledge construction depending upon their learners’ needs and the learning experience. Unsworth’s (2001; 2005) writing on pedagogical requirements for multiliteracies proposes a similar approach that involves student-centred discovery learning as well as the teaching practices of overt instruction and guided investigation. He bases the need for a range of pedagogical practices and management groupings on the character of children today. Pedagogy is responding to children’s expertise with technologies and also their inexperience with other aspects of learning such as the functional grammars of language and images. Unsworth (2005) labels teachers as mediators of new knowledge and understanding, a term that evokes linkage between the proliferation of information and its constructive use by the student.

Furthermore on pedagogy, a framework proposed by Durrant & Green (2000) aimed to bring together perspectives on literacy and technology equitably. Titled ‘Literacy in 3D’ the model brings three dimensions of learning together: operational, cultural and critical. This model emphasises that technical competence and/or functional literacy are not taught without context, that the dimensions of discourse and practice do not take priority over one another and that “this is a holistic, cultural-critical view of literacy-technology learning that takes explicitly into account contexts, contextuality and contextualisation” (Durrant & Green, 2000, p.97). The authors note that it is “consistent with the broadly constructivist view of curriculum and learning” (p.99).
One of the main arguments of this model is not to start with skills outside an authentic real world context, where pedagogy is about empowering the learner to work effectively within “particular communities of practice, discourse and inquiry” (p.103). In a similar vein, Selber (2004) conceptualises computer and literacy programs through three dimensions that have similar qualities and draws on constructivism for its premise of knowledge construction. Titled ‘Computer Multiliteracies Program’ Selber categorizes learning into: functional, critical and rhetorical. Students are users, questioners and producers of technology; teachers are co-learners; and pedagogy and technology are viewed as coextensive and mutually constitutive, that is “teachers must become sophisticated designers of the technological environments they employ” (p.210) for appropriate scaffolding of student learning that complements curricular requirements. Both models position the learner and learning at the centre of pedagogy as noted within a transformed pedagogy infused with ICT discussed in 2.1 ICT in learning.

Context, complexity and pedagogy present a blended relationship between ICT and multiliteracies. The emergence of new technological contexts has enabled scholars to re-conceptualise literacy. There is evidence in this literature of the affordance of ICT to the complexity of concepts within multiliteracies. Pedagogy is described as student centred where teachers and students are co-learners and co-teachers, both active designers of technological environments. A blended relationship is presented by both fields as expressed in section 2.1 ICT in learning and from a multiliteracies perspective. ICT are considered by scholars as a cause for the transformation of literate practices and as an embedded part of multi-mediated literate practices. Contention arises when ICT are viewed by teachers as add ons to conventional literate practices.

2.2.4 Summary of multiliteracies: Identified and discussed in this section on multiliteracies are the major concepts within the NLG’s conception of multiliteracies, broader conceptions of contemporary literacy pedagogy and the relationship between multiliteracies and ICT. Evident throughout the literature is that multiliteracies necessitate a transformative approach to literacy pedagogy and ICT are seen as both a cause and an embedded part of this new approach. The concept of design which
presents an ongoing transformative learning process; the instructional model which embeds transformed practice and presents the learner as one who actions new knowledge; the broadening of literacy pedagogy as multi-faceted and complex; and the union of ICT with multiliteracies as a transformative approach to the teaching of literacy, all indicate the influential nature of technologies. What is significant to this research is that emerging technologies have fundamentally changed the meaning of being literate and the approach to literacy education.

The literature on multiliteracies together with the literature on ICT in learning helps build a conceptual framework for pedagogy required for teachers to effectively infuse ICT and implement multiliterate classroom practices. In this research, these are the outcomes required by an ICT professional development model concerned with enabling teachers to transform their pedagogical beliefs and practices. Multiliteracies is the body of knowledge around which an ICT professional development model is actioned in this circumstance. An understanding of the concept of multiliteracies is essential as is the relationship multiliteracies has with ICT, as influences on contemporary pedagogical practices. Linkage to a pedagogy associated with infusing ICT, described in 2.1 ICT in learning, as level 3 critical (O’Rourke, 2001) or goal C new content/new pedagogy (DEST, 2001) indicate new roles and practices for teachers and students. Some of these include teacher-as-designer, students as users, questioners and producers of knowledge, blends of instructional and constructivist teaching practices and a focus on a pedagogy of learning where ICT are transparent to the learner and allows for ubiquitous, authentic learning opportunities.

A transformed pedagogy should be understood in terms of professional growth and understanding as well as actual change in classroom practices. A focus on transforming pedagogy is needed within the content of an ICT professional development model for teachers to be able to investigate, talk about and reflect upon what contemporary literacy teaching looks like, what is effective use of ICT and how ICT influence and shape pedagogy. From this perspective, ICT professional development needs to facilitate inquiry rather than the development of teacher competencies with ICT skills. The last section on ICT professional development now examines what the literature proposes for ICT professional development processes that enable teachers to transform their pedagogical practices.
2.3 ICT Professional Development

Insights into transformative ICT professional development are fundamental to this research. This section draws on significant contributions from the literature concerning teacher professional development in general as well as literature focused on ICT professional development to establish the potentially effective elements needed to design an ICT professional development model that has transforming capabilities. As the outcome of this review an ICT professional development model is put forward as a practical representation of the theoretical issues drawn from the three distinct areas of literature.

2.3.1 Teacher professional development: Teacher professional development is concerned with any activities that develop teachers’ skill, knowledge, expertise or any other capacity associated with their craft (Collins, 1991; Conners, 1991; Guskey, 2003; Johnson & Johnson, 1987). Activities can range from independent study to formal courses. Professional development has focused on the development of teachers and teaching. However, as the political climate changes to endorse the accountability of public institutions, professional development has become linked directly to student learning outcomes (OECD, 1998).

Historically, professional development is a relatively new concept that has gained prominence over the last three decades in Australia. The 80’s saw movement towards school based ‘in-service’ activities that were more likely to be funded by the school, held on-site with programs that focused study on school issues while policy and funding remained in the control of governments and employing authorities (Logan, Dempster, Chant, & Warry, 1990). Further devolution of control for professional development has continued through to the current day where individual schools now fund, manage and implement professional development to meet the specific needs of teachers (DEST, 2001). This approach allows schools to make their own decisions about the scope, nature and form of professional development. Both Fullan (2001) and Elmore (2000) emphasise that an internalized commitment to a set of standards is more powerful than those enforced through bureaucratic control, and that this is achieved through professional development at the school level, where structures and activities engender critical discourse about daily practice.
Literature on professional development indicates certain critical elements that need to be considered to ensure outcomes in terms of student learning: the crucial leadership role of the Principal and or curriculum head (Ingvarson, 1998; McCulla, 1994; Moseley, Higgins, & Harrison, 2001; Sagor, 1997); school based goals and directives for professional development rather than centralized top-down instituted goals (Collins, 1991; Cuban, 1984; Logan & Sachs, 1988; OECD, 1998; Sachs & Logan, 1990); a school culture of continual improvement and no blame (Hargreaves, 1999); built-in support structures within the school setting (Ingvarson & MacKenzie, 1988); recognition of the professionalism of teachers (Conners, 1991; Hargreaves & Goodson, 1996; Lieberman & Miller, 1984); a culture of collegial collaboration (Eisner, 1988; Johnson & Johnson, 1987; Sagor, 1997) and time given for planning, collaborating, investigating, experimenting, reflecting and critique (Darling-Hammond, 1998; Fullan & Miles, 1992; Sagor, 1997). All of these elements focus on the importance of the school context being both responsive to and supportive of professional development. Three themes have emerged from this literature as informing professional development for transformative outcomes. The three themes of school culture, teacher knowledge, and inquiry based professional development are explored further.

**School culture**

Fullan (1992) writing in the context of school improvement and teacher development, identifies four critical insights into the change process that have practical implications for transformative professional development. These include:

- active participation on a small scale is more manageable and more likely to build momentum;
- pressure initiates change but requires support to maintain it;
- change in behaviour precedes change in beliefs as action pre-empts reflection;
- ownership is vital but develops through the change process.

Two key issues are salient. Firstly, that professional development requires a school level context for real change in teaching and learning to occur. Secondly that professional development is part of what Hargreaves describes as the new approach to
educational change, what he calls “re-culturing” (Hargreaves, 1997, p.1), making “schools into the kinds of places that stimulate and support teachers to make changes themselves”. Professional development is not an isolated process; it is an embedded part of a school’s culture. If teachers are to initiate change themselves then a culture that supports this practice needs professional development activities that are aligned in this form of collegiality. Drawn from Fullan’s points on change theory, professional development requires on-going collaboration with peers to support learning processes such as experimentation, discussion, observations, critical reflection and evaluation. It needs to stimulate a change in behaviour that encourages the reflective process initiating change in beliefs. It must empower teachers to shape and direct their own professional pathways. Professional development of this kind, within a collaborative school culture, has potential transformative capabilities.

Fullan (2003, p.47) more recently advocates social interaction as a means of “convert[ing] information into knowledge” with “sustained interaction produc[ing] wisdom”. He believes that deep change will occur through social interactions as long as people are encouraged to discover new truths and that these new truths and knowledges are being continually challenged. Professional development that seeks to support this deep change requires internal school structures and processes focused on professional interaction within the school and external to the school, enabling greater opportunities for sustained and informed interaction to produce wisdom. Professional development must also enable critical consultation as an embedded function. A culture of support and collaboration as well as critique must resonate within the school and in professional activities.

Teacher professional development is about building culture (Lieberman & Miller, 1994; Robinson & Carrington, 2002) in daily practice focused on teacher’s work (Darling-Hammond, 1998; Lieberman, 1995) where teachers set the agenda (Ingvarson, 1998; Loughran, Mitchell, & Mitchell, 2002) and actively participate in sustained learning communities that advocate collaboration in a collegial atmosphere (Elmore & Burney, 1999; Letiche, 1988; Rosenholtz, 1989) with professional discourse that is critical, inquiring and reflective (Ball & Cohen, 1999; Smyth, 1987). Successful elements of professional development described by Elmore and Burney (1999, p.266-270) reiterate this focus on re-culturing school practices with
descriptors such as focusing on “high-quality instruction; “different activities at different stages of development”; “managing talented people”, “setting clear expectations then decentralizing responsibility” and “collegiality, caring and respect”. Substantial emphasis is placed on professional development as an element that contributes to and is effective within an aligned school culture. Opportunities for critical discourse, reflection and interaction are considered important elements focused around teacher directed needs. Figure 2.3 summarises the relationship between professional development and school culture.

Figure 2.3 Professional development and school culture

Figure 2.3 illustrates that professional development is an embedded part of a school’s culture. Professional development is placed in a central location bounded by school culture. Overlaying this relationship are three elements that are required of a school culture for professional development to be effective. These three elements are collegiality, critique and context. In summary, teacher professional development would be considered more effective if it is embedded within a school culture that engenders collegiality and critique and is focused on the classroom context.

Teacher knowledge
Teacher’s existing beliefs and practices must be taken into account in a model of professional development that could be considered transformative. Wideen, Mayer-Smith, and Moon (1996) identify two different views of knowledge that inform teacher professional development derived from the traditional knowledge utilization paradigm and the interpretive paradigm. Traditional knowledge is seen as externally
produced and implemented by the ‘users’. With respect to professional development, changes in teaching beliefs and practices come from experts who can provide the necessary type of knowledge needed at certain stages of a teacher’s professional career, whereas the interpretive paradigm defines knowledge as a personal construct that is embedded in the classroom context and is changed through professional dialogue. Cochran-Smith and Lytle (2001, p.48) support this interpretive notion further, labeling it “knowledge-of-practice”, stating that for teachers to teach well they need knowledge that is “generated when teachers treat their own classrooms and schools as sites for intentional investigation at the same time that they treat the knowledge and theory produced by others as generative material for interrogation and interpretation”. Loughran (2003, p.181) claims that teacher research provides teachers with “more faith in their own experiences and knowledge”. Ball and Cohen (1999) and Lieberman (1995) allude to the transformative capabilities of such professional investigation, emphasising that inquiry is central to a teacher’s role and forms an important part of the school culture. Organised inquiry that is structured and directed by teachers themselves through shared decision making processes is considered essential to facilitate professional growth of teachers for modern teaching and learning requirements (National Foundation for the Improvement of Education, 1996). Essentially, opportunities for professional discourse that are structured and derived from personal investigation into teachers’ own classrooms acknowledge the value of teacher constructed knowledge. The generation of knowledge through professional inquiry has the ability to influence change in teachers’ beliefs and practices and is imperative to transformative professional development.

A transformative professional development model must acknowledge existing beliefs that inform practices. Somekh (1995, p.341) highlights the influence of existing beliefs by stating that “The problems of change in practice are inherent to all practitioners, because human action is rooted in routines developed through experience and fundamental beliefs of the individual”. Consequently to achieve change in current teaching, a practitioner must first make conscious existing beliefs and practices so that through strategic action, these beliefs can be put to the test, enabling new and emerging beliefs to evolve that inform new teaching practices. Central processes in this endeavour are reflection, collaboration and investigation. A teacher’s systematic and rigorous investigation into his or her own classroom
practices (McNiff & Whitehead, 2002) in collaboration with members of a critical community (Zuber-Skerritt, 1993) can lead to “teacher knowing - learning that is in a state of evolution” (Clarke & Erickson, 2003, p.3). Ertmer (2005, p. 32) who has researched specifically into teacher ICT beliefs, states that teachers need to engage in “explicit belief exploration” with “opportunities to examine new practices supported by different beliefs”. The relationship between professional development and teacher knowledge is illustrated in Figure 2.4.

![Figure 2.4 Professional development and teacher knowledge](image)

In Figure 2.4 professional development is encapsulated in the process of a teacher’s classroom investigation. The central circle depicts investigation from an interpretive knowledge perspective. With this perspective knowledge is generated by teachers through investigation of their own practice. Teacher beliefs and practices play an informing role in this professional development sequence. A teacher must make beliefs and practices conscious so that through investigation, these beliefs and practices can be transformed. Further examination of inquiry based professional development is provided in the final section on teacher professional development.

**Inquiry based professional development**

The lasting appeal of Schon’s notion of the reflective practitioner (Schon, 1983), the flexible and responsive nature of the action research spiral (McTaggart, 1997a) and the value of teacher-as-researcher creating new pedagogical knowledge suggests that teachers who adopt these reflective and investigative approaches to teaching can transform their own pedagogical assumptions and practices. Inquiry based
professional development that draws on action research methods focuses professional development in the classroom. A teacher implementing an inquiry approach is able to address each point provided in Fullan’s (1992) change theory described previously, if links are made with school based structures. School based structures that provide opportunity for teachers to collaborate and critique their work through the sharing of inquiries are necessary to move knowledge creation from a solely independent exercise to a shared activity. As Fullan (1992) indicates, sharing activities places pressure on the teacher to change and is required to maintain the transformation process.

Teachers’ classroom inquiries can link with external professional development activities. New knowledge presented by experts in external workshops should be interrogated and interpreted by the teacher in his or her classroom context. This process connects strongly with the previous theme and the production of wisdom described by Fullan (2003). Morris, Chrispeels and Burke (2003) promote a connection between internal and external networks. They found that linking external networks with internal ones, for example sharing knowledge gained at external networks in staff meetings or subject groups, can double the likelihood of transformative outcomes. Lieberman (2000, p.3) contends that keeping a balance between experiential knowledge produced in classrooms by teachers and knowledge created by research is “a hallmark of success” for professional activities. Linking internal and external activities can also support what Little (1993, p.138) advocates as a principle of effective professional development, “providing teachers a means of seeing and acting upon the connections among students’ experiences, teachers’ classroom practice and school-wide structures and cultures”. A teacher’s classroom inquiry can become a platform through which a teacher makes internal and external links to develop professionally.

Inquiry based professional development has strong links with the role of community in supporting teacher education. The term community is found in the literature under various titles: learning community, communities of practice, reform networks, collaboratives, research groups, teacher networks, professional communities. These communities signify a group approach to learning which draws on the social nature of meaning (Imel, 2001). Literature in this area acknowledges that learning communities
require group commitment to long-term needs but must also focus on the daily problems and issues to sustain involvement (Lieberman, 2000). Learning communities have been found to facilitate teachers’ knowledge construction if they are able to evaluate collusions and collisions as part of the learning experiences of a group (Fletcher & Hill, 2004). Learning communities have administrative requirements and need direction from a teacher leader (Nickerson & Sowder, 2002). Also considerable time and space is required for teachers to form relationships that enable engaged and enthusiastic discussion (Wineburg & Grossman, 1998). Learning communities offer an independent inquirer a forum for discussion and reflection, a place to flag ideas and thoughts, a social support network and an acknowledgement of their commitment.

Generally the literature finds that inquiry based professional development can support classroom teachers to change their teaching practices (McLaughlin & Zarrow, 2001; Sagor, 1997), can encourage deprivatisation of classroom practice (McLaughlin & Zarrow, 2001), support the development of a community of learners and a progressive school culture (McLaughlin & Zarrow, 2001; Sagor, 1997); focus on student learning and improving pedagogy (Cochran-Smith & Lytle, 2001; Darling-Hammond, 1998) and provide a strategy through which schools can empower themselves to deal with change in a productive manner (Hargreaves, 1999). Guskey (2003) suggests that research based professional development has great transforming potential, but as yet this potential remains unfulfilled.

Figure 2.5 presents critical features of Inquiry based professional development that supports teachers’ ability to transform their classroom practices. These critical features are represented as interconnecting cogs that are important for the transformative capability of this form of professional development. These critical features include internal and external networks, learning communities, action research methods and experiential and theoretical knowledge. Collaboration and critique are placed in the middle of Figure 2.5 to acknowledge the importance of these processes within inquiry based professional development.
In summary, the three themes of teacher professional development reviewed here: school culture, teacher knowledge and inquiry based professional development indicate that there is greater potential for transformative outcomes if teachers utilize their classrooms as sites for professional activity and engage both collaboratively and in an investigative manner with their peers in learning communities within and beyond the school context.

The next section on ICT professional development presents literature more specific to issues associated with ICT. This section examines three topics including ‘re-tooling’ approaches to ICT professional development, instructional pathways and modes of ICT professional development.

**2.3.2 ICT professional development:** ICT professional development requires more complex processes than those implied by ICT skills training. Once based on purely technical grounds, ICT professional development now encompasses activities in which sound pedagogical approaches to integrating ICT are developed (Green & Bigum, 1992). Scholars who explore models of ICT professional development acknowledge the diversity of approaches and purposes, especially in regard to ICT competency training and ICT curriculum integration. For example tutorial based models available on the internet or CD Rom based materials (Chambers & Stacey, 1999; Frankhauser & Lopaczuk, 1996; Lundin, 1997; Marr, 1999; Marx, Blumenfield,
Krajcik, & Soloway, 1998; Wang, 2000) are seen to offer numerous benefits including flexibility of pace and structure, easy access to examples of best practices in a range of contexts, skill development that is non-threatening and providing opportunities for group discussions between learners. Formal models where participants achieve certificates and qualifications through Universities and TAFE courses or are rewarded by material benefits such as computers (Galligan, Buchanan, & Mullar, 1999; Hannafin, 1999) are seen to provide great incentives for extra work. School based models where teachers experience professional development related to their classroom context (Garcia, 1999; Hattam & McInerney, 1999; Yelland & Bigum, 1995) are seen as relevant and encourage collegial discussion and support. Integrated models that combine outside expertise with in-school support focused on individual classroom needs and contexts (Norton & Sprague, 1998; Ringstaff, 1996; Wepner, 1998) are generally seen to be the most effective with teachers experiencing increased feelings of self-efficacy, personal empowerment and professionalism. Each model has its benefits and may cater for varying needs and interests at different stages of a teacher’s career. However, few models focus on achieving transformative outcomes. Literature is now reviewed that specifically provides insights into the transformative capacity of ICT professional development. The topics to be covered include: ‘re-tooling’ approaches to ICT professional development, instructional pathways and modes of ICT professional development.

Re-tooling approaches to ICT professional development

‘Re-tooling’ approaches, as previously defined in the introductory chapter, intend to augment the existing curriculum by providing skills and competencies focused on specific types of applications. ‘Re-tooling’ approaches to ICT professional development emphasise ICT skill based training in particular curriculum software applications. ICT skills based training is considered a valuable component of ICT professional development as teachers perceive their competency levels greatly influencing their use of ICT in the classroom. Technical competence with ICT has been found to have a major influence on teachers’ use of computers (Dwyer et al., 1991; Veen, 1993), and significantly, Becta (2004a) in a recent literature review, places teachers’ level of confidence with ICT at the top of the list of barriers to the uptake of ICT use in the classroom. Consequently a ‘re-tooling’ component of ICT professional development is necessary.
‘Re-tooling’ teachers may be necessary. However, what needs to be considered here are the transforming capacities of such ‘re-tooling’ approaches in ICT professional development activity. Durrant and Green (2000) describe a professional development sequence designed to move from “individualized skill-development, through a more or less technicist engagement with hardware and software, to due consideration for classroom applications and implications, after which comes a more reflective concern with values and ethics” (p.96). This ICT professional development sequence, where ICT skills are taught first, followed by application to curriculum, is responsive to teacher competency and confidence with ICT. As it separates the gaining of ICT skills from a curriculum context, it would do little to enable teachers to transform their pedagogy. Such learning sequences are at odds with contemporary teaching practices that emphasise situated, authentic learning opportunities and cultural apprenticeship (Durrant & Green, 2000). Green and Bigum (1992) assure us that ICT professional development should not be perceived as mainly concerned with ‘re-tooling’ teachers. As stated in the introductory chapter, O’Rourke (2001, p.13) affirms that it is more effective for ICT professional development to help teachers “focus on pedagogy than on the technology itself”. This indicates movement in ICT professional development towards emphasizing teachers’ pedagogical practices that effectively integrate ICT while positioning teachers’ competencies with ICT as dependent upon this direction.

**Instructional pathways**

Different learning contexts may be needed due to a teacher’s stage of learning with ICT. Jonassen (1991) explains that constructivist learning environments are most appropriate at the advanced knowledge acquisition stage. He describes three stages as introductory, advanced and expert. At the introductory stage, initial schema are built about a skill or content area. The second stage, advanced knowledge acquisition, is where learners acquire advanced knowledge in order to solve complex, domain or context dependent problems. The final stage is expertise. Consequently teachers at an introductory stage require knowledge about a technical skill and are better supported by more objectivist approaches such as direct instruction (Jonassen, 1991) while constructivist approaches, such as inquiry based learning, are not as effective until teachers have acquired more knowledge and skills.
Dwyer et al. (1991) supports this advocacy for a level of knowledge and competency to be reached prior to the use of constructivist approaches within ICT professional development. Their research in the Apple Classroom of Tomorrow (ACOT) demonstrated that teachers were more interested in reflecting on, investigating and analysing pedagogical practices with ICT once they had reached a level of competence and familiarity with its curriculum application. This stage was called Appropriation and was described in the previous section on ICT in learning (see Figure 2.1). This implies that ‘re-tooling’ and pedagogical analysis require different instructional approaches within ICT professional development and are dependent on a teacher’s stage of competency in respect to ICT skills and ICT curriculum integration. Both objectivist and constructivist approaches need to be available to a teacher at any time and be responsive to individual needs. However, as found in the ‘re-tooling’ approaches above, the focus of ICT professional development must remain on pedagogical inquiry which places constructivist approaches in the forefront.

Ertmer, Addison, Lane, Ross, and Woods (1999) believe that teachers demonstrating different uses for technology, exposing varying levels of reductionist/constructivist beliefs require different types of ICT professional development. Teachers, who used technology as a reward or as supplementary to the existing curriculum needed to be challenged by their peers and leaders in the school, given time to learn skills, play with software and observe peers integrating technology. These professional development activities involve both objectivist and constructivist approaches. Teachers who used technology to support their curriculum required opportunities to extend their repertoires of practice by observing, experimenting and discussing alternate beliefs and practices, indicating constructivist approaches to professional development. Both instructional pathways can be required at any given time.

Based on the literature presented here, transformation in pedagogy requires ICT professional development to engage teachers in pedagogical inquiry (Green and Bigum, 1992; O’Rourke, 2001) with ‘re-tooling’ intentions dependent upon individual needs of the teacher and their intended curriculum. To ensure this direction, constructivist approaches such as observing, experimenting and sharing activities are required (Jonassen, 1991) to support the teacher in critical inquiry for
transformational outcomes. The combination of pedagogical inquiry, constructivist approaches and the need for 're-tooling' intentions suggests that a model of ICT professional development should incorporate ‘re-tooling’ through an objectivist approach embedded within a broader constructivist framework. This would provide pathways beyond ‘re-tooling’ and a direction that would combine rather than separate objectivist and constructivist approaches in ICT professional development.

Implementing ICT professional development through a constructivist framework has been found to enable transformative outcomes for teachers. Becker and Reil (2000) found that teachers who actively participated in professional discourse about the integration of ICT were more likely to display beliefs and practices consistent with constructivist learning theory and use computers more often in class and in exemplary ways. Scrimshaw (1997) supports such teacher growth through professional discourse by advocating teachers’ use of ICT in collaborative contexts and underwrites the need for research and reflection when integrating ICT in learning. Moseley, Higgins, and Harrison (2001) used development projects to focus teachers’ attention on pedagogy associated with ICT in particular content areas. These constructivist approaches to ICT professional development promote active learning experiences such as discussions, collaborations, action research, reflection and observation that focus on teachers’ pedagogical change.

This section on instructional pathways has presented literature on objectivist and constructivist approaches to ICT professional development. This literature proposes that a broader constructivist framework for ICT professional development would support teachers’ pedagogical inquiry and enable ‘re-tooling’ intentions to become an embedded part of such a critical development process.

In summary, ICT professional development that has the potential to transform a teacher’s pedagogical practice needs to embed ‘re-tooling’ or teachers’ ICT skill development within a greater pedagogical framework. Instructional pathways informed by both objectivist and constructivist approaches need to be available with constructivist professional development activities such as collaboration, critique, reflection and investigation forming the basis for ICT professional development. The
final section on ICT professional development will focus more specifically on modes of ICT professional development.

**Modes of ICT professional development**

There are certain modes of ICT professional development that can support transformative outcomes. Conventional ICT professional development activities such as courses or isolated workshops are unlikely to lead to change in practice back at school (Ingvarson & MacKenzie, 1988; Lankshear & Bigum, 1998). Bigum, Henry and Kemmis (1986) see greater transformative realities in ICT professional development that is school-based as improvement is focused in and on the regular classroom. They promote the application of action research within teacher development associated with computing. They contend that for sustained improvement in educational practices associated with computing, systematic and deliberate inquiry into one’s own teaching is required. A review of the models of continuing teacher ICT professional development within Australia (DEST, 2001) further supports an inquiry approach. The review put forward this proposal:

> The introduction of specific systemic strategies to improve the quality and accountability of school-based development programmes, with particular emphasis on school-based teacher inquiry projects that focus on improving student learning, and using curriculum development and teaching projects activities, with the concomitant systemic work needed to create time and opportunities within a teachers’ working day to collaborate and reflect on practice (p.58).

Inquiry based professional development has the ability to challenge teachers’ use of traditional instructional practices that accommodate ICT, presented in the first section on ICT in learning as technical or practical modes of ICT integration. Through a teacher’s personal inquiry within a context of community, the notion of teaching practices being ‘behind closed doors’ is challenged when teachers are viewing, sharing and analyzing collaboratively. This consequence supports transparency of classroom practices (McLaughlin & Zarrow, 2001) and aligns with Lankshear and Bigum’s (1998) request for “keeping things open” (p.19) as mentioned in pedagogy associated with ICT. Also the issue of time becomes altered within inquiry based professional development, as time is part of daily practice (Darling-Hammond, 1998). A teacher’s inquiry becomes part of his or her teaching day rather than being tacked on to the end of it.
Further support for inquiry based professional development is evident in the recent Pedagogy Strategy (MCEETYA, 2005) which links ICT with pedagogy as an innovative approach. Under the heading of professional development the Pedagogy Strategy calls for “establishing an ICT supportive inquiry-based learning environment” (p.11) for the production of new pedagogical skills and knowledge. In addition, an inquiry approach has been proven to be effective as a key element of ICT professional development (Ehman & Bonk, 2002; Eib & Cox, 2003; Pan, 1999; Royer, 2002).

Functional within inquiry based professional development is the involvement of teachers in inside and outside school networks. The benefits of linking such networks or learning communities were discussed previously in the section on inquiry based professional development and can be further validated by Check (1998) who found that both small and large networks are essential for the generation of new ideas and ongoing support in an inquiry approach. As part of ICT professional development, communication technologies have been promoted as a platform that provides opportunities for professional learning communities enabling many-to-many communication that is not place or time dependent (King, 2002; Rovai, 2002). Literature informed by online learning communities indicates that professional dialogue and reflective discourse can be sustained within structures (Herrington, Oliver, & Reeves, 2003) which support deeper theoretical understanding and stronger links to practice, thus providing a vehicle to support transformative outcomes. However, online learning communities are harder to maintain (Schlager, Fusco, & Schank, 2000) as they are not communities of learners in the face to face physical sense.

**2.3.3 Summary of ICT professional development:** In this section literature associated with general and ICT specific professional development has been analysed to identify particular processes and concepts that require consideration in developing a model of ICT professional development seeking to enable teachers’ to transform their pedagogy. Underlying both general and specific professional development literature is the importance of making teachers conscious of their beliefs that inform
classroom practices and the positioning of professional activity within the classroom and wider school context. The literature suggests that collaborative, reflective and critical processes generated from intentional classroom investigations have substantial transforming capabilities. Furthermore, greater potential is made possible when professional activity exists at the school level and is supported by a school’s culture that embraces change, as advocated by Hargreaves (1997). Internal professional activities that engage ‘knowledge of practice’ can provide linkage with external professional development activities, ensuring that expert knowledge is addressed within the classroom context and internalized for transformation in teachers’ beliefs and teaching practices. The transforming process is considered as evolving.

Evident in the literature specific to ICT professional development are issues relating to the mode and focus of professional activities that have significant implications for a transformative ICT professional development model. ‘Re-tooling’ intentions do not lead to transformative outcomes. New designs for ICT professional development are required. An ICT professional development model that draws on constructivist learning practices incorporating objectivist approaches provides opportunities for various instructional and developmental pathways for teachers. Activities such as isolated courses, workshops in developing teacher ICT competency and online teacher learning communities are unlikely to support teachers’ change in practice independently. There is support in the literature for school based teacher inquiry projects as a core component of ICT professional development. Inquiry projects to investigate ICT pedagogies are said to enable teachers to reflect and collaborate in systematic ways and can benefit from the incorporation of independent ICT activities, to further enrich the professional development process.

There are three major implications associated with the professional development literature. Firstly, the discussion of teacher’s ‘knowledge-of-practice’ suggests the importance of teachers’ self examination of their pedagogical beliefs and classroom practices. Beliefs and practices associated in this case with the integration of ICT need to occur at the beginning of an ICT professional development sequence and be kept at the forefront throughout the development process. Teachers’ ‘knowledge-of-practice’ sets the classroom as the context of study and is associated with an examination of pedagogy rather than a focus on ‘re-tooling’. A school culture is implicated here as
the context that bounds professional activity and provides collegial and critical professional connections within and outside of the school.

A second implication that needs to be addressed in an ICT professional development model is the capacity to ‘re-tool’ teachers without losing a pedagogical focus. Teachers’ ICT competency was identified as a critical enabler for ICT integration and for appropriating ICT (refer to Figure 2.1 Appropriation stage, Dwyer. et. al. 1991). Embedding ‘re-tooling’ intentions within pedagogical inquiry combined with the use of objectivist and constructivist approaches provides various instructional pathways for teachers within ICT professional development that may enable greater transformative potential.

Finally, an investigative approach that employs critical, reflective and collaborative processes must form the core element of an ICT professional development model, such as school based teacher inquiry projects. Through daily engagement in such processes, teachers’ beliefs and practices have greater opportunity to change. Linkage between classroom investigation and external professional activity can be established. A professional development model with these attributes may have the opportunity to contribute to re-culturing schools. It is to the synthesizing of outcomes of this review into an ICT professional development model that the chapter now turns.

2.4 A transformative ICT professional development model: Three bodies of literature, ICT in learning, multiliteracies and professional development have been drawn upon to create an ICT professional development model that has the potential to transform a teacher’s pedagogical beliefs and practices. Figure 2.6 represents the processes through which teachers’ pedagogical beliefs and practices may be transformed with the understanding that new or altered pedagogies do not reach an ideal state. They are evolving as learning is viewed as an ongoing process throughout a teacher’s career that may lead to dynamically different paths of interpretation. The professional development sequence is described to illuminate the features of this ICT professional development model.
The rectangle bounding this ICT professional development model represents the professional development activities which teachers undertake as part of their professional lives. The model is entered through the left hand side indicated by the left to right arrow movement. Teachers enter this context with pre-existing pedagogical beliefs and current classroom practices and they progress, from left to right, through a core reflective process, that enables these pedagogical beliefs and practices to be shaped. Pre-existing pedagogical beliefs and practices must first be elucidated by teachers through professional activity so that they are able to enter the core reflective process aware of their personal pedagogical beliefs and practices.

The core reflective process is represented by the interlacing triangles of reflection, collegial dialogue and investigation which have been indicated in the literature as essential professional learning activities required in ICT professional development. The overlap of the triangles shows that these three professional learning activities are dependent upon one another in that investigation requires reflection and collegial dialogue to be effective just as reflection is dependent upon collegial dialogue and investigation and in turn for collegial dialogue to be effective for professional learning, investigation and reflection are necessary. The arrows that sit on top of these triangles represent this interlacing of these activities. These professional learning
activities are not restricted to a circular motion. Rather the interrelationship and interdependence enables any of these activities to take priority while the others are of constant support and can be drawn on at any time.

The circle in which this core reflective process is embedded represents two contexts, indicated by the half circles. The two contexts are the internal school context and the external context of professional development. Both of these contexts are connected and impact on the core reflective process. The internal context focuses on elements at the school level, such as the school culture represented in the model as school vision, structures and leadership. These internal school elements support the core reflective process by providing a culture of collegial collaboration and professionalism, leadership, school based goals and direction, and school structures that enable teacher sharing, discussion and collaboration, as well as celebration. The internal context places ICT professional development within the school context as a functional part of teachers’ daily professional practice.

The external context focuses on professional development that teachers participate in outside the school, represented in the model as external events and formal knowledge. External events include such activities as teachers collaborating in online communities where critical and reflective discourse is available, ICT competency workshops, conferences or any activities where professional learning is encountered. Formal knowledge exists as academic literature or expert knowledge. These external constructs feed the core reflective process by providing new skills and knowledge, challenges, insights and ideas that can stimulate and extend professional learning. The joining of the half circles embeds the core reflective process, linking internal and external contexts as interdependent structures. In this model the core reflective process is considered professional development activity. The internal and external contexts are considered as influencing the core reflective process and as such have purchase in this model.

Movement through the model is directed towards a star shaped image that represents the number of pathways through which pedagogical beliefs and practices can evolve. Some of these evolving pedagogical beliefs and practices may be confirmed from pre-existing accounts of the teacher, some may be altered and some may be
transformative outcomes. The emphasis on evolving pedagogical beliefs and practices is important in this model as movement towards pedagogy associated with multiliteracies and ICT indicates transformation. Learning in this way is viewed as an ongoing reality as part of a teacher’s career.

This ICT professional development model has been drawn from the literature to portray conceptually, an effective form of systematic professional activity that it is believed can enable teachers to transform their pedagogical beliefs and practices. In this research context, this ICT professional development model is applied to the complex issue of multiliteracies. The model informs the research design that is presented in the following chapter.
Chapter Three  
The methodology and design of the study

The methodology for this research has been chosen to reflect my underlying assumptions about knowledge, the needs of the research context and the requirements of the research itself. This chapter begins with an examination of my assumptions, followed by the methodological paradigm that frames the research. The study structure is presented in three sections; research design, methods for gathering data and data analysis. Following this, ethical considerations and limitations of the research are presented.

3.1 Underlying assumptions
As indicated in the literature reviewed, transformative ICT professional development that leads to multiliterate classroom practices involves research relating to teachers’ attitudes, values, beliefs and feelings about three distinct areas: ICT in learning, multiliteracies, and ICT professional development. My research is founded on human thought and beliefs and on what is perceived as transformative ICT professional development in the minds of the teachers in this study. It involves analysis of the emotive nature of the human, driven by the influence of change as well as the challenges and anxiety brought about by engaging with transformative and complex entities such as multiliteracies and ICT. Therefore an interpretivist methodological paradigm as part of a qualitative inquiry is required of me as the researcher to seek understanding about human nature and the many diverse beliefs, thoughts and perceptions that people hold that can enable their distinctly different actions and reactions.

3.2 Methodological paradigm
This research seeks to get ‘inside’ teachers’ minds, to understand their thoughts and beliefs through qualitative methodology. Cohen and Manion (1994, p.36) state that the central endeavour of the interpretivist paradigm is “to understand the subjective world of human experience”. From this epistemological stance a naturalistic inquiry was chosen to provide a framework for decision making and action. Naturalistic inquiry takes everyday experiences and ordinary life as its subject matter and asks
how meaning is constructed and interaction negotiated in social practice (Scott & Usher, 1999). The five axioms of the naturalistic paradigm described by Lincoln and Guba (1985, p.37) are consistent with my underlying assumptions. The five axioms are: realities are multiple, constructed and holistic; knower and known are interactive, inseparable; only time-and context bound working hypotheses are possible; all entities are in a state of mutual simultaneous shaping, so that it is impossible to distinguish causes from effects; actions are mutually shaped; and inquiry is value bound.

Research using naturalistic inquiry is dependent upon context. Context is viewed as a “complex web of unique interrelationships” (Erlandson et al., 1993, p.16) within which the researcher is a participant, mutually shaping constructed reality. What is considered real is a construction in the minds of individuals (Lincoln & Guba, 1985). Constructions are not seen in terms of truth in the absolute sense but in terms of “the best informed and most sophisticated construction on which there is a consensus at a given time” (Schwandt, 1994, p.128). The personal nature of these social constructions suggests that individual construction can be elicited and refined only through “interaction between investigator and respondent” (Guba & Lincoln, 1994, p.111). The task of the researcher is to make known the multiple, often conflicting social constructions of meaning and knowledge. The researcher is considered a research instrument through which data are understood. In this research, a teacher’s voice provides rich data. Ornstein (1995, p.127) describes the voice of the teacher as “what teachers do, how they do it, and how they react to their teaching”. A naturalistic researcher seeks to give teachers a voice rather than an interpretation clouded by the researcher’s agenda. The core ideals of understanding and reconstructing personal realities are premises of this research.

There is a considerable corpus of research within classroom settings that use naturalistic research to foreground the teacher’s voice (Livingstone & Lemelin, 2001; Mortera-Gutoerrez & Beatty, 2000; Robinson, 1995; Thousand, Diaz-Greenberg, Nevin, & Cardelle-Elawar, 1999). Furthermore there is also evidence of naturalistic inquiry that deals specifically with educational applications of ICT and teachers’ voice (Fitzpatrick & Faux, 2002; Franklin & Lowry, 2001; Spaid, 2001).
3.3 Research design

The structure for this qualitative research project is provided by the theoretical ICT professional development model established in the Literature Review (Figure 2.6). The model has two stages (see Figure 3.1). Stage 1 involved the collection of data to inform the design of an ICT professional development activity. Data were collected on the three distinct areas implicit to ICT professional development in this context, namely ICT in learning, multiliteracies, and ICT professional development. The structure and data collection methods of Stage 1 drew on the naturalistic paradigm. Stage 2 utilised action research methodology to support the collaborative design, implementation and evaluation of an ICT professional development activity it was hoped would result in transformative multiliterate classroom practices. Each of these stages is now described.

Figure 3.1 Two stages of the research project

Figure 3.1 illustrates the two stages in this research project. The vertical dotted line breaks the theoretical ICT professional development model into the stages that provide the structure for this research. The first stage focuses data collection on
teachers’ existing pedagogical beliefs and practices. The second stage focuses data collection on professional learning activities found to be significant in the literature on ICT professional development, these being, investigation, reflection and collegial dialogue, which combine to form a core reflective process.

3.3.1 Stage 1: In Stage 1 informing data were collected to establish the existing pedagogical beliefs and practices of the participants in the given research context. I used guiding questions to obtain informing data on the three areas of: ICT in learning, multiliteracies, and ICT professional development. The guiding questions were:

1. What are the values and beliefs associated with ICT and pedagogy?
2. What are teachers’ understandings of, and pedagogical practices associated with multiliteracies?
3. What constitutes effective ICT professional development that results in transformation of pedagogy?

The data collected were intended to have an informative role. They were designed to provide a contextual understanding of the transformative capacities of ICT professional development. In Stage 2 these data inform the collaborative design of an ICT professional development activity. The methods and processes of collecting informing data contributed to the development of interpersonal relationships between myself and the research participants that were critical to the success of Stage 2 as explained in the introduction to this study, in section 1.2b, ‘Tensions within this research’.

3.3.2 Stage 2: Stage 2 examined the transformative capacity of elements of the theoretical ICT professional development model. To enable this to occur, an ICT professional development activity that may have had the capacity to transform pedagogy and enable multiliterate classroom practices needed to be designed, implemented and examined, in collaboration with participants from the Suncoast Cyberschools. To achieve this, it was necessary to develop a supportive, trusting, working relationship with a small cohort of interested teachers who would involve themselves not only in the design and implementation of an ICT professional development activity but also in the monitoring and reflection processes over a
substantial period of time. A research method needed to provide a simple framework for on-going investigation that was flexible and responsive to change and diverse pathways, enabling collaborative action that empowered the participants and engendered ownership. The nature of the research needed to emerge as the investigation proceeded to ensure that the variable context and the unpredictable interactions that would occur could be considered in the design features. Above all, the research method needed to complement the theoretical ICT professional development model established from the literature review, with consideration given to the specific professional learning activities in the core reflective process and a transformative capacity. Such a method was found in action research. The following section discusses the action research process and its application to the design of Stage 2 of this research project.

**Action Research**

Action research requires the pursuit of action-and-change while simultaneously engaging in research-and-understanding (McTaggart, 1991, 1997a; Oja & Smulyan, 1989). It is founded on assumptions of authentic group participation, real ownership of research theory and practice, and elective change (Altrichter, Kemmis, McTaggart, & Zuber-Skerritt, 2002; McTaggart, 1997b). Building on the seminal work of Kurt Lewin, Grundy and Kemmis (1982, p.84) proposed a definition of action research stated here as:

> Educational action research is a term used to describe a family of activities in curriculum development, professional development, school improvement programs, and systems planning and policy development. These activities have in common the identification of strategies of planned action which are implemented, and then systematically submitted to observation, reflection and change. Participants in the action being considered are integrally involved in all of these activities.

In defining action research, fundamental processes of plan-act-observe-reflect cycle in a spiral, and the notion of social practice as a focus for research is prominent. Participation is also notable with people being integral to the transformative process.

Involvement and improvement are the two main aims of action research (Grundy & Kemmis, 1982). Carr and Kemmis (1986) depict action researchers as deliberate
activists who seek out change in a social practice. Their involvement can be described on two planes, as implicated within the processes of planning, acting, observing and reflecting individually and collaboratively. Collaborative involvement widens the circle of those affected by the research process and further shapes improvement. Improvement of practitioners’ own understanding of their practice is therefore achieved through self-action and from critically examining action moments in a collaborative sphere. Further to issues of involvement and improvement, McTaggart (1997b) advocates authentic participation rather than involvement for improvement. He sees participation as enabling real ownership and control over research theory and practice rather than participants being involved in research. By this inference, action research is concerned with changing individuals and the culture of the group. Emerging from the scholarly discourse over time is a refining of the definition of action research to appropriate the individual and collaborative role:

Action research is a form of collective, self-reflective enquiry that participants in social situations undertake to improve: (1) the rationality and justice of their own social or educational practices; (2) the participants’ understanding of these practices and the situations in which they carry out these practice (Kemmis & McTaggart, 1988a, p.5).

A number of strategies are involved in action research methodology. Firstly, the group is joined together by an interested ‘thematic concern’ (Kemmis, 1982; Kemmis & McTaggart, 1982). A period of reconnaissance is served whereby the group is involved in fact finding and analysis. The core of the action research process is the self-reflective spirals of cycles of planning, acting, observing and reflecting, from which conscious thought and action result. This process is embedded within two dimensions: discourse and practice, and construction and reconstruction. The mutual interaction of these two dimensions is actioned by the individual systematically and responsively, for improvement in practice and understanding. The human dimensions of practice, past experiences and prior knowledge, intervene in the cyclic process, as the proactive processes for future actions and plans. Grundy and Kemmis (1982, p.86) describe these capacities as “retrospective” and “prospective” (see Figure 3.2). These processes signify implementation of action research for continued learning and development. As demonstrated in Kemmis’ and McTaggart’s (1982, p.10) model below, retrospective understanding informs action (2) and reflection (4) whereas
prospective understanding enables planning for the future (1) and reflection in observation (3).

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<tr>
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<th>Reconstructive</th>
<th>Constructive</th>
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<tr>
<td>Discourse (among participants)</td>
<td>4. Reflection&lt;br&gt;&lt;i&gt;Retrospective&lt;/i&gt;&lt;br&gt;On Observation</td>
<td>1. The Plan&lt;br&gt;&lt;i&gt;Prospective&lt;/i&gt; to Action</td>
</tr>
<tr>
<td>Practice (in the social context)</td>
<td>3. Observation&lt;br&gt;&lt;i&gt;Prospective&lt;/i&gt; for Reflection</td>
<td>2. Action&lt;br&gt;&lt;i&gt;Retrospective&lt;/i&gt;&lt;br&gt;Guidance from planning</td>
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Figure 3.2 The moments of action research (Kemmis & McTaggart, 1982)

Figure 3.2 shows the four stages within an action research cycle: plan-act-observe-reflect. The practitioner(s) construct a plan (1) for strategic action that is guided by looking forward (<i>prospective</i>) to the action (2) that will be taken. What was planned can be considered (in <i>retrospect</i>) for guiding the action. In reality, much can happen in action that was not planned. Past experience and prior knowledge inform this action stage. As observation (3) involves thinking about action in terms of the intent, it serves prospective understanding for critical self reflection. Finally, through reflection (4) improvement of practice can occur from a greater understanding of action enabling informed strategic action. In this way, reflection looks back to observation, locating significant issues, problems and circumstances. Important at this stage is discussion among participants to seek the meaning of action and thought enabling a re-construction of the plan.

Action research provides a process for construction and re-construction of a specific social practice in a particular situation. Through discourse and practice, participants engage in strategic action in repeated spirals enabling systemic learning supported by retrospective and prospective understanding. McTaggart (1991) points out that the core reflective spiral of cycles of plan-act-observe-reflect is what an individual does in action research with a group of people who have united under the same thematic concern. Such moments of planning and reflection are considered collaborative activities.
Action research was employed in Stage 2. Figure 3.3 diagrammatically represents the action research process taken in the design, implementation and evaluation of an ICT professional development activity to investigate the effects of elements of the theoretical model. The diagram was adapted from Kemmis and McTaggart (1988b, p.11) and Kemmis (1982, p.13).
Figure 3.3 represents the action research process taken in this study. The action research process began with the formation of a project team. The project team included myself and eight participants. The eight participants were volunteers from each of the eight participating Cyberschools. The project team joined together through an interest in the improvement of ICT professional development. Somekh (1995, p.340) sees the formation of such a group as a “precondition of action research”, signifying that it must be based on a mutual concern or felt need to instigate change, also described as a ‘thematic concern’ (Kemmis, 1982; Kemmis & McTaggart, 1988a). A period of reconnaissance (Elliott, 1991) was instituted to develop a sense of purpose for the project team, analyse and discuss informing data and develop a collaboratively designed ICT professional development activity that was guided by the theoretical model established in the Literature Review (see Figure 2.6). The reconnaissance period is indicated at the top of Figure 3.3 where reconnaissance is set as an independent process that involves investigative processes of exploring and analysing data, social process of developing community, and organisational processes of assessing possibilities and examining constraints. The reconnaissance period produced a plan for an ICT professional development activity indicated by the arrow leading downwards towards the ICT professional development activity plan.

Action research spirals of planning, acting, observing and reflecting are indicated by the central spiral of cycles repeated three times downward through Figure 3.3. The ICT professional development activity plan begins the first cycle that is acted upon, meaning that an ICT professional development activity was implemented. The project team had an active role in the activity implementation, during which observing and monitoring processes of looking, asking, thinking, speaking, writing and sharing were instigated.

Following through the cycle from right to left, as indicated by the clockwise direction of arrows, the project team was involved in reflection. Reflection took place individually and collaboratively as indicated in theory as a necessary function. Collaborative reflection took the form of a strategic monitoring meeting where all members of the project team were able to participate in critical discourse involving discussion, suggestion, support and negotiation on the implemented ICT professional
development activity. This critical discourse encouraged an open forum of responses where I acted as facilitator and scribe. This is indicated in Figure 3.3 by the revolving arrows in the centre of the monitoring meeting discourse processes, being symbolic of flowing conversation. A double-headed arrow connects the monitoring meeting to reflection within the cycle. The double-headed arrow indicates a mutually shaping relationship between individual reflection in the cycle and collaborative reflection in the monitoring meeting.

Reflection generates incidental changes which are formulated into a revised plan for the ICT professional development activity which is acted upon in Cycle 2. The action research process continues in the same manner through subsequent cycles. The final arrow at the bottom of Figure 3.3 indicates an on-going process that becomes embedded in individual and group action. Through this action research process and the design, implementation and evaluation of an ICT professional development activity, data were collected on the transformative capacities of elements of the theoretical ICT professional development model.

As the action research process progressed, the participants continuously refined methods, procedures for understanding data, and the content of their interpretations in the light of the understanding developed in earlier cycles (Altrichter, Posch, & Somekh, 1993; Elliott, 1991; Somekh, 2000; Wadsworth, 1997, 1998). Action research is an emergent process (Börger & Tillema, 1993) that developed along with the understanding of the project team and allowed convergence towards more refined understanding of the elements under study. Action research in this context aimed to draw to the consciousness of the participants “situational understanding” (Somekh, 1995, p.341) so that their understandings were better informed. As a final point, this research adheres to minimal requirements of an action research project, defined by Grundy and Kemmis (1982), in that it deals with a social practice with a strategic plan of improvement; it proceeds through a spiral of cycles that are critically informed in a systematic progression; and it involves participants as part of the research methodology as well as widening participation to include general staff, principals and whole school communities, in this case.
There is an extensive body of literature that identifies the strength of action research as a model for the professional development of teachers (Baird & Mitchell, 1986; Burnaford, Fischer, & Hobson, 2001; Check, 1998; Crockett, 2002; Elliott & Langlois, 2002; Espiritu, Meier, Villazana-Price, & Wong, 2002; Fox & Fleischer, 2001; Gallagher & Ford, 2002; McFarland, 2002; Rose, Jeris, & Smith, 2002; Schoen & Bullard, 2002; Senese, 2002; Vaidya, 2001; Viadero, 2002). In these studies action research is used to focus teacher inquiry into a range of educational areas and practices. Groups of practitioners within one school setting and across school settings implement action research as a form of professional development. There is also considerable and beneficial application of action research to ICT professional development (Eib & Cox, 2003; Kankaanranta, 2002; Kortecamp & Steeves, 2002; Pan, 1999; Royer, 2002; Somekh, 1997). In these studies, teacher researchers use their own classrooms as sites for investigation of the effectiveness of ICT in learning. Pedagogical practices and curriculum issues are explored in relation to ICT. Action research is said to empower the teacher through an analytical lens in a context in which teachers can feel disempowered due to their lack of competence and unfamiliarity with ICT.

3.4 Methods of data gathering

Qualitative methods that enable social interaction have a greater chance of making understandings held by teachers explicit, as the researcher is able to engage with the participant in social construction of understanding. Naturalistic inquiry is interested in propositional knowledge, that is, knowledge that can be cast into language form, as well as tacit knowledge, knowledge such as intuitions, apprehensions, or feelings (Guba, 1981). To explore these knowledges as informing data in Stage 1 and as understandings about transformative elements of ICT professional development in Stage 2, qualitative methods of interview and classroom observations provided data that were “a source of well grounded, rich descriptions and explanations of processes occurring in local context” (Miles & Huberman, 1984, p.15). This section proceeds with a description of data collection methods for each stage of the research project.
3.4.1 Stage 1 methods of data collection: Informing data were collected in Stage 1 using semi-structured interviews and classroom observations. Data were collected to establish the existing pedagogical beliefs and practices of the participants in the three areas of ICT in learning, multiliteracies, and ICT professional development. Each method is discussed in turn.

Interview
Semi-structured interviews were the main data collection device. Interviews of this nature are likened to a casual conversation with an explicit agenda (Rubin & Rubin, 1995). This agenda though pre-set, enables divergence within topics and shaping of content by either the researcher or the participant (Bogdan & Biklen, 1998). The researcher is able to change sequence and form of question in response to a given answer (Kvale, 1996) or from response to non-verbal behaviour (Bell, 1993) probing in depth, to the meaning expressed and offering a certain degree of control to the interviewee for the direction of the interview. The semi-structured interview can be viewed as a social construction process. Its capacity for a loose sequence enables the researcher to explore deeply into a teacher’s personal beliefs and experiences, capturing direct quotations in normal language. The semi-structured interview is a method suitable to naturalistic inquiry (Patton, 2002) as it focuses the researcher on understanding ideas from the participant’s perspective. Semi-structured interviews provide the vehicle for co-constructed interpretation that foregrounds the participant’s voice, where the researcher acts as an instrument to make known existing realities.

Semi-structured interviews in Stage 1 were focused on establishing teachers’ existing pedagogical beliefs and practices about ICT in learning, multiliteracies and ICT professional development. Two interview groupings were formed to achieve this aim. Each interview group served a different purpose. The first interview group (A) focused on the primary aim of establishing the pedagogical beliefs and practices of teachers pertaining to ICT in learning, multiliteracies and ICT professional development. The second group (B) focused on emerging themes within these three areas. The purpose of the interview directed the choice of interviewee, such that purposive sampling was employed. Table 3.1 provides a summary of all interviews held in stage 1.
Purposive sampling was used to select the participants for Stage 1 interviews. Purposive sampling refers to the purposeful selection of research participants based on their relevance to the research questions. This method “increases the scope or range of data exposed as well as the likelihood that the full array of multiple realities will be uncovered” (Lincoln & Guba, 1985, p.40). It supports the trustworthiness of research grounded in naturalistic inquiry (Green, 2002). It is also said to maximize the researcher’s ability to draw out themes that take account of life worlds, supporting the development of grounded theory (Lincoln & Guba, 1985). By selecting participants who “will most help to answer the basic research questions and fit the basic purpose of the study” (Erlandson et al., 1993, p.83) the likelihood of information richness will be increased. Two sampling techniques outlined by Patton (1990) were employed. Criterion sampling involved picking participants who could provide data on the primary aim of Stage 1, and opportunistic sampling allowed

<table>
<thead>
<tr>
<th>Group</th>
<th>Purpose</th>
<th>Participant</th>
<th>Sampling mechanism</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pedagogical beliefs and practices pertaining to ICT in learning, multiliteracies and ICT professional development</td>
<td>General classroom teachers</td>
<td>Criterion</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>School computer coordinator</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>ICT professional development needs and direction in context</td>
<td>Local Curriculum Leader</td>
<td>Opportunistic</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Systemic interpretation of multiliteracies</td>
<td>Multiliteracies authority</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Theoretical perspectives on multiliteracies</td>
<td>Academic experts</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total number of interviews</strong></td>
<td></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
emergent themes to be explored further. These sampling techniques are explained in further detail below.

Interview group A consisted of seven classroom teachers and four school computer coordinators for the primary purpose of Stage 1 as outlined in Table 3.1. As explained in the introductory chapter, this research took place in conjunction with a group of schools known as the Suncoast Cyberschools. Six out of the ten primary schools in the coalition responded to the request for interviews. The school Principals chose the interview participants using criteria provided by me. The criteria used in this instance identified those teachers in a position of responsibility in regard to curriculum integration of ICT (school computer coordinators) and those teachers considered by their Principal as effective curriculum integrators of ICT (general classroom teachers). Interviews took place in the participants’ local context. Principals provided teacher relief for the participants so that interviews could be held in class time. The interview questions for ICT coordinators and classroom teachers drew directly from the three guiding questions for data collection in Stage 1 (refer back to 3.3.1). The schedule was broken into three parts, with open ended questions on: ICT beliefs and practices, multiliterate understandings and pedagogy, and ICT professional development needs and transformative capacities. The classroom teachers’ interviews were focused at the personal level whereas the computer coordinators’ interviews were extended to include responses at the school level. Interview schedules (Appendices 3.1a & 3.1b) for each teacher type were provided to the interview participant prior to the interview so that deeper thoughts and richer information could be provided.

Interview group B consisted of four experts in the areas under investigation. Each interview served a specific purpose that emerged from the first group of interviews as outlined in Table 3.1. Erlandson et al. (1993) contend that once inside the context, the researcher can distinguish among stakeholders, determine how they are related, and choose among respondents for qualities related to the research. Opportunistic sampling arose as a response to the inductive analysis of interview data. As themes emerged pertaining to ICT in learning, multiliteracies, and ICT professional development, interviews were held with a series of experts. A local curriculum leader was interviewed to explicate needs and the direction of ICT professional development among the Cyberschools; an employing authority expert on multiliteracies was
interviewed to clarify the system approach to multiliterate understandings held by classroom teachers; and two academic experts with an interest in multiliteracies were interviewed to discuss theoretical perspectives. Interviews took place in the expert’s professional context. The schedules for experts’ interviews (Appendices 3.2a, 3.2b & 3.2c) were specifically related to the emerging themes discussed here. The questions in this case acted as guiding points so that I could engage in more discursive dialogue with the expert.

Fifteen interviews were held that focused on the primary research aims of Stage 1 and emergent themes, using different sampling mechanisms, as summarised in Table 3.1. Semi-structured interviews were focused on obtaining data on teachers’ pedagogical beliefs and practices associated with ICT in learning, multiliteracies and ICT professional development. The other data collection tool used in this study, to which I now turn, was classroom observation.

Classroom observation
Classroom observations were organised to provide contextual insights into current teaching practices associated with ICT in learning and multiliteracies. The many advantages to being an observer (Erlandson et al., 1993; Gay & Airasian, 2003; May, 1997; Peberdy, 1993) highlight data collection in situ moving beyond perception based data. Critically, for the naturalistic researcher, observation provides the opportunity to use all of the human senses to discover the interrelated elements of a particular setting. Guba and Lincoln (1981, p.193) describe the power of observation as “maximi[z]ing the inquirer’s ability to grasp motives, beliefs, concerns, interests, unconscious behaviours, customs and the like” that impact on what is being observed. Observation situates the researcher in the cultural context, providing context clues that enable the researcher to gain a deeper understanding of what is being investigated.

The main purpose of classroom observation was to establish current classroom practices of teachers in regard to multiliteracies and the integration of ICT. I was invited by the classroom teacher to observe in each classroom for a lesson period. The topic and activities of the lesson were at the discretion of the classroom teacher who had been made aware of the purpose of the classroom observation. I had the opportunity to discuss what was observed in the classroom with the teacher following
the observation. This discussion was used as a clarifying exercise to validate, amend and/or expand on observed data.

Sixteen classroom teachers were observed from six primary schools within the Cyberschool cohort. Classroom teachers were selected by the school Principals. I provided criteria to select participants for classroom observation. The criteria provided, sought the selection of teachers who demonstrated teaching and learning practices associated with multiliteracies and ICT. These criteria were designed to sample a broad range of participants with a variety of experiences and competencies using ICT and multiliterate practices, gender, age and teaching expertise, style and situation as in multi-age, composite or single class as well as access to one or more classroom computers and/or a laboratory of computers. Table 3.2 provides a summary of all classroom observations for Stage 1. The identification of the classroom observation relates to the learning activity observed, for example, the topic of the lesson or the use of ICT.

**Table 3.2 Stage 1 classroom observations**

<table>
<thead>
<tr>
<th>Criteria for observation</th>
<th>Name of activity/unit of learning observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration of teaching and learning practices associated with multiliteracies and ICT.</td>
<td>Famous Australian Insects Report on play Means to be Australian Powerpoint Station Endangered animal Interest presentations E-portrait Chook shed Colour My World Me Diet Planets Computer Folders Literacy aid</td>
</tr>
<tr>
<td>Total number of classroom observations</td>
<td>16</td>
</tr>
</tbody>
</table>
As described in the introductory chapter, being familiar with a classroom setting, I had to make judgements about the teaching and learning episodes observed. A Classroom Observation Form (Appendix 3.3) based on the work of Bogdan and Biklen (1998) and Peshkin and Glesne (1992) was used to record field notes. This form guided what I observed. The form was divided into seven sections or topics to observe. These included: the setting, context for activity, depiction of activity, teaching strategies, student comments, and researcher’s behaviour. A personal reflection section was also part of the observation form. This section required me to reflect on what was observed and on what was discussed with the teacher post-observation. This section required me to: speculate about teaching strategies and learning outcomes; make assumptions and/or state new ways of thinking about prior assumptions; and comment on research strategies and procedures. These three topics for reflection enabled me to summarise the classroom observation and direct further research avenues.

Two checklists were also used to guide my observations specifically targeted at observing participants’ teaching strategies. These checklists were used in depicting what multiliterate teaching strategies and learning experiences the participant used to integrate ICT. Both checklists were included as tables in the Classroom Observation Form in the teaching strategies section.

The first checklist was based on four principles of constructivist learning theory that included higher order thinking, authentic task, learner centredness and knowledge construction. In Chapter Two, a constructivist view of learning was found to be conducive to the integration of ICT through the creation of complex learning environments and meaningful learning experiences. The four principles were drawn from literature pertaining to constructivism (Ashman & Conway, 1997; Jonassen, 1991; McInerney & McInerney, 1994) and were identified by descriptors provided in Table 3.3. If I observed the participant implementing a teaching strategy that displayed a descriptor of a given principle, I shaded that principle and described the activity in the space underneath. Table 3.3 is a replica of the checklist included in the Classroom Observation Form.
Table 3.3 Principles of constructivist learning theory checklist

<table>
<thead>
<tr>
<th>Higher thinking</th>
<th>order</th>
<th>Authentic task</th>
<th>Learner centredness</th>
<th>Knowledge construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cognitive load-</td>
<td></td>
<td>Problem or project based approaches-</td>
<td>Autonomous thinker -</td>
<td>Constructing knowledge rather than the end product-</td>
</tr>
<tr>
<td>• challenge the learner either to construct better models or at least ponder the merits of the alternative models presented by the teacher.</td>
<td></td>
<td>• real-world relevance and utility,</td>
<td>• active exploration, learner is developing the necessary skills to become autonomous;</td>
<td>• emphasis on mental activity, processes and meaning making during learning not the product of that behaviour.</td>
</tr>
<tr>
<td>• Analysis, Synthesis, Evaluation of information</td>
<td></td>
<td>• problem based and or related to community issues,</td>
<td>• the teacher holds the learner in their ‘zone of proximal development’ by providing just enough help or guidance;</td>
<td>• Metacognitive awareness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• require transdisciplinary combinations of knowledges,</td>
<td>• recognition, appraisal and use of the learner’s background knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• appropriate levels of complexity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• allow students to select appropriate levels of difficulty or involvement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Chapter Two a summary of the goals of ICT integration (see Table 2.1) was presented. The second checklist focused on these goals. Within this summary there were three categories that were applicable to the classroom context, ICT integration as A: ICT skills; B: ICT as a tool for learning; C: New content / new pedagogy. For the purpose of this classroom observation, Category B: ICT as a tool for learning, was extended to aid in a more detailed description of how ICT were being integrated. This category was extended to include four examples, including B1: Skill/drill- using drill and practice software programs for repetitious practice; B2: Didactic integration- direct instruction of whole class/group on how to use a particular software program; B3: Research on the web/CD Rom- the use of the internet and or CD Rom as an information resource; B4: Presentation device- using a presentational program at the end of a learning sequence. Table 3.4 displays the three goals of ICT integration where goal B is extended to include these four categories: B1 to B4. During the
classroom observation, I shaded one or more of these goals of ICT integration and wrote a description of the given activity. A replica of Table 3.4 was also placed in the Classroom Observation Form.

**Table 3.4 Goals of ICT integration checklist**

Checklist two: Look for evidence of:

<table>
<thead>
<tr>
<th></th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Interviews and classroom observations were the methods used to collect informing data in Stage 1 of this research project. In Stage 2, action research was employed to utilise the informing data to collaboratively design an ICT professional development activity through which the elements identified as significant to ICT professional development could be examined. Methods of data collection used within the action research phase are now described.

**3.4.2 Stage 2 methods of data collection:** In Stage 2 action research was employed to support the design and implementation of an ICT professional development activity and to structure the examination of identified elements of ICT professional development. As part of the action research process interviews, monitoring meetings, professional learning activities and collaborative planning sessions were considered sources of data. The data collected through professional development activity informed the action research cycles. Table 3.5 provides a summary of the data collection methods. This table is set out in alignment with the action research process described previously in Figure 3.3 indicating the period of reconnaissance, cycle one, cycle two and cycle three.
Table 3.5 Action research data collection methods

<table>
<thead>
<tr>
<th>Event</th>
<th>Data collection medium</th>
<th>Description of event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reconnaissance</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Initial professional development day | • Digital video on transformative professional development (PD)  
• Online forum discussion contributions on ICT principles and multiliterate principles. | Group discussion by teachers on principles underlying ICT integration and multiliteracies and elements of ICT professional development that may lead to transformative practice; I introduced the research project and the need for the formation of a project team. |
| Three Project team meetings | • Meeting schedules  
• Field notes  
• ICT PD activity outline  
• Schedule for introduction of ICT PD activity | I introduced the action research model as basis for data collection; discussion of informing data by project team and design of an ICT professional development activity. |
| **Cycle 1 – implementation of ICT professional development activity** | | |
| ICT professional development activity implementation seminar | • For each candidate -investigative question form  
-support requirements form  
-planning sheet  
• Feedback form | I introduced ICT professional development activity to candidates, described the process of inquiry, discussed multiliteracies. Collaborative planning time for candidates and leaders which I supported. |
| Online threaded Discussion | • Digital postings | All teachers and I engaged in critical discourse through asynchronous forum entries. |
| Emails on planning sheet | • Revised planning sheet  
• Emailed suggestions | I provided feedback on individual candidates’ plans:- Formalised existing situation and action plan with monitoring techniques. |
<p>| Two candidate planning meetings | • Digital recording | I discussed with each candidate inquiry process and we developed their question and action plan. |
| Staff sharing sessions | • Digital video of session | Candidates shared their Inquiry Project with their staff. |
| Monitoring meeting 1 | • Digital recording | Project team collaboratively reflected on ICT PD activity using these questions- What is happening? What is not |</p>
<table>
<thead>
<tr>
<th>Cycle 2 – implementation of ICT professional development activity revised plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Five candidate planning meetings</strong></td>
</tr>
<tr>
<td><strong>Informal monitoring meeting 2</strong></td>
</tr>
<tr>
<td><strong>Half Day PD session</strong></td>
</tr>
<tr>
<td><strong>Monitoring meeting 2</strong></td>
</tr>
</tbody>
</table>

**Cycle 3 – implementation of ICT professional development activity revised plan**

| **Staff sharing sessions** | • Digital video of session | Candidates shared their Inquiry Project with their staff. |
| **Half Day PD session** | • Feedback forms • Concept map | ICT workshop facilitated by myself with discussion amongst all teachers on the relationship between ICT and multiliteracies. |
| **Culminating function** | • Multimedia presentations • Candidate speeches | Candidates each presented their Inquiry Projects to celebrate their learning, showcase student work and evidence their evolving pedagogical beliefs and practices. |
| **Six candidate interviews** | • Digital recording | I interviewed candidates. |
| **Eight candidate reflective journals** | • Reflective journals | Each candidate kept a reflective journal over the implementation phase of the ICT professional development activity which provided some account of their pedagogical beliefs and practices. |
### Six candidates reports
- Reports

Some candidates wrote a report which was a narrative of their learning journey during the implementation of the ICT PD activity.

### Two project team reflective journals
- Reflective journals

Written reflections provided by two project team members.

### Monitoring meeting 3
- Digital recording

Project team and I celebrated the project completion and discussed outcomes.

The reconnaissance period marked the onset of the action research method of Stage 2, indicated at the beginning of Table 3.5. The reconnaissance period began with an initial professional development day. The purpose of this day was to introduce Stage 2 of the research and to instigate the formation of a project team. Three representatives from each Cyberschool (N=33) attended. During this reconnaissance period, the project team was formed. The project team consisted of one representative teacher from each of the eight participating Cyberschools. The project team met three times for the purpose of collaboratively designing an ICT professional development activity. The actual ICT professional development activity, known as an Inquiry Project, is described in Chapter Five. The Inquiry Project is described after Chapter Four as data analysed here were used in project team meetings, during the reconnaissance period, to inform the design of the ICT professional development activity. Data collection methods for this period included digital video and online threaded discussions, meeting schedules and field notes. The online threaded discussion entries were copied and pasted into a word document and the field notes were formatted electronically. All spoken material on the video footage was transcribed.

Cycle 1 began with a seminar to introduce and begin the ICT professional development activity. Each project team member attended with a classroom teacher from his or her school. Classroom teachers became candidates who participated in the ICT professional development activity with the support of their project team member (see Figure 3.4). Principals were also invited to the introduction seminar. Data were collected during the introductory seminar. These data were focused on establishing each candidate’s existing pedagogical beliefs and practices in regard to ICT in learning, multiliteracies and ICT professional development. Specific forms that
related to the professional development activity, the Inquiry Project, were the data collection media. The forms obtained the direction of each candidates’ investigation, or ‘inquiry’ into their classroom practice, and required a number of parties’ signatures, those being the candidate, project team member, and school principal (see Inquiry Project investigative question form, Appendix 3.4 and Inquiry Project support requirements form, Appendix 3.5). A planning sheet included open-ended questions with spaces for responses that focused on obtaining data on the candidates’ existing pedagogical beliefs and practices in regard to ICT in learning, multiliteracies and ICT professional development, an action plan, and monitoring techniques for classroom inquiries (see Inquiry Project planning sheet, Appendix 3.6). A feedback form was given to project team members as an evaluative device on the seminar. This reflection provided direction for action for each project team member in the first monitoring meeting.

Figure 3.4 School representatives in ICT professional development activity

Other data collection methods used in Cycle 1 included an online threaded discussion which enabled chronological asynchronous digital postings in a web based environment, email communication, planning meetings with researcher and individual candidates, staff sharing sessions and a monitoring meeting for the project team. The threaded discussion was introduced in Cycle 1 and continued throughout the following cycles. Each entry was copied in full to include all fields such as date, author, subject, and written message. This was pasted into a word document in sequential order. This process was also adopted for all emails written during the implementation phase of the ICT professional development activity. Planning meetings, a staff sharing session, and the first monitoring meeting were digitally recorded and later transcribed.
Cycle 2 involved me in meetings with individual candidates and in an informal and scheduled monitoring meeting with the project team (refer to Cycle 2 in Table 3.5). The informal monitoring meeting arose as a response to the need to define the mentoring role of project team members in relation to their candidates as part of the implementation of the ICT professional development activity. All meetings were digitally recorded and later transcribed. A half day professional development session occurred within this cycle. Data were obtained on multiliteracies and development of community through digital video, of which the audio was later transcribed. Feedback forms were given to project team members as evaluative devices to be used in monitoring meeting number two which occurred at the end of Cycle 2. Monitoring meeting two was digitally recorded and later transcribed.

Cycle 3 involved further data collection methods that continued to focus on capturing evolving pedagogical beliefs and practices (refer to Cycle 3 in Table 3.5). The procedures for the same sessions and meetings have been outlined above. Candidates provided data in the form of speeches, multimedia presentations, reflective journals and reports. Project team members also submitted personal reflective journals. Semi-structured interviews with volunteer candidates were implemented as a final data collection tool. Open-ended questions sought responses to the three areas of study: ICT beliefs and practices, multiliterate understanding and pedagogy, and ICT professional development elements and transformative capacities. An interview schedule (final interview questions for candidates, see Appendix 3.7) was sent to each candidate prior to the interview and the procedure for implementation was the same as that adopted in Stage 1.

Through the action research process, rich sources of data were collected through methods that were part of the social interactions in the ICT professional development activity. Data collection methods of interviews, planning meetings, forum contributions and presentations captured teachers’ voices that were actively dealing with concepts and issues, whereas written materials such as reports, forms and journals captured teachers’ thoughts and reflections.
3.5 Data analysis

Inductive analysis was the main procedure to seek the emergence of themes within this research project. Within the bounds of grounded theory methods, thematic analysis was used to construct and reconstruct meaning in relation to the guiding research questions. Grounded theory is defined as “a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon” (Strauss & Corbin, 1990, p.24). This method was developed by Barney Glaser and Anselm Strauss (1967). It harmonises with the naturalistic paradigm as theory is grounded in data rather than being pre-established. Pre-established theory, Lincoln and Guba (1985, p.41) believe could not possibly “encompass the multiple realities that are likely to be encountered”. The structures advocated in grounded theory methods of data analysis have been adopted here to develop themes related to teachers’ engagement with the ICT professional development model central to the study.

As in grounded theory methods of data analysis, the analysis of data in a naturalistic paradigm is considered a concurrent process with data collection, as themes emerge from the beginning of the study (Erlandson et al., 1993; Miles & Huberman, 1984). In Stage 1, interviews were the first method used to collect data. Interviews were digitally recorded and transcribed. Interview transcripts were imported into computer software called NUD*IST, a qualitative data management program. NUD*IST is an acronym for the accurate description of Non-numerical Unstructured Data Indexing Searching and Theorising. The NUD*IST computer program was used to mechanise this theme analysis process (Richards & Richards, 1991). In NUD*IST the transcript becomes a ‘rawfile’ and the coding process was enacted through the assignment of data to ‘nodes’. Two coding processes were used: open and axial coding (Strauss & Corbin, 1990). These coding processes are mutually supporting. Open coding refers to the analytic process by which bodies of data are broken down consistent with the constant comparative method of analysis (Glaser & Strauss, 1967) to identify concepts pertaining to related phenomena that are categorised. This requires asking questions about the data and making comparisons for similarities and differences among the data to identify properties and dimensions of concepts. An example of such categories was ‘models of professional development’ and another was ‘professional
development needs’. Open coding is the first step in grouping concepts that seem to relate to the same phenomena. This process is also referred to as domain analysis (Cohen, Manion, & Morrison, 2000).

The idea of emergent categories becomes evident through axial coding. Axial coding involves developing a category established from open coding in terms of (i) the conditions that give rise to it; (ii) the context in which it is embedded; (iii) the strategies by which it is handled and (iv) the consequences of those strategies (Strauss & Corbin, 1990). In an alternating manner with open coding, verification of the themes is made with existing data and a continued search for properties and dimensions of categories is enabled. Attributes of what Guba and Lincoln (1989) term as a hermeneutic-dialectic process for the construction and reconstruction of reality are evident within this inductive coding process. Parallels can be made with the interpretive nature (hermeneutic) and the comparison and contrasting of divergent views (dialectic). Symbolically, the joining of or the forming of connections within categories enables (re)construction. In the analysis of the interview data the use of open and axial coding was focused primarily on providing evidence and direction for the generation of themes surrounding the three guiding questions.

The other method used to collect data in Stage 1 was classroom observation. Data obtained were written field notes and reports. Data gained from this method were assimilated into the NUD*IST node structure, termed ‘tree nodes’, to build on, modify and reconstruct themes. The rawfiles were examined for the conceptual labels they presented and then re-examined against the existing themes. Some annotations fitted into different conceptual labels and were copied into each. Incorporating additional data as an ongoing process throughout Stage 1 enabled the re-exploration of original data, further validating the coding process. At this data immersion stage I was able to implement two key principles of coding proposed by Strauss and Corbin (1990) as alternating between open and axial coding and developing some freedom with implementing procedures.

In Stage 2 the theoretical ICT professional development model (see Figure 3.1) was used as a framework to identify bodies of data. In this model there is a central capacity called the core reflective process. The core reflective process is made up of
three professional learning activities: investigation, reflection and collegial dialogue. These three professional learning activities became the concepts under which data were analysed. Through the constant comparative method of analysis (Glaser & Strass, 1967) questions were asked about data, comparisons were made for similarities and differences, strengths and weaknesses were identified, and further properties and dimensions were explored. This process of grouping and exploring data that related to the same concept resulted in the emergence of themes such as ‘community’ and ‘mindset’. As additional data were incorporated, deeper analysis was achieved as re-exploration of original categories occurred and stronger links and sub-links were made. Similarly as in Stage 1 data analysis, I reached a state of immersion in which the data were fully recognisable.

Word formatted data collected in Stage 2 were imported into the NUD*IST computer program. These data included transcription of the audio in digital video footage, interviews, monitoring meetings, field notes, and staff sharing sessions; emails and online threaded discussion entries; and candidates’ forms, reports and speeches. All word formatted data were imported into NUD*IST as ‘rawfiles’. Data were assigned to ‘nodes’ during the coding process. Imagery data obtained, such as pages within reflective journals were saved as JPEG images; and multimedia presentations were saved in their original form. Analysis of imagery data included the writing of notes which were imported into NUD*IST and assigned within the node structure respective to their inter-relationship.

In Stage 2 two analytical frameworks were used that related specifically to the professional learning activities of reflection and collegial dialogue, as part of the core reflective process of the ICT professional development model being examined. Firstly, to examine the role of reflection to enable teachers’ to transform their pedagogical beliefs and practices, the levels of reflection-on-action proposed by Hatton and Smith (1995) were used. Hatton and Smith draw on a vast range of reflection literature (Fuller, 1970; Schon, 1983, 1987; Smith & Lovat, 1991; Valli, 1992; Van Manen, 1977) for the formulation of their hierarchical developmental sequence that identifies three types of reflective writing. The three types of writing that are characterized as different kinds of reflection are: descriptive reflection; dialogic reflection; and critical reflection. Each of these reflective forms was
examined within reflective writing pieces for the role they play in enabling teachers’ to improve or transform their pedagogical beliefs and practices.

The second analytical framework was used to examine collegial dialogue in the online threaded discussion forum. Mäkitalo, Häkkinen, Leinonen, and Järvelä (2002) categorise six different forms of feedback that indicate levels of online discussion. Progressive level discussion is indicated by agreement/disagreement and personal feedback whereas deeper level discussion is indicated by notifying, supporting, comparing and paraphrasing feedback. These forms of feedback are used to guide the qualitative analysis for the cognitive demand of the online posts. Building on from this, two of the authors, Järvelä and Häkkinen (2002) categorise postings into five types that also indicate levels of discussion. On a continuum, lower levels of discussion are indicated by comment and suggestion moving towards higher levels with experience, new point/question then theory. Individual posts to the threaded discussion forum are analysed for occurrences of each of these types of discussion. Scores are tallied and a graph constructed to illustrate the frequency of each form of discussion. These data complement the qualitative analysis of the quality of discussion on the online threaded discussion forum.

3.6 Ethics

Ethical considerations of consent and confidentiality were addressed at the onset of this research. Informed consent was obtained in writing. A consent package was given to each participant that included an information sheet outlining the research project, as well as a consent form which each participant signed. In Stage 1, teachers volunteered to participate in interviews or classroom observations and in Stage 2, teachers volunteered to be project team leaders or candidates involved in ICT professional development activities. With respect to confidentiality, anonymity was preserved through coding of participant responses in all data obtained. Names were coded whereby the first initial in a participant’s name moved on one place in the alphabet, and a name was given starting with this initial, for example, sarah- s became t, code name beginning with t- tina. Names of schools mentioned in data were replaced with fictitious names. Coding of participants’ and schools’ names served to disconnect the teacher from his or her school.
Central in this research as a naturalistic inquiry was the development of trustworthiness of the findings. Trustworthiness is the form of validation that qualitative researchers tend to emphasise (Connelly & Clandinin, 1990; Patton, 2002). Lincoln and Guba (1985) and Erlandson et al. (1993) propose credibility for internal validity. The basis for credibility in this research context was the compatibility between the realities constructed in the minds of the participants with those that were attributed to them. How constructed realities were interpreted by me was critical to the emergent direction of the research and the research findings. Strategies in Stage 1 and Stage 2 were adopted to accomplish credibility.

In Stage 1 informing data obtained through interviews and classroom observations were validated through the process of member checking (Erlandson et al., 1993; Manning, 1997; Seale, 1999). Lincoln and Guba (1985, p.314) assert that “member checks…[are] the most critical technique for establishing credibility”. Member checking aids in the trustworthiness of this research. Interview participants were sent verbatim transcripts and teachers observed were sent classroom observation reports (Appendix 3.8). These reports included a brief description of what was observed including evidence of types of ICT integration practices, an explanation of the four constructivist principles under observation, a description of any activities observed that would represent these principles, and a brief recount of the main topics that arose out of the post observation discussion. A written reflection by the researcher was also included. A letter accompanied this report asking teachers for validation by adding further information or amending sections. A reply paid envelope was included to enable teachers to send back the observation report easily. At the end of Stage 1, informing data were presented at a meeting of the Suncoast Cyberschools for open discussion. Also informing data, as explained, was used to inform the design of an ICT professional development activity for implementation in Stage 2. Informing data were at all times presented to the research participants.

In Stage 2 through the action research process, data were produced through collaborative activity. Erlandson et al. (1993) emphasise that collaborative activity substantiates informed consent within a naturalistic inquiry. Informed consent is required on an ongoing basis, as part of the emergent style of research, where human
relationships and interactions continuously shift. Engaging in collaborative activity invites the opportunity to expand or redirect the basis for informed consent as further opportunities for research. Collaborative activities such as meetings, forum contributions, and professional development and presentation sessions were public activities that enabled group construction of ideas. Planning meetings for the purpose of developing classroom investigations were transcribed and returned to candidates as planning documentation. More private data, in the form of teachers’ reflective journals were scanned as whole page images to maintain the context of what was written and/or drawn. These reflective journals were returned.

3.7 Limitations
This research is limited by the sample size. It was funded by an ARC Linkage Grant with an Industry partner which consists of a small coalition of schools. This limited the available schools that could participate and number of teachers who could volunteer. However, the context enabled the development of strong collegial relationships between me and the teachers and amongst the teachers themselves across the schools. This supported the generation of rich data which contributes to substantive research findings. The research design and data collection methods contributed significantly to this collaborative relationship.

Research is judged on the extent to which its findings can be applied in other contexts and with other participants (Lincoln & Guba, 1985). In a naturalistic inquiry, transferability of the findings is the responsibility of those who apply the findings to other contexts (Guba & Lincoln, 1989). Transferability of the findings is supported by the generation of rich data and detailed description of data in context. Interviews were transcribed word for word and large sections of these are placed in the text when presenting the data analysis to provide the reader with the context for the issue raised. Whole pages of a teacher’s reflective journal were scanned so that the date and section of the reflection being focused on could be understood in context of the other reflections within the journal. Online forum postings were used with reference to sequence within a discussion and number of times read.
The complexity of the concept of multiliteracies added a complication to this research which may not be evident when applying the ICT professional development model to other content areas.

This concludes the methodology for this research. The following chapter puts the method of analysis into action with a discussion of data collected in Stage 1 to establish the existing pedagogical beliefs and practices of the teachers.
Chapter Four
Establishing teachers’ existing pedagogical beliefs and practices

Transformation of a teacher’s pedagogy has been identified in the literature as necessary because of changes taking place in work and social places, in students, in what is meant by becoming literate and by the demands brought about by rapid developments in ICT. I believe that ICT professional development can become the vehicle through which teachers systematically transform their beliefs and practices. A model for ICT professional development that has this transforming potential was created as an outcome of the literature review. This theoretical ICT professional development model also provides the structure for this research project (see Figure 4.1) in two stages, as discussed in the methodology chapter, to investigate the transformative capacity of ICT professional development.

Figure 4.1 Research structure based on theoretical ICT professional development model
In this chapter I present and discuss the data collected in Stage 1 of the project, represented in Figure 4.1 as existing pedagogical beliefs and practices. The data collected in this stage had an informing role in the collaborative design of an ICT professional development activity. The data collected in Stage 1 are focused on ascertaining teachers’ pedagogical beliefs and practices in the three areas of ICT in learning, multiliteracies and ICT professional development. The methods used to collect these data were interview and classroom observation. The analytical process was thematic analysis (Glaser & Strauss, 1967; Strauss & Corbin, 1990) employing the NUD*IST computer program (Richards & Richards, 1991) where descriptive accounts from interview transcripts and written classroom observations were coded into units of information and categorised.

Existing pedagogical beliefs and practices are organised under the three areas of ICT in learning, multiliteracies and ICT professional development. Themes that emerge under each area are analysed. Each of these areas had a guiding question that was presented in the methodology section. These guiding questions directed the collection of data. A response to each question is given at the end of each section. Each area concludes with a discussion of how the data informs ICT professional development that has the potential to enable teachers to transform their pedagogical beliefs and practices. A teacher analysis precedes this process to set the context for the data presented here.

4.1 Teacher analysis

Demographic data on age group, gender and teaching experience gained from an independent questionnaire of 44 teachers, provides a view of the teachers in the collection of data in Stage 1. Almost 80% of the teachers were female. Of the female teachers, only one was in her 20s, and 29 were more than 40 years of age. In contrast, only three of the male teachers were more than 40 years of age (Table 4.1). In regard to teaching experience, equal numbers of males and females had worked as teachers for 1-12 years. However, more females than males had worked for more than 12 years as teachers (Table 4.2). In keeping with national teacher demographics (MCEETYA, 2002) males represented a smaller percentage of the teaching staff.
Overall, the group of teachers with whom I worked in Stage 1 were predominantly females recognized as experienced.
4.2 ICT in learning

In this section I present themes on beliefs associated with ICT in learning and teaching with ICT. Figure 4.2 provides a graphical schema of the themes presented in this section to guide the reader along with the question used to direct investigation as presented in the methodology chapter. The guiding question required data to be collected on the values and beliefs teachers hold associated with ICT and pedagogy. Verbalizations of what teachers believe are presented here. Short hand indicators are used throughout this section as labels to represent explanations of those beliefs. To conclude this section, a summary of what teachers believe about ICT and pedagogy is presented along with implications for ICT professional development.

Figure 4.2 Graphical schema of themes within ICT in learning

4.2.1 Beliefs associated with ICT in learning: What teachers believe about ICT in learning is examined first. It was the first question that I asked teachers in interviews, as it set the scene for this research project and enabled free flowing conversation, mainly because it was opinion based. Figure 4.2 graphically depicts the five themes that were generated, including: real life; educational tool; non-educational; enforcement and new genre. Each of these themes is discussed.

Real life

Statements collated under this theme indicate that teachers believe ICT are part of real life experiences. Technologies are something to be used in the classroom as they reflect everyday experiences. This theme is demonstrated in the following interview excerpt:
Emme: I think it is a part of life. I don’t think we can separate it. As any other instrument I think it is just a tool. I’m thinking electronic as in information and communication technologies. Is that your meaning?

Sarah: Yes

Emme: I don’t know how you could do anything without it now.

Sarah: So your belief would be that it is a part of everyday life.

Emme: Just a part of everything. We are not yet comfortable with that. Not everybody is comfortable with that I believe. But I don’t think we can escape it.

Emme believes that ICT are an accepted part of the personal and professional interactions of people outside the classroom. Therefore ICT need to be used inside the classroom in ways that reflect real life interactions. The point Emme makes that all teachers in her school have not yet become comfortable using ICT indicates strength in what she believes. The connection between ICT in the workplace and ICT in the classroom is present in visionary goal oriented education documents produced by local government in Australia (Department of Education, 1999; Queensland Government, 2002) accentuating that education should provide the skills that children need in their future societal roles, such as those related to learning and working with ICT. Emme clearly expresses the link between our social worlds and our classrooms by stating that “I don’t think we can separate it”. For Emme, this short phrase is evidence of a firm validation for ICT existence in the learning process in the classroom. The word ‘separate’ was used in a similar vein by another teacher to express what she believes about ICT in learning:

Sarah: What are your beliefs about ICT in education?

Isla: I was thinking about that and it’s like asking what your personal beliefs are about pencils and paper. I really don't separate it. It is just a part of life. I really don't think computers are separate in any way.
Isla uses ‘separate’ in presenting two different ideas about ICT. Firstly, ICT are presented as a tool that cannot be thought of as different from other educational tools such as a pencil or paper. In another way, Isla uses separate in a comparison of the ways ICT are used inside and outside the classroom. Similarly to Emme, ICT are to be used in the same way that reflects real life applications. In summary, the theme of ‘real life’ signifies that some teachers believe the use of ICT in learning is validated because of its existence in our social, cultural, professional and personal worlds. It also indicates that ICT should be used in a manner that reflects real life application.

Educational tool
The theme ‘educational tool’ was generated from teachers’ discussion about ICT as educational tools that children use to learn. Teachers focused on the actual applications of ICT in their students’ learning, how it is being used or how it could be used, as demonstrated in the following interview excerpt:

Elspeth: My belief is that children should look at a computer as part of the overall picture because we got computers we don't stop reading books. We need to use the computer for research, for drill and reinforcement. There are so many uses for a computer and I think it is writing up a webpage, which we haven't done, giving information out to other people. It is like an advanced form of a report, so I want them to see there are a whole range of uses for a computer.

Elspeth sees the computer as another educational tool available for her students to use, comparable to other educational tools like books. She qualifies her valuing of the computer by stating that books also have an important role in education. To Elspeth computers are valued like other educational tools but they are not more valuable. She goes on to note a variety of uses of computers. These uses were mainly described as learning processes such as “for research, for drill and reinforcement” rather than as a product such as a webpage. Naming learning processes expresses a belief in learning with ICT rather than learning about ICT (Jonassen et al., 1998). Other teachers believe that ICT are considered tools to learn with in the classroom by describing ways in which ICT are integrated:

Michelle: …but as time has gone on we have got more [computers]. We are very fortunate at this school. A lot of money is put aside for computers so we are encouraged to incorporate them in the classroom. Which is brilliant cause you
don't have to take your cohort somewhere else and set aside 30 minutes in your timetable. You can actually jump on or an individual can jump on or a group can jump on, access the internet. So it really is just part of everyday school work. It’s not seen as something separate.

Kelly: Obviously for the skills, being able to use them, because of the vastness of the information you can get from them. Just the little things like what they can learn from them. Ummm, it’s just part of what you do in the classroom.

Both Michelle and Kelly say that computers are an integral part of their learning and teaching in the classroom. They believe that computers cannot be thought of as “separate” from other educational activities. Through descriptions of what this tool provides such as “access [to] the internet” and “vastness of the information”, educational value is placed on the use of computers in learning. In summary, the theme of ‘educational tool’ indicates that some teachers believe computers are tools that are used for learning processes and products as part of contemporary education.

Non-educational
This theme ‘non-educational’ suggests that teachers believe ICT are not a valid part of learning in the classroom. A computer coordinator provided reasoning for this based on the notion of technophobia:

Malcom: Teachers are not using ICT in their classrooms because they are technophobic. They do not value or see the value in the use of ICT. They don’t realise the skills and interests the children already have in this area and older teachers are just not interested in computers.

Technophobia, and specifically computer phobia is defined as “a generalized negative attitude towards technology that manifests itself in the form of (a) resistance to talking or even thinking about computer technology; (b) fear or anxiety which may even create physiological consequences; and (c) hostile or aggressive thoughts and acts, indicative of some underlying frustrations” (Jay, 1981, p.47). From Malcom’s perspective, the basis of such technophobia was that teachers do not see the educational value of ICT. A ‘non-educational’ position was also evident in a classroom teacher’s discussion of ICT in learning. The following section of a written account was taken from a discussion that occurred after a classroom observation with
Denise feels that the New Basics and the use of ICT is taking up valuable class time which is needed for basic literacy and numeracy. She feels that if the New Basics Project wants teachers and children to use ICT then they should provide a teacher for that specific purpose. When asked if ICT could help support the development of literacy Denise believes that due to the highly visual medium and the reading level required that it was not a good tool to support literacy development.

Denise’s main concern is that ICT takes away from the fundamental task of teaching and learning ‘the basics’, expressed here as literacy and numeracy. She believes that ICT do not support the development of these fundamental areas, which seems to indicate that Denise’s concept of literacy does not include current literacy frameworks, such as multiliteracies. Denise would consider ICT as add-ons (Prestridge, 2005) to a traditional curriculum. Denise also expresses the need for ICT to be the responsibility of someone else. This indicates that she views ICT as a subject to be taught that has little relationship to the literacy needs of her students. In summary, the theme ‘non-educational’ indicates that some teachers believe ICT lack educational merit in the learning process.

Enforcement

The theme of ‘enforcement’ is drawn from the context in which the teachers found themselves as trial schools for the New Basics Project. The New Basics Project was explained in the introductory chapter. As trial schools, the Cyberschool teachers, implemented a new curriculum that presented opportunities for ICT in learning. Teachers said that they were being forced to use ICT in their classrooms because of the requirements of implementing prescribed elements of the New Basics curriculum. Responses to an interview question: “Why do you use ICT in your classroom” evoked general responses that indicated enforcement, such as “it’s part of the New Basics” or “because of the Rich Tasks”. The following excerpt illustrates this theme:

Emme: Well I think that it is an integral part of the New Basics. It is the here and now. It is a relevant curriculum.

Sarah: So what is it showing the teachers?
Emme: They have to do something about using ICT. It has forced them to examine how they are using or not using it.

The New Basics project provided justification for teachers to investigate the use of ICT in learning. Emme indicates that the New Basics curriculum provides incentive. ‘Enforcement’ may be interpreted in a positive or negative sense, depending on a teacher’s belief in the value of ICT in learning, as exposed in the previous themes.

**New genre**

The final theme that was isolated through an analysis of data on ICT in learning was discussion about ICT enabling the development of new language genre. A good number of teachers believe that ICT are not just educational tools to support learning, but through their use in the curriculum it has enabled the creation of new text forms. This was expressed in the following interview excerpt:

Sarah: In a curriculum sense what are ICT doing?

Emme: It is producing new genres. Take email for example. A bulletin board. A website. And the visual language that comes with that.

The teacher went on to describe the difference between the language of an email and the language of a letter, demonstrating how the use of email has changed the format of a written letter. This theme indicates that many teachers are aware of the transformative capacity of ICT and their influence on traditional literate structures.

**Summary of beliefs associated with ICT in learning**

What teachers believe about ICT in learning can be represented through five themes: real life, educational tool, non-educational, enforcement and new genre. In regard to the themes of real life, educational tool and new genre, ICT are considered by some teachers as valuable in the sense that they are integral to learning and teaching, responsive to contemporary social and cultural demands. In regard to the themes of non-educational and enforcement, ICT are considered by several teachers as lacking educational worth, they would be better served by a specialist teacher and have been forced upon teachers through school reform. In summary, some teachers believe that
ICT have a valuable role in learning, while others hold negative or technophobic attitudes that may be inhibiting their use of ICT.

In this section I have examined what teachers believe about ICT in learning. The other section under ICT in learning to be analysed focuses on teaching with ICT (shown on the right hand side of Figure 4.2).

4.2.2 Teaching with ICT: Three themes were identified in the data related to teaching with ICT. These include: goals of integration; teaching style; and management issues. As illustrated in Figure 4.2, each of these themes has two sub-themes that indicate the teaching practices and pedagogy teachers adopt for the integration of ICT. Each theme is discussed.

**Goals of integration**

The ‘goals of integration’ theme refers to what teachers want to achieve when integrating ICT into their classrooms. There were two distinct goals for ICT evident in the data. These have been categorised as ‘ICT skills’ and ICT as ‘tools for learning’. Correlation can be made with goals for integrating ICT into the classroom discussed in the Literature Review (Table 2.1). Each of these goals is presented here.

**ICT skills:** Teachers express goals for learning about ICT. Learning about ICT indicates a focus on how to use particular software and hardware. Basic ‘ICT skills’ and competencies are learnt and valued. The following interview excerpt demonstrates the goal of teaching basic ‘ICT skills’:

   Mary: My experiences so far have been basically keyboard skills and recognizing letters, matching capitals to lower case, that type of things. Getting them used to getting in and out of their files, turning the computer on and off and all those basics that you start with. We have used Kid Pix\(^1\) program to introduce them to drawing. This year we hope to introduce this to Year 2’s as we didn’t last year. To Paint\(^2\), to get them ready because Kid Pix doesn't transfer well into other programs. Using word art and clip art and getting them used to that this year.

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\(^1\) Kid Pix ® is a graphic tool used by primary students that involves draw, paint and other mixed media tools

\(^2\) Microsoft ®Paint
Mary is focused on teaching her children how to use a particular software program such as Kid Pix. She displays a functional approach to using the computer in her classroom, by describing learning experiences such as keyboarding skills and basic computer competencies. She is not concerned about using ICT in terms of curriculum outcomes where the technology is used to enhance learning in disciplinary fields. A considerable amount of data was collected under this theme. Teachers described how they focused on typing skills, using particular software such as making a webpage or using Microsoft® Publisher or Microsoft® PowerPoint. The emphasis was on how to gain competency with the software rather than on curriculum content or learning processes.

Another example of integrating ICT in learning for the purpose of gaining ‘ICT skills’ is presented by Harry. He explains a learning activity his year three class did with PowerPoint: “The emphasis of this activity was to skill children in how to do a PowerPoint”. The content in this instance was kept very simple, an ‘About Me’ topic, so that the children learnt the functions of the program. The year three children created a PowerPoint presentation about themselves. This sub-theme indicates that some teachers believe the goal of integrating ICT is to develop ICT skills.

**Tools for learning:** The second sub-theme, ‘tools for learning’, indicates that some teachers value an approach to teaching ‘with’ ICT (Davis et al., 1997; Jonassen et al., 1998) that does not focus on the building of ICT skills or on technology itself. Rather ICT are considered by teachers as tools to support curriculum ends. Teachers who expressed this belief about teaching with ICT acknowledge the need for computer competency but put greater emphasis on the process of learning and the products created with ICT.

An example of teaching with ICT as ‘tools for learning’ is illustrated in an extract taken from an interview with Harry. In this instance, Harry describes a segment of a unit of work where the goal of integrating ICT was to develop cultural understanding and further intercultural communication. This learning segment was not pre-planned. As Harry explained to me, it just happened because he had mentioned to his colleague...
what his class was learning about. The following provides a short description of the learning activity:

Harry: With emails, we had a little sister school relationship with an International school in Papua New Guinea. The Principal was a Papuan. I met him as he was an instructor in Taekwando and his school was in Australia and we exchanged our school address and email address and we went from there.

Sarah: What was the learning you saw achieved in that exchange?

Harry: Learning was the ability to get answers about their [Papua New Guinea] culture, what they did, what they ate, different things like that. They also did letters using Word\(^3\) and they put graphics or they illustrated them themselves. Some put borders around them telling them a little bit about their own culture and they sent them off. So that was something that they did last year and that was a part of the Dance Unit Task 3 (The New Basic Project Rich Task).

When asked about what learning was achieved, Harry provided examples of curriculum outcomes that focused on an understanding of culture, rather than the skills of how to use email. Harry explained that this opportunity opened his eyes to using ICT to enrich the curriculum. The goal of integrating ICT as ‘tools for learning’ suggests that a teacher places emphasis on developing learning outcomes and or using ICT to support the learning process. These teachers consider ICT as tools to achieve curriculum outcomes. However, teachers who use ICT as ‘tools for learning’ do not necessarily change their pedagogy or content in the curriculum. In the Literature Review, Lankshear and Bigum (1998) remind us that teachers can integrate ICT as a tool that is focused on learning with existing pedagogical practices that are just ‘technologised’. This means that some teachers accommodate or add ICT to their repertoires rather than transform their pedagogy.

There are two sub-themes in goals of integration: ‘ICT skills’ and ‘tools for learning’. These goals can be linked to the goals of integration framed by DEST (2001) in Table 2.1 in the Literature Review. There is considerable data collected indicating that some teachers believe ICT skills should be the goal for using ICT in the classroom. There

\(^3\) Microsoft®Word
was also data indicating some teacher use of ICT to enhance and support the achievement of curriculum outcomes. Both of these goals of integration lack evidence that these teachers changed their pedagogy to integrate ICT. The third goal of integrating ICT, called new content/new pedagogy (see Table 2.1) indicates transformation of pedagogy that effectively infuses ICT. This goal was not present when teachers talked about integrating ICT.

This section has analysed and discussed data under goals of integration, the first theme of Teaching with ICT. The second theme, teaching styles, is now discussed.

Teaching styles
Two sub themes emerged under teaching styles (see Figure 4.2). These were instructional and constructivist approaches. Both teaching styles are examined here. In the Literature Review these approaches were discussed in relation to a transformed pedagogy infused with ICT. This is referred to again to remind the reader of pedagogy that effectively infuses ICT.

Instructional approach: The traditional teacher has been described as using an ‘instructional approach’ to disseminate information to students, where the types of activities include lectures, demonstrations, seat work and repetitive practice (Roblyer, 2004). This style of teaching remains the same with connection to ‘ICT skills’ as the teacher’s goal of integration. The following interview extract exemplifies the instructional style of teaching about ICT:

Elspeth: Ideally it could be whole class. I'd love a big screen with my computer up there. We'd all love that. I'd love access to a computer lab where I could take the whole class and I could teach them how to use publisher to make signs for instance but I haven't got that so I have to make the most of what I've got. I suppose that what's available limits my strategies too.

Elspeth believes it is best to use an ‘instructional approach’ which would enable her to teach all students how to use a particular software program at the same time. She values this approach, even though she can not teach in this way at her school. The relationship between instructional teaching and ‘ICT skills’ as the goal of integration, is present in this discourse. It is evident when Elspeth provides the aim of the activity
as “teach[ing] them how to use publisher”. A reductionist epistemology (Jacobs & Clements, 1999) deriving from an objectivist learning model (Howard et al., 2000) underwrites this perspective. An objectivist learning model assumes that teaching practice should be teacher directed and that learning is transmitted knowledge. With respect to integrating ICT, instructional teaching places emphasis on technical competency and involves whole class demonstration, individual tutorials and repeated practice. An ‘instructional approach’ to teaching with ICT can be linked to ‘ICT skills’ as the goal of integration, when teachers implement direct instruction for the purpose of student advancement with ICT skills.

An ‘instructional approach’ can also be linked with ICT as ‘tools for learning’ as the goal of integration. ‘Tools for learning’, as explained in the previous theme, suggests that ICT are used to enhance students’ learning outcomes with the existing curriculum. However, actual teaching practices remain unchanged. Lankshear and Bigum (1998) describe this as a ‘technologised’ approach through an aggregated process. Examples of teaching with ICT in this way would include a directed approach (Roblyer, 2004) to integrating ICT where teachers assume an informer-receiver relationship in teaching, such as using skill or drill software to reinforce mathematical concepts, using a projector to look at a website in a similar manner to using a blackboard, using the internet as a resource for information gathering in a similar manner to using a text book or using powerpoint as a device to present research in the same manner as doing a project on cardboard. The medium has changed but the style of teaching has not. The following interview transcript provides an example of employing an ‘instructional approach’ where ICT are integrated as ‘tools for learning’:

Isabelle: … fables as a theme and what happens when things don’t go right. So they [children] got the idea of what a fable was about and then watched models of it, created it together and then made the next step of structuring their own. Then once it was approved on paper they then moved onto putting it into a powerpoint.

Isabelle explains a thematic unit of work on fables that served a distinct purpose in relation to behaviour management in her classroom. Even though a descriptive account of the teaching strategies was not included, the structure of the learning activities indicates that ICT were not used as an integral part of the learning process,
rather as a tool for publishing at the end of the learning episode, when the fable was in final draft form. ICT were considered an add-on, not used to enhance learning about fables but rather used as tools to present fables.

Teachers’ use of the ‘instructional approach’ that had goals of ‘ICT skills’ or ICT as ‘tools for learning’, were found to be significant in interviews and in classroom observations. The following Table 4.3 provides data drawn from classroom observations. During these observations, I categorized the teaching practices and associated goals for the use of ICT in the lessons observed. The goals of ICT integration checklist (Table 4.3) described in the methodology section is used. As explained, this checklist provided three categories (A: ICT skills, B: tools for learning and C: new content/new pedagogy). To provide a richer insight into exactly how ICT were being used as ‘tools for learning’, category B was extended to capture different uses of ICT as tools. A description of each category is repeated below in Table 4.4:

Table 4.3 Teaching practices for goals of ICT integration

<table>
<thead>
<tr>
<th>Unit</th>
<th>Goal A</th>
<th>Goal B: Tools for learning</th>
<th>Goal C</th>
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<tbody>
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<td>Famous Australian</td>
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<td>Insects</td>
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<td>Report on play</td>
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<td>Means to be Australian</td>
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<td>Powerpoint</td>
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<td>Station</td>
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<td>Interest presentations</td>
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<td>E-portrait</td>
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<td>Chook shed</td>
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<td>Colour My World</td>
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<td>Me</td>
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<td>Diet</td>
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<td>Planets</td>
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<td>Computer Folders</td>
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<td>Literacy aid</td>
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</table>
These data indicate that the majority of teachers were implementing ‘instructional approaches’ that integrated ICT for the attainment of ‘ICT skills’ or they used ICT as ‘tools’ for curriculum outcomes. Teachers mainly used ‘instructional approaches’ to increase the computer competency levels of their students or used ICT as a presentational device at the end of a unit of work. The use of didactic methods such as whole class instruction was also evident. A number of teachers used ICT in a range of ways through their units of work. For example, in the lesson sequence on Planets, the teacher taught PowerPoint in a didactic manner (‘instructional approach’ for the goal of ‘ICT skills’) so that each child could produce one slide on a given planet (‘instructional approach’ for the goal of integrating ICT as ‘tools for learning’). These individual slides would be put into a PowerPoint presentation by the teacher at a later stage. ‘Instructional approaches’ with the goal of ‘ICT skills’ or as ‘tools for learning’ has been described as a “conservative” (DEST, 2001, p.18) approach to the integration of ICT. Bigum (2002, p.133) describes these uses of ICT as “domesticating” the computer, where ICT are made to conform to requirements of the classroom rather than transform pedagogy.

An ‘instructional approach’ to teaching with ICT presents linkage to both goals of integrating ICT, for the attainment of ‘ICT skills’ and using ICT as ‘tools for learning’. An ‘instructional approach’ that integrates ICT in these ways can be described as accommodating ICT. Pedagogy remains unchanged. It was found that this approach is generally adopted by teachers in this research context. The other

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>A: ICT skills</td>
<td>acquisition of ICT skills</td>
</tr>
<tr>
<td>B1: Skill/drill</td>
<td>using drill and practice software programs for repetitious practice</td>
</tr>
<tr>
<td>B2: Didactic integration</td>
<td>direct instruction of whole class/group using data projector or computer</td>
</tr>
<tr>
<td>B3: Research on the web/CD Rom</td>
<td>the use of the internet and or CD Rom as an information resource</td>
</tr>
<tr>
<td>B4: Presentation device</td>
<td>using a presentational program at the end of a learning sequence.</td>
</tr>
<tr>
<td>C: New content / new pedagogy</td>
<td>change in content and pedagogy</td>
</tr>
</tbody>
</table>
teaching style that teachers adopted less frequently is the ‘constructivist approach’. The way teachers use this approach to integrate ICT is presented now.

**Constructivist approach:** Data brought together under this sub-theme of teaching styles explores teachers’ constructivist teaching practices that integrate ICT. In the Literature Review, the relationship between constructivism and ICT integration was explored. Teaching with ICT in this approach was described as student-centred where the learner is viewed as the user and creator of knowledge and learning is described as an active process within real world experiences that draw on multidisciplinary concepts. Teaching is characterized as based on cooperative learning through problem oriented activities (Roblyer, 2005). I used another checklist during classroom observations to identify the existence of four principles of constructivism in teacher classroom practice: higher order thinking, learner centredness, authentic task and knowledge construction (Ashman & Conway, 1997; Jonassen, 1991; McInerney & McInerney, 1994). Descriptors of each of these principles were provided in the methodology chapter and in the classroom observation form (see Appendix 3.3). Table 4.5 indicates the presence of each principle evident in the lessons observed.

**Table 4.5 Lessons demonstrating constructivist principles**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Higher Order Thinking</th>
<th>Authentic Task</th>
<th>Learner centredness</th>
<th>Knowledge construction</th>
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</thead>
<tbody>
<tr>
<td>Famous Australian Thinking</td>
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<tr>
<td>Insects</td>
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<tr>
<td>Report on play</td>
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<tr>
<td>Means to be Australian</td>
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<tr>
<td>Powerpoint</td>
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<tr>
<td>Station</td>
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<tr>
<td>Endangered animal</td>
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<tr>
<td>Interest presentations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-portrait</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chook shed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colour My World</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Me</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Diet</td>
<td></td>
<td></td>
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<tr>
<td>Planets</td>
<td></td>
<td></td>
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<tr>
<td>Computer Folders</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Literacy aid</td>
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</table>

Authentic tasks and learner centredness are the more common constructivist principles that I observed in lessons. The link between the integration of ICT and
these two principles could be explained by the idea that using ICT supports or provides greater opportunities for these two principles to occur in an emerging form. For example, in the lesson sequence on Insects, the teacher designed learning through an authentic task where students linked to real world issues using the internet to research their given insect. In regard to learner centredness, children were able to explore software programs and use direct learning pathways. There were varying strength of these principles observed and some teachers were just beginning to implement these principles in their teaching practices. Data also indicate that if a teacher demonstrated constructive principles in their teaching practice, the goal of integrating ICT was as ‘tools for learning’.

Evidence of higher order thinking and knowledge construction were found to indicate a learner centred constructivist approach to the integration of ICT. The addition of these two principles in the teaching observed indicated the use of ICT to enhance student’s own construction of knowledge. There are two example activities where teachers adopted a constructivist approach that evidenced all four principles of constructivism, displayed in Table 4.5 – as ‘Means to be Australian’ and ‘E-portrait’. These teachers were demonstrating what was found in the Literature Review to be moving towards a transformed pedagogy infused with ICT. This should not be considered unusual in this context. The teachers chosen for classroom observation were considered ICT innovators and were implementing an educational reform that redefined ICT and pedagogy in a futures orientation. For these reasons many of these classrooms should have been sites for ICT infusion. Instead what was found were two unique instances of a transformed pedagogy infused with ICT. One of these teachers provided a description of what his pedagogy looks like and how ICT becomes an integral part of the teaching/learning process in his classroom:

Quinn: At the moment we have a business thing happening down at the shade house. Children are sent down there to do some weeding, get materials, check some plants. Normally with this video production we would send kids in the lab and they take little videos and put them together, so that while this group is doing something on the video for me the other group is doing something on the business side. So we have two groups of students doing different things and it’s just me shooting backwards and forwards.
The context of this unit provided real life relevance and meaning. They were doing something business like, using a number of resources, one being ICT in the production of a video. The classroom was the “shade house” and the “lab”. Relationships with the community were being developed. The teacher assumed the role of facilitator “shooting backwards and forwards” and the children took control of their learning, “they take little videos”. They are “apprentice knowledge workers” (DEST, 2001, p.18) using ICT in ways that construct their knowledge in purposeful activity that is reflecting real life learning.

Two teaching styles are identified in this research context. These are an ‘instructional approach’ and a ‘constructivist approach’ to integrating ICT in learning. Teachers who demonstrated ‘instructional approaches’ used ICT for ‘skill’ development or as ‘tools’ for supporting curriculum outcomes. The ‘instructional approach’ is more commonly used by teachers. The integration of ICT in this approach has been described as ‘technologising’ teaching practice, such that, teachers’ pedagogy remains unchanged. Teachers who demonstrated constructivist principles such as authentic tasks and learner centredness were found to be moving towards a constructivist approach to teaching that integrated ICT as ‘tools for learning’. Change in pedagogy was observed in two instances where teachers demonstrated all four principles of a constructivist approach. Vision into what was defined in the Literature Review as a transformed pedagogy infused with ICT is provided: a problem based real life learning activity that engages students as knowledge makers developing community relationships and using ICT for authentic purposes.

In this section I have analysed data under teaching styles, the second theme of Teaching with ICT. I made direct links with, and drew extensively on, the first theme of ‘goals of integrating ICT’. The final theme under Teaching with ICT is management issues (refer to Figure 4.2). These data are significant, in that teachers found management issues contributing strongly to how they teach with ICT.

**Management issues**

There were two management issues that teachers raised consistently in interviews. These were the need for functional computers and using ICT in a lab or in a classroom.
**Functional computers:** Issues teachers have about ‘functional computers’ contribute to the beliefs associated with ICT in learning previously explored. Teachers’ comments taken from interviews identify frustration and disempowerment associated with dysfunctional computers that are found in classrooms. Example comments include: “when we get some computers that work without wasting hours on them, then we will be able to incorporate IT in the classroom” and “to get computers that work and enough of them for students to use”. These comments reflect the value placed on the use of ICT as well as beliefs that can inhibit the use of computers in the classroom (Becta, 2004a).

The issue expressed in the second comment about having “enough” computers is another more complex concern that exposes varying teaching approaches to integrating ICT. Having a ratio of “1 computer to 2 students” was expressed as a minimum requirement for using computers. These two comments could indicate an instructional approach where a teacher instructs the whole class requiring a large number of computers. This teacher would find it frustrating to incorporate a small bank of computers in his or her classroom using an ‘instructional approach’. What is important to ICT professional development is understanding the pedagogical approach to integrating computers that is causing the teacher to get frustrated with the lack of hardware.

**Lab or classroom:** Discussion with teachers around pedagogy with ICT addressed the issue of the location of computers. The idea that a ‘lab’ configuration supported an ‘instructional approach’ to teaching for ‘ICT skills’ development was evident in the following interview excerpt:

Isla: I like the way we have a lab. A lot of schools have got rid of theirs and put more machines in classrooms but I like the lab because teaching the basic skills is a very nice way to get the kids on board with a minimum of fuss and I think that is really important. It is very easy to have ten kids sitting around if you want to teach them how to build a webpage. You go to file and then you do this and that and then you save as html. All ten you have taken though the steps and then you get the next ten and so on. In an hour and a half you have shown everyone.
Isla promotes the use of a ‘lab’ environment because it is easy to teach children computing skills. Instructing ten children on webpage construction is considered by Isla as an effective way to implement ICT. With further discussion with me on effective teaching approaches to webpage construction in a classroom environment Isla advanced an important idea:

Isla: If we did that and pulled all the computers out and put them in the classroom I don't think the teachers would have the skills to function like that. We have some very clever teachers that put their children in groups and that is second nature for them. Maybe it is a slight hang up about what I said before. It is not pencil and paper tools. Remember that most of these teachers are all baby boomers. We had a 50th birthday party last year and about half the staff were 50 and a couple the year before and a couple the year after so we are an old staff.

Isla believes that teachers at her school do not have the right “mindset” (Lankshear & Bigum, 1998) for infusing ICT. As discussed in the introductory chapter, both Lankshear and Bigum (1998) and Spender (1995) agree that age has a connection with an immigrant mindset and being raised in a print culture. Teachers at Isla’s school have ‘immigrant’ mindsets. As these teachers were not raised with digital devices they have been described as viewing ICT as tools similar to conventional tools like the pen and paper. Teachers with this mindset would use ICT in the same way, with every child having access at the same time. This ‘immigrant’ mindset supports the relationship between a ‘lab’ environment and an ‘instructional approach’ in the attainment of ‘ICT skills’. Support for this relationship is evident in the following excerpt where a computer coordinator describes how lower school teachers use a small computer ‘lab’:

Emme: What tends to happen is that the [teacher’s] Aide takes small groups of children [into the lab] and I am not clear if the teacher stays in the class and takes the rest of the class or keeps the others in the resource center.

This situation, where another teacher takes students to a ‘lab’, is not unfamiliar in schools. The employment of an ICT teacher or use of a Teacher’s Aide is an option available in some schools. This situation was discussed further with the computer coordinator to try to expose the underlying beliefs about ICT that support this practice:

Emme: When I said to the teachers, could you not do it in your classrooms, they said no because there is too much noise and
you can’t run a group in here. I think that is the traditional classroom coming through. The teachers have to be comfortable on how it is done and hopefully they will come to see that as the children’s skill base increases that they don’t have to send the children off.

As pointed out in this discussion, Emme acknowledged that teachers in her school are not using computers in their classrooms because of their preference for an ‘instructional approach’. The use of ICT is at odds with what they believe about how children learn, as ICT requires “group work” and creates “noise” which is not consistent with a teacher-centred pedagogy where learning is a passive activity. Teachers’ mindsets for integrating ICT can be seen as directing teachers’ preferences for the location of computers, in a ‘lab’ or ‘classroom’. A relationship can be seen between the location of computers and the style of teaching adopted which is rooted in beliefs about how children learn. Location of computers is a significant issue in this study as it provides a pathway for teachers to examine their mindset for using ICT and their approach to teaching.

Teacher’s talk about management issues provides discourse around the functionality and instructional setting of ICT in learning. Both themes indicate preference for an ‘instructional approach’ that focus on ‘ICT skills’ which support the earlier finding of the prevalence of this teaching style. The topic of management issues within ICT professional development offers pathways for teachers to explore the reasoning behind the preferred location and teaching style for the integration of ICT.

**Summary of teaching with ICT**

Three main themes emerged from interviews and observations with teachers on teaching with ICT. These included goals of integration, teaching styles and management issues. A picture emerged of an instructional preference for teaching with ICT that focused on the attainment of ICT skills and the use of ICT as tools for learning. This approach is deemed conservative in the literature, as teachers are accommodating ICT into existing pedagogical practices. ‘Immigrant’ mindsets were found to support this approach. Evidence of movement towards pedagogy informed by constructivist learning theory that could infuse ICT, was found in development and in unique circumstances. Management issues are found to be avenues that could
potentially provide pathways for teachers to explore their pedagogical preference for integrating ICT within professional development activity.

4.2.3 ICT in learning- implications for ICT professional development: What teachers believe about ICT in learning and the teaching practices they adopt to integrate ICT has been examined in this section. In this research context, teachers talked about the value of ICT in learning both positively and negatively. They mainly used the ‘instructional approach’ for integrating ICT either for the attainment of ‘ICT skills’ or as ‘tools for learning’. Some teachers believed in the valuable role of ICT in learning but were frustrated with management issues in regard to the location of computers. Some frustrations were identified as relating to the ‘instructional approach’ they were adopting and the mindset they hold in regard to integrating ICT.

It seems that when teachers adopt an instructional or a constructivist approach to integrating ICT, ICT are used in different ways. Instructional approaches focus on ‘ICT skills’ and use ICT as ‘tools for learning’. Whereas, in a constructivist paradigm, ICT are ubiquitous in learning. Both teaching approaches indicate valuing of ICT, as expressed by teachers in the themes of ‘real life’, ‘educational tool’ and ‘new genre’. What could be suggested as different is the mindset of some teachers that is evident in the ways they engage with ICT and students. Teachers demonstrating constructivist principles in their teaching have engaged with the transforming capacity of ICT. These teachers are developing new types of relationships to work with their students who are considered apprentice knowledge workers. These teachers are active facilitators supporting student engagement and empowerment with ICT, opening doors and encouraging new thoughts and directions for student learning. It seems that the mindsets teachers have, in regard to the way they think about ICT and therefore use it in the classroom, needs to be addressed within ICT professional development. These data suggest that teachers’ mindsets in regard to ICT, are determining factors in their pedagogical approach to ICT.

Management issues teachers spoke about also point to the need for ICT professional development to focus on challenging fundamental assumptions teachers hold in regard
to how today’s digitally ‘savvy’ students learn. Given the findings for ICT in learning, I believe that ICT professional development must engage with teachers’ underlying beliefs and practices and contest their validity in a contemporary world. ICT professional development may then be able to move teachers to a different cultural milieu, somewhat like a move to a different dimension. ICT professional development should aim to alter teachers’ beliefs and practices in an evolving, recursive manner, so that the emergence of new ways of working with students is explored. ICT professional development seems to require more that the development of teachers’ competency and confidence with ICT skills, if transformative outcomes are required.

In this chapter I am describing teachers’ pedagogical beliefs and practices in regard to the three areas of ICT in learning, multiliteracies and ICT professional development. Their pedagogical beliefs and practices in regard to ICT in learning and the implications these have for ICT professional development have been presented. The second area, multiliteracies, will now be brought into focus to discuss what teachers in this research context understand by the term multiliteracies and the pedagogical practices required by the concept.

4.3 Multiliteracies

In this section I present themes on multiliteracies which is the concept that a transformative model of ICT professional development deals with in this research. The structure of this section is more straightforward than the previous section, but a graphical schema (see Figure 4.3) has been provided to guide the reader. The guiding question required data to be collected on teachers’ understandings of, and pedagogical practices associated with, multiliteracies. There are two sections: the meaning of multiliteracies and pedagogy associated with multiliteracies. To conclude, implications for ICT professional development are proposed.
4.3.1 Meaning of multiliteracies: Teachers were asked to explain what the concept of multiliteracies meant to them. Their responses were collated into four themes: communication, knowledges, critical processes and ICT (see Figure 4.3). Each theme is explored individually. This section provides a picture of the meanings teachers attach to multiliteracies.

**Communication**
Multiliteracies was expressed by teachers as synonymous with the process of communicating. ‘Communication’ is the key term, defined by the teachers through phrases such as “being able to convey and interpret a message in a multitude of ways”. Multiliteracies emphasises multiple modes of communication. The following interview extract illustrates this meaning of multiliteracies:

Nathan: Multiliteracies is being able to communicate, a two way process, being able to express your thoughts and ideas in different ways using ICT. Using pen and paper, using drawing mediums and other diorama. Whatever is necessary or appropriate to convey a message. And obviously it’s being able to read that message, so putting yourself in that place of the recipient. Can they interpret a table of information, can they read a webpage, can they distinguish between fact and opinion, are they able to get the message from what might be a purely pictorial presentation, because of the way it is presented, which is rather complex. It is how our world is so. It is being able to communicate given all the different media and presentation methods.
Nathan emphasises two important elements within his definition of multiliteracies. Firstly, he discusses the process of communication, enabling learners to convey and interpret messages in a number of different formats. Secondly he associates communication with a wider range of media. To Nathan, multiliteracies open up ways we communicate through old forms, such as pen and paper, new forms such as those associated with ICT, mentioned by Nathan as webpages, and visual forms such as drawings and pictures. This definition represents a conventional view of literacy which does not consider the transformative impact of ICT (Prestridge, 2005), in that the way we communicate has changed because of the impact of technologies. Nathan also attributes multiliteracies to current times with reference to “our world” and communication through “all” the different media. The following two interview responses to the meaning of multiliteracies unveil patterns of representation within the theme of communication:

Emme: To me it means being very comfortable with all forms of communication. It means being able to understand oral language, written language and visual language. To write, whether it is [pause] I am still saying visual, to write, to put those languages down, to analyse them to be very comfortable with all those forms of language and that is what true multiliteracies is and that is what our society is.

Isla: It means [long pause] all the techniques you need to communicate effectively in the modern environment so kids need to know how to chat, how to email, how to use the web, all the business of authority and they need to know the traditional numeracy and literacy. They need to know the graphic and visual and they need to know the culture, how culture affects your understanding, communication techniques.

Both Emme and Isla, as well as Nathan, attach understandings about communication to multiliteracies. They apply the ‘multi’ prefix through a process of splitting communication into various elements. This is not dissimilar to the six modes of meaning that require a metalanguage in the concept of multiliteracies- linguistic, visual, audio, gestural, spatial and multimodal. Emme splits communication into oral, written and visual language, while Isla splits communication into technical, visual, cultural and traditional. To Nathan it is multiple media. The second pattern threaded through the three excerpts focuses on the modern context. Isla talks about “our society”, Emme frames her discussion within the “modern environment”, and Nathan speaks of “our world”. The theme of ‘communication’ indicates that some teachers
understand multiliteracies to be about the process of communication. They split up the concept of communication into multiple elements to represent the ‘multi’ in multiliteracies and place discussion of literacy within contemporary times.

**Knowledges**

The theme of ‘knowledges’ utilizes the ‘multi’ in multiliteracies, in a similar manner to the previous themes, but in this case it talks about multiple knowledges. Again it may be representational of the six modes of meaning within the concept of multiliteracies. The following extract provides an example of this theme:

> Isabelle: [Long pause]…being literate in so many ways, areas, and knowledges. I guess it’s a bit like Gardner’s Intelligences and having the knowledges and the variety of knowledges and being literate in that variety of mathematical, kinesthetic knowledges.

Isabelle has drawn on her understanding of Gardner’s theory of multiple intelligences to verbalise the meaning of multiliteracies. The notion of being intelligent in multiple ways is synonymous with being “literate in so many ways”. Interestingly, she does not mention linguistic intelligence but rather draws parallels to logical-mathematical and bodily-kinesthetic intelligences. These have relationship with gestural and spatial designs, which are part of the six modes of meaning of multiliteracies. As discussed in the Literature Review, Tyner (1998) supports Isabelle’s direction, as she contends that there should be greater connection between multiliteracies and Gardner’s theory of multiple intelligence. The theme of ‘knowledges’ indicates that some teachers understand multiliteracies to be comprised of a number of different fields of knowing.

**Critical processes**

Teachers understood multiliteracies to be defined by the critical processes involved in interacting with a range of texts. Quinn refers to a number of different multimodal media in his discussion of the critical processes involved in being literate. Quinn also demonstrates practical application of the concept of design, critical framing and transformed practice in this interview excerpt:

> Quinn: To me it extends beyond the computer. It’s looking at all assets of communication media, pictures, movies not only access to those but interpreting those and looking at those really critically. Looking at books a whole range of things all combined into one. It is certainly not only computer technology
but a whole range of mediums. Print, written literature as well. And movies, animations and comics. It means to me a whole range of things we have, not just technology as far as computers are concerned.

Sarah: So these are mediums children can utilize. Then what is actually multiliteracies?

Quinn: If you are looking at TV, then instead of looking at it at face value have a look at what they are talking about. If you are looking at a poster which is trying to get a message across then trying to understand what it means. Once you understand that then they should be able to use that in everyday means. If they are going to do something then they can make a poster or a TV show to give a message to pass on the information, so it is understanding it and using it and combining those sort of things in the work that they are doing.

Quinn discusses multiliteracies as a process of critically interpreting different texts and communicating in different media. He draws on critical framing in the concept of multiliteracies by describing activities that make children look critically at literate practices to “understand what it means”. Quinn also alludes to transformed practice as he describes the construction of new texts through the application of design, a core concept of the ‘what’ of multiliteracies. Emphasis on the “everyday” context which underwrites multiliteracies is substantive in his discourse.

Quinn’s short explanation of multiliteracies that concentrates on critical processes for understanding and creating contemporary texts could be considered as discourse at the practical implementation level. An interview with an academic expert who had an interest in multiliteracies provided a theoretical perspective on the meaning of multiliteracies. Quinn’s interpretation of multiliteracies is evident within this discourse. In the interview Quentin, the academic expert, separates multiliteracies into three parts- inputs, outputs and overlaying influences. Inputs involve critique as Quinn stated “looking at it at face value” using critical processes to understand texts:

Quentin: when doing a project, do they [students] have facility, are they able to appreciate, can they find relevant source and once they get to those sources …The second level there is, is the actual semiotics of the texts and images. Do they have facility in not just reading the text and being able to make distillations of what they want, finding what
they want, reading comprehension, researching. Are they able to look at other semiotic systems learn from diagrams, charts and pictures, text here, picture there, hotspots here, linear, non-linear…. that second level of multiplicity.

Bathed in linguistic complexities Quentin describes a need to critically interpret texts through semiotic structures just as Quinn describes understanding through seeking meaning from the text. Outputs simply stated by Quinn as applying the given knowledge and making something are supported by the academic:

Quentin: Are they able to, can they produce project work that draws on verbal, print electronic sources. Does it have sound, use of audio in their products? Is there intermeshing of these things. Then say within the print electronics or whatever, similarly are they able to appreciate the interplay of the multiple semiotic system, diagrams, pictures, drawings… so that they can use the text, they can develop texts that interfaces with the picture or diagram. Picture or the diagram is not just a caption of what they say here. They actually use that interplay which is a more subtle way of gaining meaning.

Quentin goes beyond Quinn’s understanding of making things by drawing on key theoretical concepts within multiliteracies such as transformed practice, hybridity and especially multimodal design. The notion of “interplay” described by Quentin is pivotal in multiliteracies for representing patterns of interconnection among different modes of meaning. Quinn’s lack of depth of understanding of the theoretical intricacies and interdependence of multiliteracies is evident as he is operating at a practical level. Quentin’s third part of multiliteracies described as overlaying influences, surrounds cultural diversity and the impact this has on learning environments. Increase in cultural diversity, which the NLG (1996) state as a reason for the advent of multiliteracies, was absent from Quinn’s meaning. This comparison of interpretations indicates that the meaning of multiliteracies experiences simplification as it moves from a theoretical frame to a practical frame.

The theme of ‘critical processes’ representative of the teachers charged with the implementation of multiliteracies in the classroom, indicates the need for a critical frame for working with real world texts. Teachers mean that critical processes are essential tools students use to understand and interpret texts in relevant contexts.
Multiliteracies to them involves a critical approach to literacy education. The final meaning of multiliteracies that was present in teachers’ discourse was in terms of ICT.

**ICT**

There is a prevalence of the term ‘ICT’ in discussion about multiliteracies. The NLG (1996) advocate that the term multiliteracies was coined to focus on the emergence of a multiplicity of communications channels, highlighting ICT as a premise. Unsworth (2002, p.63) believes that ICT have had a transforming impact on literacy and uses the term “becoming literate”. The use of ICT mainly indicates technological contexts. Discussion of the impact of ICT and the changing nature of literacy education was not present. Teacher use of technological contexts gave definition to multiliteracies as evident in the following interview extract:

Emme: ICT has a major role because how can you be multiliterate in our society and ignore it? You can’t have one without the other, because ICT is now producing much of our communication. I come in here every morning and look at my email and if I don’t I will be behind. I will be behind because everything that is sent to me is on that [points to computer]. At the moment I type up a news sheet so that they [teachers] know what is happening for the week. It is just a communication media. As soon as that classroom is connected to the intranet I won’t be using paper. I’ll be putting that on a noticeboard for the teachers. So I don’t see how you can have multiliteracies without the use of ICT. Technology is very convenient.

Emme bases her discussion of multiliteracies as multiple ways of communicating digitally and emphasizes her understanding of the relationship through a number of technologically created social contexts such as “email”, “intranet” and “noticeboard”. Her statement that “technology is very convenient” signifies her belief in technological contexts that bind ICT and multiliteracies. She qualifies the relationship between ICT and multiliteracies by stating that ICT are “producing” much of the communication within digital forms, signifying the influence of new technologies in the creation of multiliteracies.

Teachers define multiliteracies based on technological tools such as the “ability to communicate using old and new technologies” and “using tools such as internet links in Word, sending digital photos, chat sessions, creating powerpoint and publisher
projects with sound, visual animation and buttons”. ICT products are considered multiliterate outcomes. This kind of idea is somewhat limited but logical due to the relationship between ICT and multiliteracies. An interview with an academic whose research interest focuses on learning processes while creating with technologies, emphasises empowering children to be producers and creators of electronic texts as an essential part of multiliteracies. The association of ICT products as multiliteracies is evident in this excerpt:

Nelson: There has been so far a lot of emphasis on receptivity and a lot less emphasis on producing multimedia texts, like producing powerpoint presentations or producing webpages partly because of teachers [lack of skills, confidence]. So I think that’s led to a lot of work on comprehending what is already there and very little or too little on being part of the world of the electronic literacies. And I think that you are inadvertently training people to kind of understand what is there but not to contribute. I think there needs to be a lot more emphasis on skills that kids need to actually make and create multimedia presentations…

Sarah: But multiliteracies can’t be just skill based, an attainment of skills to produce a product?

Nelson: No, but I think an attainment of skills to produce a product has been sadly overlooked. I think a lot of the work has been concentrated on how you find your way around, how you search but not so much on how you transform information and create information in a multimedia environment.

Nelson expresses concern for skilling students so that they can produce multimedia texts. He sees that as a valuable part of transforming practice. He believes that to be a part of an electronic world you must be a producer not a consumer and that more emphasis is needed on teaching these skills. Spender (1995, p.107) supports this dynamic stance suggesting that by nature children of the electronic generation are predisposed to “think, assess, react, decide and act” when engaging with technologies. The idea that children are creating with ICT is fundamental to the concept of multiliteracies. However, it can be limited if it is considered in regard to producing multimedia texts with a focus on the student’s skill attainment. Directing attainment of ICT skills needs to be framed in a wider pedagogical learning context otherwise ICT integration may be viewed as a technologised approach. Further to this
connection between ICT products and the meaning of multiliteracies, an employing authority expert on multiliteracies, who provided workshops for the Cyberschools defined multiliteracies as:

Danica: I think about multiliteracies as being the literacies of the future. Where we once held a canon of what literacy is in the book I assume it is being literate in lots of ways. That is not only technology, which is the most obvious. But I view it as the ability to perform and convey your message in that way, literate in the sense of bringing people to your point of view.

When I inquired about teachers’ confusion surrounding the term multiliteracies, evident in interviews, Danica responded that in workshops:

Danica: …we keep stressing multimedia in things so multimedia is a term used.

Danica has a depth of experience with ICT. This has influenced her view of the relationship it has with multiliteracies and how she presents the concept of multiliteracies in workshops. She stated that the Cyberschool teachers participated in a multiliterate workshop where the term was explained and talked about. However, the professional development in this area was limited. Getting students to do multimedia presentations was seen by teachers as achieving multiliterate outcomes.

Multiliteracies is defined by teachers in terms of ICT in two ways. Firstly, it is seen as creating technological social contexts in which multiliterate practices occur. Secondly, it is related to students producing ICT products. This limits the concept of multiliteracies to an application of ICT within conventional literate practices rather than engaging with transformative potential that ensures students are becoming literate.

**Summary of meaning of multiliteracies**

Multiliteracies means a number of different things to different teachers. This is not unusual for a complex concept that can be interpreted in a number of ways. In this study, multiliteracies is understood by the teachers as communication, knowledges, critical processes and ICT. A consideration of the prefix ‘multi’ is evident in the themes of communication, knowledges, and ICT. In ‘communication’, teachers talk
about multiple aspects of communication. These include multiple languages, multiple media and multiple literacies. In ‘knowledges’ the use of ‘multi’ is associated with areas or fields of knowing, similar to multiple intelligences. In ‘ICT’, multimedia dominate. Placing literacy education within contemporary times is evident in ‘communication’, ‘critical processes’ and ‘ICT’. In all three themes, a contemporary context encases the discussion. Terms such as ‘our world’, ‘everyday means’ and ‘our society’ set the context of time. The idea of interacting critically with a range of texts, looking at cultural and political frameworks was evident in the themes of ‘communication’ and ‘critical processes’. The prevalence of rhetoric around the use or existence of technologies was evident throughout the majority of discussion. Webpages, chats, email, computers were mentioned by teachers as they talked about being literate today. This indicates a strong link between ICT and multiliteracies. ICT are used to explain new technological social contexts, new educational tools to use in the classroom and as synonymous with multiliteracies. Lastly, there was no discussion of the decline in print as defining the relationship with other modes of meaning. However, data indicate that other modes such as visual and auditory modes are being given greater consideration by teachers when they talk about being literate.

Teachers’ meanings of multiliteracies involve communication and critical processes, other fields of knowledge, multiple elements, a contemporary context and a strong relationship to ICT. This demonstrates a concrete understanding of the ‘what’ of multiliteracies- design and metalanguage. However, there is limited critical analysis of these or how they interrelate and are interdependent. Also lacking is an understanding of the empowerment and transformational capacity of multiliteracies, the cultural and linguistic significance and the implication of a critical-sociocultural paradigm. The complexities inherent in the concept of multiliteracies have been simplified to more rudimentary forms. This was evident in the comparison between Quentin and Quinn’s explanation of multiliteracies. In summary, these data suggest that teachers generally talked about multiliteracies as literacy education that acknowledges the influence of new technologies by accommodating rather than transforming their pedagogy. The second section on multiliteracies examines more closely the pedagogy teachers are using to implement multiliterate practices.
4.3.2 Pedagogy associated with multiliteracies: After explaining what multiliteracies meant, teachers were asked to describe the pedagogy required to implement multiliterate teaching practices. From the teachers’ discussions three themes about pedagogy associated with multiliteracies emerged. These include: an integrated approach, group work and real world application (refer back to Figure 4.3). The ways teachers think about pedagogy to inform their multiliterate classroom practices are presented here.

**Integrated approach**
An integrated approach, as described by a teacher, enables a topic to be taught from a range of disciplinary fields. Rather than teaching content in independent subjects, a topic is chosen by the teacher and appropriate fields of knowledge are drawn on to explore the topic in an integrated fashion. A teacher explains an integrated approach in this interview excerpt:

Isabelle: I guess it shows up in a very integrated style of work where we no longer just do topics on their own and we were discussing this the other day. One teacher was asking where do you keep the science pages that they [children] work on? We don’t always have them because we can’t actually separate things out as they happen in an integrated fashion. A topic will draw a variety of responses from different areas and so if you were doing maths in language and language in maths, so that’s what I am seeing.

Isabelle describes her approach to teaching as an “integrated style of work” which does not look at a topic from one subject area. She describes this approach in a holistic manner where a topic is developed and investigated, drawing on appropriate disciplinary content and processes. In an integrated approach, the topic is in focus rather than the subject domain. Instead of doing an isolated Mathematics activity, teaching and learning tasks employ mathematical strategies to explore the particular topic. Teachers who adopt an integrated approach draw on content and processes within the literacy domain, as well as other relevant fields, to explore chosen topics.

**Group work**
Group work describes the employment of teaching strategies that enable children to work collaboratively. An excerpt from an interview with a teacher describes this strategy:
Kelly: Teaching strategies, um, we do a lot of group work and things like that that are multi-age. Children get experiences from other children as well, with the group strategies, we like the team effort. We teach them the skills so that everyone can be involved in a team. Everyone has something different to offer and everybody’s learning styles and the strategies they learn to do things and learn things are different, so you are going to get lots of different things from that as well.

Kelly describes group work as the major teaching strategy she employs to achieve multiliterate outcomes. She does not mention any other strategy. She relates group work strategies to multi-age teaching and talks about catering for children’s learning styles as an important part of the teaching/learning process. A pedagogy of multiliteracies focuses on instructional rather than organizational teaching practices. However, group work points towards the application of principles of constructivist learning theory that encourage collaboration and the need to cater for different learning styles in children. For some teachers pedagogy associated with multiliteracies is related to encouraging children to work in teams and collaborate through group work strategies.

**Real world application**

Teachers talked about the need for teaching and learning to be about real world events. Teaching is presented as needing to be relevant to children, related to the real world and situated in context. The following two teachers talked about real world application in the following interview excerpts:

Isla: All embedded in real tasks that need to be achieved. You can’t have disjointed stuff that is not connected. I mean today you can’t do email, its got to be email about something.

Michelle: I think it makes you go beyond that traditional English, Mathematics, that’s crossing over and integration and knowing that you have to be able to go beyond the classroom and it has to be up to date, keeping up with what is happening out there. I think that is the biggest thing. It's the awareness and then doing something about it.

Both Isla and Michelle talk about connecting to the real world beyond the classroom, making learning relevant and learning about real world events. Teaching and learning must have meaning for the learner and be relevant to their current life worlds. Isla raises the issue that learning to email needs to be embedded in purposeful context
rather than just learning email functions. This reflects the way email is learnt in the real world, for a purpose, to communicate with someone. Email is used here in an authentic way, for a real world purpose. Authentic application of ICT was explored previously in teaching styles associated with ICT in learning. Teachers who were providing authentic contexts for the integration of ICT had as their goal the use of ICT as ‘tools for learning’. This indicates that these teachers had not engaged with the transformative potential associated with ICT and multiliteracies.

Michelle in her interview, mentions “going beyond traditional English [and] Mathematics” as separate subject domains through the process of “integration”. Similar discussion is present in the previous theme of an ‘integrated approach’ which also highlights the importance of making learning relevant, meaningful and authentic to the learner. These teaching strategies are evident within Productive Pedagogies (Department of Education, 2000b) as strategies that enable multiliterate outcomes within the New Basic Project. As stated at the beginning of this thesis, the teachers in this research context were trialing Productive Pedagogies. Therefore discussion of these teaching practices is not unusual within the discourse of teachers who are implementing this reform. Teachers are implementing multiliterate teaching strategies by placing learning in real world contexts so that learning is presented as relevant, meaningful and connected to the current life worlds of the children in their classes.

**Summary of pedagogy associated with multiliteracies**

Three themes are presented that encapsulate teachers’ dialogue about pedagogy associated with multiliteracies. Teachers talked about an integrated approach, group work and real world application. Key ideas that are evident include interdisciplinary study, grouping children so that they worked collaboratively and in teams, making learning authentic, relevant and connected to the learner. The limited discussion around the idea of a pedagogy associated with multiliteracies supports what was established in the previous section on the meaning of multiliteracies, that in general, teachers lack understanding about the concept of multiliteracies. Therefore teaching practices associated with multiliteracies have not been specifically identified by the teachers in this study. As multiliteracies is a curriculum organizer of The New Basics which the teachers are currently trialing, discussion of pedagogy was focused on ideas underpinning this reform, such as connectedness, relevance and interdisciplinary
approaches. Discussion of the four components that make up the ‘how’ of a pedagogy of multiliteracies—situated practice, overt instruction, critical framing and transformed practice and their dynamic interplay was not evident. However, talking about multiliteracies as a separate entity outside the other curriculum elements of The New Basics reform may have caused teachers’ confusion.

4.3.3 Multiliteracies- implications for ICT professional development:

Data presented here on multiliteracies provides teachers’ understanding of, and pedagogy associated with multiliteracies. The data demonstrates a preliminary understanding of the ‘what’ and the ‘how’ of a pedagogy of multiliteracies held by teachers generally. Both of these areas need to be explored in more depth within ICT professional development, highlighting how core concepts such as design, introduce issues of empowerment and transformation of knowledge to teaching and learning processes.

Issues that are central to ICT professional development focus on the relationship between ICT and multiliteracies. As shown in the data, ICT are defining new social contexts, educational tools and ICT products. Teachers are assuming that these ICT related applications are multiliterate outcomes. ICT professional development must establish the transformative nature of ICT on literacy education so that multiliteracies is presented as a transformative approach to teaching. Teachers must investigate how this influences the use of ICT in learning, the relationship between the teacher and the student, and the teaching practices that ensure ICT are not accommodated into established classroom practices but rather change pedagogy. Notions of becoming literate, digital mindsets, and bifurcation in social practices, as responses to the impact of emerging technologies, need to be openly explored. Connection between a pedagogy of multiliteracies and a transformed pedagogy that infuses ICT and what it could be interpreted as practical terms, is required.

This section has analysed teachers’ understandings of and pedagogy associated with multiliteracies. It informs this study by contributing to a background understanding of teachers in regard to multiliteracies and the related requirements for transformative ICT professional development. The first area, ICT in learning, provides background
understanding about teachers’ beliefs and teaching practices with ICT. Requirements also emerged in regard to transformative ICT professional development. The final area, ICT professional development is now addressed to suggest what teachers in this research context require from ICT professional development that supports the transformation of their pedagogy.

4.4 ICT professional Development

The final area that I collected data on in Stage 1 of this research project was ICT professional development. The guiding question asked teachers to comment on effective ICT professional development that results in transformation of pedagogy. This section presents themes on ICT professional development needs and types of ICT professional development. Figure 4.4 provides a graphical schema to guide the reader, consistent with the format of this chapter. In conclusion, what teachers constitute as effective ICT professional development that has transformative capabilities is presented. The implications these have for ICT professional development processes are discussed.

Figure 4.4 Graphical schema of themes in ICT professional development

4.4.1 ICT professional development needs: Teachers were asked to identify their ICT professional development needs. These needs are categorised into three themes and labeled as: digital mindset, skills and The New Basics. Each of these themes is explored individually.
Digital mindset

To challenge the way teachers think about ICT in learning is a need expressed by teachers. The term ‘digital mindset’ was introduced in the introductory chapter as a reason for transformation of teachers’ pedagogy. Lankshear and Bigum (1998) use the term to describe ways of thinking about how people interact with technologies. For example, those people who have not grown up within electronic worlds and who have ‘migrated’ to them, have a distinctly different mindset when interacting with ICT. The mindset is compared to those who have grown up with digital life as extensions of themselves, and is therefore, called a ‘digital mindset’. Teachers who have an ‘immigrant’ mindset accommodate ICT into existing practices, rather than change their pedagogy to support learners who are digital natives and who learn in different ways. The excerpt below is taken from an interview with Isla, who is a computer coordinator for her school. She is discussing with me the ICT professional development needs of the teachers in her school:

Isla: I'd rather that kids get in there and have a go rather than believe we can get perfection. We got to stop telling them there are right ways of doing things and I wonder whether we quite got that in the culture yet. That's one of the professional development problems. That people are hung up on the fact that the year three website might not be a good website. Well, I don't think it really matters. I mean we'll do a crummy one this year and a better one next year. And so on. I don't think we have to be perfect.

You know what we were saying about the whole school environment, about being confident, that you can have a go at it and make a mess of it and it’s not going to be a disaster. That's a professional thing isn't it? And I think that in the past with everything documented, and you got to do this and tick this, there is a whole mindset in EQ [Education Queensland] that there is a right way of doing everything. That is the most unprofessional inappropriate thing.

Isla suggests that the process of learning associated with making a website is more important than the actual website produced by students. Her statement that “do[ing] a crummy one this year and a better one next year” indicates that she values the process of learning rather than the end product. She talks about “perfection” associated with ICT products as a professional development problem and a part of the culture of the educational institution. The teaching culture does not enable teachers and therefore
their students to “have a go at it and make a mess of it” as restrictions such as “you got to do this and tick this” reinforce the competitive, perfectionist stance of the institution. Isla suggests that this mindset is not consistent with using ICT in learning as she believes that there is no such thing as a right way, by stating, “We got to stop telling them there are right ways of doing things”. This mismatch of mindsets associated with ICT in learning is a factor of print culture within an electronic generation (Spender, 1995). Isla’s discussion of thinking about different ways of teaching with ICT suggests the need for analysis of a ‘digital mindset’ and its impact on teaching with ICT, as part of ICT professional development.

Skills
Building ICT skills as part of a teacher’s personal repertoire was a need expressed by teachers for ICT professional development. Specific software programs were mentioned such as a need to learn powerpoint or how to do a webpage. These needs were directly related to curriculum requirements as part of implementing The New Basics assessment tasks called Rich Tasks. As stated in the Literature Review, teachers level of competence with ICT significantly impacts the use of it in the classroom (Becta, 2004a). Data show that teachers consider learning ICT skills associated with specific software programs an important part of ICT professional development. The following excerpt comes from an interview with a local curriculum leader who was sought by me to explicate ICT professional development needs of teachers at her school:

Eva: They are looking for a myriad of things. They want to be able to enter internal monitoring, tracking of students on our network, how to work a spreadsheet for their own record keeping. We still have some people here who are not reading their emails because they are afraid to log on. We are trying to get our intranet up and running and there will be some who will hesitate with that for a while. They want to know about powerpoint with their kids and how to construct a website, theory behind it. They have expressed the desire to know more but they are tired at the end of a very busy day.

Eva describes both teacher professional ICT skills such as “spreadsheet for their own record keeping” and curriculum requirements such as “how to construct a website” and “powerpoint”. These are specific software programs that Eva believes teachers need competency in. She emphasises that teachers “are afraid” that they have the
“desire to know more” but are “tired at the end of the day”. The notion of fear and anxiety induced by ICT is supported by Russell and Bradley (1997) who describe this as a cyberphobia. Cyberphobia or technophobia, was evident in a previous theme in ICT in learning and related to teachers viewing ICT as lacking educational value. In Russell’s and Bradley’s research, teachers wanted more experience with ICT through training programs and by observing skilled colleagues. Cyberphobia coupled with a teacher’s workload are significant factors that impact implementation of ICT in the classroom and therefore, need to be addressed through training options in ICT professional development.

The need for teachers to feel confident and competent in the use of a particular software program or hardware before they use it with children in the classroom raises issues regarding teachers’ beliefs about teaching and how children learn. This interview excerpt with Immogen exposes an ‘immigrant’ mindset that can limit application of ICT in learning:

Sarah: What professional development in ICT do you need?

Immogen: How to do a webpage….

Sarah: So could you learn it with the children?

Immogen: I think I need more of a handle on it before we start because too many things go wrong. Like my learning has taken place because of what I want the children to be able to do. Like when I wanted to email America, I learnt things about storing emails and sending them and all that stuff, because it was a need.

Immogen starts with stating the exact ICT skill that she needs to learn. Her focus is on becoming competent with a particular ICT application before she implements it into the classroom. She states her reason for learning email was due to a project linked with emailing America. Her reason for learning a skill before implementation is based on efficiency, as she states that “too many things can go wrong”. The need to feel competent with ICT prior to using them in the classroom can also be driven by underlying beliefs held about how children learn. This is linked to the objectivist learning model and the instructional approach where teachers are the knowledge keepers and children are the knowledge receivers. In this fashion, teachers prefer to disseminate how to use a particular software program or feel it necessary to have all
the answers when children face a problem. Teachers present themselves as competent rather than learning with and from their students. Teachers who are seeking ICT skills, as part of ICT professional development, may also need to challenge their mindsets to examine the process of learning with students, as co-learners or knowledgeable partners and exploring different ways of teaching children ICT skills other than using a didactic method.

Teachers’ need for personal and professional competency acknowledges the priority of ICT skill development within ICT professional development. However, ICT skills training should be embedded within a context that addresses pedagogical beliefs and practices associated with ICT in learning, so that pedagogy moves towards constructivist paradigms and mindsets become more open to the way digital clients learn. The final theme, The New Basics, also presents an emphasis on the need for teachers to attain ICT skills in ICT professional development.

The New Basics
Discussion by teachers about their ICT professional development needs in regard to the New Basics curriculum is evident. Rather than talking about needs associated with the curriculum in general, such as using ICT in Key Learning Areas or to develop particular student learning outcomes, teachers focus on Rich Tasks (assessment items in The New Basics curriculum) as directing ICT professional development. The following interview excerpt demonstrates this:

Immogen: How to do a webpage.

Sarah: Why is that important?

Immogen: So I can get on with this Rich Task because I am at a juncture year, year 3.

Sarah: So is it based on the New Basics. How about a year 2 or a year 1 teacher because they feed your Rich Task. What would be their needs?

Immogen: The same because they are expected to develop those skills for the juncture year.

Sarah: So all these needs are driven by the New Basics?

Immogen: Yer, it’s true.
Sarah: Because your curriculum is devised.

Immogen: Yes that's right.

Through this dialogue Immogen is able to recognise that ICT professional development is currently being driven by The New Basics curriculum. Two important consequences are raised. As Rich Tasks are prescribed assessment tasks within The New Basics curriculum, the need for ICT professional development in the area of curriculum development and integration is not warranted as ICT are already embedded in Rich Tasks. This leads to teachers focusing on the skills dictated by Rich Tasks. Consequently the need for ICT skills training in ICT professional development becomes important.

The second consequence focuses on restricting ICT skills taught within ICT professional development to those required by Rich Tasks. Limiting ICT professional development to ICT skills needed to implement Rich Tasks was addressed in an interview with a local curriculum expert. I asked if Rich Tasks were limiting the ways ICT are used in learning:

Eva: I think it has expanded them at a greater rate than it would of if they weren't there. It has given us a sense of urgency and a breadth that wouldn't have been there else wise…. The need is more obvious now because you weren't being driven by an assessment item.

Interestingly, Eva having compared teachers’ use of ICT prior to The New Basics has acknowledged that this new curriculum and the “assessment item”, namely Rich Tasks have “expanded them [ICT applications] at a greater rate”. She believes it has stimulated an “urgency and breadth” to using ICT in learning. The New Basics framework has created an antithetical position in that it has limited the potential use of ICT within the curriculum (Prestridge & Watson, 2002). This valuing of a prescribed curriculum and the way it formulates the integration of ICT in learning has major implications for ICT professional development in this context. As shown in the literature, an ICT skill training approach does not support transformation of pedagogy associated with ICT. Consequently, ICT professional development must acknowledge the importance of the curriculum and seek to make known the underwritten beliefs
about how children learn and the pedagogical models associated with ICT. It must also expose the various ways ICT have been integrated into the curriculum and expand on these in other curriculum contexts. Teachers talk about The New Basics as directing ICT professional development needs, as limiting the range of applications of ICT on one hand, while increasing teachers’ implementation of ICT in prescribed learning experiences. The need to implement The New Basics curriculum is directing teachers to focus on the ICT skills required to implement Rich Tasks, which in turn, emphasise ICT skills training requirements.

**Summary of ICT professional development needs**

The ICT professional development needs categorised as ‘digital mindset’, ‘skills’, and ‘The New Basics’ suggest that teachers are predominantly focusing on gaining competency with ICT with further interest in understanding how children of a digital era learn with ICT. Both themes of skills and The New Basics indicate a preference for training approaches within ICT professional development and the focus on the attainment of ICT skills. The data presented here suggest that both skills and curriculum issues associated with ICT are important within ICT professional development, however, these are considered as distinctly different needs. In other words, some teachers are requesting ICT skills and others are interested in understanding appropriate curriculum uses of ICT. These distinctly different needs can be associated with levels of knowledge and competence with ICT, which were discussed in the Literature Review through Jonassen’s (1991) and Dwyer’s et al (1991) research. Their research suggests that teachers need to reach a certain level of competency with ICT before they are able to think about curriculum aspects of ICT integration. What is wanted for ICT professional development is a model that can cater for both needs. The second section on ICT professional development discusses what types of ICT professional development teachers think are beneficial and have the potential to transform pedagogy.

**4.4.2 Types of ICT professional development:** The types of ICT professional development that were suggested by teachers are categorized into four themes: Just in time, mentoring, structured sharing activities and training approaches
Just in time

When teachers talk about ‘Just in time’ ICT professional development it means that they want professional support provided just at the time they require it. The timing of the support is critical to the implementation of ICT. The term ‘Just in time’ is used widely by Jamie McKenzie (1998a, p.1) when describing the “best way to win widespread use of new technologies”. The type of support can focus on both curriculum needs as well as personal ICT competency. The emphasis of this professional development practice is on providing responses quickly and on a daily basis or when needed by the teacher. In the following interview excerpt a computer coordinator provides her idea of ‘Just in time’ support and how it relates to gaining ICT competency and a professional development provider:

Emme … because they have to do a webpage in year three they have to be able to insert a picture in year one. We need to develop a school ICT continua. So we could then say to the teachers these are the skills that are required and which of these skills don’t you have and then we could get some professional development on that. And just how that would have it would be to look for anyone else on the staff that would have it and I think that point in time is the best professional development.

Sarah: Point in time? What do you mean?

Emme: I need it now. I need to use it now because I need to use it and I’ll use it today, tomorrow and the next day because I’ve got to and I’ll learn it.

Sarah: So there needs to be a need there, a relationship to an ICT need. And if there is no need why bother, and you’ll forget it

Emme: Especially if you don’t have a passion there.

Emme sets the context for ‘Just in time’ professional development by acknowledging teachers’ need for implementing ICT into the curriculum as “hav[ing] to do a webpage in year three and hav[ing] to be able to insert a picture in year one”. This is defining the integration of ICT based on ICT skills. Within the data collected, ‘Just in time’ professional development was associated with learning ICT skills in a particular
software program or a hardware device. Teachers described reaching a critical stage when learning a new piece of software and ‘Just in time’ support provided the help needed to move forward, solve problems or simply demonstrate how to do something. ‘Just in time’ support is related to gaining personal competency with ICT and is better supported by training approaches within ICT professional development (Jonassen, 1991).

In Emme’s description of ‘Just in time’ professional development she qualifies two distinct features. Firstly, the ICT skill needed and secondly the daily “in time” support. Learning an ICT skill in this fashion enables the learner to retain the skill. Emme states that “I’ll use it today, tomorrow and the next day because I’ve got to and I’ll learn it”, meaning that ‘Just in time’ professional development enables teachers to learn at the time when the skill is being used in the classroom and that repeated use of the skill supports retention. These two key features of ‘Just in time’ professional development, that is, based on a need and in the daily work of teachers is “more personally beneficial” which was proposed by Michelle in an interview. She believes that if given ‘Just in time’ support, the ICT skill stays with you. ‘Just in time’ professional development suggests short intensive bursts of on-going skill based training.

Emme also points to a colleague or staff member as the best provider of ‘Just in time’ professional development. This acknowledges the feature of daily support. She links “passion” about ICT with such a professional provider. This passion drives the provider to become competent with ICT in their personal time and enthuses other staff to use ICT in their classrooms. Emme describes this attribute about an ICT professional development provider:

Emme: You know how you’ll get teachers who are just passionate about something. No one has displayed a passion [for ICT] but that could be because the resources aren’t in this school. We have teachers who have a passion for sport so that gets pushed along. But no one has taken on technology.

Sarah: Do you see that as one of the ways we lead our professional development in our schools is through that teacher with the passion?
Emme: Yes, if you have a teacher with the passion, they can enthuse other people and obviously then it is not a chore for them. They will be playing at home and it is what they would do and then they could share that passion and it would be infectious. And that doesn’t exist here.

Emme sees the advance of technology as dependent upon a person with a passion for it. She links ICT professional development with such a teacher. This belief has left her school without such an interest or growth in the area of ICT. In this way the need for a passionate ICT teacher has limited both growth in ICT and ICT professional development. She acknowledges that it is “not economical to buy someone in to teach one person something” which further supports her reasoning for the need to have someone on staff with a passion providing ‘Just in time’ support so “if they are here you can come back and say I tried that and it didn’t work so you could try some other way” indicating the benefits of quick response from an onsite provider. The need for someone with a high level of competence may be due to the fact that learning a new piece of software can be very complicated and frustrating. Further in the interview, Emme adds to the attributes needed by a professional development provider, stating that “certain teachers [have] more sway about them in a peer situation” indicating that both passion and leadership is required.

Teachers who want ‘Just in time’ ICT professional development are mainly seeking the attainment of ICT skills during their daily working context. It proposes greater skill retention as teachers are using the skills repeatedly and purposefully at the time of curriculum implementation. ‘Just in time’ professional development also advances the need for an ICT professional developer to be onsite as it is more economical and is required in a timely fashion. The attributes that were expressed as important in such an ICT provider are both a passion for ICT and leadership skills.

**Mentoring**

The second theme, ‘mentoring’, indicates that teachers are interested in learning from their peers. ‘Mentoring’ can take place within the school setting, led by teachers who are skilled in an area of ICT and able to support their colleagues in both ICT skill acquisition and curriculum application. The following interview excerpt with a computer coordinator describes the mentoring process that is occurring in her school:
Isla: This is quite an unusual school and if you don't know how to do something you just ask and everyone does that. So there are no little ghettos where other people are doing things that others don't know about. So this is an informal mentoring thing. One to one. For example, I headed the budget towards buying video because that is an all encompassing thing where it takes a huge number of skills and it is all tied up in their culture and it helps develop the kids in a real life kind of way. But we got all this gear and I got overwhelmed about how to actually learn it because I have all of these other things that I am trying to do. So it was a simple thing to identify the person who seemed to be most interested in video and to say to Quinn this is your baby and I am not going to bother how to learn Studio MP10 and how to use the digital camera. So that will be his. And I know that the person in the next classroom wants to do it and he'll ask Quinn to teach him and when he has developed something he'll be available to help others. So we can do this because we are a small and friendly staff. And it is not just computers it is everything.

Isla describes the ‘mentoring’ process that occurs in her school. She sees it as an “informal” approach to ‘mentoring’ that is possible because of the professional culture established at the school. An important idea that can be taken from a ‘mentoring’ approach is the devolution of ICT skill to interested teachers so that no one would be considered the ICT expert. The theme of ‘mentoring’ focuses ICT professional development mainly on the acquisition of ICT skills. It highlights sharing and supportive processes in an informal manner. ‘Mentoring’ can also focus on curriculum application of ICT. The idea of many ICT providers is advocated.

**Structured sharing activities**

Two activities were discussed by teachers that involved sharing as an ICT professional development activity. These were organised teacher sharing workshops and protocol sessions. Teachers said that they valued sharing activities because they were considered to be directly related to the classroom. In the following interview excerpt a teacher describes a sharing workshop focused on ICT implementation:

> Isabelle: On a Saturday at Buderim in their computer lab in their library they organised teachers from different schools to come and talk about what they were doing, so we were finding out what people were doing, getting ideas.

Sarah: Did that change your teaching at all?
Isabelle: It opened up some possibilities yes, um, yes it did change, it is helping me through coping with technology a bit better. Bringing it into the classroom.

Isabelle’s positive dialogue about this type of workshop and the fact that she attended it in her own time indicates that she values this type of professional development. She makes two important points about sharing activities. Firstly, she sees them as an opportunity to gain ideas and expand possibilities in a curriculum sense. Secondly, she talks about changing her teaching as the workshop helped her “cop[e] with technology a bit better” and relate the use of ICT to her classroom. She implies that a feeling of comfort or reassurance was achieved. These could be considered critical elements of sharing activities. Mary, another teacher at this same sharing event also said that her ideas were expanded but when asked if it had had any effect on what she did with ICT in her classroom, her response indicates that it had no transformative outcomes:

Mary: Lots of ideas and things like wow I have to learn PowerPoint. Oh I didn't know year seven’s could buy shares by going through a particular program. Even though it was a year seven, that interested me. In maths by using spreadsheets and things. Just ideas.

Sarah: Did you go from saying that was a great idea to doing something about it?

Mary: Our local teacher here in-serviced us on PowerPoint.

Sarah: Have you used it in your classroom?

Mary: Not yet. There are plans this year to.

Mary has good intentions on using PowerPoint in her classroom and was motivated to attend a local workshop but no changes occurred in her teaching. The literature supports this lack of change from isolated workshops (Ingvarson & MacKenzie, 1988; Lankshear & Bigum, 1998). Mary’s last statement of her future use of PowerPoint “there are plans this year to” indicates direction from The New Basics curriculum rather than her own interest or curriculum development.

The other sharing activity discussed in interviews was protocol sessions. Protocols are given structures which teachers employ in groups for a particular purpose. For
example teachers are able to choose the Tuning protocol to seek feedback on a unit of work. Some teachers within the Cyberschools were trained in protocol implementation. However, little use of these protocols in relation to ICT in learning was currently occurring. One computer coordinator employed protocols to help her write the Management and Learning Technology Plan (MALT Plan), a school ICT infrastructure agreement. She described this process:

Isla: …last term at the beginning of the year we had to write the MALT Plan and we used an Inside Outside one [protocol]. A group of us, the ICT people, talked about our vision and where we could go and then the outside group had their chance to talk and that was just fantastic and I couldn't talk back and they were saying things like ‘Oh I wish we could do something like’. But we can do that but I couldn't say anything. It was a bit confronting, not really but it certainly tuned up the MALT Plan. It was people who weren't into the computers as much and who I don't work with as much so it was a different vision.

Isla’s account of an Inside Outside protocol demonstrates the sharing process and how it can be “confronting” but beneficial in purpose. This protocol enabled her to take on board ideas from teachers who she otherwise would not have considered. In other interviews teachers were asked about the value of using these protocols more directly in relation to curriculum applications of ICT in a unit of work. This idea is supported by a teacher in the following interview excerpt:

Nathan: I think that would be a valuable experience. I would be interested to hear the answers of the other coordinators when you ask them. I think that would be worthwhile. I have been to protocols training and have used protocols here and I have taken along units of works not ICT based and we have run protocols over them and I have found that really helpful for me as a teacher. I think that until people have been through that process and have been game enough and say have a look at this and go through that process they are a little afraid of it.

Nathan sees the value in using a protocol as a professional development activity where units of work that have incorporated ICT can be analysed. He highlights that the sharing process involved in analyzing units of work with peers can be a daunting one that some would be “afraid of”. The process itself and the anxiety associated with ICT both add to this fear. However, as the literature suggests professional
discourse that is critical, inquiring and reflective, is an essential process for effective professional development (Ball & Cohen, 1999; Smyth, 1987). This process can be achieved with protocols that enable teachers to share. Michelle, a teacher, supported this idea, stating that a good professional development activity is one that “makes you actually sit down and think about” how you are teaching in the classroom. Both forms of sharing sessions enable this transformative thinking as they were focused on teaching and learning practices occurring in classrooms and invited critical and analytical processes. What is missing is that teachers are not acting on these thoughts.

When teachers talk about ‘structured sharing activities’, the focus of ICT professional development seems to be on ICT curriculum integration rather than on the attainment of ICT skills. ‘Structured sharing activities’ evoke in teachers feelings associated with ICT. Teachers talked about comfort or reassurance when involved in sharing workshops and fear and a sense of being confronted when taking part in protocol sessions. These emotions enabled teachers to think about what they were doing with or how they were thinking about ICT in learning. Sharing sessions appear to be effective in enabling teachers to think critically about their classroom practices with ICT. Therefore sharing processes need to be considered within ICT professional development activities. The final type of ICT professional development teachers talked about is training approaches.

**Training approaches**

Teachers requested ‘training approaches’ as ICT professional development activity to develop their ICT skills in specific software or hardware. Examples of ICT skills include how to email or use a digital camera. Training sessions for teachers were currently occurring in formal workshops where teachers are instructed on a particular software program or in more informal environments such as in small groups or one-on-one. The following interchange with a computer coordinator depicts his role as a professional development provider concerned with getting teachers to a minimum ICT skills standard through training sessions:

Nathan: I already operate outside the school in terms of being involved. We have a Cyberschools IT group, and have run a couple of sessions there.
Sarah: What did they involve?

Nathan: We did a powerpoint one last year. ...for the year three teachers, looking at webpages with powerpoint.

Sarah: Have you mainly done skill based professional development sessions?

Nathan: At that level yes. At the school level I also do ‘have you seen this I will demonstrate that’ and ‘this is what you can do’.

Sarah: So come and discuss your planning?

Nathan: Not planning normally. Just what we can do with this piece of software. ‘Have you seen this’ kind of thing.

Nathan has taken on the role of an ICT professional development provider who uses a ‘training approach’ to teach basic ICT skills to teachers. He works at the district level as an instructor, providing ICT training for teachers in particular software programs and in his school at the classroom level, as a peer tutor demonstrating specific features of a software program. Later in the interview, Nathan provided reason why he believes this approach is so important, stating that “a lot of teachers still don’t feel comfortable that they don’t have the skills. They want someone there to hold their hand, show them”. The need for teachers to attain a certain level of competency with ICT before they look at curriculum issues was found previously in this chapter and in the Literature Review.

The form of ‘training approach’ is important. Having the option of one on one tuition or small groupings with a trusted instructor is preferred. Teachers consider their skill level to be low, they feel that learning new software is complicated and they want to feel comfortable with the instructor. An excerpt from an interview with Mary highlights the need for such ‘training approaches’:

Mary: There was one where they showed us how to do an email, no sorry, a webpage using powerpoint using hyperlinks, um. The only criticism that I had of that was that they had too many in the class. It was an hour and it sort of went (hand over head sign) so we are asking for it again...[in] small groups. We have Nathan who is on staff here. He has worked with us and the admin here have been great. He can do after school sessions with us.

Sarah: Is that better?
Mary: I think that's better because we know him. We felt comfortable to ask him things and um it was a set time so we knew every second Wednesday afternoon was computer time after school and he had a program set down so if you wanted to do publisher that was what was on.

Mary found a training workshop on powerpoint to create web pages unproductive. She states that she needs to learn ICT skills in smaller groups with someone she feels comfortable with. These requirements for ‘training approaches’ are considered to be more responsive to teachers needs and more beneficial to gaining ICT skills. There is a preference for a ‘training approach’ to take the form of small group sessions with an instructor that has gained a teacher’s trust.

With regard to the themes presented in this section, some interesting relationships emerge. The themes show a preference for ICT professional development to focus on ICT skill attainment whether it be ‘Just in time’, through ‘mentoring’ practices or in ‘training approaches’. ‘Just in time’ and ‘mentoring’ could also focus on curriculum integration of ICT. However, these have not been implemented for this purpose. ‘Structured sharing activities’ which provide potential for curriculum analysis are considered activities to share how teachers integrate ICT.

Summary of types of ICT professional development

Data on types of ICT professional development are categorized into four themes of ‘Just in time’, ‘mentoring’, ‘structured sharing sessions’ and ‘training approaches’. Teachers seem to prefer types of ICT professional development that are associated with gaining ICT competency as three out of the four types spoken about have this orientation. The three types that focus on ICT competency, that is ‘Just in time’, ‘mentoring’ and ‘training approaches’, all propose that teachers are able to achieve greater outcomes when ICT skills training takes place with a peer or trusted provider and in smaller ratios.

‘Just in time’, ‘mentoring’ and ‘structured sharing sessions’ are all able to be employed to focus on curriculum issues associated with ICT. However, this was not the preference found in data. The only type that teachers related to curriculum issues was ‘structured sharing sessions’. Features of these four types of ICT professional
development that teachers considered important include a focus on specific needs of teachers, taking place in daily work environments and in small ratios, led by an ICT provider who has a passion and leadership skills, and enabling sharing opportunities that expand ideas and stimulate thinking.

This section on ICT professional development has examined what teachers constitute as effective ICT professional development that results in transformation of their pedagogy. Data clearly show that these teachers are concerned with gaining ICT competency which they feel will increase the use of ICT in their classrooms. However, the data seem to be suggesting that little change is occurring in teachers’ pedagogy and ICT are being added to already established pedagogical practices. As uncovered in the Literature Review, skill based training approaches do not support transformation of pedagogy. However, gains in confidence and competence with ICT lead to teachers seeking alternative ICT professional development (Dwyer et al., 1991) that focus more on analysis of curriculum issues associated with ICT. Curriculum oriented types of ICT professional development, such as sharing sessions, provided elements that were considered by teachers as having transformative qualities. Those mentioned were expanding ideas, providing comfort and reassurance, making teachers think critically and being confronting. In conclusion, teachers are firstly seeking ICT competency through workshops or training approaches before they are able to be involved or interested in types of ICT professional development that involve sharing or curriculum analysis.

4.4.3 ICT professional development- implications for ICT professional development: This section has explored needs and types of ICT professional development. Gaining ICT competence was found to be a significant need of teachers that directed their preference for training oriented ICT professional development. Teacher anxiety, fear and confidence were associated with gaining competence with ICT. This indicates that training approaches should form part of ICT professional development. Types of professional development that were found to be effective in supporting ICT skill attainment include ‘Just in time’, ‘mentoring’ and or ‘training approaches’. Teachers suggest that these types of activities should occur in
daily practice with an ICT provider who is trusted, has a passion for ICT and leadership skills to provide direction for the integration of ICT.

ICT professional development must also provide support for teachers seeking professional development associated with ICT curriculum issues. This orientation addresses issues of ICT curriculum application and digital mindsets. It can involve sharing activities that have transformative qualities such as expanding teachers’ ideas, providing comfort and reassurance, confronting teachers and making them think.

ICT professional development needs to acknowledge the distinction teachers make between ICT skills and curriculum issues. However, as uncovered in the Literature Review, isolating ICT skills from curriculum integration does little for the capacity of ICT professional development to enable teachers to transform their pedagogy. It is suggested here that combining both teachers’ needs for competency and curriculum issues is required for transformative outcomes of professional development. ICT professional development must align ICT skills attainment with curriculum inquiry that informs teachers’ discourse and analysis, so that teachers develop a more critical approach to the integration of ICT in learning.

4.5 A transformative ICT professional development model that enables multiliterate classroom practices

This chapter has analysed data collected on teachers’ beliefs and practices associated with ICT in learning, understandings and teaching associated with multiliteracies, and teachers’ needs and associated types of ICT professional development. An element that has run consistently through the three areas is the impact of teachers’ fundamental beliefs about ICT and how ICT should be used in learning. Teachers’ beliefs about ICT influences both their understanding of multiliteracies and how they use ICT in the classroom, which in turn directs their need for ICT professional development and a subsequent preference for a type of professional development activity. This suggests that in the initial stages of ICT professional development, teachers need to become aware of their pedagogical beliefs and practices so that through professional development processes, these beliefs and practices can be challenged and ultimately transformed.
Significant curriculum issues found in these data suggest that enabling teachers to talk constructively to one another is an important professional development process. Teacher talk could focus on such topics as the difference between accommodating ICT into established teaching practices and a transformed pedagogy infused with ICT; digital mindsets of students; and a critical analysis of the complexities of multiliteracies and its relationship with ICT. A transformative model must acknowledge the need for ICT competency embedded within curriculum inquiry so that beliefs and assumptions held by teachers are investigated and challenged providing for informed and reformed pathways of professional learning.

Based on these understandings about ICT in learning, multiliteracies and ICT professional development as well as implications for models of ICT professional development, a professional development activity was collaboratively design by me and a group of teachers called the project team. The following chapter describes this professional development activity and the implementation process.
Chapter Five
The Inquiry Project

This chapter describes the ICT professional development program that was collaboratively designed and implemented by the teachers and me in Stage 2 of this research project. In the previous chapter, data were presented and analysed on teachers’ pedagogical beliefs and practices about ICT in learning, multiliteracies and ICT professional development. This analysis provided implications for ICT professional development that has the capacity to transform teachers’ pedagogy. In this sense the data had an informing role. Through the action research process these data were used collaboratively by the teachers and me to design and implement an ICT professional development program that was guided by the theoretical ICT professional development model established in the Literature Review. The ICT professional development program was called an Inquiry Project. In the next chapter the data collected through the action research process during the implementation of the Inquiry Project are analysed. Providing a sense of what teachers experienced as ICT professional development is considered a necessary precursor to the analysis and interpretation of data in the next chapter.

The following account of the Inquiry Project includes a description of the teachers who participated as co-researchers and volunteer participants, and the professional development activities involved in the program. An Inquiry Project is a collective term for a range of professional development activities. The central activity was a classroom based investigation in which a teacher, guided by the action research process, systematically acts to change classroom practice. In this instance, teachers were asked to design their classroom investigations on the effective use of ICT for multiliterate classroom practices. There were eight teachers who volunteered to do a classroom investigation. Details of the professional development activities experienced by these teachers as they implemented their classroom investigation are provided in this chapter.
5.1 Inquiry Project participants

Eight primary schools from the Suncoast Cyberschool cluster provided participants for the Inquiry Project. It was previously explained that each of these eight primary schools provided one representative teacher, who with me formed what we called a project team. These project team members participated in the design of the Inquiry Project and became what we called project team leaders in the implementation phase of this study. The project team leaders organised one volunteer teacher from their school who they would mentor during the implementation phase of the Inquiry Project. This volunteer teacher was called a candidate. Each of the eight schools provided one project team leader and one candidate, except for one school which provided one candidate due to its small size and another school which had three teachers volunteer as a team. Figure 3.4 presented in Chapter Three, provides a visual image of the mentoring relationship between the two school representatives, project team leader and candidate, in the implementation of the Inquiry project.

A pictorial overview of the Inquiry Project (see Figure 5.1) demonstrates the relationships between the project team leaders, the candidates and me as the researcher and professional development provider. Figure 5.1 also captures professional development activities that each of these participants, including myself, was involved in during the implementation of the Inquiry Project. These professional development activities are explained in depth in the second section of this chapter. Firstly, I discuss the relationships amongst the participants and each of their roles in the Inquiry Project.
Central to the Inquiry Project was the relationship between the three groups of participants indicated in Figure 5.1 by the central triangle created with bolded arrows that link participants. The arrow heads are used in a defining way that emphasise the relationship between the participants. Each participant is now discussed with respect to relationship and role in Inquiry Project.

My role as researcher and professional development provider was that of a guide to each candidate and project team leader. This is indicated in Figure 5.1 by the one way direction of the arrow moving outward towards both candidate and project team leader. In relation to candidates, I was considered an outside expert who provided relevant academic literature, guidance on inquiry planning and reflection processes. I also provided leadership of an online threaded discussion forum and helped with the construction of online postings if required. In relation to the project team leaders, I was a co-researcher monitoring, redesigning and implementing the Inquiry Project. In this capacity I collected all data during the action research process. I also provided guidance to the project team leaders on how they could support and mentor their candidates.
The project team leaders maintained a dual role during the Inquiry Project. This is indicated in Figure 5.1 by the two arrows linking them with candidate and myself. In regard to the candidate, the project team leader was considered a critical friend. In this context, a project team leader worked collaboratively with his or her candidate on professional development activities such as posting to the threaded discussion forum, critically discussing academic literature, supporting and guiding the candidate’s planning and reflections on their classroom investigation, organising and or providing ICT skill training and classroom visits to view colleagues as exemplars, and attending weekly meetings with the candidate. Project team leaders also attended specific professional development sessions to develop their own skills as leaders. In regard to their role as part of the action research process, leaders were considered co-researchers. They maintained a reflective journal to support the monitoring and evaluation of the Inquiry Project and attended strategic monitoring meetings to collaborate with me.

The candidates were the teachers who volunteered to do a classroom investigation. As such, they were involved in a range of professional development activities. The double headed arrow between the candidate and project team leader in Figure 5.1 indicates a mutually supportive relationship. The relationship is considered co-dependent rather than the leader having authority over the candidate. In regard to myself, as explained above, candidates viewed me as an outside expert, collecting data on what was happening during professional activities and in their classrooms, and as a professional development provider who was knowledgeable about the use of ICT in learning.

This section has described the participants, their roles and relationships with one another in the implementation of the Inquiry Project. The next section describes in detail the ICT professional development activities in which these participants were involved.
5.2 The Inquiry Project- ICT professional development activities

As the Inquiry Project was designed as a practical interpretation of the theoretical ICT professional development model established in the Literature Review (see Figure 2.6), the theoretical model is used in this section to structure the description of the professional development activities involved in the program. The model has two contexts for professional development activity- an internal and external context. The professional development activities that occurred in each context are described respectively. Some professional activities could be considered taking place across contexts. For the purposes of a descriptive account these professional activities are described in the context most suitable.

5.2.1 Internal context: The internal context bounds ICT professional development activity that occurs in the school. A candidate’s classroom investigation was the focal professional activity that occurred in this context. Other professional activities included one hour weekly meetings, reflective journals, staff sharing sessions, ICT skills training sessions, classroom visits, and final written reports by candidates. Each of these professional activities is explained.

Candidate’s classroom investigation

An Inquiry Project professional development day marked the beginning of each candidate’s classroom investigation. This professional development day was set towards the middle of the first term of the new year as it was considered by project team leaders important to give candidates time to organise their classrooms. All of the eight project team leaders and their candidates attended with an invitation open to the school principals. The objectives for the day were to introduce, motivate and begin planning a classroom investigation. A schedule for the Inquiry Project professional development day was provided (see Appendix 5.1). The day began with a motivational guest speaker who provided evidence of the empowering process of teachers’ personal classroom inquiries. This was followed by a background to the research context which I presented. Candidates were given the majority of time to work with their project team leader supported by their school principal and myself, developing an investigative question that would direct their own classroom inquiry.
This is illustrated in the photos capturing participants planning together in Figure 5.2. In this time teams worked through three forms: Inquiry Project investigative question (see Appendix 3.4); Inquiry Project planning sheet (see Appendix 3.6) and Inquiry Project support requirements (see Appendix 3.5). These documents were critical in the planning of the classroom investigation as they helped to establish the candidates’ question to be investigated and began formal documentation. At this stage, formal documentation included establishment of each candidates’ existing pedagogical beliefs and practices and the development of an action plan with monitoring techniques.

Figure 5.2 Inquiry Project day planning session photos

In the last session of the day everyone reformed for a whole group sharing of investigative questions. Table 5.1 provides the investigative questions for each candidate. Every project team leader and candidate was given a hard covered blank page journal to record reflective writing, drawings and anecdotal notes.
Table 5.1 Candidate’s inquiry questions

<table>
<thead>
<tr>
<th>Candidate</th>
<th>Leader</th>
<th>Investigative Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>David</td>
<td>Cherry</td>
<td>How can the internet be used as a tool to enhance multiliterate student learning outcomes? What teaching strategies can I implement that will ensure students will use the internet productively? What learning activities will empower students’ use of the internet?</td>
</tr>
<tr>
<td>Elspeth</td>
<td></td>
<td>How can students be supported when creating an electronic picture book using the theme ‘Program Achieve’?</td>
</tr>
<tr>
<td>Darren</td>
<td>Nicholas</td>
<td>How can my pedagogical practice through the use of information and communication technologies enhance student multiliteracy outcomes, within the context of a whole school musical production?</td>
</tr>
<tr>
<td>Immogen</td>
<td>Ivy</td>
<td>What strategies need to be employed to promote effective/productive ICT practices that encourage intellectual demand and recognise difference and diversity?</td>
</tr>
<tr>
<td>Megan</td>
<td>Harry</td>
<td>What are the effective teaching and learning strategies I could use to help students understand the power of multimodal presentations?</td>
</tr>
<tr>
<td>Kim</td>
<td>Harvey</td>
<td>How can I integrate word processing and publishing software to enhance students’ understanding of selected genres?</td>
</tr>
<tr>
<td>Unwin</td>
<td>Kevin</td>
<td>How can ICT enhance student multiliterate outcomes flowing from the next phase of the Rainforest Project? How can my pedagogical practices impact on students’ multiliterate outcomes flowing from the next phase of the Rainforest Project?</td>
</tr>
<tr>
<td>Kate</td>
<td>Kelly</td>
<td>What learning model will best enable students to present an artistic, finessed media presentation which incorporates music and sound and is both informative and engaging? How do we ensure that the learning model suits our learning environment and that students can transfer their new learning/s into different contexts?</td>
</tr>
</tbody>
</table>

Prior to the day, candidates were given an Inquiry Project Outline (see Appendix 5.2) that provided a description of the features of a classroom inquiry and the mandatory requirements for participation in the project. They were provided with two academic readings focused on the inquiry process: Royer (2002) Supporting technology integration through action research and Boyle (2002) Disasters and metacognition in the SOES classroom. Lastly, they were given an Inquiry Project support booklet (see Appendix 5.3) which was an eight page document that provided detailed guidance for implementing a classroom investigation, involving the action research process of ‘plan, act, observe and reflect’, with descriptions for each of these stages and leading questions. This booklet provided important information on how to go about a classroom investigation with the intention that candidates would be more familiar with the inquiry process at the professional development day. Project team leaders were also provided with a role definition prior to the inquiry professional development day (see Appendix 5.4). This outlined their responsibilities as supporters of their candidate.
Following the introduction day, candidates were responsible for further development of their action plan and the implementation of these into their classrooms. As stated earlier, teachers’ classroom investigations were the focal professional development activity. Other professional development activities that occurred in the internal school context were meant to provide further support for candidates in their classroom investigation. These included one hour weekly meetings, reflective journals, staff sharing sessions, ICT skills training sessions, classroom visits, and final written reports by candidates. Each of these is now described.

**One hour weekly meetings**

A mandatory requirement for each candidate and project team leader was to meet formally one hour per week after school. This hour was paid back to the candidate and project team leader through the Teacher Relief System (TRS) offered to them during school hours. In these meetings, candidates and leaders could choose to do a variety of activities all of which centred on the candidate’s classroom investigation. Activities could include candidates talking about what was happening in their classrooms; candidates and leaders reflecting on pedagogy associated with the effective use of ICT and multiliterate classroom practices; leaders providing specific ICT skills training required by their candidates; the candidate and leader working collaboratively on the refinement of inquiry plans, analysis of student work, critical discussion of academic readings, support for each other with journal reflections and postings to the online threaded discussion forum or collaboratively writing a reflective statement form if required (this form signaled the completion of a cycle of inquiry and movement onto a new cycle, Reflective statement- second cycle, see Appendix 5.5). Both the candidate’s inquiry project outline (see Appendix 5.2) and the leader’s role outline (see Appendix 5.4) profiled what to do in these meetings.

**Reflective journal**

Each candidate was asked to maintain a reflective journal throughout the course of the Inquiry Project. It was mandated that a minimum of one contribution per week was required by each candidate. A reflective contribution could be written or drawn and could refer to specific data obtained by the candidate such as video recordings,
questionnaires, interviews or student work. The purpose of the candidate’s journal was to reflect on pedagogical beliefs and practices associated with multiliteracies and ICT and to document the classroom investigation. A hard covered blank page book was given to each candidate at the initial Inquiry Project professional development day.

Project team leaders were also asked to maintain a reflective journal both as a data gathering device to inform the action research process and as a personal developmental technique to inform and analysis their own professional growth as a learner within the model.

**Staff sharing sessions**
Candidates were required to lead two sessions on their classroom investigation at staff meetings during the implementation phase. The presentation was considered voluntary and at the discretion of the candidate. The main purpose was to share with their colleagues what they were doing and to celebrate their learning. Suggestions were provided such as leading a discussion on an academic reading or using part of their reflective journal to demonstrate specific ideas.

**ICT skill training sessions**
ICT skill competencies required by candidates to implement their classroom investigations were catered for in a number of ways. Project team leaders could either direct their candidate to teachers at other schools, to training workshops or they could provide the competency training. Specific teachers within the Cyberschool network interested in providing training were located through an ICT skills audit, resulting in an ICT support personnel address booklet. ICT training sessions could form part of the schedule in the mandatory weekly one hour meetings (as described previously) or an alternate time and place convenient to both parties was organised by the leader. A candidate requiring ICT skills training provided by a teacher from another school, had to fill out an ICT skills proposal form that was authorised by the candidate’s principal and the principal of the teacher who was providing the training.
Classroom visits
Candidates were able to visit classrooms in their own school and in other schools to view lessons by any teacher the candidate considered beneficial to their classroom investigation. The candidate had the opportunity to critically discuss pedagogy and instructional practices in regard to multiliteracies and ICT, and share ideas, thoughts and planning with the classroom teacher. A reflection on a classroom visit was required to be written in the candidate’s reflective journal. Project team leaders organised this professional activity and worked with their candidate on a classroom visit proposal form (see Appendix 5.6) for authorisation by the school principal.

Final written report
Each candidate was required to write a final written report on his or her classroom inquiry. This report drew on all aspects of their learning journey with specific reference to evolving pedagogical beliefs and practices in regard to multiliteracies and ICT. Each candidate was provided with a full day relief from teaching to write this report. Two afternoon sessions were organised for candidates to participate in fine tuning the draft copy of their final report. These sessions were led by a trained protocol facilitator who took them through a Tuning protocol. Through this structure each candidate received constructive feedback from peers, myself and the protocol facilitator. Final written reports were forwarded to me in electronic format.

Summary of internal context
The professional development activities that teachers engaged in as part of the internal context have been described in this section. The focal activity of the Inquiry Project was classroom based investigations that candidates designed and implemented with the support and guidance of their project team leader in the school setting. Other professional development activities that provided further support for candidates included one hour weekly meetings in which candidates and project team leaders collaborated in various ways, maintenance of reflective journals, staff sharing and or ICT skill training sessions, classroom visits and final written reports by each candidate. The other context which bounded professional development activities that were also designed to provide support for candidates as part of the Inquiry Project, was considered external to the school context. This context is now described.
5.2.2 External context: The external context included professional development activities that took place outside the school. As explained, the theoretical ICT professional development model (see Figure 2.6) has two contexts in which professional development activity takes place. The external context provides activities for teachers that were described in the model as external events and formal knowledge. External events and formal knowledge in the Inquiry Project included teachers participation in an online threaded discussion forum, planning meetings, academic readings, half day Inquiry Project sessions, and a culminating celebration. A description of each external professional development activity follows.

Online threaded discussion forum
A mandatory requirement for each candidate and project team leader was to participate in an online threaded discussion forum. An asynchronous threaded discussion structure was implemented via the forum communication tool in a Blackboard environment. Mandatory participation in the online threaded forum involved project team leaders and candidates discussing topics posted. For a period of two weeks, school teams were responsible for instigating a topic that related to their classroom investigation. In this two week period, school teams had to respond to and encourage forum postings under their thread. Support for accessing and participating in the threaded discussion forum was provided in a number of ways. The actual mechanics of accessing the forum were described in the leader’s role outline mentioned previously. In regard to postings, it was decided by project team leaders that I would lead the first two weeks of discussion, therefore demonstrating the process. I provided further encouragement by faxing announcements of new threads and suggesting topics.

Planning meetings with researcher
Candidates could request a planning session with me at anytime during the implementation of the Inquiry Project. These meetings were considered external as I was an adviser from outside the school context. Initial requests from candidates were for planning sessions that focused on developing their investigative questions and planning the initial action research cycle, including establishing their existing pedagogical beliefs and practices and developing an action plan with monitoring
techniques. Other planning sessions supported the development of subsequent action research cycles or acted as reflective sessions.

**Academic readings**

Based on the general direction of classroom investigation into multiliterate practices and the use of ICT, I provided academic readings for each candidate. These academic readings were meant to stimulate reflection and discussion between the leader and the candidate in their weekly meetings, and amongst all participants in the online threaded discussion forum. Topics covered by the academic readings included examples of an inquiry approach in classrooms; approaches to integrating ICT in general and specific activities for integrating the internet into learning experiences; problem based learning approaches and meaningful learning; characteristics of the digital generation; multiliterate teaching and learning and connections between multiliteracies and ICT.

**Half day Inquiry Project sessions**

Half day Inquiry Project sessions were focused on conceptual development of multiliteracies and ICT and the nature of teacher inquiry into classroom practice. All candidates and project team leaders were required to attend. There were two half day sessions structured during the implementation phase, one mid term and the other three quarters of the way through. The first meeting focused on multiliteracies. There were two sessions (see schedule - Appendix 5.7). In the morning session, the candidates with the support of their project team leader, informally shared what they were investigating in their classroom. This gave the candidates a chance to celebrate what they were doing, receive supportive feedback and opportunity to hear what other teachers were investigating. After morning tea, a guest speaker from my university, Dr Margaret Fletcher from the School of Cognition, Language and Special Education, gave a workshop on multiliteracies. In this workshop teachers were presented with practical approaches to a pedagogy of multiliteracies. This session focused on the use of pop culture and the deconstruction of Barbie.com (depicted in Figure 5.3). Principals and other interested community members were encouraged to attend.
The second half day Inquiry Project session focused on ICT in learning. I led a clay-animation workshop that looked at the use of ICT for multiliterate student outcomes. A clay-animation is a sequence of still images of clay figures which are strung together using QuickTime© to create a movie sequence. Candidates and project team leaders formed mixed teams to make a clay-animation which was then shared. Following this practical activity I facilitated a critical group discussion on the use of clay-animation for multiliterate teaching and learning outcomes. After morning tea, candidates and their project team leaders worked through a report writing worksheet (see Appendix 5.8) to structure and provide ideas for their final written report.

**Culminating presentations**

Candidates were asked to present the results of their classroom investigation at a public function. All those involved in the Inquiry Project were invited to attend including principals, parents and community members, educational district personnel and the Dean of Education from my university. Candidates used any media form to present their understandings of their evolving pedagogical beliefs and practices. This presentation evening was held at a local function room towards the end of the school year. As a celebration of professional learning it was fully catered and ran between 5pm - 7pm. I orchestrated the evening and the Dean of Education gave a gift to each candidate and project team leader after their presentations. Some of the presentations can be viewed in the Teacher Journeys section on the CD Rom that accompanies this document. Figure 5.4 illustrates the front screen of a website children created as part
of their teacher’s investigation into ICT and multiliteracies. This website and other related student work is also available on the CD Rom.

Figure 5.4 Screen shot of a student created website

Summary of external context

The professional development activities that teachers engaged in as part of the external context have been described in this section. The Inquiry Project involved teachers in ICT professional development activity that reflect elements established in the theoretical ICT professional development model (see Figure 2.6). In the model, the core reflective process involves professional learning activities of investigation, reflection and collegial dialogue that are actioned through teachers participating in activities described in both the internal and external context. Analysis of data collected during this implementation phase occurs in the following chapters. A return to the theoretical ICT professional development model provides the structure for this analysis.
Chapter Six
Examing ICT professional development-investigation

This chapter begins my analysis of elements within ICT professional development. Over the following three chapters I return to the theoretical ICT professional development model established in the Literature Review to examine its potential to guide professional activity that will enable teachers to transform their pedagogical beliefs and practices. The model is examined in two stages (see Figure 6.1). In Stage 1 existing pedagogical beliefs and practices of teachers were collected. These have been examined in Chapter Four. This provided contextual understanding of the transformative capacities of ICT professional development. These data informed the collaborative design and implementation of an ICT professional development program that was guided by the theoretical model. The program was called an Inquiry Project and was described in the previous chapter. Stage 1 has been completed, indicated in Figure 6.1 by the faded section of the model. Stage 2, which is bolder in Figure 6.1, is examined now.

![Figure 6.1 ICT professional development model (adapted from Figure 2.6 and Figure 3.1)](image-url)
Data collected in Stage 2, during the design and implementation of the ICT professional development program called the Inquiry Project, are examined over the following three chapters. In each chapter I deal with a professional learning activity namely, (i) investigation; (ii) reflection; and (iii) collegial dialogue (indicated numerically in Figure 6.1) which together form the core reflective process. Each professional learning activity is examined individually and in relation to one another for the transformative capacity they provide teachers in changing pedagogical beliefs and practices. Other elements of the ICT professional development model such as the internal and external context are included in this examination. Each chapter concludes with suggestions for adjustment to the ICT professional development model in the light of the data analysis.

As detailed in Chapter Three, the methods used to collect data in Stage 2 emerged from moments within action research cycles. Data collection methods included professional development sessions and activities, interviews, monitoring meetings and planning sessions. Open coding was the analytical process employed (Glaser & Strauss, 1967; Strauss & Corbin, 1990) to question, compare and identify existing, emergent properties and dimensions of the core reflective process. Frameworks were specifically employed to analyse reflection and collegial dialogue data.

The core reflective process comprises the three professional learning activities of investigation, reflection, and collegial dialogue. In the Inquiry Project, these professional learning activities were actualised through activities that were based on and around teachers’ classroom investigations. In this research context, a teacher’s classroom investigation was focused on examining personal pedagogical beliefs and practices associated with ICT and multiliteracies. As an Inquiry, teachers were guided to use action research methods for recursive action and reflection. Themes that emerged through the professional learning activities of investigation, reflection and collegial dialogue as teachers designed and implemented their classroom investigations are presented in each chapter respectively. Evolving pedagogical beliefs and practices of the teachers are explored within each professional learning activity. The first professional learning activity that I examine is investigation,
followed by reflection in Chapter Seven and then collegial dialogue in Chapter Eight. Conclusions for ICT professional development are drawn together in the final chapter.

### 6.1 Investigation

Through an Inquiry Project, described in the previous chapter, each candidate (term used for teachers who were participating in the professional development program) developed an investigative question that focused on pedagogical beliefs and practices associated with the integration of ICT and multiliteracies. A teacher’s classroom investigation became the focus for further ICT professional development. Three themes emerged from the data relating to investigation. These included pedagogical focus; a platform for external professional activities; and investigation design. I analyse each theme respectively with implications drawn for the role of investigation within the core reflective process.

#### 6.2 Pedagogical focus

Since the introduction of computers in schools, models of ICT professional development have been defined by the needs of teachers in respect to the uses of educational technology. In the eighties, Taylor’s (1980) categories of tool, tutor and tutee, signified the need for ICT competency training so that teachers could utilise word processing tools, drill and practice tutors and programming tutees. With technological advances and the increase in ICT in classrooms, the importance of competency and confidence currently remain high for teachers (Becta, 2004a). Established through an examination of teachers’ pedagogical beliefs and practices in Chapter Four, there is emphasis on teachers wanting to gain competency with ICT and the need for training approaches that support this. However, as indicated in the Literature Review, the development of ICT competency divorced from curriculum integration only aids in personal mastery for teachers and does little for transformation of teachers’ pedagogy.

The approach advocated in the theoretical ICT professional development model was to emphasise a pedagogical stance where the focus was on teachers examining their beliefs and practices associated with ICT and multiliteracies. Gaining competency with technology was considered a means to enabling teachers to implement their
classroom investigation. The data demonstrated that teachers considered a pedagogical focus important in enabling change in their thinking about ICT in learning and change in associated pedagogical practices. Emerging from the data were two different personal directives for ICT professional development. Firstly, there were teachers driven by lack of competencies with ICT who sought training approaches. Secondly, there were teachers who had reached a level of competence and were interested in developing further ICT competencies but were also concerned with investigating pedagogy associated with ICT. As uncovered in the Literature Review, the level of competency with ICT that a teacher holds has been found to direct his or her interest in particular types of ICT professional development (Dwyer et al., 1991; Jonassen, 1991). These authors suggest that teachers with low ICT competency levels seek ICT skill training and more ICT competent teachers seek pedagogical investigation associated with ICT.

What was interesting in this research context was that the Inquiry Project having an emphasis on pedagogy and not the development of a teacher’s ICT competency was able to cater for both types of needs. Teachers who had little ICT competency, who sought ICT training approaches found pedagogical investigation beneficial and demonstrated evolving pedagogical beliefs and practices. Data obtained from a teacher named here as Unwin, who considered himself low in competency and confidence with ICT and who was seeking ICT skills training, is presented to illustrate the importance of a pedagogical focus for ICT professional development rather than an ICT skill focus. It also demonstrates that ICT skill development should be considered within a model of ICT professional development.

Unwin expressed concern about a pedagogical focus through initial planning documentation as he had “completed a year-long course that was long on theory but short on practice”. He wanted ICT professional development in the form of ICT skills training and he wanted someone to show him “how to do it”. In regard to pedagogical beliefs and practices, Unwin thought that “computers appear to be a necessary evil – I don’t particularly like them as unstructured learning takes so much time out of an already overcrowded day. I don’t do a lot with my class other than word processing, set software packages”. Unwin’s personal directive for ICT professional development was for the attainment of ICT competency through ICT skills training.
At the end of the Inquiry Project, Unwin described his professional growth as an increase in confidence with ICT. This confidence was not solely focused on competence with ICT as Unwin also expressed confidence in an evolving pedagogical approach. The following dialogue was taken from my final interview with Unwin.

Unwin: I think my confidence has increased more. I’m more prepared than earlier in the year. It was sensational. And it was the right time and it was something I wanted to do and I wouldn’t have done it on my own. Kevin [unwin’s leader] was keen and we could see the possibilities for the rainforest thing going on to the web and it just grew from there. It’s been great….

Unwin: To me, I’ve always been, well there’s the goal, minimum talk, maximum action, let’s get the job done and go onto the next one and I’m happier now to break the kids into groups and if it takes an hour to come to a decision rather than 5-10 minutes then that doesn’t worry me because this rainforest project, the kids, we’re so rapt in that.

Sarah: Why do you think so?

Unwin: I really don’t know but it did. I think the fact that they know they’re going to be here for a couple of years and if they do this project and follow it through, which they will, it’s basically theirs. It’s theirs and they’re going to use it for three years. They were the ones who thought of it and it was their design basically.

Sarah: It’s really purposeful for them. Do you think the learning they got out of it, like do you think there was Mathematics, all different?

Unwin: There was maths, scale and perspective. They had to do birds eye views, front ons…

Sarah: Do you think that an integrated approach is a good way of?

Unwin: I totally agree. I think integration of any kind makes it more relevant when they can see that it involves so many different things. It’s got to be the way to go.

This interview excerpt illustrates Unwin’s increase in confidence with ICT but also an evolving understanding and awareness of different pedagogical practices. Unwin who initially expressed dislike for unstructured lessons and particularly, teaching practices that entailed notions of child-centred learning, talked about the importance of decision
making and its time dependent nature, the interests of the children, learning being real and purposeful and an integrated project based approach. This interview, as a form of reflection, illustrates a self-realisation by Unwin of new pedagogical practices and the associated student learning outcomes. These new pedagogical practices suggest movement towards a pedagogy favourable to effective ICT integration as identified in the Literature Review as a critical level (O'Rourke, 2001) or new content/new pedagogy (DEST, 2001) and a pedagogy of multiliteracies. The nature of Unwin’s chosen inquiry seemed to play a key role in his ability to transform his pedagogical beliefs and practices.

In Unwin’s chosen inquiry he investigated the pedagogical practices needed to implement project based learning. Collaboratively with his project team leader, Kevin, Unwin designed, implemented and evaluated a unit of work titled ‘rainforest project’ that integrated spreadsheets for the calculation of material needed for construction of a seating arrangement in a rainforest area within the school grounds (see Figure 6.2 winning design for seating arrangement by a student and Figure 6.3 spreadsheet constructed by students to calculate required building materials).

Figure 6.2 Winning seating design
There were a number of key elements within the rainforest project that gave rise to Unwin’s success. Firstly, importance was placed on analysing his teaching process. Unwin took on a more critical approach to what learning outcomes were being achieved from the implementation of particular teaching strategies. The project ran over two terms which provided a substantial period of time to investigate. There was no pressure to rush and it enabled a different approach to term restricted tasks. Ongoing support throughout this investigation aided in both the depth of analysis and maintenance of the project. Lastly, and significantly, the integration of one ICT application into the project provided opportunity for Unwin to gain personal competency and confidence and time to think more about how spread sheeting could be integrated effectively, how it aided student learning, its relevancy, purpose and place within the project.

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Figure 6.3 Spreadsheet of required building materials

A pedagogical focus to investigate beliefs and practices in regard to ICT and multiliteracies was found to be an important element of ICT professional development for all teachers, including those that sought ICT skills training, as demonstrated here through Unwin’s investigation. This agrees with the premise proposed by Dwyer et al. (1991) and Jonassen (1991) that a certain ICT competency level must be reached before teachers want to investigate pedagogy. However, the findings here in regard to a pedagogical focus for ICT professional development, suggest that there is greater
potential for teachers to be able to transform their pedagogy when the linkage between ICT skill attainment and a pedagogical focus is such that ICT skill attainment is directed and limited by a teacher’s investigation that is focused on examining their pedagogical beliefs and practices.

A candidate, Megan who considered herself competent with ICT, proposed her view about a pedagogical focus for ICT professional development. She described a diagram to me that she drew in her final interview:

![Figure 6.4 Megan's drawing](image)

Megan: Oh well, I just drew it to myself. Here it is. Um pedagogical application leads to change, therefore greater impact. Increased skilling leads to increased skills. No change. And that sums it up. That’s basically what it’s all about. If you don’t look at it from the pedagogical side then you just won’t change.

The value of Megan’s view for ICT professional development is in the capacity for self-realisation. Megan was able to form a critical perspective on the process she was undergoing. Providing a focus on pedagogy rather than on the attainment of ICT skills within the ICT professional development program, made Megan assess the significance and validity of such an approach.

**6.2.1 Summary of pedagogical focus:** A pedagogical focus has been presented here as the first theme to emerge from an examination of investigation, the first professional learning activity of the core reflective process considered essential for effective ICT professional development. A pedagogical focus identifies the need for ICT professional development to enable teachers to participate in a curriculum based investigation with ICT training incorporated as limited and directed by a teacher’s pedagogical examination. How a teacher designs the unit of work to be investigated is
also an important factor, in that the teaching and learning experiences should examine new teaching approaches and be responsive to the ICT competency level of the teacher.

6.3 Platform for external professional activities

In the second theme of investigation I examine how a teacher’s classroom inquiry relates to professional development activity that took place outside the school context. Conventionally, ICT professional development has been considered as courses or workshops outside of the school. This situation persuades teachers to believe that new and improved knowledge and skill is gained from external sources and ‘experts’ (Russell, 1993; Wideen et al., 1996) and that skill attainment is imperative for effective classroom integration of ICT by teachers. The literature suggests that isolated external activities lead to little change in teachers’ practice back in the classroom and that greater transformative realities lie in linking external professional development activities to internal professional development (Bigum et al., 1986; Ingvarson & MacKenzie, 1988; Lankshear & Bigum, 1998; Morris et al., 2003). This idea connects the professional learning activity of investigation with the external context in the ICT professional development model (see Figure 6.1).

A teacher’s classroom based investigation could be considered a platform that provides a basis or links to professional activities that occur externally. External professional development activities were described in the previous chapter. Of particular interest are those external activities that could be described as workshops such as both half day Inquiry Project sessions on multiliteracies and ICT; and the academic readings. These external professional activities were linked to the teacher’s classroom based investigation within the Inquiry Project. This linkage is examined for its potential to enable teachers to transform their pedagogical beliefs and practices. Integral in this analysis are reflection and collegial dialogue which are the other two interdependent professional learning activities in the core reflective process explored in the next two chapters; however, the focus is on investigation in this section.

Generally teachers acknowledge that a classroom based investigation provides a platform for external professional activities in comments such as:
Darren: They [workshops] would have been able to stand by themselves, but I think having to work through the inquiry gave an application for it rather, if they stood alone people might have thought that was a nice thing to do, I'll try it once, or Ok I've done that what’s the next thing, but when it is linked to a project you see it more as a means rather than an end in itself.

Darren expresses the idea that classroom based investigation provides a space for thinking about and applying what is presented or learnt in an external workshop. This idea that workshops are isolated activities that have little transforming capability is supported by Immogen:

Immogen: How many times have you gone to seminars, said that is fantastic, that’s great and then you

Sarah: do nothing about it, that’s right.

Immogen: I do that, you know, all the time. That’s-that’s just something that just happens…

Immogen moves on in her discussion of the value of ICT professional development that indicates the benefits of providing a platform:

Sarah: Would it have been better just a workshop and

Immogen: Yeah, I really thought about that question and the answer is definitely not. It wouldn’t change what you’ve done and the way you’ve structured it. It was really important, the whole show, the whole box of dice or I’d have stopped because the part where I thought I grew was in the reflection and then changing my action and that really did happen, it really did.

Immogen acknowledges all the professional learning activities within the core reflective process placing emphasis on their interdependent nature through her expression “the whole box of dice”. She indicates that external professional activities provided stimulus for reflection upon what she was doing in her classroom which then informed change in action. This experience supports Fullan’s (1992) insight into the change process within teacher development as action pre-empting reflection. The classroom based investigation provided Immogen with the opportunity to experiment and reflect on new ideas presented externally. It gave her a platform to think about things, experiment and then reflect, which informed change in her pedagogical beliefs and practices.
A change in Immogen’s pedagogical beliefs and practices resulting from external activities being linked implicitly to the professional learning activity of investigation is evident. The degree to which the external professional activities shaped or influenced this change is difficult to ascertain. However, there is evidence of teacher’s conscious response to and action from external professional activities being linked to classroom investigation. Further illustration of teacher’s transformations that respond to the three different external activities: (i) the multiliteracies workshop; (2) the clay-animation workshop; and (3) the academic readings are explored (for further explanation of these three external professional activities refer back to the external context in Chapter Five).

6.3.1 The multiliteracies workshop: One school put forward three teachers as candidates who taught as a teaching team. Their classroom investigation focused on the pedagogical practices associated with enabling their students to create a finessed multimedia presentation that was a culminating activity for a historical Rich Task. Evidence from the team’s final written report and interview suggests that the multiliteracies workshop was valuable because they were looking at the influence of media in their multimedia presentation and some of the ideas presented in the multiliteracies workshop just “slotted into that as something we could use and the kids loved it”. Timing is relative to professional development, however, the timing of this workshop was set within a context of classroom investigation which created the platform for association and analysis of what occurred in the workshop. The team drew on the information presented in the multiliteracies workshop to design and implement some learning experiences, as explained in the team’s final written report. The final written report states:

We were able to translate the content of a multiliteracies workshop into the philosophy sessions we were conducting with our students. The comparison of Barbie doll marketing and merchandising with home grown Feral Cheryl doll gave much fuel to our philosophical questions and discussions. This became yet another example of the multiliteracies ‘happening’ in our classrooms.

The team expressed a growing understanding of the concept of multiliteracies in two ways, through “translate[ing]” content in learning experiences for their students and through the ability to acknowledge other “multiliterate happenings in our classroom”.
In a later interview the team’s pedagogical beliefs and practices were further explored with one of the teachers:

Sarah: So it takes a mixture of direct lessons as well as experimentation for the kids.

Mandy: Yes. And pointing things out that we think are obvious and that kids know because they live in a visual world but they don’t.

Sarah: Because they haven’t read texts?

Mandy: No. And some of them look at things and they don’t get out of it what you think they should.

Sarah: So creative and critical discussions…

Mandy: Yes. Probably we were excited about the Barbie doll idea because it gave us something we really thought the kids would grab hold of and they did and they loved it.

In this interview excerpt Mandy provides some of the understandings that she gained, confirmed or altered as a result of the multiliterate workshop and from implementing learning activities within the context of her team’s investigation. She and her colleagues reflected and acted in a transformational manner that indicates a greater likelihood of embedding multiliterate understandings into future learning activities as well as evolving pedagogical beliefs and practices.

6.3.2 The clay-animation workshop: The clay-animation workshop is the second external activity that I will examine in relation to the professional learning activity of investigation as a platform. The following interview excerpt provides an insight into the value of developing a platform such as a teacher’s classroom investigation that provides a basis for or links ICT training sessions. As explained in the previous chapter, candidates were able to develop their ICT competency through training provided by their project team leader or from other sources. A teacher’s attainment of ICT skills was directed by those ICT skills he or she required to implement a classroom based investigation. The clay-animation workshop as an external professional activity was considered supplementary. The established approach within the Inquiry Project of a pedagogical focus and an analytical lens through which to view the attainment of ICT skills, enabled critical transformations to occur for teachers as expressed by Immogen:
Immogen: Workshops too have shown me that, you know, it’s given me more confidence with it all. Like you know how we’ve had skilling through all of this. Um I haven’t learnt huge volumes but I’ve learnt that I’m capable of learning huge volumes and that’s really a great start. Like I’m prepared now if somebody wants to do something, I can say ‘can I watch, can I do something’?

Evident here is a transformation in Immogen’s personal beliefs about gaining ICT competencies. She presents a realization that with ICT you don’t need to know huge volumes and that it is more important to feel capable of learning. This belief is held by digital natives (Prensky, 2004) who have skills to advance with ever changing technologies. This belief is articulated by Immogen in how she is able to approach new ICT situations such as learning a new software program. Immogen feels confident to watch and equally important, confident that she is able to participate and contribute in some way to someone else’s learning, even though she does not have all the answers or ICT expertise. These evolving beliefs were also transforming her classroom practices as she explained in her final interview:

Immogen: You know when um who was it, teach-teaching them, they really needed to learn the Internet properly because they were wasting a lot of time and I believe that does happen and so I believe you really do need to teach them just like you do. But in regard to teaching strategies you still got to have your structured lessons but there is opportunities for other things than those.

Sarah: Absolutely.

Immogen: And-and I do think that if you work from children’s um, what they’re interested in, their interests and things like that, that’s where you really get them... they-they’ll pursue, yeah engaged but they’ll also pursue it and quite often they have enough skills to be able to teach you stuff that you don’t know. I don’t I don’t think I need now to know everything about something before I try and teach it and that’s changed. Um, I’m willing to-to um let kids teach me and we flow on from there and I think that’s important.

Evident here is Immogen’s evolving understanding about pedagogical practices in regard to multiliteracies and ICT. Immogen felt comfortable in justifying an instructional approach drawing on her experience with investigating ICT teaching practices in her classroom. She also acknowledged and expressed value in learning with and from her students and not being totally competent in a software program.
before using it in a learning situation. Immogen’s evolving beliefs and practices indicate movement towards pedagogy that effectively infuses ICT and a mindset that is more like her students in working with ICT.

6.3.3 Academic readings: The final external professional development activity examined in relation to the professional learning activity of investigation is academic readings. Academic readings that were relevant to teachers’ classroom investigations were provided by me as a way to extend teachers’ thinking about pedagogical beliefs and practices associated with multiliteracies and ICT. One instance was found where a teacher took on something she found valuable in a reading which linked to her investigation. Megan was investigating teaching strategies to help children understand the power of multimedia presentations. At the beginning of the year she experienced behavioural difficulties with children in her class so she was eager to see if catering for individual needs using ICT would have an impact on children with specific behavioural problems. Megan was interested in the idea of empowering children to make choices in their learning as described in a reading titled: McKenzie (1998) Grazing the net: raising a generation of free range students (http://www.fno.org/text/grazing.html). The following interview excerpt demonstrates how Megan’s beliefs about student learning were influenced by this reading:

Megan: I think some of the fun things, like I read the free range student article and I actually brought those words into the classroom and we explored them. And letting the children know that they were now free range students and that in their group that being a free range student had responsibilities. It has been really, they were free to come up with how and why and what but they had to present this and they have to be infotectives. Well infotectives had to find this information but not just find it they have to then present it and utilize it. They love that terminology.

Sarah: Something that is real to them.

Megan: Our classroom is now, like I say to them, ok it is free range activity time and they know that they still have responsibilities to get the work done but how they get it done is up to them so every now and again on the internet you have to come in and guide the kids and make it more structured but it really has engaged them and brought them on.

Sarah: You are developing more skills in your students so that they can be more free range.
Megan: So if nothing else I have enjoyed that reading and implementing it into the classroom. They just loved those words. We brainstormed on those words and the responsibilities that go with doing those things. Even those that had behavioural problems have gone with it.

Megan reflected and acted upon the free range student article. Her beliefs about students learning with ICT were influenced, stimulating her to investigate this in her classroom. She implemented specific teaching and learning activities where students in small groups worked together on a project in which they were empowered to direct their own learning. In this new approach, students were “free to come up with how and why and what but they had to present this and they have to be infotectives”. Students were provided with more individual or small group structured learning opportunities based on needs. Megan’s monitoring and evaluation of these ideas and practices was indicated by statements such as “you have to come in and guide the kids and make it more structured but it really has engaged them” and “even those that had behavioural problems have gone with it”. In Megan’s reflective journal her investigative stance is evident in the following entry (see Figure 6.5):

![Image: Megan’s reflection on free-range student activities]

We started our free range activities in earnest and all students are zooming through, remaining on task. With these free range activities there are some pluses and minuses. They enjoy the thought of being responsible for their own learning and the thought of being infotectives but some have a tendency to dodge the work part of the exercise.

Xxxx on the other hand has taken on his task with gusto, often spending his free time on the activity, both in the classroom and out. The level of commitment is astonishing.

Megan was reflecting on the responses of the children to new teaching practices. She was able to act on these new ideas in her classroom and utilized the investigative space she had created. Through reflective action she was aware of the “pluses and minuses” of this new approach and would be considered in a state of evolution in regard to these pedagogical beliefs and practices.

**6.3.4 Summary of a platform for external professional activities:** A platform for external professional activities has been presented here as the second theme to emerge from an examination of investigation. A platform for external professional activities acknowledges the value of a classroom based investigation in
providing a space for the examination and reflective action upon those concepts and ideas presented in external activities. This theme indicates that greater transformative potential of external professional activities is possible if linked to a classroom based investigation.

6.4 Investigation design

The final theme to be examined in the professional learning activity of investigation is investigation design. The design of a teacher’s classroom investigation arose from discourse with teachers on motivation to participate in ICT professional development and from reflective exercises as part of the teacher’s initial planning sequence for their inquiry. Investigation design indicates that a classroom inquiry must be (1) part of what a teacher does in his or her classroom not considered an extra, that it is (2) professionally enhancing and purposeful to student learning outcomes. Each of these qualities of design is examined.

6.4.1 Part of what a teacher does in his or her classroom: The idea that a classroom inquiry must be what a teacher does in his or her classroom and not seen as an extra activity, was considered by teachers as a reason for participating in the ICT professional development program and a critical design issue. The following excerpt (see Figure 6.6) from the first entry in Megan’s reflective journal epitomizes the importance of this:

![Figure 6.6 Megan’s reflective statement on Investigation as the 'what' in the classroom](image)
The first sentence of Megan’s reflective journal (see Figure 6.6) both qualifies and emphasises the importance of an investigation being considered by her as “the what” of her teaching and learning in the classroom. This sentence is written in a manner that validates to others what she believes is the correct approach to take. She states, about her classroom investigation, that “It was not an extra”. Megan goes on to explain that the Green and Healthy Awards would be the focus of her classroom investigation. The unit designed for the Awards would become the unit she would investigate, thus “killing two birds with one stone so to speak” as stated in her final written report. Of significance here, is that Megan says in this reflective excerpt that both her and her project team leaders (CC and GM as she refers to them) believe that she would not cope if the application of investigation was not designed in this way.

6.4.2 Professionally enhancing and purposeful to student learning outcomes: The other quality of design for a classroom investigation is that it needs to be professionally enhancing for the teacher and purposeful to student learning. As discussed above, Megan’s response to designing and implementing a classroom investigation was to design a unit of work to analyse her teacher practices. This is similar to the approach adopted by Unwin, described previously as the rainforest project. Other teachers approached the investigation by pinpointing a teaching strategy associated with ICT and multiliteracies, they considered would be professionally enhancing and purposeful to student learning outcomes. The following example indicates this alternate approach, by David, in his initial planning documentation for his classroom investigation:

David: Since reflecting on our own teaching practices in particular IT in the classroom, Cherry and I have come to realise that we need to focus our teaching practices more on the internet and its effective use in the curriculum. Since coming to realise this we are looking forward to approaching this investigation, as we see it as being crucial for our own teaching and critical in assisting our students to become better users of the internet. Had we not deeply reflected on this, we may have never realised this or may have been some time before any action was taken on this subject.

The motivation for David, and his leader Cherry, to participate in a classroom inquiry was described by David as “crucial for our own teaching and critical in assisting our students to become better users of the internet”. David identified a professional need,
one that implicated student outcomes. He was interested in investigating student’s use of the internet and developing support material. His approach examined one ICT application using a teaching strategy, rather than examining a range of teaching strategies that could make the internet integral to learning in his classroom.

Emerging from the data are two different approaches to a classroom investigation. One focuses teacher’s examination on a particular ICT application, as adopted by David. The other focuses on developing a project oriented unit of work that integrates ICT, described in Unwin’s rainforest project and in Megan’s Green and Healthy Awards. Different approaches would be expected from teachers as a consequence of different pedagogical beliefs and practices. What seems to be evident is the importance of enabling and supporting different approaches in professional development activity. Teachers’ motivation to pursue a classroom investigation is affected by their professional aims and projected student learning outcomes. Engagement with the other two professional learning activities of the core reflective process, reflection and collegial dialogue, should provide opportunities to challenge and/or extend beliefs and practices that inform the particular approach.

6.4.3 Summary of investigation design: Investigation design has been presented here as the third theme to emerge from an examination of the professional learning activity of investigation. Investigation design identifies key practicalities that need to be addressed for teacher’s motivational and professional outcomes. An investigation needs to be seen as synonymous with teacher’s daily work; catering for participants’ professional needs and interests; and situated within student learning outcomes. Teachers must be comfortable with, and motivated by, the design of a classroom investigation. It must challenge their personal beliefs and pedagogical practices.

6.5 Summary of investigation

Three themes emerged under the professional learning activity of investigation, which is the first of three activities in the core reflective process that are considered essential for effective ICT professional development. The three themes are: pedagogical focus; platform for external professional activities and investigation design. A pedagogical focus for ICT professional development was found to enable teachers with various
levels of ICT competencies greater potential for the transformation of their pedagogical beliefs and practices. A teacher’s need for ICT competency and confidence was found to be satisfied when a classroom investigation directed and limited ICT skill development. A classroom investigation was also found to provide a platform upon which concepts and ideas presented to teachers in external professional activities could be actioned. Therefore external professional activities have a greater chance of enabling teachers to change if they are linked to classroom application. Finally, three characteristics were found to direct the design of a classroom investigation. These characteristics were considered as both motivators and qualifiers for teachers participating in the professional learning activity of investigation.

Investigation as an interdependent element of the core reflective process plays a significant part in the ICT professional development model. A pedagogical focus and platform for external professional activities indicate that investigation is a central, contextualising element of the core reflective process suggesting that reflection and collegial dialogue are shaped around or based upon the professional learning activity of investigation. Investigation can contribute an analytical approach for teachers’ evolving pedagogical practice. Based on the analysis in this section, Figure 6.7 displays an amended relationship between investigation, reflection and collegial dialogue within the core reflective process of the ICT professional development model.

![Figure 6.7 Core reflective process based on analysis of investigation](image)

The original relationship between investigation, reflection and collegial dialogue is represented by the interlacing of three triangles in Figure 6.1 each representing an
interdependent professional learning activity. Figure 6.7 displays an amended relationship resulting from the analysis of data on investigation. In Figure 6.7 investigation is bounded by a circle representing the investigative activities a teacher is involved in during ICT professional development. The triangles of reflection and collegial dialogue are embedded within investigation, with circular arrows indicating that these professional learning activities are dependent upon each other. Investigation becomes the platform upon which reflection and collegial dialogue are actioned.

Further analysis of reflection and collegial dialogue is needed to understand each role and relationship within the core reflective process of the ICT professional development model. In the following chapter I examine reflection, the second professional learning activity of the core reflective process.
Chapter Seven
Examining ICT professional development-reflection

Reflection is the second professional learning activity that I examine as part of the analysis of Stage 2 of the theoretical ICT professional development model. The model established following the review of literature, proposed to guide professional activity that is likely to enable teachers to transform their pedagogical beliefs and practices. Three interdependent professional learning activities form a core reflective process which is considered essential for effective ICT professional development. In the previous chapter, the examination of investigation occurred. In this chapter I examine the professional learning activity of reflection. The final professional learning activity, collegial dialogue is examined in the following chapter.

7.1 Reflection

Inquiry based professional development frames teachers’ active production of new pedagogical beliefs and practices rather than positions teachers’ consumption of professional knowledge produced in other academic or expert realms. Through the ICT professional development program called the Inquiry Project (described in Chapter Five) reflection was applied to all professional activity that required reflective thought (Hatton & Smith, 1995) such as candidate journal writing, planning meetings with me, one hour weekly meetings, staff sharing sessions and final written reports (for further explanation of these reflective activities see descriptions in Chapter Five).

Two aspects of the professional learning activity of reflection are examined. These are the perceived value of reflection and the role of written reflection in the transformation of teachers’ pedagogical beliefs and practices. I analyse each aspect with implications drawn for the role of reflection within the core reflective process.

7.2 Perceived value of reflection

Watson and Wilcox (2000, p.58) suggest that “making sense or constructing meaning of one’s professional world complements and enhances the body of objective and
Reflective action is one technique considered to contribute to sense-making, particularly in complex situations such as developing pedagogy that transforms learning with ICT. Reflective action defined by Dewey (1933, p. 9) is the “active, persistent, and careful consideration of any beliefs or supposed form of knowledge in light of the grounds that support it and the further consequences to which it leads”. Dewey’s seminal work on reflective thinking and Schon’s (1983; 1987) application of this work to the reflective practitioner advocate the inherent role of reflective practice in teacher professional development programs (Cady, Distad, & Germundsen, 1998; Clarke, 1995; Korthagen, 1993; Neapolitan, 2000).

Reflective action in the Inquiry Project was promoted in a concrete way by providing each candidate with an A4 blank page book to encourage both written and diagrammatic reflections. It was a mandatory requirement for all candidates to write a weekly reflection. It was found that one candidate out of a possible ten kept a reflective journal that demonstrated consistent reflection over the implementation of the Inquiry Project. Two candidates provided spasmodic entries, mainly at the beginning, which petered off over the implementation phase, while the other seven candidates did not partake at all in reflective writing. The perceived value of reflective writing stated by teachers ranged along a continuum from being “the most outstanding benefit” encapsulated in this excerpt from Megan’s final written report—“The most outstanding benefit of this Inquiry Project was the development of my reflective portfolio. This allowed me a deeper understanding of my own teaching style and ultimately, greater effectiveness as a teacher” to the other end of the continuum with comments such as—“I just don’t do it” stated by Unwin, with reasoning given as “I don’t know whether it’s a man’s thing or not...It’s just not me”.

Three themes emerged from data on teachers’ perceived value of reflection. These were (1) limiting conditions implied by inquiry approach; (2) lack of understanding on how to reflect; and (3) preference for verbal reflection. Implications these have for the professional learning activity of reflection as part of the core reflective process are now examined.
7.2.1 Limiting conditions implied by inquiry approach: The term ‘inquiry based professional development’, like ‘teacher as researcher’, ‘reflective practitioner’ or ‘reflective teacher’, imply an orchestration of action research methods which presume a reflective facet (Bell, 1993; Elliott, 1991; Hopkins, 2002). Presented to the candidates and project team leaders at the beginning of the Inquiry Project were documents defining an inquiry approach and the action research method. The main document, Inquiry Project support booklet (see appendix 5.3) provided instruction on the inquiry approach, including eight steps with directions and questions. The eight steps were: 1. Deciding on your investigative question(s); 2. Record the existing situation- Reconnaissance; 3. Relevant Literature; 4. Planning; 5. Action; 6. Observation; 7. Reflection; 8. Publication. The action research method of a self-reflective spiral of cycles of ‘plan-act-observe-reflect’ was evident in diagram form and in instructions. However, the teachers received no other formal training.

Generally, an Inquiry Project was interpreted by the teachers as a single rotation of an action cycle. Analysis of teachers’ Inquiry action plans suggests that all candidates took on the approach to an inquiry as an extended study of a concern, where a question was formulated, a plan [unit of work] was devised to investigate the question in context and teaching and learning outcomes were reported. Figure 7.1 displays Unwin’s planning for his rainforest project. This planning demonstrates a linear sequence for a single rotation of an action cycle. Some candidates also shifted the focus from examining their own pedagogical practices to evaluating the design of the unit of work over the implementation phase.
In this form a teacher’s classroom investigation was considered one cycle of ‘plan’ [the unit of work], ‘act’ and ‘observe’ [implement the unit of work], and ‘reflect’ [at the end of the unit of work] rather than implementing spirals of cycles that affect teaching practices in a systematic way throughout the implementation phase. This raises inconsistencies between action research and an inquiry approach. Carr and Kemmis (1986, p.185) state that a single loop of planning, acting, observing and reflecting should not be considered action research rather it should be termed “arrested action research”. The use of terminology such as Inquiry Project, rather than action research, may have played a part in this movement towards a problem solving approach, which in turn affected teachers’ ability to reflect strategically. Furthermore, the adoption of reflective practice representative of Schon’s (1983) notion of reflection-in-action, where teachers are constantly reframing a problem as they work on it, being conscious of what is taking place and modifying actions, may have limited reflective writing that advocated reflection before or after action.

**Summary of limiting conditions implied by inquiry approach**

Limiting conditions implied by the inquiry approach is the first theme to indicate teachers’ perceived value of reflection. This theme suggests teachers’ confusion between action research and an inquiry approach resulting in the adoption of a single action cycle or problem solving approach. This illustrates that experienced teachers are familiar with the rhetoric of action research. However, they are unfamiliar with
the practicalities of its implementation. Generally, teachers’ reflective journal writing within this context was limited to summative responses that occurred at the end of a teaching and learning sequence.

7.2.2 Lack of understanding of how to reflect: As previously stated Watson and Wilcox (2000, p.58) heralded the perceived value of teacher’s sense-making. However, they also qualify that it “may emerge as chaotic, subjective, and tentative” in form. Such unstructured, uninhibited thought work by teachers may suggest a lack of validity or limited in potential, to the inexperienced reflective practitioner. What to write in the reflective journal and then what to do with these reflections were issues raised by teachers. As stated previously, one candidate out of ten wrote constructive written reflections over a substantial period of time. This candidate, Megan, was a graduate who drew on her knowledge of reflective practice from her recent undergraduate degree program. The other candidates, familiar with the rhetoric, but not the practicalities of action research, as mentioned above, and as equally positioned with reflective practice, expressed disinterest and limited value in reflective writing. The following interview excerpt provides a teacher’s honest response to maintaining a reflective journal. The following account, given by Unwin, provides insight into teachers’ personalities and predispositions for reflective writing:

Unwin: Once again I’ve got to be honest and say that when I saw the size of the book you’ve given us to keep a journal I thought I’m not going to fill that, and I didn’t. I don’t know whether it’s a man thing or not but I find it difficult to reflect and write. It’s just not me. I just don’t do it. What I would like to do now would be to, and I think because this inquiry thing was such a different way of doing things I’ve ever done before, it took me a while to get fair dinkum about it. I still couldn’t believe the journal. I did make a valiant effort to write something down. I think I’ve probably done half a dozen pages of typed and written notes, but having said that if I was going to do it again I’d probably be happier because I can see now the value of writing stuff down because Kevin [project team leaders] would come up to me and ask me a question and if I’d written stuff down painstakingly I could have said yep, its there, and this is what I did and this is the way we did it. Whereas if you commit it to memory you can’t do it. So in terms of keeping the journal that’s one positive that’s come out of it because if I was asked to do something like this again then I would do it much more readily.
Unwin’s initial response to the blank page journal and his lack of interest in writing predisposed him to limited reflective writing. As he states “when I saw the size of the book you’ve given us to keep a journal I thought I’m not going to fill that, and I didn’t”. The journal was approximately 50 pages long, A4 size. He admits that he “find[s] it difficult to reflect and write”. Reflective writing to Unwin, is similar to recordkeeping, as exposed through his description of “writing stuff down painstakingly” and stating that “this is what I did and this is the way we did it”. Recordkeeping has no analytical elements, there is no examination of practice. Rather entries are purely descriptive. Hatton and Smith (1995) advise that this type of writing would not be characterised as reflective as it merely reports events. This indicates that Unwin does not understand how to write reflectively and may not know how to reflect. Similar results can be found in other adult educators’ reflective journals (Holt, 1994) where reflective journals were found to serve more as recordkeeping devices.

A teacher’s lack of understanding of how to reflect was found to be linked with available time for reflective writing and a lack of guidance. Project team leaders expressed in a meeting with me, the difficulties they were having getting their candidates to write in their reflective journals. Inclusive in a leader’s role was supporting their candidate in reflective writing. However, no formal training was provided to either the leader or candidate. The following excerpt presents the quandary that a leader found himself in, in regard to reflective writing:

Kevin: I need your advice on something Sarah. It’s about keeping the journal up to date …I feel that if I insisted on it he might be intimidated and jack up. That’s a big part of the project isn’t it? I might give him the key days and say well go and catch up because he reads mine. There might be some stuff that I can give him for those few days to catch up because he always remembers what’s happened.

Sarah: Or just maybe a part of the regular meetings you have, say in the last 10 minutes we’ll reflect?

Kevin: Exactly.

Sarah: Before he actually walks away. Once they’ve walked away there might not be any…

Kevin: But I don’t want to be seen as pushy. That would be bad wouldn’t it.
Leaders found themselves in a situation in which they had to encourage their candidate to reflect. Two factors influenced this predicament, time and guidance. Firstly, time for reflective writing was to form part of weekly meetings between the project team leader and candidate, which was outlined in initial documentation. Indicated in this excerpt is the acknowledgement that reflection was not occurring in weekly meetings. Secondly, guidance provided by the project team leader, Kevin, was not appropriate for the development of his candidate’s reflective writing. This is evident in Kevin’s comment “…few days to catch up because he always remembers what’s happened”. This comment indicates that reflective writing should reiterate what occurs in learning situations not analyse or reason. Kevin’s understanding of reflection is at a descriptive level or as a form of record keeping. In this context, reflective writing was restricted by both time and a lack of understanding of reflective practice held by both candidates and leaders.

Further support for a lack of understanding on how to reflect is evident in candidate’s initial reflections that formed part of their action plan for their classroom investigation. An action plan, specifically requested the candidate’s rationale for their classroom investigation. The rationale was a culmination of a set of six preceding questions, posed to support reflection on candidate’s existing beliefs and practices associated with using ICT and multiliteracies. Rationales in general, were found to lack detail and depth, as general one line answers were written by candidates. For example, in Kim’s rationale for her action plan (Figure 7.2) she wrote:

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The enhancement of skills for the teacher and students to benefit learning outcomes.
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**Figure 7.2 Kim’s rationale for her classroom investigation**

All candidates’ action plans were emailed to me. I provided support with leading questions to try to elicit further clarification on all categories of an action plan. The
following extract indicates the emailed response to Kim’s rationale above, that I sent her:

The rationale is really important so I'd like you to expand on this and just state what you think off the top of your head. You wrote: *The enhancement of skills for the teacher and the students to benefit learning outcomes.* Is it that you believe that skilling the children in using Word and or Publisher will lead to greater/better learning outcomes? If so what are the learning outcomes you want achieved from this unit? How does using these pieces of software support that? What real world context are the children engaged in in your unit. What multiliterate outcomes are involved?

I was seeking more complex levels of reflection indicated in Bain, Ballantyne, Mills, and Lester’s (2002) 5Rs reflective writing framework, as reasoned reconstructions of teaching beliefs and practices and future intentions. I qualified Kim’s statement [bold] and then proceeded to provide a range of questions that would stimulate her to reflect beyond a descriptive level. This follow up support was provided to each candidate. Following this, project team leaders requested my assistance to help each candidate write their action plan. The construction of candidates’ action plans, which underpin the application of action research, and specifically the structure in which reflection is actioned, required considerable support. This indicates that reflection is not an implicit professional practice for these candidates and that these candidates like other practising teachers, are unlikely to improve the level of their reflective writing unaided (Burk & Littleton, 1995; Ewert, 1994; Hatton & Smith, 1995; Lewison, 1996; Watson & Wilcox, 2000).

**Summary of lack of understanding of how to reflect**

Lack of understanding of how to reflect is the second theme to indicate teachers’ perceived value of reflection. Reflective journal writing was found to be affected by teachers’ attitude and interest; use of available time specifically for reflective writing; and the amount of support and guidance provided. In the Inquiry Project, reflective writing by teachers was found to be more generally considered as a recordkeeping tool. This demonstrates a lack of understanding of the theory and practice of written reflection held by both project team leaders and candidates.
7.2.3 Verbal preference: The final theme examined to understand the teachers’ perceived value of reflection is verbal preference. Providing opportunity to reflect verbally has been found to enable teachers to reach a deeper level of understanding (Watson & Wilcox, 2000); co-construct knowledge (Buysse, Sparkman, & Wesley, 2003); probe effectively into instructional practices that increase self-efficacy (Cady et al., 1998); and fundamentally shift thinking about teaching (Mueller, 2003). Both formal and informal professional activities were provided for candidates to reflect verbally on their classroom investigation in collaborative settings. These included (a) planning meetings with me on the construction of action plans (b) weekly meetings between the project team leader and candidate; and (c) staff sharing sessions where candidates reflected on the progress of their classroom investigation. These opportunities for verbal reflection are explored respectively for their perceived value in enabling teachers to transform their pedagogical beliefs and practices.

Planning meetings with me
Planning meetings as previously described, emerged as a response to the needs of candidates to formalise their action plans. The candidate and I worked through the Inquiry Project planning sheet which included six leading questions and an action plan (see Appendix 3.8). The sections included: establishment of existing situation-personal beliefs, teaching practices and community issues; and action plan- rationale, schedule and monitoring techniques. As a response to a need, these planning meetings were considered pivotal in making conscious candidates’ existing pedagogical beliefs and practices which were the entry point of the ICT professional development model (see Figure 6.1). A project team leader, at a meeting of all leaders, spoke about the value of this planning meeting for his candidate:

Harry: The Inquiry Project has gone really well at [school name]. There’s a few things that, the way Sarah’s gone about it, that’s worked really well. Your visit to the school, that was really necessary.

Sarah: Why has it worked?

Harry: I think she [candidate] just needed that, it gave her a lot of confidence.

Sarah: So like a discussion and a reflection.
Harry: Yes.

Sarah: Encouraging.

Harry: Yes. I think that went pretty well.

Sarah: That was like the other meetings I had with candidates about their planning. That was the meeting I had with her about what she was doing.

Harry: We’d already done our planning and it was just that reflective discussion.

Harry says that the meeting was a reflective discussion. He indicates that it “worked really well” so much so that “the Inquiry Project has gone really well”. The candidate, Megan, also provided insight into the outcomes of this reflective meeting in her final interview. I was asking her about ways to support teachers’ critical reflective practice and her response was:

Megan: And your day when you came out and I just reflected and just blah. That was great and then when I got the transcript that was, that transcript taught me more than anything else in those early days, because it just helped me pull it back through.

Megan was enthusiastic about this form of reflective practice. I had asked her probing questions that stimulated her to reflect on her pedagogical beliefs and practices. The transcript of this meeting was emailed to Megan. This transcript (see Figure 7.3) was an important reflective device. Megan had it pasted in her reflective journal, where sections were highlighted and decorated:
Megan found the initial planning meeting a valuable exercise that enabled her to reflect verbally on her beliefs and current teaching practices. The meeting also provided stimulus and direction for further reflective activity as she moved through her classroom investigation. Similar results can be found in Cady et al., (1998) where probing questions increase teachers’ sense of efficacy and lead to teacher empowerment. This indicates a beneficial connection between reflection and the need for leadership in the form of a critical friend from the external context of the ICT professional development model.

**Weekly meetings between project team leader and candidate**

The second professional development activity as part of the theme of verbal preference is weekly meetings between the project team leader and candidate. Weekly meetings provided opportunities for collaborative reflection on a candidate’s classroom investigation. Reflective discussion and journal writing was listed as an option in these meetings (see description of weekly meetings in Chapter 5). As meetings that required the release from classroom duties by both teachers, they occurred at times suitable to the teachers and school timetables and were not recorded.
Examined in this section is the perceived value of the discussion time as a reflective activity through responses provided by candidates about the meetings.

Megan used an analogy of a sounding board to describe her weekly meetings with her project team leader. This analogy also highlights a descriptive form of reflection (Hatton & Smith, 1995) as Megan is “spilling out all the frustration” through descriptive sequences of her practices:

Megan: Without them [project team leaders], I go to them to debrief with them, like when I lose track. Go blah, spill all the frustrations out and they gave me, “Well how about you try it this way?” and the more they listened and the more I rambled on the more I got to where I needed to be going.

Sarah: Yes.

Megan: It’s just that sounding board thing from both of them. Diana [project team leader] in particular because she is very like minded in that she’s going through her own journey in development, professional development and looking at that research side. So she was very perceptive to it and was able to give a lot of feedback academically. So I could think about what I was doing. And um without that I don’t think I would, probably wouldn’t have lifted me to that sense.

Megan highlights the opportunity of being able to “ramble” in a constructive context in which she is seeking what could be seen as best possible practice. She is provided with appropriate feedback that is “like minded”, suitable to her needs and given direction and options for subsequent action. Megan states that these sessions were fundamental in developing her reflective capacity. This is supported by Hatton and Smith (1995) who found that critical friend dyads are powerful strategies for the development of reflection enabling “self-revelation”. Providing opportunity for collegial dialogue, that involved explaining, questioning, and even confronting the trusted other, enabled Megan to “think about what I was doing”, to stand back and constructively critique her beliefs, ideas and actions in a safe environment. Reflecting verbally with the support of a critical friend also indicates a beneficial connection between reflection and the need for leadership within the internal context of the ICT professional development model.
Alternatively, weekly meetings were considered a part of the usual collaborative curriculum development meetings amongst the candidates who were team teaching. Reflection for these teachers was viewed as an embedded process in their teaching practice as future lessons were responsive to reflection on executed lessons. Verbal reflection in this instance reached a dialogic level (Hatton & Smith, 1995) as candidates were able to explore alternate pathways or solutions with one another, as described in the following interview excerpt with one candidate, Mandy, who represented this teaching team:

Sarah: Do you think you’ll continue to adopt or your colleagues continue to adopt that kind of approach where you investigate one area and reflect on it and talk about it?

Mandy: I think we do it all the time without formalising it. I think we’ve done it this year with the tasks [Rich Tasks]. We’re continually talking about it, how can we do it better and smarter, where did we go wrong here. I think we’re doing it without calling it reflection but we’re probably not formalising it in any way.

Statements that Mandy provided as examples of reflective discourse, such as “where did we go wrong here”, are typical of dialogic reflection (Hatton & Smith, 1995). Due to the collaborative teaching context and their use of verbal reflection, Mandy and her colleagues did not feel the need for written reflection. Mandy presents herself as a confident teacher and finds benefit in collaborative reflection. She repeated herself by saying “I think we’re doing it without calling it reflection but we’re probably not formalising it in any way”. Mandy and her colleagues are drawing on reflective practices as part of their on-going planning and are able to look consciously at their teaching practices. Verbal reflection for both Megan and Mandy and her colleagues is a powerful learning tool. These candidates find verbal reflection beneficial in shaping and stimulating their classroom practice.

**Staff sharing sessions**

The final professional development activity as part of the theme of verbal preference is staff sharing sessions. These sessions provided opportunities for candidates to reflect on the changes to their pedagogical beliefs and practices within the context of their classroom investigation. Staff sharing in a public arena, such as a staff meeting, provided the capacity for verbal discourse and the promotion of a school culture of
collaboration and community. The candidates who participated in this activity expressed anxiety and apprehension at public speaking. These staff sharing sessions occurred at the convenience of the school schedule and as such, I had the opportunity to attend two presentations. Pre and post discussions with candidates confirmed anxiety at presenting to their peers. Anxiety inhibited the reflective discussion amongst the staff, as both candidates preferred not to stimulate discussion during or after their presentations. Consequently the value of the staff meetings was in the constructive reflection to formulate a presentation by the candidate. Evidence of a candidate’s reflection on her pedagogical beliefs and practices can be demonstrated in this excerpt from the transcript of the video recording of Immogen’s presentation to her staff:

Immogen:…was a whole session on what is multiliteracies. And I don’t know about you but I have been really skirting the question and I am not really sure what it was. So I had to come away with what I believed it was. And like I said we were told a stack of stuff, and what did I take, one thing. The thing I took was that if you are using ICT you got to teach children how to use it, you got to teach kids how it works and just like you teach a text or a book, like how a book is formatted, you start from left, you start from left to right you read down the page, all of that sort of stuff. How print works. It is different just saying to a child go and use a computer and make a webpage. Or go and use a computer and do word processing or something. That Information and Communications, that ICT, it enhances what you are doing that is deep and meaningful.

This was Immogen’s first public presentation about her understanding of multiliteracies. This excerpt represents a verbal reflection, descriptive in nature as indicated by a self constructed depiction of teaching tasks associated with ICT. As a reflective activity, it enabled Immogen to articulate and clarify ideas and provided a basis for further reflection. However, verbal reflection in this context lacks the capacity for development. As found in both planning and weekly meetings above, the opportunity for collegial dialogue supports growth in reflective practice.

**Summary of verbal preference**

The final theme of verbal preference has analysed three professional activities that enabled teachers the opportunity to reflect verbally. In planning meetings and weekly meetings with project team leaders or myself working as a critical friend, candidates
responded to probing questions that drew deep reflective thoughts and developed reflective practice. This indicates a beneficial connection between reflection and leadership in the form of a critical friend for both the internal and external context of the ICT professional development model. In staff sharing sessions, candidates valued organising their thoughts and being able to express their grasp of a complex concept. Verbal forms of reflection could therefore be considered valuable in making conscious candidates’ pedagogical beliefs and practices and were also found to be important in the development of candidates’ reflective practice. Teachers in this research context indicate a preference for verbal reflection.

7.2.4 Summary of perceived value of reflection: The perceived value of reflection and the role of written reflection are the two aspects of the professional learning activity of reflection that I am exploring which contribute to an understanding of effective ICT professional development. In this section, three themes have emerged under the perceived value of reflection. These are limiting conditions implied by an inquiry approach; lack of understanding on how to reflect; and preference for verbal reflection. All themes indicated that teachers generally have limited understanding of how to reflect in written form. Limiting conditions for teachers included a lack of knowledge of how to implement action research methods; confusion generating from action research and an inquiry approach; how to write reflectively and the application of reflective writing, specifically how it informs further practices; teacher attitude and interest; and lack of guidance provided by project team leaders. Time was not found to limit teachers’ reflective writing.

Alternatively, verbal reflective practice was found to be highly valued by teachers. The three professional activities that enabled verbal reflection: planning meetings, weekly meetings and staff sharing sessions, all enabled teachers to reflect verbally at a level that supported change in their pedagogical beliefs and practices. The development of reflective practice by teachers was also indicated where there were opportunities for collegial dialogue such as in critical friend dyads. Verbal reflection was considered more so by candidates as an element of their professional practice. Being able to talk about teaching thoughts and ideas in a reflective frame was something some candidates do and other candidates saw benefit in. These findings indicate the need to include leadership in the internal and external context of the ICT
professional development model to specify the important role of a critical friend. This would emphasise the beneficial relationship between teacher reflection, collegial dialogue and a critical friend in ICT professional development.

Reflection as an interdependent professional learning activity of the core reflective process was found to be valued more highly by the majority of teachers in the verbal form. Verbal reflection aligns well with collaborative, collegial professional activities. Verbal reflection could also be considered as an established professional practice for some teachers and having a greater chance of assimilation for others. Evidence of both descriptive and dialogic reflection was found in teacher discourse which indicates the possibility that for some teachers, more critical forms of reflection can occur through verbal exchanges. Further research into the impact of verbal reflection on written reflection is required.

Teachers’ perceived value of reflection has been analysed. The other aspect of reflection that I examine is the role of written reflection in enabling teachers to transform their beliefs and practices.

7.3 Role of written reflection

As discussed in the previous section and in the Literature Review, reflective action has been considered an inherent part of teacher practice (Fitzclarence, 2003; Watson & Wilcox, 2000; Yost, Senter, & Forlenza Bailey, 2000). Its role has been defined in its ability to enhance professional practice, enabling an analytical approach to teaching for continuous improvement and significantly, to bring about a “consequent reformulation of practice” (Bain et al., 2002, p.10). However, in the past, there has been discussion that reflection brings automatic calls in the improvement of teaching (Gore, 1987; Korthagen, 1993; Zeichner, 1987) and that studies which claim such reformation of practice lack substantive evidence (Calderhead & Gates, 1993; Russell, 1993). What is presumed, among these scholars, is that reflection is beneficial to teaching practice in that it can improve teaching and provide a lens through which re-conceptualisation of practice recurs.

The role of the reflective process in the Inquiry Project was to provide candidates with a professional learning activity that could support transformation of their existing
pedagogical beliefs and practices. Reflection in this sense was a process by which candidates engaged to deal with a range of issues and problems that they encountered during the implementation of their classroom investigation. As discussed, reflective journal writing was considered the major form of reflective action within reflection-on-action (Schon, 1983), that is, reflection before or after teaching. As indicated at the beginning of this section, one candidate, Megan, a recent graduate, wrote constructive written reflections over a substantial period of time and found reflective journaling to be “the most outstanding benefit” of the professional development program.

A sketch of Megan’s learning journey (Figure 7.4) that she drew towards the end of her journal illustrates the valuable role of the process of reflection. Her journey begins on the left hand side of the sketch and moves downward, then across and upwards as indicated by the arrows. What is obvious in this sketch is the use of the term reflection as it repeated over and over again throughout her journey. In the central spiral, reflection is written repeatedly in conjunction with the word ‘growth’ in an upward motion. As Megan moved from ‘confusion/bewilderment’ to ‘risk taking’, ‘catering to learners’ and ‘thinking processes’ Megan’s reflective processes were consciously actioned.

Figure 7.4 Megan’s sketch of her learning journey
Megan’s reflective journal is examined here to ascertain the role of written reflection in improving teaching and providing a critical lens through which pedagogical beliefs and practices can be transformed. A short background on Megan’s classroom investigation precedes an analysis of Megan’s written reflective journal.

7.3.1 Background: Megan’s classroom investigation was titled Envirosmart using a state government project, Comalco Green and Healthy Awards as impetus. This project required the students in her year four class to investigate and develop a school environment management plan and then use a range of multimodal devices to demonstrate the value of the plan to the school and its wider communities. The learning unit was constructed using the format of the New Basics Project’s Rich Task. Rich Tasks are assessable learning activities that adopt a transdisciplinary approach (Education Queensland, 2000c). Megan’s planning sequence for her Envirosmart project is illustrated diagrammatically in Figure 7.5.
7.3.2 Written reflective journal analysis: The levels proposed by Hatton and Smith (1995) that were used to describe verbal forms of reflection above, will continue to be used more systematically as an analytical tool in developing understanding of the role of written reflection in supporting teachers’ transformation of their pedagogical beliefs and practice. The three types of writing that are
characterized as different kinds of reflection are: descriptive reflection; dialogic reflection; and critical reflection. To keep the sense of Megan’s learning journey, the written reflections are analysed in chronological order so that these types of reflections can be examined for their potential in situ. Linkage between type of reflection and the role it plays in improving and or supporting teachers in transforming their beliefs and practices is emphasised.

Descriptive reflection
Reflection that is concerned with giving a range of reasons for action based on personal judgment is classified by Hatton and Smith as descriptive reflection. It is considered a more easily mastered and more commonly utilized form of reflection. Megan’s journal is full of descriptive accounts of events and happenings that occurred during the teaching day. These descriptive accounts, like those described previously in Unwin’s recordkeeping account, are not considered by Hatton and Smith as reflective. Rather descriptive accounts often serve to establish the context for descriptive reflection that deals with alternate reasoning. However, an early entry in Megan’s journal deals with reasoning as evidence of descriptive reflection, as she validates her involvement in the Inquiry Project. The complete entry is provided here (Figure 7.6) with the descriptive reflection section magnified.

Figure 7.6 Megan’s reasoning for involvement in Inquiry Project

CC was struggling with the Green and Healthy awards. She thought that it would be great to build this Inquiry Project and the awards into one unit because it would be easier to cope with in the classroom. So I suppose in the very beginning it might have had something to do with behaviour because I was having such a tough term 1 and CC thought that I may not cope if I took on board an extra. I agreed... As a class we were doing environmental studies so it would follow on to that... I have no real ICT experience but a bucket load of enthusiasm. I believe that children learn best in a supportive environment and using life learning contexts engages students in a positive manner. I believe that as students watch my own learning that they too will become more eager to participate in the project.
Megan provides a number of reasons for being involved in the Inquiry Project. From a professional viewpoint she validates the idea of the Inquiry Project serving two purposes. One purpose being a directive from the principal [CC] who is needing someone to take on the Green and Healthy Awards, which links in with her curriculum position as it is a “follow on from environmental studies”. Secondly, Megan justifies from a personal viewpoint, stating that behaviour issues in term one may have indicated that “it would be easier to cope with” if the Green and Healthy Awards become the unit of work to be investigated in her classroom. Megan continues to reason with becoming involved in the professional development activity through statements on personal beliefs about how children learn that are congruent to providing a real life context using the Green and Healthy Awards. Other reasons include professional growth opportunities especially noting ICT and the development of teaching strategies. Both professional and personal reasons are acknowledged by Megan to instigate action. The whole page of the journal was inserted in this instance to illustrate the positive signature captured in the rainbow background that grounds Megan’s descriptive reflection on joining the Inquiry Project.

Through descriptive reflective passages, Megan explores and analyses her own professional practices, seeking what she considers as possible best practice. She writes in the first week that “Although I have a basic concept of what and when to teach- its how that remains a little foggy”. A substantive concern that Megan expresses throughout the implementation of her Envirosmart project, is on behaviour management. As the focus of the Inquiry Project is investigation of pedagogical beliefs and practices associated with ICT and multiliteracies, and as Megan discloses that her first term experience with integrating powerpoint exposed a number of behaviour management issues, powerful precipitants for reflective action were created. Clarke (1995, p.255) identified “precipitants”, that is “those things that precipitate or initiate reflection” as an essential component of the process of reflection. The following descriptive reflection (Figure 7.7) demonstrates how Megan begins to reason about her pedagogy that is focused on behaviour management issues.
Megan describes a brainstorming activity where the class behaviour was poor. As Megan values this type of strategy she reasons with the children’s response by blaming herself for not establishing a productive rapport with her students. At this initial stage she is looking inward and analyzing her own performance. Her current focus is on behaviour management rather than on learning outcomes. This focus changes in the following weekly reflection as she describes initial activities that her students are involved in (Figure 7.8):

The children enjoyed the ‘enviroaudit’ activities. Being able to work outside, interviewing and assessing our school has been an exciting and enjoyable series of lessons this week. They seem to enjoy the rating part of the exercise. They love finding other classes doing the wrong thing environmentally.

In this section of her weekly reflection, Megan begins to explore the educational value of the Envirosmart project. Her grounds for success with the enviroaudit activities derive from notions of relevance and connectedness, which are classroom strategies outlined in the reform agenda of The New Basics Project (Department of Education, 2000b). She states specific characteristics within the activities that the children enjoyed, therefore making conscious connection between student learning outcomes and her pedagogical beliefs and practices. Megan’s investigation of effective teaching strategies also occurs when activities are not as productive as in the following reflection on ICT activities within the project (Figure 7.9):

The research on the net is proving difficult for quite a few children. I am not sure why this is. I will continue to revisit this during the next few weeks. The signs are also proving allusive for some children, struggling to find their artistic flair. I will try other ways of encouraging them to stay on task.
Even though Megan does not describe the teaching practices that were being used in supporting children’s research on the internet or in the designing of signs, she is making conscious the connection between effective teaching practice and learning outcomes through descriptive reflection. She begins to express her reflection in a more dialogic manner towards the end of this written section by proposing the purpose of seeking different strategies that may encourage better learning outcomes. This tends to be evidence of the reflective capacity of Megan’s written journal. The most common type of reflection is descriptive which provides a leverage for dialogic reflection that Megan chooses or does not choose to pursue, as found in the second level of reflection that I turn to now.

**Dialogic reflection**

The reflective act of exploring possible reasons and alternative solutions of an action is expressed by Hatton and Smith as dialogic reflection. It is a reflective discourse with oneself. At this level, the problematic nature of professional practice is acknowledged and a speculative examination of why things occur the way they do provides meaning. As illustrated through descriptive reflection, Megan begins to make conscious connection between her pedagogical beliefs and classroom practices. These descriptive reflections provide context for dialogic examination. However, this is often not advanced, as illustrated in the following excerpt in Figure 7.10:

![Figure 7.10 Context for dialogic reflection](image)

Megan’s design of free range activities as a new teaching practice she was trialing was first discussed in the previous chapter within the professional learning activity of investigation. Megan got the idea of free range activities from one of the academic readings that I supplied to her. The principle that underwrites free range activities seeks to empower children to make choices in their learning and acknowledge the digital culture of children today (McKenzie, 1998b). In this excerpt Megan is exploring the potential of students’ self directed learning as she mentions “pluses and
“minuses” with reasons based on her personal judgment. This indicates a descriptive reflection. What is significant is the last two sentences in which a revelation is made that child Xxxx [a label established by Megan to preserve the child’s identity] who usually is a behaviour problem, engaged with a level of commitment that was found to be “astonishing”. This descriptive account enabled Megan to acknowledge the potential of such a learning and teaching experience. However, the potential for a more insightful analysis of why [Xxxx] responded the way he did was not acted upon through dialogic reflection.

Megan’s inability to look deeper into why children are responding in a particular way to a teaching strategy was made evident to her during a planning meeting. This planning meeting occurred approximately mid-way through the implementation phase of the Envirosmart Project. In this meeting, I took on the role of a critical friend and consistently asked Megan probing questions to help her look more deeply into circumstances occurring in her classroom. The transcript of the meeting was emailed to her after I had transcribed it. The following excerpt (see Figure 7.11) from the transcript of the planning meeting was found stuck and highlighted in Megan’s journal, indicating the importance to Megan of this consciousness raising opportunity: (the transcript was scanned from two connecting pages of Megan’s journal).
In this excerpt of the transcript, Megan was describing the engagement in a learning task by a child who was considered a behaviour problem. Megan is reflecting descriptively, providing details of the task and the child’s level of engagement. Throughout the meeting I consistently ask Megan to consider why such engagement is occurring, with direct statements of “did you ask him why?” (‘why’ being emphasised) with connection to Megan’s pedagogy made through discussion of the impact of teaching strategies on student learning outcomes. Megan acknowledges a number of times, that her response to a child working productively is to “just observe them doing and go yeh!”, which supports the descriptive reflective writing found in her journal. However, when consistently probed for an examination of why this child is working productively, Megan vocalizes a dialogic reflection that presents her analysis of the reason for engagement, beginning with “I think that it may have to do...
“Megan also demonstrates an understanding of the power of such reflection towards the end of this excerpt by responding to me with “no another why” indicating that she realizes the value of unanswered probing questions about her pedagogy.

Glimpses of dialogic reflection can be found in Megan’s journal following this meeting, when she reflects back on a learning activity to explore why things went well. The last two sentences of this excerpt (see Figure 7.12) illustrate the beginning of dialogic reflection:

![Figure 7.12 Example of dialogic reflection](image)

In this excerpt, Megan is exploring her personal beliefs about how children learn and validating the use of a teaching strategy that supported her role as a knowledge facilitator. She was discussing with herself why such a strategy was engaging student dialogue, in a manner that reinforced the benefits of this teaching approach. This process of exploring and examining what works and why it works is a powerful shaper of pedagogical beliefs and practices. Pedagogy illustrated through such discourse Megan expressed as “children became knowledgeable experts” and “information took on another realm” indicates development of a mindset consistent with effective integration of ICT and multiliteracies, discussed in Chapter One and Two.

As established the depth of Megan’s reflective capacity at a dialogic level is minimal with greater conceptualization being achieved when direction is provided by a critical friend. Towards the end of Megan’s classroom investigation she reflected on her Envirosmart unit of work in a diagrammatic fashion (see Figure 7.13). This diagram illustrates an application of dialogic reflection, as it demonstrates Megan stepping back and mulling over tentative reasons for success. The uses of arrows are pivotal in this reflection to identify the critical facets that impacted learning. The Envirosmart unit focused on development of persuasive language in combination with media.
elements that together make a powerful presentation. Megan identifies the value of catering for all abilities and social skills by placing these statements in the centre of the diagram from which arrows emanate. Following the arrows downwards, the identification of focusing on different types of presentations using four different applications of ICT to cater for differing student needs was identified. This central flow is of greatest importance in her reflection, as other possible reasons for success explored to the right hand side and along the bottom, validate this core approach. This reflection identifies some of Megan’s new pedagogical belief and practices that have emerged as a result of participating in the ICT professional development program. These can be identified as providing children with a real world context for learning, catering for divergent needs of students, empowering and facilitating student self directed learning and the application of ICT in learning activities that have relevance and connectedness to students.

Figure 7.13 Reflection on Megan’s Envirosmart unit
Dialogic reflection, though not as drawn upon or as in depth as it could potentially be, enabled Megan to shape her pedagogical beliefs and practices through the exploration of action within her classroom. While descriptive reflection enabled her to make conscious the connections between her pedagogical beliefs and actual practices, it served more as a justification exercise. Dialogic reflection moved Megan into the realm of examination and exploration of teaching strategies, thus having a greater possibility to help shape and transform her pedagogical beliefs and practices. The final level of reflection-on-action described by Hatton and Smith as critical reflection is now addressed.

**Critical reflection**

Considered a more complex form of reflection than descriptive or dialogic, Hatton and Smith place the critical perspective at the higher end of their developmental sequence as it requires metacognitive skills and an acceptance of a particular ideological framework. In essence, it involves reason giving for action which takes account of broader historical, social or political contexts.

Evidence of critical reflection can be found spasmodically through Megan’s reflective journal. Megan analysed her performance drawing on broader social notions of the teaching profession for the development of her conceptual understanding of teaching and her place within it. This type of reflective discourse has potential to impact her pedagogical beliefs and practices as it builds an understanding of the realities of teaching in the classroom. The following excerpt (see Figure 7.14) provides a snippet of the thoughts that are constructing Megan’s identity as a teacher:

![Figure 7.14 Megan's identity as a teacher](image)

In this excerpt Megan is drawing on sociocultural norms that define a teacher. She reasons with these notions to reform her construct of a teacher by stating that it is “the one of the most demanding (both mentally and physically) career[s] in the world”. She then draws on this belief to validate the pedagogical practices she needs to implement and maintain in her classroom. Evident in this excerpt is a transformation...
of Megan’s concept of a teacher from an existing sociocultural and historical image to an evolving concept that is responsive to her classroom experiences.

Further exploration of this evolving conceptualization is evident as Megan reflects more broadly on her learning as an outcome of participating in the Inquiry Project. As noted, critical reflections, like descriptive and dialogic reflection are evident spasmodically throughout Megan’s journal, rather than found in a sequential order. In any weekly reflection, one or more of the types of reflections can be found. The following complete weekly reflection found in the middle section of Megan’s journal, indicates that she drew on critical reflection to make meaning as required rather than towards the end of her journal when it would be more likely for broader statements or summative conclusions to be made. The complete weekly reflection is provided (see Figure 7.15) to illustrate the journal entry position [week 5] and the section which demonstrates critical reflection is enlarged:

![Critical Reflection Image](image_url)

Figure 7.15 Critical reflection
Through critical reflection Megan comes to an understanding about ICT professional development, its purpose and design for supporting her and her colleagues’ professional development at her school. Megan draws on her own beliefs and experiences in coming to the realisation that what “I have discovered on this journey is the advantage of [a] collaborative learning where computers are involved”. From this new perspective she confronts the outward ideals about ICT expressed by staff, parents and community member summed up as: sophisticated computer equipment equals sophisticated use in classrooms. Megan confronts this with the statement: “That does not happen automatically”. Megan then articulates the purposes and processes she believes to be most effective for ICT professional development. At this critical level, Megan is reconstructing her understanding and developing future action plans.

7.3.3 Summary of the role of written reflection: The role of written reflection was analysed using Hatton and Smith’s (1995) hierarchical developmental sequence of three levels of reflection that are constituted within reflection-on-action. These three levels were descriptive, dialogic and critical reflection. The most common type of reflection found in Megan’s written journal was descriptive. In this context descriptive reflections provided opportunities for dialogic reflections that were more often not actioned. In Megan’s case, dialogic reflection was found to require direction or support from a critical friend. However, capability for this form of reflection was indicated. All three types of reflection were found throughout Megan’s journal such that a critical or dialogical reflection occurred at any point, often embedded within descriptive reflection which was found to give rise to the other types. Data support the notion of a developmental sequence of reflection starting with the more simplistic descriptive form, as this was found to be common, whereas the more demanding types of reflection, dialogic and critical, were evident in emergent form.

Each type of reflection played a different role in transforming Megan’s pedagogical beliefs and practices. The role of descriptive reflection was that of a connector, making conscious the links between Megan’s pedagogical beliefs, current teaching practices and student learning outcomes. At this level, Megan was concerned with issues of best practice and intrinsically driven motives. The role of dialogic reflection
was that of a shaper, where these conscious connections between beliefs and practices were examined and explored, enabling her to transform her pedagogical beliefs and practices. At this dialogic level, Megan was able to identify specific strategies and practices that were successful or not successful in enhancing her students’ learning and in this way, shaping her beliefs and future pedagogical practices. Lastly, the role of critical reflection was that of a positioner, placing Megan in the role of a professional teacher and providing a lens through which to critically evaluate her professional role from the inside and outside. This broader lens helped her re-conceptualise her image as a teacher which instigated an alignment with and validation of her pedagogical beliefs and practices.

7.4 Summary of reflection

Reflection as an interdependent professional learning activity of the core reflective process within the ICT professional development model was explored for its perceived value and the role it plays in supporting teachers’ transformation of their pedagogical beliefs and practices. As reflection was embodied in the Inquiry Project, as candidates’ contributions to personal reflective journals, teachers’ perceived value of reflection was affected by a number of factors. These include teachers’ lack of understanding of how to reflect, the limiting conditions implied by an inquiry approach, lack of practical application of action research processes and confusion with an inquiry approach. Alternatively, this research found strong support for verbal reflection as it aligned closely with collaborative collegial professional activities. Verbal reflections were found to contain both descriptive and dialogic levels of reflection and indicated an important role in supporting teachers’ transformation of their pedagogical beliefs and practices.

Written reflections were found to play a substantial role in enabling one teacher to transform her pedagogical beliefs and practices. This research indicates that the three levels of reflection perform different functions and have been labeled respectively: [connector] descriptive reflection that helps teachers make conscious connections between their pedagogical beliefs, current teaching practices and student learning outcomes; [shaper] dialogic reflection that helps teachers examine and explore their beliefs and practices; and [positioner] critical reflection which positions the teacher to
examine his or her professional role in a broader context. These three forms of reflections, found within Megan’s written journal, indicate the importance of maintaining a written reflective journal as part of ICT professional development.

Reflection as an interdependent professional learning activity of the core reflective process provides the teacher with the means to actively transform practice. Whereas the professional learning activity of investigation was found to provide the context or the platform for ICT professional development activity, reflection provides the tools and processes for teachers to engage with new ideas. It provides the conscious acknowledgement of time for teachers to think critically about, reason with and examine what is actually happening in the classroom, enabling change and future action. The preference for verbal reflection indicates a linkage with collegial dialogue. Verbal preference and the potential of written reflection indicate the validity of both forms of reflection as well as the identification of each as separate processes in ICT professional development. The result constitutes a verbal preference associated with collegial dialogue while written reflection assumes a supporting role. The following diagram (see Figure 7.16) illustrates an amended core reflective process for ICT professional development based on these findings:

![Figure 7.16 Core reflective process based on analysis of reflection](image)

The core reflective process comprises the three interdependent professional learning activities of investigation, reflection and collegial dialogue. Investigation however, was found to establish the context through which the other two interdependent professional learning activities are actioned. This is indicated in Figure 7.16 with the
oval boundary of investigation encompassing the other two professional learning activities. Reflection has both non-shaded and shaded areas, indicating a distinction between written and verbal reflection respectively. The relationship between reflection and collegial dialogue has changed. The two professional learning activities have merged indicating the more active connection between verbal reflection and collegial dialogue, with written reflection in a more passive but essential role. The shaded section of Figure 7.16, where the three professional learning activities merge could be considered the nexus through which teachers are enabled to transform their pedagogical beliefs and practices.

Further unpacking of collegial dialogue is needed to establish the structure of the final professional learning activity considered essential for ICT professional development. This occurs in the following chapter.
Chapter Eight
Examining ICT professional development-
collegial dialogue

The third and final professional learning activity that I examine as part of the analysis of Stage 2 of the theoretical ICT professional development model is collegial dialogue. In the previous two chapters, I have examined investigation and reflection as interdependent professional learning activities resulting in the adjustment of the core reflective process. The core reflective process is a combination of three interdependent professional learning activities that teachers engage in during ICT professional development to enable them to transform their pedagogical beliefs and practices. In this chapter, I examine the professional learning activity of collegial dialogue and draw implications for the role of collegial dialogue in the core reflective process. Final changes to the core reflective process are made in light of these implications.

8.1 Collegial dialogue

The professional learning activity of collegial dialogue accentuates space for teachers’ professional talk about classroom practice. Advocates define collegial dialogue on the basis of sustained interaction by teachers who seek potentially better ideas, indicating critical reflective and inquiring processes (Ball & Cohen, 1999; Fullan, 2003; Guskey, 2003; Smyth, 1987). In the previous chapter on verbal reflection, collegial dialogue was found to play a role in enabling teachers to make conscious existing pedagogical beliefs and practices in the search for understanding and new solutions.

As the term suggests, collegial dialogue necessitates the formation of a group or ‘community’ for teacher professional development. Learning communities, teacher networks or collaboratives, provide organised social places for collegial dialogue. The notion of community is explained by Sagor (1997, p.172) as a “critical unit of change within education”. In the ICT professional development model (see Figure 6.1) the capacity for teachers’ engagement in collegial dialogue is depicted as relevant to the development of a learning community.
The development of a community of candidates and their project team leaders participating in independent classroom investigations was based on two key professional activities that sought to provide opportunity for collegial dialogue across schools. These two professional activities were within the external context of the ICT professional development model and were intended to develop across school communication. The first activity was called Half Day Inquiry Project sessions where all candidates and leaders from each of the eight schools met face to face to share and discuss their classroom investigations. The second activity was an online threaded discussion forum that occurred in a virtual sense throughout the implementation phase of the Inquiry Project. For further explanation of each activity see Chapter Five. The rationale for developing a community amongst the school teams was to engender a sense of shared purpose in regard to seeking new knowledge and understanding about multiliteracies and the integration of ICT; to provide opportunity to reflect critically on classroom practices; and to counteract the feeling of isolation that would ensue from independent classroom investigations. These purposes are consistent with the essential characteristics of learning communities (Barab & Duffy, 2000; Lieberman, 2000).

This section explores collegial dialogue through an analysis of the development of a learning community amongst the teachers in the eight schools participating in the Inquiry Project. Three themes are examined: face to face compared with virtual environments; the roles of leaders; and community in an online forum. Implications these have for collegial dialogue as an essential professional learning activity of the core reflective process are summarized.

8.2 Face to face compared with virtual environments

Two professional activities provided two different environments to support the development of a learning community amongst the teachers. The face to face environment where school teams met to share their classroom investigations was found to play a fundamental role in the development of a learning community. The virtual environment that enabled many-to-many communication and the advantage of place or time independence (King, 2002; Rovai, 2002) was not considered by the teachers as beneficial to building a learning community. The relationship between the
two environments was also found to play a major role in the development of a learning community. Four themes emerged that provide insight into these findings. These include (1) mindset; (2) perceived lack of pedagogical knowledge; (3) reciprocity; and (4) critique. Each of these themes is discussed respectively.

8.2.1 Mindset: The first theme of mindset indicates a reference to a particular way of thinking about and living with new technologies that teachers possess. As identified at the beginning of this thesis, in the introductory chapter, there is a distinction between those people that have grown up with technologies, who access it in a ubiquitous fashion, and those who have immigrated to the digital world (Lankshear & Bigum, 1998; Spender, 1995). A mindset of the print reared generation, considered outsiders or ‘immigrants’, does not dwell within a digital culture. Rather they circumnavigate it. This could, in a very general way, apply to older teachers who have not grown up in the digital age. A special mention needs to be made here to indicate that I do not assume a distinction of mindset based on age. The notion of mindset provides a means of dealing with different ways people of any age, approach old and new technologies and interact within digital worlds. I have adopted the terminology of ‘immigrant’ and ‘digital’ as descriptors to present two different mindsets that were evident in the data. Evidence of an ‘immigrant’ mindset was seen in the way teachers interacted in the online threaded discussion forum. In the following interview excerpts, two teachers provide reasons for their lack of discussion on the online forum:

Immogen: Onto say the thread of discussion like we did. I was thinking about why that wasn’t very successful because you know I mean as the year progressed we were so busy and I’m sure you’ve heard that a million times.

Sarah: It needs to be heard.

Immogen: Yeah and the other thing is too, because it’s not in our face like the things that we’re doing here at school are, and if you don’t get it done well there’s repercussions. Whereas with that, it’s away, so you tend to be able to forget about it. And so that’s one of the things. But maybe it would’ve worked if we had to have had something done at the end of it.

Sarah: Like an assessment item or something?
Immogen: Yes, yes. But I mean you know and that doesn’t make it pleasant and it was quite nice that it, there wasn’t anything. There was no rap over the knuckles.

Sarah: Do you see a place for it [threaded forum]?

Mandy: I do, and I think we’ve got to get into it more and I think we’re all still a little bit hesitant.

Sarah: Hesitant why?

Mandy: Because we’re not comfortable with doing it. We had a few problems getting on a couple of times and I think we’re still not confident technically. We never check our emails at school. We don’t have a computer on our desk. The computers are there for the kids. We get on them occasionally but I never check my emails.

Sarah: You wouldn’t consider logging on to one of the computers in your classroom? It doesn’t matter the location of the machine?

Mandy: No, its just I think we’re flat out.

Immogen raises three reasons why the online threaded discussion forum wasn’t successful for her. These include being too “busy”, “it’s away” removed from the routine of her day, and “no rap over the knuckles”, that is, no formal requirement to participate. Mandy adds technical competence. Lack of time and limited technical competence is evident in the literature concerning the factors that limit success of online networks (Zhao & Rop, 2001).

However, what appears as more obvious reasons such as these could also indicate an ‘immigrant’ mindset. As Mandy explains, using the analogy of email, that communications technologies are not considered part of a teachers’ daily routine. Rather it is “for the kids” to access. It is also not considered a professional component because they are “flat out”. This indicates a lack of valuing or relevance of this form of communication in their professional work as teachers. Schlager, Fusco and Schank (1998/99) place significant value on the belief that online communication practices should occur in the context of daily life for the professional educator.
Further beliefs about ICT expressed by Immogen that “it’s away”, removed from her world, indicate a mindset different to that of a ‘digital’ native. A term adopted by Prensky (2004, p.1), ‘digital natives’ is used to describe those young people who are “approaching their life and daily activities differently because of technology”. Needing a formal assessable requirement, choosing to be busy with other things, avoiding rather than seeking out or even limiting ICT to sections of daily life, indicates that an ‘immigrant’ or ‘digital’ mindset is a powerful determinant to online communication and more generally the infusion of technologies into teachers’ daily practice.

The theme of mindset indicates a frame of thinking that limits teachers’ engagement in virtual environments. Limited engagement regulates the development of community and restricts collegial dialogue.

8.2.2 Perceived lack of pedagogical knowledge: Teachers’ perceived lack of pedagogical knowledge was found to inhibit use of the online threaded discussion forum. During implementation, each school team was required to lead a discussion on a topic or question relevant to their classroom investigation for a two week period. For this two week period, the particular school team was responsible for responding to and encouraging online postings. These pedagogical discussions created a formal environment that inhibited collegial dialogue due to teachers’ perceived lack of knowledge as indicated in the following interview excerpt:

Sarah: How can we make people contribute [on the online threaded discussion forum]?

Unwin: With me it was possibly some of the jargon that was used. With me it would have been a confidence thing and a lack of perceived knowledge about the topic and not wanting to make a mug of yourself. I suppose that was the reason why. Unless I was absolutely positive that I was right I probably wouldn’t say anything. Whereas I’m not really up on speaking jargon and I find that off-putting. But in a relaxed informal atmosphere you find you might have done what they’re talking about but you don’t call it that.

Two issues are raised by Unwin. The first deals with his perceived lack of knowledge and “not wanting to make a mug of himself”. Given that the context of this research is teachers seeking to understanding multiliteracies and ICT integration, and given that
these concepts are understood by teachers in rudimentary form (see Chapter Four), it is not difficult to understand here, a teacher’s lack of confidence and knowledge when online postings required unpacking complex concepts. This also indicates that complex discussions may not be productive in virtual environments that are viewed by teachers as unfamiliar or removed.

The second issue raised by Unwin is that a virtual environment is considered formal as it engenders the use of educational jargon which limited his pedagogical discussion. In Unwin’s last sentence he indicates that a more relaxed informal environment is required for the development of common understandings. Di Mauro and Jacobs (1995) argues that a critical element for the building of a collaborative electronic community was the need for negotiations that establish common understandings amongst users, to occur prior to and during online communication. The development of common understandings about multiliteracies and ICT may be established better through face to face meetings before the application of such concepts are explored in a virtual environment. This would benefit the scope of collegial dialogue and strengthen the development of an online learning community.

The perceived lack of pedagogical knowledge of teachers was found to limit collegial dialogue in virtual environments, as well as, to construct virtual environments as formal. Common understandings need to be negotiated by teachers through face to face meetings prior to and during discussions in virtual environments for more productive forms of collegial dialogue.

8.2.3 Reciprocity: The third theme to emerge from the data on face to face compared with virtual environments is the notion of reciprocity. Reciprocity is a term used by Javela and Hakkinen (2002) in their study of the quality of discussion in virtual environments. Reciprocity identifies the need for a contributor to formulate a posting with an awareness of the mutual knowledge base of the community. Drawn from the principle of reciprocity, described by Nystrand (1986), this mutual knowledge base is likened to a shared understanding of a concept that is shaped by personal intentions and interpretations. Grauman (1995) unpacks reciprocity further within dialogue, to acknowledge the process of developing assumptions about other people’s personalities and social backgrounds as a means of enabling reciprocation.
Indicators for the need for reciprocity were evident for teachers to make meaning in the online threaded discussion forum:

Kim: The other thing that didn’t really support me was the threaded discussions. I was a bit reluctant I suppose to comment sometimes because I didn’t know where different people were coming from. We’d had that first meeting at Rosemount Gardens but we stayed in our own little cliques. It think if we’d have had another chance to meet with the people maybe three weeks or a month later and say this is where we are at, this is what we are doing, like we did last time. That was very beneficial because I could then say oh, now I know where you are coming from. It’s like knowing the face that goes with the name. You get the name on the computer and you think where are they from? What level are they coming from? Why are they making these comments? I’m from a different level and would make different comments.

For Kim to engage effectively in the online threaded discussion she needs to understand the perspectives and experiences of the people that were informing their online postings. She needed to gain a sense of the contributor, to know what they did or did not know, to formulate her response. She found the lack of what was mutually known restrictive. Nystrand (1986) points out that in face to face situations, meaning is made through more than the spoken word. Whereas, in writing, such as an online posting, misunderstandings of more complicated terms are more easily made. Kim was unable to make meaning of the online postings as she states she needed to know “what level are they coming from, why are they making these comments?” This indicates that for Kim to make meaning of the online postings, she needed more background information on the contributor and the context of the contribution.

Kim indicates a need for “another chance to meet with the people” before she is able to fully understand online postings and construct appropriate responses. Kim believes that face to face meetings are essential to establish mutual understanding before meaning can be made in online environments. Similar beliefs and ideas are found in Unwin’s discussion of educational jargon taken from the interview excerpt in the previous theme. Unwin states that “I’m not really up on speaking jargon and I find that off-putting”. In a virtual environment that has not established mutual understandings, educational jargon would be difficult to interpret, as such terminology is embodied with personal beliefs and experiences. Unwin agrees with Kim in that a more relaxed atmosphere, where all the senses can be used to gain background about the person, reciprocity can be attained. The choice of context is interesting, as one
might assume that the virtual option would provide some capacity to develop reciprocity. However, as expressed by a number of teachers, the virtual environment was found to be “impersonal” or not appropriate for their needs, such as in this comment: “see I’m not a chat room person. I hate them because I need to see people’s [breath], what their face is doing in order for me to respond”. Such a comment supports teachers’ inability to achieve reciprocity virtually.

Lack of reciprocity limits teachers’ engagement in virtual environments. Lack of background information on contributors’ personal experiences and perspectives of concepts, limits teachers’ construction of mutual knowledge in virtual environments. Teachers believe that face to face meetings are more productive in the development of reciprocal understanding which becomes a prerequisite for making meaning of online postings in a virtual environment. The virtual environment was not considered a place for developing reciprocity as it was deemed by teachers as too impersonal or teachers’ mindsets were restricted.

8.2.4 Critique: The final theme of ‘critique’ examines the role of critical discussion in the development of a learning community. It focuses on teachers’ perceived value of discussion that involves critique in the face to face and virtual environments. Achinstein and Meyer (1997) make a point of the uneasy relationship between developing community and the role of critique as representing opposing goals. They acknowledged the paradoxical relationship between emotional support and critical reflection by reconceptualising their positioning through a framework of “critical friendship” (p.4). This relationship between critical and collegial discussion is examined here to further understand the professional learning activity of collegial dialogue in supporting teachers’ transformation of their pedagogical beliefs and practices.

As established in the previous chapter on reflection, teachers’ collaborative discussions as a form of verbal reflection played a significant role in developing teachers’ reflective practice enabling self-revelations that informed change in their practice. Emerging from the data is the idea that critical discussion is an important element in the development of a learning community and that virtual environments enable teachers to engage in such discourse. In an interview with Megan, I asked her if there was a learning community created amongst the teachers. The following
lengthy excerpt emphasises Megan’s passion about enabling critical discussion in both face to face sessions and on the online threaded discussion forum and its impact on the development of a learning community. Here Megan is talking about the face to face sharing session where candidates were asked to share their classroom investigations with one another:

Megan: One of the things that I found was that they just weren’t open to suggestions. They were just so locked into what they were doing that when someone made a comment they took it as a criticism. When somebody made a suggestion, ‘how about you try this?’ they took it as a personal attack on their abilities. Like I felt it a few times when I made suggestions and that’s why I stopped doing it because it wasn’t an attack, it was just ‘have you thought about it this way?’

Particularly in that I feel that my learning has been quite profound with ICT and experiences that I’ve had. And like they just weren’t really open to that collaborative work. It was really all about ‘this is my project and I don’t want to know what you’re doing’.

I had a laugh at [school name] at their presentation. They just weren’t open to listening. I laughed and chuckled to myself when they said they needed something stronger than powerpoint to do the oral histories [Rich Task]. And I went you’ve just thrown the baby out with the bath. Now I could hear myself saying that six months ago. ‘Oh this powerpoint’s no good’ yadda yadda. It’s not that powerpoint is a good program. It’s how you use it that makes it a powerful presentation. And it’s all that background work that goes into powerpoint presentations. It’s not about software, it’s about whole big picture stuff. And exposing the kids to expositions and what is powerpoint and what makes a word powerful and all of that metalanguage that comes in under that productive pedagogies. All of those little assets have to be built in, not just teach them that video is so much better than powerpoint. That’s just my personal opinion.

In the first section of this excerpt, Megan explains that she ceased making comments that were critical because she found that they were being taken in the wrong way by the other teachers. She found that the face to face environment was not conducive to collaborative work that involved critique as other candidates were only interested in describing what they were doing and did not want to be challenged or take on other teachers’ suggestions. Megan illustrates this in the last paragraph. She describes a situation that unfolded with teachers from another school in which she had provided feedback based on her own beliefs and understandings. The candidates in question
had not taken on her feedback and had not learnt what she had, that the focus of the integration of ICT is grounded in pedagogy, not ICT itself. The change in her beliefs about ICT in learning is stated by her as “profound”. In the face to face environment she was unable to challenge her peers’ beliefs and practices through critical discussion of their classroom investigations. This interview excerpt illustrates the need for critical discussion to provide purpose for a community of learners. Descriptive accounts of their classroom investigations were seen as beneficial to other teachers as it expanded ideas for the application of ICT in learning. Further into the interview I asked Megan if she could see a benefit in developing a learning community online. Her response is provided here:

Megan: And it was the same as when I played devil’s advocate on the threaded discussion and said you know, ‘when’s too much too much?’ A few of them [teachers] got offended because I said that and I thought ‘oh hang on’. You’ve got to think of things from both sides, not gloss things over as being wonderful and really pulling it apart and have a look at it. I think there is a benefit for education. And that if we want to go forward and get out of these this is my rock, this is where I belong, then we need to create networks and move out there and start sharing ideas and experiences. But we have to move beyond this is my project and wow this is great. You have to be able to deal with that critical feedback and a lot of people would be very upset.

Megan values a learning community that engages participants in critical discussion. She would perceive it as a professional learning opportunity and acknowledges the potential. Even though Megan felt a negative response to her action of playing devil’s advocate, she validates her online posting as a learning initiative and sought such activity online. Comments from other candidates indicate positive responses to the online threaded discussion postings:

Immogen: [referring to Megan] her questions and her discussions on that threaded discussion… I just thought oh, I don’t really know too much about this so the less I say the better.

Sarah: If we did more sharing sessions where we were able to be more critical about each other’s work and, you know, giving direction and ideas and thoughts. Do you think in that type of environment, the face to face would be more valuable in creating those types of discourses than on the threaded discussion?

Immogen: Yeah I think so. I do honestly, yeah. Um I-when I either read her work, we’re talking about Megan here?
Sarah: Yep.

Immogen: When I read her work or spoke to her, I agreed with what she was saying but she put it so much better and um you know, if it sort of just built on your knowledge each time you know.

Immogen, having stated that she withdrew from online responses to Megan’s postings due to a lack of perceived knowledge, still found benefit in such critical dialogue as she claims that it “built on your knowledge”. This response provides insight into the lack of collaboration and critique that Megan felt in this online threaded discussion. As a ‘lurker’ in this virtual environment, Immogen was a non-responsive member who was benefiting from the theoretical discussion. Interestingly, Immogen comments that she believes face to face environments are more conducive to critical discussion. This may be because face to face meetings were not perceived as places for conceptual development requiring deep engagement with a topic. Rather they were seen as more informal and focused on sharing. Another reason offered by Megan was that in face to face meetings “you develop relationships”. This links to the importance of reciprocity and to an extent for Immogen, an ‘immigrant’ mindset, as one who is unfamiliar with online communities and their capacity for building a learning community. Further insights into critical discussion in a virtual environment were offered by Unwin:

Sarah: Do you think we had very good discussions?

Unwin: Some of the questions were. Some of the people got really into it. I think in some cases you were talking around the point a bit, the multiliteracies one. I think we’re all still trying to find out what they really were.

Sarah: No one really wanted to say anything.

Unwin: Yes, just jousting.

Sarah: Why do you think that’s so? Because of the medium?

Unwin: No, I don’t think it was the medium because I think if anything its more adventurous saying stuff when you haven’t got someone there on [pause] calling you. It’s sort of like an anonymous place.
Sarah: So you think it would be better if it was anonymous?

Unwin: I’m not as put off by it as I was. I would much rather have met and talked.

Two interesting points are raised by Unwin. Firstly, he uses the term “jousting” to describe how the meaning of multiliteracies was discussed. As stated in a previous theme of ‘perceived lack of pedagogical knowledge’, teachers hold a rudimentary understanding of multiliteracies. This indicates that the candidates and project team leaders were engaging in collaborative dialogue for the purpose of seeking understanding and new knowledge. As Unwin states “some people really got into it” indicating that teachers engaged in critical discussions. Secondly, the online threaded discussion forum was considered an “anonymous place” where more “adventurous stuff” could be said. It could be assumed then that greater critique would occur virtually. In Unwin’s final comment a change in his mindset is evident. Through his experience of participating in the virtual environment he states that “I’m not as put off by it as I was” indicating a greater understanding and valuing of such communication technologies. However, an ‘immigrant’ mindset is evident as he would still “much rather have met and talked”.

The theme of critique identifies both the need for and evidence of critical discussion in the development of a learning community within a virtual environment. When teachers engage in critique it validates the educational potential for a community of learners who seek to challenge their existing ideas and create new knowledge. It also contributes to the sustainability of the community in that critique provides the catalyst for learning. More traditional notions of professional communities that share ideas are validated as essential for developing relationships, mutual understandings and common knowledge. However, for learning to exist, critique is an essential condition. Teachers’ discussion in the virtual environment was found to be regulated by reciprocity, teachers’ mindsets and lack of perceived knowledge. Consequently, the face to face environment was preferred. However, the face to face environment did not enable critical discussion. Rather it was a place where teachers developed collegial relationships.
8.2.5 Summary of face to face compared with virtual environment:

Teachers’ experiences within the online virtual environment suggest a relationship between critical discussion and the development of a learning community. Teachers engage in critical discussion in this environment for educational potential. However, teachers’ critical discussion was limited by their mindsets, reciprocity and lack of perceived knowledge. The virtual environment was perceived by teachers as a formal environment where pedagogical issues were explored. Therefore, more critique was expected by teachers.

Alternatively, the face to face environment was perceived as conducive to the development of community. Data indicate that the idea of community was closely linked with the development of relationships between teachers. Face to face environments were considered more informal and focused on sharing. This was evident in all themes. Teachers’ engagement in critical discussion however, was lacking in this environment.

A concomitant relationship was found between the face to face and the virtual environment for the development of a learning community. The face to face environment provides opportunity for teachers to develop relationships and establish common understandings and background knowledge for reciprocity. These activities are more focused on negotiation and sharing. The virtual environment provides a space for teachers to engage in critical discussion about their beliefs and practices. Critical discussions are more focused on learning. Together, face to face and the virtual environment provide teachers with spaces for the development of a community of learners.

An examination of face to face compared to virtual environments has occurred. This is the first of three themes that explores the professional learning activity of collegial dialogue. The second theme is the roles of leaders.

8.3 The roles of leaders

In ICT professional development, a leader is considered essential in sustaining commitment to the use of ICT in learning (Moseley et al., 2001). In the Inquiry Project, project team leaders maintained a mentoring role for both skill and
curriculum application of ICT. Sagor (1997) acknowledges the role of the leader as an active supporter within the context of building community. Darling–Hammond (1998) added the descriptors of ‘sustained’ and ‘intensive’ to this supportive role. In this section, the role of the leader is analysed in relation to the development of a learning community. As established in the chapter on reflection, collegial dialogue has an interdependent relationship with reflection found in critical friend dyads. Collegiality and its relationship to supporting constructive dialogue and building community is analysed in this section.

Literature reviewed suggests that a component of effective ICT professional development is to cater for teacher competency with ICT skills and curriculum application within an inquiry context. Dwyer et al. (1991) established five stages of teachers’ transformation with ICT. The critical stage for teachers’ transformation lies in the movement between Adaptations to Appropriation which hinges on ICT competency (see Figure 2.1). Teachers at the Appropriation stage were more able to engage in analytical and transformational practices. Consequently, ICT competency was seen as a critical enabler for appropriating ICT.

The ICT professional development model was designed to cater for all learning needs and maintain a transformational directive by enabling teachers to gain ICT competency within a context of pedagogical inquiry. In the implementation of this model, the Inquiry Project, there were three types of leaders who took on one or more roles. The leaders included the project team leaders, me as an external expert, and the school principal. Three themes emerged about the roles of leaders drawn from cumulative evidence on these three forms of leadership in relation to collegial dialogue. The three themes include: the trainer, critical friend and connector. Each is examined alternatively.

8.3.1 Trainer: Teachers who were focused on attaining ICT competency and basic application of ICT skills integrated into the curriculum, looked towards their project team leader as a trainer. Teachers placed a high value on this role of a leader. Affirmations from Unwin “I needed a crutch” and Darren “I couldn’t have done it without him. He provided a lot of practical help. It’s just good to do it with someone else” indicate this. Teachers found the professional development program, which
provided close proximity to a trainer and weekly meetings, was beneficial to building relationships and collegial dialogue.

The following interview excerpt demonstrates teachers’ construction of the project team leader as a trainer of ICT skills. Kim stated that her rationale for her classroom investigation was distinctly focused on her own ICT competency needs (see Figure 7.2 Kim’s rationale for her action plan): “the enhancement of skills for the teacher and the students to benefit learning outcomes”. Her pedagogical beliefs and practices that were written in a reflective journal entry (see Figure 8.1) indicate that she was at an Entry stage in Dwyer’s (1991) model. Her written statement supports this categorization. She states “I’d prefer someone else [to] do training”, meaning that she would prefer someone else to teach her students to use ICT. Kim looked to her project team leader as a trainer, evident in the following interview excerpt:

![Figure 8.1 Kim's journal entry]

Kim: What I wrote down was that the model was beneficial to me in that it, having that one to one meeting with Harvey on a regular basis, that worked really well. We did that in term two. This term we looked at doing it on the same afternoon then things popped up all the time like his dog had a tick and things happened so we haven’t done that this term. That’s one of the reasons I decided it wasn’t working for us so we’d just leave it but for term two it worked really well. It was good because the regularity of doing that helped to keep the skills up that you were learning. You could go over the skills again so it was constant. It wasn’t like learning on your own. This is something that I wrote in this report section. I’ve written it here. When we had our initial lot of funding for becoming computer literate we ended up buying that computer over there and that to me was totally hopeless. For me to come up and have an hour at a time to load it
up, to start anything, to get into anything, it just wasn’t good. That’s why I really appreciated doing this because having somebody there to talk to saying ok, what do I do now, how do I go through this, it was very good.

Kim set out to learn how to use a range of Microsoft® applications. She used Harvey, her project team leader, to support her in this by accessing their weekly meeting time to focus on the development of her personal ICT skills and the development of curriculum material for her students. She states that “the regularity of doing that helped to keep the skills up that you were learning; you could go over the skills again so it was constant”. She compared this approach to another that her school opted previously. Her school purchased a computer for the staffroom, for teachers to access in their non-contact time. This approach was “totally hopeless” for Kim as she needed one on one support. Interestingly, Kim admits that this training approach didn’t work in the subsequent term, due to a lack of a mutually available time. However, other unmentioned factors were noted in her journal and report. By the subsequent term, Kim had obtained the necessary ICT skills to feel competent implementing the Microsoft applications in her classroom by herself. She didn’t need her project team leader to support her anymore. She has reached her goal, as indicated in her final report (Figure 8.2):

Whilst we haven't yet done a post-skills checklist of each individual's progress (something that may be best done one to one), they have all developed skills, knowledge and confidence and so have I.

Figure 8.2 Excerpt from Kim's final report

Kim acknowledges the value of gaining ICT competency for herself and her students in her final sentence of her report. At this crucial stage, her project team leader was unable to maintain her commitment or renegotiate her goals. The movement into an appropriation (Dwyer et al., 1991) of ICT was not actioned by her project team leader.

The theme of trainer indicates the role of a leader as limited to that of a developer of ICT competency. In this role the leader supports a ‘Just in time’ model of professional development that does little to enable teachers to transform their pedagogical beliefs and practices. However, it was found to be considered by teachers as valuable. The gaining of personal ICT competency is a necessary precursor to the appropriation of ICT and as such, in term of professional development, places value on a training role. The trainer does establish collegial relationships with the teacher and strong
affirmation by teachers indicate the invaluable support provided by this form of leadership.

8.3.2 Critical friend: The second form of leadership for teachers was a critical friend. A critical friend enabled teachers to engage in critical discussion. Some candidates acknowledged that there was a lack of critical discourse and direction provided by their project team leader. In the Inquiry Project, project team leaders were the ICT coordinators in their schools. They were considered ICT competent and interested in this area. They volunteered to take on the role of supporting a candidate at their school. They had no formal training and their understanding of pedagogy associated with ICT and multiliteracies was not directed or assessed. Also, as shown in the previous chapter on the professional learning activity of reflection, project team leaders as with candidates, lacked an understanding of reflective practice. Consequently, candidates who sought critical discourse aligned themselves with other members in their school who could take on the role of critical friend. Teachers’ need for critical discussion and alignment with a critical friend was described by Megan in this extended interview excerpt:

Sarah: OK. How about leader’s role? How about Harry’s role? Honestly?

Megan: Honestly? Um I never thought he’s the best person. He was very flexible I must admit that and he allowed me to steal [teacher] aide and everything off him when I needed them when I needed to get worked up. But well his understanding of multiliteracies and his understandings of ICT, I think he’s got some there. He just hides it, so nobody knows.

Sarah: Do you think just having someone else acknowledged your process in this?

Megan: Somebody to scream at was pretty good. ‘Grrrr’. He’d say “What now?” I went like, “Grrrrrr”. He had that nice classic, and didn’t get stressed type of personality, which was really good for a highly strung overambitious over chatty person to bounce off. So that was good. It was a good effort that way.

Sarah: Do you think it would be more critical to find someone in your school who

Megan: Yes.
Sarah: So you sought out somebody else?

Megan: So that was easy to do. And I think most people would do that. Um because it would be worse if they had someone who was too critical.

Sarah: Yes. If you had someone such as um the person like Iona [curriculum adviser to the school] who’s in that role, who came around once a fortnight or once a month to talk to you about this type of thing instead of having someone at school. I mean I’m looking at my role as well and I’m trying to think of ways to. How this can be modeled type of thing.

Megan: So if Iona came with one of those [pointing to tape recorder] and could type up and send it back to us. I’d believe it is really valuable.

Sarah: Once a fortnight.

Megan: I’d even go once a month. Just once a month came out, did a 20 minute session.

Sarah: That’d be even better than the principal [Megan’s critical friend]? I mean you’d probably do the incidental.

Megan: Yeah. You still do the incidental but it would take a bit of pressure off that one.

Sarah: And that would then cater for the leader’s inadequacies.

Megan: Yep. It was also, sometimes having an outsider come in. You’d be a bit more open to speaking.

Sarah: Yes. And has the right frame in their mind, so you know they can critically challenge you, in a very friendly manner.

Megan: I think you’d get a lot more reception out of all the candidates and then you’d see that break up and you’d see what they found at the end because you’d have somebody to steer them in the right direction. Particularly I keep thinking of one set of scenarios and it’s only that Harry’s given me a bit of background information that I didn’t know about that’s helped me. And that was somebody was, one of the mentors was being very critical of the candidate and it showed in their end result that they didn’t gel together as a team. So it’s best to have a critical friend from outside to come and do all that critical reflection stuff.

As found previously in verbal reflection and in the theme of ‘critique’, Megan requires critical discourse to develop professionally. She had realised that her project
team leader was unable to take on such a role so she sought out someone in her school who could, in this case, her school principal. Through this interview sequence Megan and I discussed the fact that some project team leaders were not able to take on a critical friend role and engage their candidates in critical discussion. They were better suited to the role of a trainer.

The issue of having an appropriate mindset to be able to critically challenge candidates in regard to their pedagogical beliefs and practices was raised by me in this interview. Megan supported this in two ways. Firstly, she states that “having somebody to steer them in the right direction” was important. Secondly, she demonstrated the need for a critical friend by seeking out her school principal for this role. I suggested the idea of outsourcing a critical friend and Megan validated this with an interesting point, that candidates would be “a bit more open to speaking” and that “you’d see that break up and you’d see what they found at the end”, meaning that a learning journey would be supported to a greater extent and that teachers would focus more on conscious pedagogical change. Both of these findings, the role of the critical friend in directing teacher change and the relationship between an external critical friend and being more open, were also found in Fleet and Patterson’s (2001) study of professional growth reconceptualisation.

Linking back to Kim’s learning context that was explored in the previous theme of ‘trainer’, it was suggested that Kim was unable to move to an Appropriation stage because of the lack of support and direction provided by her leader. Movement from Entry, through Adoption and into early Adaptation stages occurred for Kim. This movement was supported by a development in personal ICT competency provided by a trainer. However, as found in Kim’s reflective journal, the challenges of a critical friend also had a role to play in this movement. In a planning meeting I had with Kim, we discussed her pedagogical practices with ICT. Kim was focused on skilling her ten year two students in specific Microsoft® applications, such as Word, Publisher and Powerpoint, and was doing this in a weekly one hour time slot in a computer lab in her non-contact time with the help of her project team leader. I challenged her on this teaching practice for its educational value, focusing on relevance and curriculum enhancement as well as sustainability. Her response to this was evident in two ways. Firstly, an initial response was noted in her reflective journal (see Figure 8.3):
Kim’s initial reaction was defensive. She was angered by the critique that I gave on her pedagogical approach to using ICT in learning. She felt that her approach to using ICT, that focused on student attainment of ICT skills in a well supported environment, was being treated unfairly. Similar findings on emotive responses to a challenge from a critical friend can be found in Achinstein and Meyer’s (1997) analysis of charettes in critical friendship groups. The conflict that arose in Kim created a critical event that was actioned as a collision (Fletcher & Hill, 2004) redirecting her learning. Kim redesigned the way her students used ICT for the following term, as described in her final report (see Figure 8.4):

This led me to think "How far would they have gone if they had only been allowed to explore for themselves?" I value "play" time as learning time so in term three that's what we've let the children do Tuesday afternoons. We have set some boundaries so by the end of term they need to make a slide for our whole class powerpoint presentation on the solar system, and they need to make a card for someone. I was going to get my non-contact time back. I was interested to see their reactions however, and the first couple of weeks was difficult for them – Harvey was running everywhere fielding questions. They didn't feel comfortable to 'run amok' (his words not mine). Eventually they settled down and asked each other; tested new ground and lots and lots of cards were made!
Firstly, Kim validated her approach to developing ICT skills of her students by stating the question "How far would they have gone if they had only been allowed to explore for themselves?" However, as a response to this, Kim constructed a different approach to the development of her students’ ICT skills. She implemented learning experiences that embedded the application of ICT for specific curriculum purposes. She had started the moved towards an Adaptation stage (Dwyer et al., 1991) as ICT were being integrated into traditional classroom practices. Positive student learning outcomes were noted by Kim, in her last sentence, with the emphasis of an exclamation mark. In this instance, the role of the critical friend was a necessary enabler for Kim’s transformation of her pedagogical beliefs and practices.

The theme of critical friend identifies the role of a leader through descriptors of ‘critique’, ‘challenge’, ‘direct’, ‘shape’ and ‘enable’. The role of the critical friend was found to be fundamental in enabling teachers to examine their current practices and existing beliefs to support deeper reflection and informed action. A person from outside of the school would bring benefits to the role of a critical friend. Benefits of an external critical friend include: enabling the project team leader to focus on ICT skill development, compensation for any inadequacies a project team leader may have in regard to their mindset and reflective practice; ensure a consistent and appropriate direction provided to all candidates, and encouragement of critical dialogue as candidates would be more open to this type of discussion with an external person.

Findings presented here suggest that discussion that involves critique should be placed above the need for more collegial activities for teachers, to validate the notion of an ‘educational’ learning community. However, as noted through Kim’s emotive reaction, not all critique is objectively received, suggesting that the establishment of collegiality is required to maintain productive relationships. These findings further support the need for leadership in the form of a critical friend that could be available to teachers in the school context or from an external provider.

8.3.3 Connector: The final form of leadership examined for its relationship to the development of a learning community is the connector. The role of a leader as a connector implies the construction of links or connections between teachers. Candidates who made connections with other candidates across schools or who made
connections with other staff in their own school were supported by their school principal. The school principal played a role in the development of a learning community by supporting these connections. The following final interview excerpt illustrates how a principal provided support to enable a candidate to make connections with her staff:

Immogen: So and the other part of the friendship thing, you know, was um the friendship that was built at school here and even um. Like I’ve never worked so closely with people in my life before and we relied on each other, we shared our knowledge which was really, really good. Even the person who knew how to do everything didn’t and had to go over to [school name] and learn how to do something. You know in strata where you’ve got teacher aide, teacher, that sought of, you know, administration. Hey, I was learning heaps from teacher aides. They, you know, it was all over the place. It was- it was just, you know, it was just amazing. Really was fantastic so really, we were all learners and it really created a lovely learning climate.

Sarah: And especially if you say I need help, you put your hand up, you fly the flag?

Immogen: That’s right…and Steve’s [principal] been really supportive in all of that. Yeah, he has and he’s been blown away with the presentation as well.

Sarah: I bet he has.

Immogen: Very proud, so you know. And I haven’t done it on my own. I haven’t, I mean every single person here has said yeah we’re happy to share, it’s one of those um growing things to.

The enjoyment and pleasure that Immogen expresses as she describes the connections that were made as a result of needing help with her classroom investigation are evident in this excerpt. She talks about the “lovely learning climate” which involved “friendship”, “shar[ing] our knowledge” and the notion of “strata” which she employs to describe the levels of school administration, teacher and teacher-aide working together. She states that “I was learning heaps from teacher aides”. Her principal, Steve, supported this development of community within the school by being “really supportive” and “very proud”. It is evident here that her classroom investigation provided an avenue through which community could be developed in this school and that the school’s culture was conducive to this form of professional development. The prominence of the term ‘friendly’ as a descriptor for the learning
community is evident in this role, contrary to what was found in the previous role of critical friend and the placement of critique.

Steve instigated a further connection with another candidate from a different school. He invited Megan to give the same talk to his staff about her classroom investigation that she had done at a presentation evening. The presentation evening involved each candidate talking publicly about their professional and student learning outcomes (see Chapter Five for further details). The following interview excerpt provides an insight into the effect this had on Megan:

Megan: [school name] have asked me to come up and do that presentation to the whole staff.

Sarah: Really. Have they. I’m not surprised. They’re very proactive, [school name]. Yeah I must admit they are very much like that.

Megan: That’s really nice.

Sarah: That’s great. That’s really good feedback isn’t it?

Megan: I was a little bit like, “Me?” (laugh) not one of my peers. I’m getting used to it. It’s great.

For Megan, this was an acknowledgement of her professional ability as a teacher. She is still unsure of herself as she states “Me?” (laugh) Not one of my peers”. However, her confidence has grown as indicated in her last statement that “I’m getting used to it. It’s great”. A connection, such as this between schools, supports the development of a learning community and focuses it on collegiality. Nodding (1992, p.177) epitomizes a collegial community through its caring nature, where teachers “build time to talk to each other about their growth as well as that of students. They will have to offer each other mutual support, intellectual/academic help, and solid friendship”. Megan was able to talk about her growth and her students’ growth in an intellectual frame. A collegial connection was made by the principal.

For Megan, connections within her own school were flourishing, as a direct result of the way she sought help from her colleagues for her classroom investigation. Megan spoke about her classroom investigation at staff meetings. She formed a direct relationship with her principal, who became her critical friend. This relationship was pivotal to the connections Megan made in her school. Her principal “starting to
throw a lot more responsibility my way”, indicating the development of confidence and respect in Megan’s teaching and professional development. The following final interview excerpt, illustrates these connections within her school and how Megan’s professional learning provided direction and confidence:

Megan: It’s just grown and we’re just getting communities. We’ve come together, as a group. In working together, helping each other develop and particularly as I get more confidence in myself and can sort of do things that I read. Particularly in our Rich Task because they were all really into the ICT skill and I said no you are going to do it this way. We need to take it from looking at making it a worthwhile activity. Which New Basics is all about being in context and making it real life. Not just skilling the kids. It’s getting them to apply the information. It’s about how they can use powerpoint to do something in the Rich Task. So that was really great and that’s when we started to change.

Sarah: So did you form afternoon groups? Was it just an incidental type of thing?

Megan: Yeah incidental and in staff meetings when we’re talking about our planning and everything. And I just, and the more my knowledge grew, the more confident I got to start saying things and the more I did presentations and spoke at staff meetings. The more confident I got. The more I felt that I was knowledgeable on the subject and therefore could.

Sarah: But really did it change the sort of, the collaborative professional.

Megan: Yeah, we are forever we’re all forever sharing now. It really really and helping each other out with our task rather than just doing on our own. Yeah and I can honestly say that it was slow to start with and they were really, don’t want to know about what you’re doing, we’re too busy looking after ourselves until they realised the benefit to themselves. So now they are at the stage ‘I want to do that, show me how. How can we release you so that you can come and teach us?’

Sarah: So you’re bringing that pedagogical side in there as well.

Megan: Yeah, yeah. It is all about making it authentic rather than skilling because we had an ICT lady coming in but she was just yelling at the kids and it’s not about skilling. You’ve seen what my group has done and it’s and they didn’t have a lesson, they just learnt as they went.

Sarah: Fantastic. You’re very happy with yourself?
Megan: Oh yeah.

Sarah: Good on you, good on you, you should be patting yourself on the back.

Megan’s enthusiasm is evident in this discourse. She has gained respect from her peers and is able to confidently lead them in professional development. Her mindset has evolved as a result of her classroom investigation. Megan’s mindset illustrates the integration of ICT within a pedagogical framework. Through terms she uses such as “worthwhile activity”, “real life” and “authentic”, Megan is making conscious connection to theoretical underpinnings within The New Basics to the understandings of ICT as transparent and the way the digital generation learn. Megan’s eagerness for professional sharing that has developed in her school demonstrates the value of collegial relationships in a learning community. There is also evidence that critical discussion was needed to substantiate her direction with ICT, as she states “they were all really into the skill and I said no you are going to do it this way”. In this instance, it would seem that critique plays a significant part of professional learning in development of community.

The theme of connector analyses the connections made between candidates within their own schools and across schools. It was found that the school principal played a role in supporting these connections. Support was evident in the form of enabling collaborations between staff members such as amongst administration, teachers and teacher-aides; being proud; placing responsibility on teachers such as inviting them to present at staff meetings and making them leaders of professional development. The two candidates illustrated here were in schools that demonstrated collegial culture. It is not the purpose of this study to determine if classroom investigations and ICT professional development stimulate the development of a collegial school culture. However, it is evident that the connections made had a positive effect on collegiality within and across schools. In all cases of connections, the focus of a learning community was on caring collegial relationships that were viewed with enthusiasm by teachers and were considered professionally beneficial.
8.3.4 Summary of roles of leaders: The roles of leaders have been analysed to identify the relationship between collegiality and critique and their effect on the development of a learning community. The three roles identified in the data suggest that a learning community requires both collegiality and critique and that they serve different purposes for different teachers. Depending on the teacher’s needs at a particular stage as aligned with Dwyer’s five stages of transformations with ICT, collegiality or critique was sought by the teacher. The role of the trainer indicates a collegial supportive relationship that was invaluable to candidates who required the development of ICT competencies, consistent with Dwyer’s early stages. The role of the critical friend indicates a focus on critique to support teachers in their transformation of pedagogical beliefs and practices, required for appropriation of ICT. The role of the connector indicates the development of collegial relationships that are celebratory and extensions of community.

The roles of leaders and the relationship between collegiality and critique within a learning community, suggest different meanings of learning. Learning in a learning community from a critical perspective is considered by teachers as related to professional change whereas from the collegial perspective, learning was found to be related to relationship building and mutual support. Either of these may take the focus in a learning community to satisfy the needs of a teacher at a given time, but both are required.

The professional learning activity of collegial dialogue has been examined through an analysis of the development of a learning community. Two themes have been explored: face to face compared with virtual environments and the roles of leaders. The findings suggest an amendment to collegial dialogue to include critique as a significant part of a learning community. The final theme of community in an online forum contributes to the changes in the professional learning activity of collegial dialogue, essential for effective ICT professional development.

8.4 Community in an online forum

Communications technology, such as online discussion forums, have been promoted as platforms that facilitate learning communities as they enable many to many communication that is not place or time dependent (King, 2002; Rovai, 2002).
However, Zhop and Rop (2001, p. 11) problematise notions of community in online environments, which are based loosely around being “connected” rather than determining if community actually exists. Dillenbourg (1999) suggests that looking at the collaborations and the learning taking place provides meaning for a learning community. The threaded postings to an online forum are analysed here for evidence of a learning community.

In this research, the use of an online forum served the purposes of facilitating a network of discussion amongst teachers who were geographically separated and constrained within their daily teaching routine; and for professionally engaging candidates in learning opportunities that were ICT based. Zhop and Rop (2001, p.8) suggest that the goals of “electronic teacher networks” can be categorises into three groups: sharing information; fostering professional development; and creating communities. The online forum was conceived of as having each of these goals. However, as found in the first theme in this chapter, face to face compared with virtual environment, an online forum was not considered by teachers as a platform in which community would develop. Community was perceived on the grounds of relationship building and therefore was more likely to occur in face to face environments. Whereas, critical discussion, which was found to be a necessary element of professional learning and sustainability of community, was perceived by teachers as more related to virtual environments. The actual collaborations that occurred in the online forum are analysed to indicate what function/s of community were evident.

An asynchronous threaded discussion forum was implemented via the forum communication tool in a Blackboard© environment. During the implementation phase, mandatory participation was required from each school team. A candidate with the support of their project team leader, would lead and encourage discussion over a two week period (see Chapter Five for further details). Implementation occurred over a nine month period with nine different discussion topics posted by the school teams. It was decided by the project team that I would lead the first discussion to demonstrate the process. This is in keeping with Manning and Payne’s (1993, p.364) suggestion that “the mechanism for growth in the zone [Vygotsky’s concept of zone of proximal development] is the actual verbal interaction with a more experienced
member of society”. However, to improve the sustainability of the community this initial leadership was to be redirected amongst the teachers through the leadership of subsequent threads. Generally, the number of postings by a given teacher was higher when it was their turn at leading the threaded discussion.

I opened the online forum with an activity (see Figure 8.5) connected to specific documentation that each candidate needed to submit, to formalize the beginning of their classroom investigations:

![Figure 8.5 My activity posting](image)

Discussion of such documentation was intended to direct initial teacher engagement. For many candidates and their project team leaders this was their first experience contributing in an online environment and as such, early responses were of a technical ‘trialing nature’ to ‘test’ to see if their posting worked, such as in Figure 8.6:

![Figure 8.6 Trial posting](image)

By its address to “all”, this post suggests some acknowledgement of collegiality. It also acknowledges the potential for “real discussion” signifying the purpose for more critical pedagogical postings and having to get the preliminary documentation out the way. The form of address used in the initial postings points to ambiguity with the genre of the forum as a means of communication, between the conversational forms of “hi”, the verbal greetings of “g’day” and the written form of “Dear” as would be used in letter format. As the forum progressed the postings tended not to have any form of address, which may have been influenced by familiarity with sequential
listings of posts. To keep sense of cross postings, coded names are used in this analysis.

Following this opening for real discussion in Figure 8.6, I used my ‘expert’ standing to direct the discussion towards pedagogical issues by replying in Figure 8.7:

Figure 8.7 My response to trial post

In this posting, I was trying to engage Cherry [David’s leader] in more constructive discussion by providing background information on effective use of the internet to establish common understanding (Di Mauro & Jacobs, 1995) and directing discussion with a question, signifying a cognitive cue (Mäkitalo et al., 2002). From the use of individual names in these posts and the flow of conversation, it would be expected that the following post would come from Cherry or David. However, evidence of a cross post occurred from Kelly who continued this constructive discourse as in Figure 8.8:

Figure 8.8 Kelly's cross post

I responded with more questions in the following post:

Figure 8.9 My post of questions
Both Kelly and I instigated further discussion by providing questions that were optional forms of direction for David’s inquiry. These questions provided a signal for our willingness to continue the interaction (Mäkitalo et al., 2002) as did my final comment in Figure 8.9, inviting others to participate. This thread ceased at this point. It could be suggested that at this early stage, within the first week of the online forum, that participants had not established enough common understandings about multiliteracies and ICT to respond to these questions or that confidence or experience in pedagogical application of the internet was lacking. As identified in a previous theme of ‘perceived lack of pedagogical knowledge’, common understandings of terms such as ‘multiliteracies’, ‘repertoires’ or ‘pedagogy’ need to be established prior to application in a virtual environment to support critical discourse amongst teachers.

Mäkitalo et al (2002) make a distinction between feedback and questioning in web based discussion. As found here, questions initiate constructive discussion whereas feedback is more oriented towards the establishment of a common understanding and the building of relationships in a learning community. These authors propose six different forms of feedback that include agreement/disagreement, personal, notifying, supporting, comparing and paraphrasing. The first two forms of feedback were found to be more common in what Mäkitalo et al (2002) termed progressive level feedback, while the later four forms of feedback were more typical in deeper level discussion. An initial posting to my orientating activity suggests the building of relationships through a personal more jovial tone by Ivy in Figure 8.10:

[Ivy] Dear Sarah, and hi to you all. Immogen and I are very high achievers and are sure we will manage to complete our project planning sheet by the 11 April as you requested. We promise not to party, shop, or play with the grandkids for the next seven months. Immogen has even deferred her open heart surgery and face lift until next year so that she can concentrate on her Inquiry Project.
Yours in professional learning development ..............

Figure 8.10 Ivy's jovial posting

Personal feedback by Ivy in her posting conveys positive emotions that set the tone for the development of a learning community. This posting suggests interest and commitment encased in good humour. As an initial posting it supported the development of community.
Di Mauro and Jacobs (1995) state that a leader plays a critical role in the building of a cooperative community. In this context I was considered the leader who initially directed the discussion. However, due to the structure of an online forum, where postings and cross postings are unrestricted, this leadership at times devolved into the community. This transfer of responsibility occurred at critical stages where leadership was found to be problematic. An example of this is evident in the following series of postings (Figures 8.11-8.17) which I initiated:

![Figure 8.11 My post 1]

The first posting to this question was by Unwin (see Figure 8.12):

![Figure 8.12 Unwin's post]

This response is problematic as it is not in keeping with goals of effective integration of ICT for multiliterate outcomes. It places emphasis on teaching about ICT. I am concerned not to alienate the participant, so I frame my response in the form of questions and seek other comments, removing myself from the expert role (see Figure 8.13):

![Figure 8.13 My post 2]

Mitchell and Mayer (2002, p.15) suggest caution about comments that can be read as regulatory, serving to “stifle or silence” discussion. Fortunately, the thread was picked up by a candidate, Megan, whose response was more in keeping with the goals of the project (see Figure 8.14):
Megan used comparing feedback to explain her personal views on the focus of ICT skills. She validates the use of a learning journal as evidence of student understanding. She then enters into a deeper level discussion, drawing on her understanding of multiliteracies and its relationship to ICT. This opens up the opportunity for richer discussion. The following posting (see Figure 8.15), two days later, reverted the focus back to an ICT skills checklist:

![Megan's post]

Harvey describes pedagogical practices and beliefs that limit the effective integration of ICT. Learning about ICT through the sequential development of computer skills indicates a technical approach (O’Rourke, 2001) or a goal of ICT skills (DEST, 2001) discussed in the Literature Review. Harvey disregarded Megan’s posting, as there was no feedback in Harvey’s post. This lack of acknowledgement or loss of thread of discussion is symptomatic of this environment unlike in a face to face environment where a conversation is more easily continued because of notions of time and place. At this point, I wanted to encourage discussion and engage Harvey in exploring his beliefs and practices, so I posed a series of questions in Figure 8.16:

![Harvey's post]
Once again a response came from another participant (see Figure 8.17):

[Harvey] did not engage in critical discussion. This thread ended with Kelly’s post that reiterated the theme of a focus on learning with ICT, again enabling me to remove myself from the expert role. Suggested reasons for Harvey’s disengagement could include a disagreement with or a lack of understanding of the perception being presented in the postings or a lack of confidence or an unwillingness to engage in critical discourse. The virtual nature of this environment enables participants to engage as ‘lurkers’ or as ‘respondents’.

The transfer of responsibility to lead discussion was also embedded in a design feature for this online forum. As mentioned earlier, each school team was given a two week period to engage and direct discussion on a topic related to the candidate’s classroom investigation. It was found that the quality and level of interaction within topics was dependent upon factors such as interest amongst the community and the generality of the topic. The many to many relationship that exists in this structure enabled an open critical discussion. The following example of a series of postings on the topic ‘Is the media the message’ started by Unwin enabled critical discussion and a high level of engagement. The number of times that the postings were read also indicates a significant amount of engagement even though it was inactive. The postings within this thread are displayed together in Table 8.1 to mirror the ebb and flow of discussion:

<table>
<thead>
<tr>
<th>Sarah</th>
<th>What is the outcome you want to achieve from a thank you card? How does it relate to the concepts under study in the classroom/unit? Is computer skilling at the forefront? Should we be explicitly teaching computer skills? Think this is an important issue to discuss. Comments please</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly</td>
<td>Technology skills need to be embedded where possible with some focus teaching for immediate needs as they arise. Peer mentoring is an apt strategy because it allows for most efficient and effective use of time and expertise.</td>
</tr>
</tbody>
</table>

Figure 8.16 My post 3

Figure 8.17 Kelly’s post

Harvey did not engage in critical discussion. This thread ended with Kelly’s post that reiterated the theme of a focus on learning with ICT, again enabling me to remove myself from the expert role. Suggested reasons for Harvey’s disengagement could include a disagreement with or a lack of understanding of the perception being presented in the postings or a lack of confidence or an unwillingness to engage in critical discourse. The virtual nature of this environment enables participants to engage as ‘lurkers’ or as ‘respondents’.

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Unwin presents a complex issue in a sociable way. His use of terms such as “all things techno that whistle, bang and shout” provides context for the discussion which helps establish and maintain common ground (Mäkitalo et al., 2002). I respond only once in this thread which indicates the move from a leader to a participatory role. My response uses both supporting and comparative feedback as I provide a pedagogical example to what Unwin is theoretically describing. Megan then moves this discussion into her personal realm where she describes a practical example of how her children are “hypnotised by the animation and sound effects and thus some of their message was lost”. Megan then compares two pedagogical approaches and student learning outcomes. She notes that this reflection on her teaching is informative.

Megan continues this discussion in her second posting by putting a negative twist on the use of multiliteracies with the use of terms such as “overkill” and “over saturation”. This controversial posting brought both agreement and disagreement.
feedback. Dillenbourg (1999) suggest that collaborative learning must provide a space for negotiation and a space for misunderstanding. Mitchell and Mayer (2002) acknowledge that negotiating meaning enables the possibility of taking conflict and different values into account in our understanding of community. Megan did not reply to either of the posts by Harry or Unwin. The meanings of multiliteracies from each of these postings differed. Harry focused on ICT skills while Unwin was not interested in methods of instruction. This suggests that Megan’s intention was misunderstood, causing her to disengage in the discussion. As established previously, multiliteracies is a complex term that was understood by the teachers in rudimentary form. The thread analysed here indicates some unpacking of multiliteracies through a movement from theory to practice to personal experience. Such unpacking builds common understandings and indicates critical discussion.

This qualitative examination of feedback within postings suggests that an online threaded forum provided an environment where both collegiality and critical discussion existed. Furthermore, in alignment with feedback for lower level and higher level discussion, an examination of the quality of discussion revealed that higher level discussion which involves critique, was more common than lower levels of discussion. Using Järvelä’s and Häkkinen’s (2002) categories of electronic posts, Figure 8.18 displays the percentage of lower and higher levels of discussions. Järvelä and Häkkinen identify five types of postings that exist on a continuum beginning with comment and suggestion (lower) through to experience, new point/question then theory (higher). It can be seen that ‘experience’ and ‘question’ were the most frequently used forms of discussion. This further supports the finding that an online threaded forum provides substantive capacity for critical discussion.
8.4.1 Summary of community in an online forum: Postings to an online forum were analysed for evidence of community and critical discussion. A number of theoretical concepts regarding community and discourse within electronic environments, as identified by Di Mauro and Jacobs (1995) and Mäkitalo, Häkkinen, Leinonen, and Järvelä (2002) discussed in text, are supported by the data presented here. It would appear that teachers’ postings within an online forum facilitated the development of community. Controversy, humour, personal experience and positive feedback all played a valuable role in the development of this online community as they do in other enactments of community. Cross posting, inviting comments and sharing the leadership role all served to mirror the dynamics of face to face communication.

Critical discussion was evident in this online forum. Teachers engaged in high levels of discussion where experiences were shared and questions and new points were raised around issues of multiliteracies and ICT. These critical episodes provided a professional learning purpose in the virtual environment. However, it was found that critical discussion was only sustained for a small number of postings by teachers in a given thread. The data reveal a number of practical aspects of online environments that inhibit critical discussion. These include the opportunities for teachers to ‘lurk’ or disengage at any given time and the ease with which misunderstandings or comments can silence participation. Alternatively, the role of the leader and the change of
leadership are found to have a positive impact on discussion. The development of relationships and common understandings and these symptomatic features of online discussion suggest that the face to face environment serves specific purposes that can enhance discussion online. As teachers gain more experience in these online environments, greater participation and critical discourse could occur without the support of face to face communication.

8.5 Summary of collegial dialogue

Collegial dialogue as an interdependent professional learning activity of the core reflective process within the ICT professional development model was explored for its relationship to the development of a learning community. Three themes were analysed. These were a face to face environment compared with a virtual environment, the roles of leaders and community in an online forum. Underwriting collegial dialogue was the relationship between critical discussion and the development of community. Indicative of both the face to face and the virtual environment was the tension that existed between collegial and critical discussion. Tension arises as collegiality is opposed to critique but without critique there is no need for collegiality. In other words, a learning community is built on camaraderie but without the opportunity for learning to occur through critique, there is no point in membership.

The analysis of the roles of the leaders facilitated the discussion of the contrasting but complementary relationship between collegiality and critique. The nature of critique enabled teachers’ mindsets to be challenged; the establishment and maintenance of common understandings; the movement from adaptation into an appropriation of ICT; and the transformation of teachers’ pedagogical beliefs and practices. The nature of collegiality provided a sense of friendship. It also established and maintained common understandings and aided in group sustainability. Consequently, both critique and collegiality are necessary. However, it was found that the application of each could vary dependent on the needs of the learning community.

In light of the foregrounding analysis, collegial dialogue as an independent professional learning activity of the core reflective process must change to subsume a greater acknowledgement of the transformative capacity of critique. Both critique and
collegiality are required to support a given need at particular times. Collegiality establishes the context that enables constructive critique to be formulated and actioned. Consequently critique becomes a section of collegiality that can be accessed anytime thus impacting on the feeling and purpose of community. The following diagram (Figure 8.19) illustrates a remodeled core reflective process based on these findings in relation to collegial dialogue, additional to the findings from the professional learning activities of investigation and reflection:

![Figure 8.19 Remodeled core reflective process](image)

Building on the findings established from the analysis of investigation and reflection, the process of collegial dialogue in the core reflective process is now amended to address the capacities of both collegiality and critique. The term constructive dialogue is used to imply the need for critical discourse that is grounded in supportive relationships within a learning community. Constructive dialogue has both unshaded and shaded parts in the model that represent collegiality and critique within community. The unshaded section represents collegiality within community. The shaded section assumes a critical capacity within community. Aligning the three professional learning activities in the core reflective process, the shaded section brings together the integral capacity of verbal reflection that is supported by written reflection; the critical capacity of constructive dialogue embedded within a collegial learning community; and the nature of investigation as a context in which reflection and constructive dialogue is actioned. This shaded section is considered the space where teachers engage to transform their pedagogical beliefs and practices.
Chapter Nine concludes this research project with a discussion of the key understandings that have emerged as an evolving learning journey throughout the study. Suggested directions for future research are also offered.
Chapter Nine
Transforming ICT professional development

A concern for conceptualizing ICT professional development that can enable teachers to change their pedagogical beliefs and practices has driven this research. What is significant about this research is that it has responded to a need presented in the literature on multiliteracies and ICT in learning. Both fields foreshadow the need for a transformed pedagogy in contemporary education as a response to the changes brought about by new technologies. Current forms of ICT professional development were described as “fragmented and fleeting” (OECD, 1998, p.15) and as not tackling pedagogical issues adequately (OFSTED, 2002). What was and is still needed is a model of ICT professional development that enables the transforming possibilities of ICT to become part of every teacher’s practice. Drawing on action research as a method to investigate the implementation of a research based model of ICT professional development, this study deconstructed and reconstructed three professional learning activities that are considered essential for teachers to experience for transformative outcomes. The model (see Figure 9.1) that has evolved from the study presents a justifiable response to the question proposed at the beginning of this research and it is here that both are addressed.

In this concluding chapter, I first describe the transformative ICT professional development model illustrated in Figure 9.1. The Figure brings the findings of Chapters Six, Seven and Eight together as a response to the question presented at the beginning of the study. The question and model are presented together here:

What models of ICT professional development empower teachers’ multiliterate classroom practices?
Following the discussion of the model, I describe what is meant by the term transformed pedagogy, as this is a hoped for outcome when teachers employ the model. A transformed pedagogy is also an outcome for me during this research, as I uncovered what it means to transform one’s pedagogy and the types of pedagogical practices that are required for the infusion of ICT in learning. Having dealt with the outcome, the construction of professional learning activities within a core reflective process required for effective ICT professional development is then discussed in a section on a summary of the findings of this research. This is followed by suggestions for further research. Finally my thesis concludes with implications for ICT professional development.

9.1 Transformative ICT professional development model

The rectangle bounding the ICT professional development model in Figure 9.1 represents the activity teachers undertake as part of their engagement in professional development. Figuratively, teachers enter this model from the left hand side and move as the arrows indicate, from left to right. They enter with existing pedagogical beliefs and practices. These existing pedagogical beliefs and practices are shaped through engagement within the core reflective process to produce a state where their beliefs and practices are continually evolving. An evolving state also implies meaning associated with teachers’ understanding of professional development. Firstly, it implies that a teacher considers professional development as continual and as an intrinsic part of their professionalism. Secondly, it implies that different pathways are
required within professional development. Teachers’ evolving pedagogical beliefs and practices about the targeted concept/s as well as the process of professional development are depicted in the model through a circular array of triangles pointing in different directions.

The capacity for professional development is indicated in the formation of and relationship between the central three sections. These include the core reflective process indicated by the central circular configuration of investigation, reflection and constructive dialogue; the internal (blue) context which contains elements relevant to the school context; and the external (green) context which contain elements external to the school context. The elements within these contexts impact on the teacher’s engagement with the core reflective process. As the teacher moves from left to right, he or she engages simultaneously with the three professional learning activities of investigation, reflection and constructive dialogue. The innermost shaded intersection of the core reflective process is considered the space where teachers are able to transform their beliefs and practices.

Developing a model that enables teachers to transform their pedagogical beliefs and practices lead me first to question what could be considered transformed pedagogy. It is this finding that has emerged from the review of the literature as well as the analysis of data that I can now envisage and describe.

9.2 Transformed pedagogy

A transformed pedagogy is required for multiliterate classroom practices that effectively engage ‘today’s kind of children’. In Chapter One I discussed new ways of thinking about children in educational spaces and the changes in learning that have been shaped by rapid advances in technologies. There were three distinct messages that emerged from discussion around teaching students who engage with ICT seemlessly. These included a mindset, a bifurcation in social practices, and the infusion of ICT into learning. Each of these I discuss respectively to inform the understanding of a transformed pedagogy.
The term mindset in this research is used to identify the differences that people have in their frames of thinking about and working with technologies and the changes presented in society. The term also presents a framework that enables a range of perspectives to be identified and expressed concerning people’s behaviour interacting within digital environments. A mindset identifies the disparity between those who have grown up with and feel comfortable in cyberspace and those who have been print reared. Age was made a reference point by Lankshear and Bigum (1998) who identified the influence of people being raised in a print-based culture and the appointment of a ‘generational divide’. However, in this research, age was not considered a mark of distinction, rather a way of understanding and framing the different ways people of any age interact with and in digital worlds.

Underwriting the concept of multiliteracies is the current bifurcation of social practices. Such a divergence has created both complexities and tensions in the teaching of literacy. A reformation of what it means to be literate has emerged as a response to the transformative impact of new technologies. Again the digital student is acknowledged as a user and creator of information rather than as a consumer. New ways of working with these students are required that suggest a change in pedagogy shaped by new technologies rather than a mechanical approach where ICT are integrated as a tool to serve literacy needs.

Lastly, the infusion of ICT into learning marked a transformed pedagogy. In Chapter One, evidence of a ‘technologised’ pedagogical approach, presented as traditional ways of teaching that ‘added-on’ ICT was discussed. This approach is founded on the body of knowledge principle that Spender (1995) claimed was out of ‘synch’ with current reality, irrelevant and unworkable. Through a review of the literature on ICT in learning in Chapter Two, new paradigms of pedagogy were explored. Transformed pedagogy sought new roles for the teacher and learner, drew on both instructional and constructivist approaches to pedagogy depending on learning purpose, and indicated fluency and invisible blends of learning with ICT. Descriptors such as transparency, ubiquitous learning and the production and circulation of knowledge were associated with a pedagogy that helps teachers effectively infuse ICT into classroom practice. A transformed pedagogy was identified as consistent with O’Rourke’s (2001) critical
level and DEST (2001) type C - new context/new pedagogical practice, summarised in Table 2.1.

Movement towards a transformed pedagogy is the desired outcome of ICT professional development. Evolving pedagogical beliefs and practices of teachers, representative of these three ideas: mindset, bifurcation of social practices and the infusion of ICT, indicate appropriate shaping by professional development activity. What has been found through this research is the form of dynamic interplay of specific professional learning activities required to enable teachers to transform their pedagogical beliefs and practices. It is to these professional learning activities that I now turn.

9.3 Summary of the findings of this research

The significant contribution that this model makes to ICT professional development lies in the identification of the form of dynamic interplay of the professional learning activities within the core reflective process and their linkage with identified elements within the internal and external contexts. In light of the data, the professional learning activities within the core reflective process have been amended and one has been renamed to illustrate what are considered to be key requirements of a model that can guide teachers to transform their pedagogical beliefs and practices. An important contributor to the revised model was the methodological approach that provided data to inform the design and evaluation of professional activity over a substantial period of time. In addition, this enabled me to collaborate with the teachers as co-researchers and valued contributors.

In this section, I identify what is required of ICT professional development to enable teachers to transform their pedagogical beliefs and practices by discussing the contribution of the methodological approach and the form of dynamic interplay of professional learning activities in a core reflective process.

9.3.1 Contribution of the methodological approach: Candidates were required to make known their existing pedagogical beliefs and practices, formulate a question and design and implement an action plan to investigate their question
relating to multiliteracies and ICT, drawing on action research method. In this sense, inquiry based professional development provided a research connection with a classroom focus.

From a different perspective, the chosen research method connects quite strongly with the ICT professional development model. As found in Chapter Four, establishing teachers’ existing beliefs and practices provided contextual understanding of the transformative capacities of ICT professional development. The data collected in Stage 1 were analysed by project team leaders and me during the reconnaissance period of the action research method employed in Stage 2 of this research (see Table 3.5). Within the reconnaissance period, an ICT professional development activity was designed collaboratively. Data on teachers’ existing pedagogical beliefs and practices provided contextual insights that shaped the design of the ICT professional development activity. This process of obtaining and analysing teachers’ existing beliefs and practices for the collaborative design of an ICT professional development activity empowered the teachers and situated a proposed activity.

Further connection between research method and model is evident. The action research method was employed to provide a framework for the design, implementation and evaluation of the ICT professional development activity. It was found that the action research method became an intrinsic component of ICT professional development in a number of ways. Firstly, as indicated in the previous paragraph, the reconnaissance period enabled the project team leaders and me to collaborate on the design of professional activity. Secondly, in the implementation stage, professional development activities were considered as opportunities to collect data. Chapter Three details the data collection methods that were used throughout the action research process. Linkage between these is presented in the alignment of Table 3.5 with Figure 3.3. Clearly, professional activities provided rich sources of data throughout three action research cycles. Examples of these include the online threaded discussion forum in which teachers engaged in critical discourse and the planning meetings I had with teachers to develop their action plans. Lastly, and, most significantly, in regard to evaluation, the action research process provided a framework through which systematic reflection and planning could be enacted collaboratively amongst the co-researchers. Through monitoring meetings, the project
team leaders and I discussed and shaped ICT professional development activities during the implementation phase in response to contextual needs. This redesigning process developed ownership, empowerment and activated teachers’ voices. A method that enables social interaction and initiates voice was an underlying assumption of the approach taken with this research (Guba & Lincoln, 1994; Ornstein, 1995).

What has emerged from these findings is a sense of layering in regard to the relationship between method and model. As has been discussed, the design, implementation and evaluation of ICT professional development became an intrinsic component that enabled the ICT professional development activity to be shaped and re-designed, responsive to contextual needs. This layer of action research runs in unison within the ICT professional development model to ensure that a re-designing commitment is maintained. This action research layer is depicted in Figure 9.2 within the transformative ICT professional development model. It runs through the core of the model as a reflective spiral of cycles of ‘plan-act-observe-reflect’. It illustrates what each project team leader does, engaged in concert with co-researchers. This layering of method brings greater strength to the transformative effect of ICT professional development through the notion of ownership and redesign.

![Figure 9.2 Layered model](image-url)
9.3.2 Dynamic interplay of professional learning activities in a core reflective process: The findings of this research suggest that for transformative outcomes of ICT professional development, three professional learning activities in the core reflective process must be viewed as dynamically interdependent. Their connection provides the space for teachers to transform their beliefs and practices. Each professional learning activity, namely investigation, reflection and constructive dialogue is required in ICT professional development to initiate teacher engagement that pre-empts reflection to enable further informed strategic action. The core reflective process is embedded within an internal and external context which provides elements that support teacher’s engagement. As a teacher enters ICT professional development with existing pedagogical beliefs and practices she/he is engaged in activity that requires investigation, reflection and constructive dialogue either in unison or at times when one will dominate while others are accessed as required.

The notion of interdependence of the three professional learning activities is evident in the theoretical ICT professional development model derived from the Literature Review. In the theoretical model (see Figure 2.6) the core reflective process was depicted by interlacing triangles of investigation, reflection and collegial dialogue where the overlap of triangles indicated an interdependent relationship. This notion of interdependence was developed further through the analysis that occurred in Chapters Six through Eight. Each professional learning activity and its dynamic interplay within the core reflective process can now be explained.

Construction of investigation
The analysis of the professional learning activity of investigation proposed that it should be remodeled to become the focus of professional activity with a view to establishing it as a guiding principle for ongoing ICT professional development. The representative image of investigation was redesigned from a linked triangle in the theoretical model (Figure 2.6) to an oval shape that bounds reflection and constructive dialogue (Figure 9.1), to highlight investigation as the pedagogical focus for ICT professional development. Investigation as both the focus and guiding principle for professional development is promoted within the literature on teacher-as-researcher (Carr & Kemmis, 1986; Kemmis & McTaggart, 1988b; McTaggart, 1997a) where
teachers adopt an activist role as part of their professional practice. There are three themes that emerged from the analysis that support this claim.

The first theme that emerged in investigation indicates that ICT professional development has greater transformative potential if it enables teachers to use the professional learning activity of investigation to focus on examining their pedagogical beliefs and practices rather than as a ‘re-tooling’ agency (‘re-tooling’ refers to developing ICT skills). This condition was evident in the literature with researchers such as O’Rourke (2001) and Green and Bigum (1992) promoting ICT professional development based within pedagogical examination. However, the shape and actualities of ICT professional development had yet to be defined by them. This research suggests that greater transformative capacity is enabled when investigation provides a space for self-realisation. Establishing a pedagogical focus for ICT professional development, where competency training is considered as a secondary condition directed by and restricted to the teacher’s chosen classroom investigation, had two outcomes in this study. Firstly, it was found to cater for both ICT competent and less competent teachers. Secondly, it moved teachers’ thinking towards teaching and learning outcomes. An important factor in facilitating teachers’ self-realisation is the examination of new teaching approaches rather than a reconstitution of established practices using a different technological application. Self-realisation is supported by this approach to investigation but can only be achieved in combination with the professional learning activities of reflection and constructive dialogue.

Strengthening this remodeling of investigation is the analogy of investigation as a platform from which external professional activities can be viewed by teachers. As seen in the literature, ICT professional development has conventionally been considered as workshops or isolated events outside of the school (Ingvarson & MacKenzie, 1988; Lankshear & Bigum, 1998). A remodeled investigation locates ICT professional development in the classroom where teachers relate knowledge presented externally back to a local setting. This changes the way external activities are perceived and utilised by teachers. The findings of this research suggest that once a classroom becomes the centre for investigation by teachers in ICT professional development, there is a change from teachers consuming knowledge provided externally to teachers reflecting upon and transforming their own beliefs and actions.
Professional development becomes related to the classroom rather than to external professional activities.

The final theme to emerge from data related to investigation provided practicalities for establishing classroom based investigations. These practicalities align closely with the previous two themes discussed. For teachers to be motivated and to sustain involvement, investigation must be considered as part of what teachers do in classrooms daily, rather than as an extra or additional exercise. It must also be designed to cater for specific professional needs and be linked to student learning outcomes.

Based on my data analysis, the professional learning activity of investigation has been remodeled to capture the transformative potential of ICT professional development that focuses on teachers’ pedagogical examination making ICT competency training contingent on classroom investigation; teachers creating cognitive links with professional activities in external contexts through associations made with their classroom investigation; and teachers seeing investigation as synonymous with their work. In this research, investigation is perceived as the focus of ICT professional development that creates a context for the other two professional learning activities of the core reflective process, reflection and constructive dialogue. Links can be made by teachers with professional activities in external contexts as they are relative to their investigation; and as a classroom based approach, investigation is embedded within the internal school context as teachers look to their school vision and leadership for support. Transformative ICT professional development must be concerned with and directed by teacher’s classroom inquiry.

**Construction of reflection**

Reflection as a professional learning activity has been remodeled following the data analysis to illustrate the interactive role reflection has with investigation and constructive dialogue. Reflection emerged as a cognitive tool that teachers use to engage with new ideas produced during investigation. This placed reflection in symbiosis with investigation as a process that provides teachers with space to think critically about what is happening in and outside the classroom. To illustrate this relationship, reflection was redesigned from a linked triangle in the theoretical model.
(Figure 2.6) to an oval shape that sits within the professional learning activity of investigation in the transformative model (Figure 9.1). In regard to constructive dialogue, reflection was found to connect directly in the verbal form with written reflection providing a supportive role for teachers. Teachers’ written and verbal reflections were found to have a capacity to support teacher change. Written reflection used independently by teachers and verbal reflection engaged in collaboratively by teachers, play a substantial role in enabling them to transform their pedagogical beliefs and practices. To illustrate this, the oval shape of the process of reflection within the transformative model (Figure 9.1) indicates the distinction between written (unshaded section) and verbal reflection (shaded section) where verbal reflection, constructive dialogue and investigation are combined enabling teachers to transform their beliefs and practices. Both the value and role of reflection were examined to establish this re-constitution.

Through an analysis of the perceived value of reflective journaling, the distinction between written and verbal reflection became apparent. Teacher’s written reflections were found to be limited by their understanding of the implementation of action research method and its relationship with an inquiry approach. It was found that a single action cycle was adopted which limited systematic written reflection. There was evidence of teachers’ written reflection as recordkeeping with no analytical quality indicating a lack of understanding of how to reflect. Teachers in this study also required a significant amount of support in writing action plans. These findings indicate that for written reflection to be perceived as a valuable activity in enabling teachers to transform pedagogical beliefs and practices, instruction is required to help move the rhetoric of action research and reflective writing into the practical realm. In this research, teachers’ written reflection was found to play a supporting role for teachers’ engagement in verbal reflection.

Conversely, verbal reflection was perceived by teachers as a valuable form of reflective activity. Through professional opportunities that provided collegial contexts, teachers were found to be more constructive in their reflections. Teachers’ verbal reflection was affected by two circumstances. Firstly, in instances where teachers were asked probing questions by knowledgeable others, verbal reflection was found to be deeper and had the capacity for development. In instances where the
teacher had to reflect verbally in a public setting, reflections were limited to a clarification of their ideas. Both of these circumstances had a positive effect on the depth of verbal reflection with greater development and capacity for verbal reflection occurring when a connection existed with the constructive dialogue process in the form of a critical friend. A distinct connection was made between verbal reflection, constructive dialogue and leadership in the internal and external contexts. This resulted in the establishment of a third element in the external context that was an extension of an internal context element, namely leadership-critical friend (see this inclusion in Figure 9.1). Finally, reflecting verbally was perceived by teachers as more relevant to a teacher’s professional practice and in general teachers’ preferred verbalising of their thoughts compared to writing.

The role of written reflection was further examined through the analysis of a single written reflective journal to ascertain the purpose of this form of reflective action within the context of ICT professional development. This research finds that three levels of written reflection performed three different functions in enabling teachers to transform their pedagogical beliefs and practices. Based on Hatton’s and Smith’s (Hatton & Smith, 1995) levels of reflection, descriptive reflection enabled the teacher to make conscious connections between pedagogical beliefs and practices; dialogic reflection was a shaper of the teacher’s pedagogical beliefs and practices; and critical reflection positioned the teacher in the broader political/social context. Evidence of these levels of written reflection and the functions they perform validates the role and capacity of written reflection in enabling teachers to transform their pedagogical beliefs and practices. Consequently as stated above, greater instruction in written reflection is required to enable this transformative capacity in teachers and to further develop its supportive function within ICT professional development.

As a result of these findings from an examination of the perceived value of both written and verbal reflection and the role of written reflection in the context of teacher ICT professional development, verbal reflection assumes greater capacity for enabling teacher’s transformation of their pedagogical beliefs and practices if it is perceived as interdependent with the process of constructive dialogue. When teachers engage in constructive dialogue it provides capacity for and development of verbal reflection. Written reflection provides a supportive independent function. Teacher’s reflective
practice, within the ICT professional development model, draws support from the internal context in the form of leadership from a critical friend, and school structures that provide opportunity for collegial/reflective meetings in small and large forums. To the external context, teacher’s reflective practice requires external leadership, again in the form of a critical friend for a broader perspective; and to wider external events that provide opportunities for collegial/reflective discourse. Teacher’s verbal reflection, when supported by their written reflection enables them to transform their practice when they are able to engage in constructive dialogue that is embedded in the process of investigation. This combination suggests a dynamic interplay of the three professional learning activities. The final professional learning activity, constructive dialogue will further advance this dynamic interplay within the core reflective process.

**Construction of constructive dialogue**

Again, in light of my data analysis, collegial dialogue was renamed constructive dialogue in the revised transformative ICT professional development model (Figure 9.1). The renaming illustrates the importance of critical discourse within a professional learning context as well as the relationship critique has with collegiality in terms of teacher’s transformation of their pedagogical beliefs and practices. Like reflection, constructive dialogue is a professional learning activity that teachers engage in collaboratively to examine their beliefs and practices. Constructive dialogue sits within the context of investigation as an action where teachers critically discuss what is happening inside and outside of their classrooms. The triangular shape of collegial dialogue was remodeled to an oval shape to represent constructive dialogue in the transformative model (Figure 9.1) to illustrate its positioning within the professional learning activity of investigation.

As established in the discussion on reflection, there were beneficial connections between reflection and collegial dialogue that are represented by a unified shaded section in Figure 9.1. Engaging in verbal reflection within collegial contexts linked to internal and external critical friend dyads was found to benefit the depth and development of a teacher’s reflection. Teachers’ reflective dialogue also implied the need for teachers to engage in critical discourse. Constructive dialogue in the transformative ICT professional development model (Figure 9.1) represents a layer of
collegiality (unshaded section) and a critical capacity (shaded section) within a community of learners. An analysis of three themes within collegial dialogue contributed to this fine-tuning.

The first theme explored the transformative potential of learning communities in face to face and virtual environments. The findings suggest that even though face to face environments were perceived by teachers as a preferred mode for developing community, this was based on the assumption of community being a place to share and collaborate. In comparison, critique was evident within, and a requirement of, teachers’ participation in a virtual community. Critique symbolised the transformative potential, the notion of ‘learning’ in an online community and also contributed to sustainability. However, notions of mindset, reciprocity and lack of perceived knowledge limited this potential in the virtual forum. A concomitant relationship emerged that evidenced teachers’ collegial dialogue in face to face environments supporting teachers’ critical discourse in virtual environments. This finding suggests the layering of collegiality and critique within the professional learning activity of constructive dialogue.

The connection between collegial dialogue and leadership was examined through an analysis of the different roles of leaders found within this research context. This analysis further explores the relationship between critique and collegiality to inform the reconstruction of collegial dialogue into constructive dialogue. Three different roles for leaders were identified that had different implications for transformative outcomes. Firstly, leader as trainer indicates an instructional relationship to develop ICT competencies which were considered by some teachers as a very important part of ICT professional development. Little transformative potential was enabled from this form of leadership. However, the gaining of competence and confidence by a teacher as a precursor to the appropriation of ICT (Dwyer et al., 1991) establishes the importance of such a role. The findings here suggest that leader as trainer established collegiality in investigative contexts.

Secondly, leader as critical friend, indicates a strong focus on a critical lens for professional development. Critique was found to be fundamental in enabling teachers to examine current beliefs and practices, support deeper reflection and inform
strategic action. Critique embodies the move from collegial dialogue to constructive dialogue. It epitomises the need for teachers to challenge their beliefs and validates the notion of an educational community which values both friendship (community) and learning (educational). The need for both an internal critical friend as well as an external broader and informed perspective was found to be crucial in supporting teachers to transform their mindset and pedagogical practices. The inclusion of the element of leadership-critical friend in the external context was representative of this need for critique from an external position.

Thirdly, leader as connector, emphasises collegiality again that connected constructive dialogue with the internal context of school vision and structures. Collegiality in this form represented a sharing professional culture being nurtured within and across schools. The link between school culture and professional development is evident through this form of leadership with particular visionary activities and school structures beneficial in enabling teachers to transform their practice. Evidence of in-school and across-school connections benefited collegiality amongst participating teachers.

These three roles of trainer, critical friend and connector, indicate that both critique and collegiality are required for different purposes within a community that could be considered educational. The notion of learning as part of professional development was explored further to indicate the balance needed between collegiality and critique. The term constructive dialogue was created to represent this balance. Learning was found to be representational when teachers engaged in collegial dialogue whereas learning was found to be transformative when teachers engaged in critique. For ICT professional development both forms of learning are required.

The third theme to be examined under collegial dialogue was community within an online forum. The findings suggest that a learning community was created in an online environment as both collegiality and critique were enabled. Symptomatic features of the online environment were found to limit teacher’s constructive dialogue and evidence of social activity was found to benefit collegiality. Teachers required both collegiality and critique for participation. These findings further support the importance of the revised term, constructive dialogue, in the model (Figure 9.1) and
suggest the potential for this form of communication and community building within ICT professional development.

Constructive dialogue has emerged as having greater transformative capacity than collegial dialogue within ICT professional development as it identifies the need for teachers to engage in critical discourse that challenges and shapes their pedagogical beliefs and practices; it acknowledges the importance of teachers’ discussion taking place within a supportive, nurturing environment; it symbolises the learning emphasis of professional development; and in this instance, it has enabled teachers to engage with key issues associated with a transformed pedagogy, namely, mindset and the infusion of ICT in learning. As a professional learning activity within the core reflective process, it represents a layer of collegiality supporting critical discourse; hence the shaded section embedded within the unshaded circle of constructive dialogue (see Figure 9.1). As teachers engage in constructive dialogue, they look towards the internal context for a leader who performs the three roles of trainer, critical friend and connector and who provides school vision and structures that enable discussion within and across schools. Teachers engaging in constructive dialogue, like reflection, require broader leadership through an external critical friend and further opportunities for group discourse. Teachers’ constructive dialogue is actioned while reflecting within the context of investigation. The dynamic interplay of the three professional learning activities within the core reflective process can now be described as a transformative approach to ICT professional development.

**A transformative approach**
The activities of investigation, reflection and constructive dialogue with internal and external contextual connections underlined by a collaborative design process provide teachers with the ability to move from their existing pedagogical beliefs and practices to a state where these beliefs and practices are evolving. Teachers’ transformation occurs within ICT professional development when teachers’ verbal reflection, supported by written reflection is actioned with critical discourse that is based in collegial formations. Teacher action is best embedded within an investigative context such as a classroom based inquiry. Teachers engaged in this dynamic interplay of the three professional learning activities make links with elements in the internal and external context when they are required, such that internal and external leaders are
drawn on to direct or challenge their pedagogical beliefs; formal knowledge and external events are used to inform their pedagogical practices; and school vision and structures provide opportunities to collaborate with other teachers within and across schools.

This research into ICT professional development has informed me of the kinds of activities that teachers are required to engage in if they want to change their teaching practices. I firmly believe that teachers need to begin ICT professional development by becoming aware of and acknowledging the pedagogical beliefs that are informing their existing classroom practices. They need to contextualize ICT professional development by making their classroom a site for pedagogical investigation. Teachers need to make the walls of their classrooms transparent, inviting opportunities to engage with other teachers about what is occurring in their classroom, forming relationships that give rise to both collegial and critical discussion around pedagogy. Teachers also need to support these discussions with personal reflection so that changes in their beliefs are informed, strategic and a response to actions. It is important also to ensure that teachers are able to follow their own pathways in ICT professional development, and to gain a better understanding of their digital students, and to do so, teachers need to live and learn within technologically supported environments.

ICT professional development is about enabling teachers to engage with a transformed pedagogy infused with ICT. It is about developing teachers who are sufficiently critical of themselves to acknowledge and utilise the differences they have with their students; and developing the capacity for continual transformation and being responsive to the changes brought by new technologies; and lastly, it is about providing the pathways for self renewal of one’s own beliefs and practices.

9.4 Suggestions for further research

Documented throughout the previous three analysis chapters were instances where research is required to further understanding of the professional learning activities within the core reflective process. In the examination of investigation, the impact of the design of teachers’ individual classroom inquiries was found to influence self-
realisation and the transformation of pedagogical beliefs and practices. Specific circumstances within the design of a classroom inquiry were identified that enabled teachers to develop capacity with reflection and constructive dialogue and to encourage the adoption of an analytical approach as part of teaching practice. These design parameters require further examination to provide constructive guidance for teachers in designing classroom inquiries.

In regard to reflection, the emergence of the relationship between verbal and written forms necessitates the examination of the impact verbal reflection has on the development of written reflection. The use of ICT in this capacity such as the application of Blogs (web based journals), Moblogs (combination of word blogs and mobile phone technology) and Vlogs (video based journals) would serve a number of purposes. Firstly, it would spark interest and motivate teachers to trial new technologies, which in turn would develop confidence and competence as a necessary capacity of ICT professional development. The ICT would provide the space to examine the reflective forms and their interrelationships. Electronic journals would also provide avenues for communication with a critical friend and other participating teachers for further examination, discussion and development of posted reflections. Underwriting both of these purposes would be the examination of the transformative impact of ICT and the interdependent professional learning activities of constructive dialogue and investigation.

Like reflection, constructive dialogue raises opportunities for further research within spaces created by ICT. With continual advances in technologies, new ICT are required within ICT professional development activities to maintain relevance and connection to the curriculum. The relationship between the face to face environment and the virtual environment in the collegial-critical dynamic of constructive dialogue requires ongoing examination. The capacity for this relationship to change due to the defining factors of a teacher’s mindset, reciprocity and perceived lack of knowledge may be influenced by experience in other communication technologies. Wikis (web-based publishing systems which enable anyone to update or change content), VoIP (voice transmissions such as relay chats) and also further experiences within online forums can provide ICT professional development environments. Teachers need to use ICT in professional learning contexts so that they have a better understanding of
the application itself and therefore, how it can be used in contemporary curriculum tasks. Examining the professional outcomes of getting teachers connected within digital worlds opens up a wide range of research options that can be directed by the application of this transformative ICT professional development model.

In a broader sense, the three underwriting features of a transformative pedagogy identified in this research as mindset, bifurcation of social practices and the infusion of ICT require further investigation. A teacher’s mindset is a powerful determinant to teachers’ infusing ICT in learning and is presented in the literature as defined by age (Lankshear & Bigum, 1998; Prensky, 2004). This premise was not accepted within this thesis and requires further examination in relation to the application of mindset as a framework for teachers’ use of ICT in learning. The bifurcation of social practices and the infusion of ICT suggest changes in learning and teaching that require ongoing examination through ICT professional development or as studies that can move us towards redefining learning and teaching in educational spaces. ICT provide a powerful precursor for transformative educational research.

9.5 Implications for ICT professional development

This thesis has produced a transformative ICT professional development model that moves the concept of ICT professional development away from a ‘re-tooling’ approach with infrequent focus on a teacher’s pedagogy to a model that enables teachers to see the transforming possibilities of ICT and their own informing mindsets that connect them with their digital students for pedagogical renewal. Features that underwrite the value of this transformative model are the envisaged outcome of a transformed pedagogy infused with ICT; the contribution the model makes to concepts associated with ICT professional development and professional development in general; and the model’s application to other contexts.

As reiterated at the beginning of this chapter, movement towards a transformed pedagogy that infuses ICT and facilitates the concept of multiliteracies was the desired outcome of a transformative ICT professional development model. This desired outcome in itself is a significant finding of this research. What emerged from the literature presented in Chapter One and Two was an insight into the paradigm of
pedagogy that effectively utilises the transformative capacities of ICT. The notion of mindset, the bifurcation of social practices and the infusion of ICT into learning presented a seamless approach to what has been commonly termed an ‘integration’ of ICT in policy documents (Department of Education, 1999, 2000a, 2000b; DEST, 1999, 2001). Presenting ICT as “add-ons” (Prestridge, 2005, p.7) or as “technologising” traditional teaching (Lankshear & Bigum, 1998, p.12) has been confirmed by Green and Bigum (2003, p.213) as a “misguided and misleading position to adopt”. Presented here is a formulation of new ways to talk about ICT in learning. An infusion of ICT sees ubiquitous opportunities for learning. Learning is the objective and ICT re-focuses our attention on a learner-centred pedagogy.

A redefining of our objective in the form of a learner-centred pedagogy that personalises learning justifies the need for a transformative ICT professional development model. Espoused in current policy reform documents internationally and nationally is the limited conceptualisation of ICT professional development based on conventional views of ICT. The Pedagogy Strategy (MCEETYA, 2005) discussed in the first chapter, outlines the type of professional development required to ensure teachers utilize ICT to create new learning opportunities. In this document there is a heavy emphasis on the development of ICT knowledge and skills which is presented as independent from integrating ICT into curriculum planning. An ICT supported inquiry based environment is mentioned as an additional strategy. Brown (2005, p.20) labels this approach as promoting ICT as the “neutral learning tool metaphor”. What is missing is the underpinning of the transformative capacities of ICT and the interdependent nature of the critical elements of professional learning with complex entities.

At a national level, a recent report on emerging technologies (education.au, 2005) for the Australian Capital Territory (ACT) Department of Education and Training identified the general trend of technologies in educational contexts as emphasising “mobility, interoperability, convergence, divergence …” (p.10) among other innovative terms. The promotion of “mLearning” (p.63) described in Chapter Two encapsulated the social and cultural shifts and the transformative potential of ICT. The report also acknowledges the changes in students and uses Prensky’s (2004) term
of digital natives. From these acknowledgements, changes in teaching are advised. A limited view of ICT resonates:

Teachers/tutors are being required to adopt and use ICT as an alternative, or add-on, to traditional face to face ‘chalk and talk’ teaching strategies. This requires significant changes in teaching practice and in management of teachers’/tutors’ day to day tasks (p.17).

Such a limited response to change in pedagogy that regenerates traditional teaching approaches foreshadows the inadequate and potentially damaging prospects for ICT professional development. Again, confidence and competence are emphasised and unconnected in professional development discourse within this report. Further to what has been illustrated in this transformative ICT professional development model is the capacity for self realisation of how to learn in ICT contexts, where teachers have come to the conclusion themselves that it is more important to feel capable of learning, to learn with their fellow students, to be able to contribute and suggest, and to go with the flow of learning. This mindset moves us from ICT professional development focused on the attainment of ICT skills to ICT professional development focused on student learning.

Throughout this thesis, ICT professional development has been acknowledged within the realm of general professional development. As evident in the Literature Review, professional development in general was considered for its informing theories and strategies on teacher change and adult learning. Issues and complexities associated with ICT professional development specifically were then reviewed. This thesis contends that in its move from a ‘re-tooling’ to a transformative approach, ICT professional development has established its own theories and capacities and can be considered as a separate entity dealing specifically with the transformative effects and complexities associated with the nature of its subject.

In this research context, ICT professional development dealt with the concept of multiliteracies as a body of knowledge. Multiliteracies were considered a complex concept that connected with ICT in a transformational sense. The intricacies of multiliteracies and ICT as individual concepts as well as the presence of innovation and change within both, added to teachers’ confusion as found in Chapter Four. This thesis presents a model of ICT professional development that can effectively deal, and
engage participants, with such complexities in a manner that provides the learner with strategic and systematic courses of action within their locus of control. This facility implies an application of this model to contexts that require other connections to ICT. It would be considered that this ICT professional development model can facilitate participants’ evolving beliefs and practices in other subject domains.

In closing, in this research, I have formalised a transformative approach to ICT professional development that is underpinned by the nature of current and emerging technologies. I have presented insights into a core reflective process that consist of the professional learning activities of investigation, reflection and constructive dialogue within internal and external contexts for understanding and conceptualising ICT professional development. I have provided teachers with a mechanism for self-renewal where their beliefs and practices become the focus and influence the design of professional development. In dealing with the new and challenging the old, the transformative model (Figure 9.1) provides teachers with a guide to designing ICT professional development that is strategic, flexible, effective and an empowering approach to change. It is with this final remark that I am pleased to contribute to the teachers of today and tomorrow a pathway to their evolving pedagogical beliefs and practices.
Appendix 3.1a
Interview questions for classroom teachers
Thank you for your time and thoughts. My research is trying to develop new models of effective Information and Communication (ICT) Professional Development that has as its goals ‘multiliterate’ classroom practices. Please do not hesitate to contact me prior to this interview. Once again, thank you for your valuable contributions.
Sarah Prestridge
Griffith University
s.prestridge@mailbox.gu.edu.au

Building background
1. Tell me a little about you and your teaching and your experiences with using computers in the classroom.

2. What are some of the reasons why you use ICT in the classroom?

Multiliteracies (definition, outcomes and teaching strategies)
3. Literate Futures and the New Basics Project both employ the concept of Multiliteracies. What does multiliteracies mean to you?

4. Describe for me a recent unit of work that went well, that used ICT.
   (specially what went well..., why was that important...)

5. Reflecting on this unit of work, what Multiliterate outcomes did you achieve?

6. What teaching strategies did you use in that unit to achieve Multiliterate outcomes?

Professional Development
7. I’m interested in the Professional Development that underwrites some of this. Can you think of any Professional Development opportunity that has changed the way you teach? What particular elements of this PD opportunity were beneficial?

Has the New Basic’s and Productive Pedagogy training impacted on your teaching practices? What particular elements were beneficial?

Can you think of any ICT Professional Development that brought about change in your teaching?
Appendix 3.1b
Interview questions for computer coordinator
Thank you for your time and thoughts. My research is trying to develop new models of effective Information and Communication (ICT) Professional Development that has as its goals ‘multiliterate’ student outcomes. Please do not hesitate to contact me prior to this interview. Once again, thank you for your valuable contributions.
Sarah Prestridge
Griffith University
s.prestridge@mailbox.gu.edu.au

1. What are your personal beliefs about ICT in education?

2. Both the New Basics Project and Literate Futures employ the concept of Multiliteracies. What does Multiliteracies mean to you?

3. What do you think is the role of ICT in developing Multiliterate outcomes?

4. How has the New Basics project or specifically the Productive Pedagogies conference had an impact on teacher’s use of ICT?

5. What type of ICT Professional Development is currently happening within this school?

6. What type of ICT Professional Development is currently happening across schools? Are learning communities established?

7. Are protocols being implemented to facilitate effective use of ICT in curriculum planning? Explain to me a protocols session and how it facilitated curriculum development.

8. What type of ICT professional development do you need?
Appendix 3.2a

Curriculum expert interview questions

1. I can see from all the literature that the New Basic’s Project is grounded in substantive theory. Could you explain to me your understandings of the reasons for this initiative?

2. What are your philosophical beliefs about this initiative?

3. What has been the most effective element of this project that you have seen lead to change in teaching practice?

4. What role do you think ICT plays in teaching practice within this initiative? And student outcomes?

5. What model/s of professional development have been most effective and why?

6. Literate Futures and the New Basics Project both employ the concept of multiliteracies. What does multiliteracies mean to you?

New Basics Categories and Multiliteracies

1. To what depth are teachers instructed on the curriculum organisers for example on the meaning of Multiliteracies, curriculum application of Multiliteracies. Have Specific outcomes been developed?

2. On page 67 of the New Basic technical Paper, the Year 6 Rich task no.3 “Oral Histories and Changing Lifestyles” shows the relationship between Rich Tasks and the four New Basics categories by listing Knowledges and Skills (called significant discourses). Are teachers given these ‘List of significant discourses’ or is each Rich Task described in this way or do teachers develop these lists of significant discourses’?

3. Are the ‘significant discourses’ like outcomes for each category? Do the significant discourses correlate to the Repertories of Practice for each Task?

4. Do the repertories of practice relate specifically to each of the four New Basic categories/referents? Are they like outcomes? Where do the repertories of practice come from? Who created this list? Are the Repertories of Practice for each Rich Task drawn from this one list and does this list grow?

Rich tasks

1. Are the suite of Rich Tasks completed in the one year level ie during year 3 or throughout the three years?
2. Who created the Rich Tasks? Will these be the same for everyone? When will new ones be created?

3. How much scaffolding is ‘allowed’ to be given by the teacher in a Rich Task?  
   Eg Rich Task Year 3 no. 5, Historical and Social Aspect of a Craft.  
   In this task there is no choices of crafts available. Is the teachers allowed to presents a list to the children?  
   In the flow chart the first box says to “explore craft as a personal, social and cultural endeavour” . How much teacher support/scaffolding is allowed to be given ie criteria sheets devised?

4. What percentage of class time for that given year is spent on Rich Tasks?  
   Is any time specifically given to rich tasking in the lead up years?

Planning

1. Schools have to develop a three year curriculum plan that gives children the repertoires of practice to be able to engage with the suite of Rich Task at the given junctures.  
   What support are they given (Money/human resources/formats?)  
   How do you develop ownership of Rich Tasks for the teachers in the previous years (eg yr 1 and 2 teachers) Are all teachers involved in this process?  
   Is it correct that what this new three year curriculum plan will embodies is dependent on what the teachers see as necessary knowledge and skills? What is the reasoning behind this?

2. After the 3 day Productive Pedagogies conference what practices are currently happening to sustain this approach in the classroom?  
   How does the Productive Pedagogies fit into the planning schema that the teachers use?

3. In any of the three year spans are teachers allowed to develop similar units to the prescribed Rich Tasks for that juncture? For example the Year 3 Rich Task No. 3, “Design an Object” – can they develop the same type of task with an emphasis on Advertising but still include the stated requirements? (p. 68 technical Paper).
Appendix 3.2b
Academic A interview questions

1. What does multiliteracies mean to you?

2. What do you see as the role of ICT in the achievement of multiliterate outcomes?
   a. What multiliterate practices can be developed by the use of technology?

3. What changes in teaching strategies do you think are necessary for teachers to facilitate multiliterate practices? ie not the old skills in a new way

4. What elements of the professional development do you think are the most effective in changing teaching practice that facilitate multiliterate practices?

5. In Literate Futures Peter Freebody describes the ‘Four Resource Framework’ that has been adopted by schools to structure and review their literacy strategies. This framework enables them to chart and describe the ‘multiliteracies’ that students need along two axes: media of communication and roles of the literate. (p.12)
   a. Would you describe all of these literacy skills as repertoires of Multiliteracies?
   b. Could you give me some examples of skills that would come under Multimedia?
Appendix 3.2c
Academic B interview questions

What does multiliteracies mean to you?

What do you see as the relationship between Information and communications technology and Multiliteracies?

a. What Literate practices do you want to see children engaging in with technology?

b. The example in Literate Futures that was referred to as an effective approach to Future Literacies was at Buranda State School. Buranda specialises in a whole school Philosophy program and focuses on real life learning experiences. The use of technology was in the form of a powerpoint presentation that the children created as a part of their Local Area Study. What specifically are the Multiliterate outcomes that would have been achieved within this unit? And why is this an example of a curriculum with a futures orientation?

In Literate Futures you describe the ‘Four Resource Framework’ that has been adopted by schools to structure and review their literacy strategies. This framework enables them to chart and describe the ‘multiliteracies’ that students need along two axes: media of communication and roles of the Literate.

c. Would you describe all of these literacy skills as repertoires of Multiliteracies?

d. Could you give me some examples of skills that would come under multimedia?

e. Could you recommend a school which I could contact to get a copy of their literacy program that is supported by the ‘Four Resource Framework’?

What changes in teaching strategies do you think are necessary for teachers to facilitate Multiliterate? ie not the old skills in a new way.

What elements of the professional development do you think are the most effective in changing teaching practice?
Appendix 3.3
Classroom observation form

Classroom Observation Form
Suncoast Cyber schools

To establish current ICT classroom practices

Date:      School:      Teacher:
Class:

Floor Plan

Additional Comments:
Sections:
1. Setting: classroom decorations, teacher, children, (dress, appearance, style of talking)

2. My behaviour: interactions/conversations with class, actions.

3. Context: where does this activity fit within unit

4. Depiction of activity: Sequence of behavior and acts, gestures including dialogue.
   - outcomes of lesson
   - ICT activity/other activities
   - management strategies
5. Teaching strategies

Checklist one: Look for evidence of:

<table>
<thead>
<tr>
<th>Higher order thinking</th>
<th>Authentic task</th>
<th>Learner centredness</th>
<th>Knowledge construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cognitive load -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• challenge the learner</td>
<td>Problem or project based approaches-</td>
<td>Autonomous thinker -</td>
<td>Constructing knowledge</td>
</tr>
<tr>
<td>• either to construct</td>
<td>• real-world relevance and utility,</td>
<td>• active exploration,</td>
<td>rather than the end</td>
</tr>
<tr>
<td>alternative models</td>
<td>• problem based and or related to community issues,</td>
<td>learner is developing the</td>
<td>product-</td>
</tr>
<tr>
<td>presented by the</td>
<td>• require transdisciplinary combinations of knowledges,</td>
<td>necessary skills to become</td>
<td>• emphasis on mental activity,</td>
</tr>
<tr>
<td>teacher.</td>
<td>• appropriate levels of complexity</td>
<td>autonomous;</td>
<td>processes and meaning making</td>
</tr>
<tr>
<td>• Analysis, Synthesis,</td>
<td>• allow students to select appropriate levels of difficulty or involvement</td>
<td>the teacher holds the learner in their 'zone of proximal development' by providing just enough help or guidance;</td>
<td>during learning</td>
</tr>
<tr>
<td>Evaluation of</td>
<td></td>
<td>• recognition, appraisal and use of the learner’s background knowledge.</td>
<td>and not the product of that behaviour.</td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
<td>• Metacognitive awareness</td>
</tr>
</tbody>
</table>

Checklist two: Goals of ICT integration
Look for evidence of:

|------------|--------------------------|--------------------------|-----------------------------|------------------------|-----------------------------|
6. Student comments: statements made during learning process and or responses to “What are you learning?”

7. Researcher’s reflections based on observation and post-observation discussion:
   1. Analysis: speculate about what learning, themes pop up, ideas
   2. Frame of mind: state assumptions, any break thoughts to new ways of thinking about my prior assumptions
   3. Method: procedures and strategies using- any problems, development of rapport
Inquiry Project investigative question

<table>
<thead>
<tr>
<th>Candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
</tr>
<tr>
<td>Leader</td>
</tr>
<tr>
<td>Principal</td>
</tr>
</tbody>
</table>

We have read this investigative question and planned proposal and believe that it is relevant to Inquiry into Information and Communication Technology and multiliterate student outcomes. We recommend that it be accepted as an Inquiry Project.

Principal: .......................................................... Date /

Project Team Member: ............................................ Date /

Candidate: ......................................................... Date /
### Inquiry Project Support Requirements

<table>
<thead>
<tr>
<th>Inquiry Project Investigative Questions</th>
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<table>
<thead>
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<table>
<thead>
<tr>
<th>ICT skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>List those skills you want to focus on for your inquiry that you need support in gaining</em></td>
</tr>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Literature</th>
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<tbody>
<tr>
<td><em>Provide points or a blurb about what kind of literature you require for your background reading</em></td>
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</tbody>
</table>
## Appendix 3.6

Griffith University - Suncoast Cyberschools research project
Inquiry Project planning sheet

### Existing situation
Are you responding to an intuitive feeling? If so what evidence could demonstrate this? Or have you observed overt occurrences? If so document these.

<table>
<thead>
<tr>
<th>Existing situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you responding to an intuitive feeling? If so what evidence could demonstrate this? Or have you observed overt occurrences? If so document these.</td>
</tr>
</tbody>
</table>

### What are your current teaching practices relevant to the situation?

<table>
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<th>What are your current teaching practices relevant to the situation?</th>
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<tbody>
<tr>
<td>What are your current teaching practices relevant to the situation?</td>
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</table>

### What are your current student practices relevant to the situation?

<table>
<thead>
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<th>What are your current student practices relevant to the situation?</th>
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<tbody>
<tr>
<td>What are your current student practices relevant to the situation?</td>
</tr>
<tr>
<td>Question</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>What are your preconceived thoughts and notions in regard to the situation and this investigation?</td>
</tr>
<tr>
<td>What are your beliefs, values and attitudes in relation to the use of ICTs in your classroom?</td>
</tr>
<tr>
<td>What are the general ideas and thoughts presented by other teachers, your school and community on ICTs and Multiliteracies and your chosen inquiry topic?</td>
</tr>
</tbody>
</table>
# Action Plan

**Rationale for Plan**

**Schedule (what doing, when, where, and how)**
Appendix 3.7
Final interview questions for candidates

ICT in learning- beliefs and practices

How have your beliefs about ICTs in learning changed since becoming involved in this project?

Has the way you use ICTs in the classroom changed since becoming involved in this project? How?

Multiliteracies

How has your understanding of multiliteracies changed?

What teaching practices do you believe are significant to developing multiliterate student outcomes?

Professional Development

A. Creating Community

Did you feel that there was a sense of community created?

How important was community in your participation within this project?

What were the most important elements in creating a sense of community?

How successful do you think the threaded discussion was in creating community amongst the teachers involved in this project?

Why do think that teachers generally participated to a greater extent only when it was their turn to lead the discussion for two weeks?

B. Transformative practice

Did you use any understandings gained in the multiliterate or claymation workshop, from the threaded discussion or the readings, back in the classroom? If so, how?

Do you think that the inquiry project provided a basis of reflection and action for the other elements of the professional development model? or would the workshops, discussions and readings be as effective if they stood alone?

Will you continue to adopt an inquiry approach to teaching and learning in your classroom? If so, in what fashion?
C. Sustainability
Did this project start to develop a school culture that encourages professional development, professional discourse, collegiality and innovation?

How important was the Principal’s role in your commitment to this project? How important was the valuing of this project by your colleagues and community to your commitment to this project?

How valuable was the leaders role in supporting you through this inquiry project?

How valuable is an outside role, such as the manager/researcher, to this ICT professional development model?

What needs to happen to ensure that the core elements of this ICT professional development model (inquiry process, threaded discussion, workshops and sharing sessions) are likely to be sustained?

D. General
Did you receive an appropriate amount of time to fulfill the requirements of this project? If not what is needed?

ICT professional development usually implies a degree of emphasis on ICT skilling. In your case, how was this catered for? Was the ICT Skills address book or classroom visits options, of any benefit?

Was the greater emphasis on ICT curriculum application Vs skilling in this ICT professional development model, an appropriate approach?

Please tick the appropriate value of these elements within the ICT PD model:

<table>
<thead>
<tr>
<th>Elements</th>
<th>Not valuable</th>
<th>Valuable</th>
<th>Comment (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry Project</td>
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<tr>
<td>Introductory Day</td>
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<tr>
<td>Weekly meetings</td>
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<td>Readings</td>
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<tr>
<td>Personal journal writing</td>
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<tr>
<td>Online threaded discussion</td>
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<tr>
<td>ICT skills address book</td>
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<tr>
<td>Classroom Visits</td>
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<tr>
<td>Staff sharing sessions</td>
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<td>Group sharing sessions</td>
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<td>Workshops</td>
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<tr>
<td>Report</td>
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<tr>
<td>Culminating function</td>
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</table>
Appendix 3.8  
Classroom observation report  

Dear Teachers  
Thank you for the time you spent with me on my last visit to your classroom. Since then I have been writing up all of the observations and discussions that I had with you. I am forwarding these individually to each teacher in the hope that you could spend a few minutes reading over what I wrote and adding your own thoughts to it or amending it in any way that you see fit. I want to be as objective as I can so if I have not observed or heard correctly please let me know so I can change things.

Please take note of the table titled “Evidence of Constructivist Principles”. Here I was trying to gain evidence of these elements within the classroom practices. If I have left any of these sections blank I either did not view these or did not ask the right questions to elicit this information. If possible could you please add to this table, any comments or thoughts you may have in respect to the ICT practices that I was observing or discussing. Below I have provided a brief explanation of each of these elements.

- **High Order Thinking**: asks students to cope with very complex situations where the cognitive load is high. A high cognitive load asks students to perform at the higher end of Bloom’s Taxonomy, where they are synthesising and evaluating information.

- **Authentic task**: are those that have real-world relevance and utility, that are problem based and or related to community issues, that draw on knowledge from across the curriculum, that provide appropriate levels of complexity and that allow students to select appropriate levels of difficulty or involvement.

- **Learner centredness-Autonomous Learning**: the focus is on active exploration, where the learner is developing the necessary skills to become autonomous and where the teacher progresses the learner by providing just enough help or guidance.

- **Knowledge construction**: how the learner goes about constructing knowledge rather than the end product of that construction. The process of how the individual acquires the skills, strategies and resources needed to perform learning tasks effectively as well as the ability to know when and how to use particular learning strategies.

Lastly could you please use the reply paid envelop to return the observation sheet to me. If you have any further planning documentation that you think would help me understand the use of ICT in your unit, please forward a copy as well.

Thank you for your time and support.
Sarah Prestridge  
School of Curriculum Teaching and Learning  
Mt Gravatt Campus  
Griffith University  
Australia  
PH: 3875 5816  
FAX: 3875 5991  
S.Prestridge@mailbox.gu.au
Classroom observation     Suncoast Cyber schools

To establish current ICT classroom practices

Date:   School:   Teacher:   Class:

Description of ICT Practices

a. Description of unit of work

b. Evidence of Constructivist Principles:

<table>
<thead>
<tr>
<th>Higher Order Thinking-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentic Task-</td>
</tr>
<tr>
<td>Autonomous Learners-</td>
</tr>
<tr>
<td>Process/Metacognition-</td>
</tr>
</tbody>
</table>

c. My Reflections:
Appendix 5.1  
Inquiry Project professional development day schedule

Inquiry Project Professional Development Day  
Rosemount Garden, Nambour.  
8:30am – 2:30pm

8:30am  
Guest Speaker: Nicole Mockler, Loreto Normanhurst and University of Sydney. Presentation will describe outcomes teachers have achieved using an inquiry based professional development model.

9:30am  
Research Project  
Background: Sarah Prestridge (researcher) will cover  
- Griffith University-Suncoast Cyberschools Research project- background  
- The Meaning of Multiliteracies: Know & wonder activity

10:30am  
Morning Tea

11:00am  
Project Building: Inquiry Projects planning time  
Teacher candidates, Project Team members, Principals and facilitators will collaboratively plan teacher’s classroom inquiries  
- Formulating an Investigative question  
- Planning to record existing situation  
- ICT Skill needs of candidate  
- Literature needs of candidate

12:30am  
Lunch

1:00pm  
Project Building continued.

2:10pm  
Sharing of Investigative questions/Closure
Appendix 5.2

Griffith University- Suncoast Cyberschools research project

Inquiry Project Outline

Each teacher investigates a concern and formulates a question based on effective integration of Information and Communication technology with the view to achieving multiliterate classroom practices.

Project Team- 1 leader from each of the Cyberschools
Inquiry project candidates- 1 to 2 teachers from each school depending on school size

- March - Full day introducing Inquiry Project: setting goals and mission statement; how to be a teacher researcher- Action Research processes and methodology; ethical procedures (special presenters)

- One hour per week work collaboratively with the other members –leader and teachers- planning, analyzing student work, discussing pedagogy, redesigning plans, reading associated literature, reflecting on instruction. This hour could occur in teachers own time and paid back during the teaching day.

- Literature and internet resources will be organised by the Researcher initially as finding focused relevant and meaningful articles and sites is difficult and time consuming. The Cyberschools website will feature an Inquiry Project link so that such resources can be utilised by all teachers. Candidates can contribute to this and will become responsible for its maintenance. Inquiry project reports will be posted on the website at their completion.

- Half day Inquiry Project meetings twice per year, with all candidates and leaders. Volunteers will be asked to share plans, progress and outcomes in a workshop format. Keynote speaker on relevant topic. Use of protocols in groups- lead by a trained protocol person such as Iona (June & September).

- Opportunities to visit other candidate’s classrooms in own school and other schools to view lessons, provide feedback on instruction and ICT practices, discuss thoughts and ideas.
• Develop ICT skills using ICT support personnel in afternoon planning times or at a convenient time for both persons. The provider will be paid back the time given in TRS time.

• Culminating function where each volunteer candidate presents his or her Inquiry Project. This presentation can be given in a number of different ways such as a workshop on a practical skill, a video segment of a lesson or a part of a reflective journal to discuss, or a powerpoint showing a learning journey. This function will be open to every member of the Cyberschool community. Certificates presented by Dean of Education, Griffith University. (November).

**Mandatory Requirements of Inquiry Project**

• Maintain a reflective journal throughout the course of the Inquiry- thoughts about teaching and student learning, research methodology, readings, issues discussed on the web forum, thoughts on changes in practice and personal beliefs. A minimum of one written contribution per week.

• Staff sharing sessions twice per year (May & August) where candidates present inquiry project at staff meeting. Presentation is open where teacher could lead a discussion on a reading or use part of their reflective journal to demonstrate specific ideas or a general presentation on what their research is about and what they have learnt. (5mins minimum)

• Using Education Queensland’s Learning Place web forum each school must lead a threaded discussion on an area of their choice such as a question they are interested in relating to their inquiry. This discussion is open for two weeks and must be maintained by that school. The timetable for this threaded discussion:

<table>
<thead>
<tr>
<th>Date Range</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>31st March - 11th April</td>
<td>Researcher</td>
</tr>
<tr>
<td>12th – 23rd May</td>
<td>Woombye</td>
</tr>
<tr>
<td>2nd – 13th June</td>
<td>Montville</td>
</tr>
<tr>
<td>16th – 27th June</td>
<td>Mooloolah</td>
</tr>
<tr>
<td>21st July – 1st August</td>
<td>Glenview</td>
</tr>
<tr>
<td>4th - 15th August</td>
<td>Eudlo</td>
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<td>18th – 29th August</td>
<td>Mapleton</td>
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<td>1st-12th September</td>
<td>Chevallum</td>
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<td>13th - 24th October</td>
<td>Nambour Special</td>
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• Publication. Each candidate will be required to write a report on his or her Inquiry Project. This report should highlight the inquiry research process and the teacher and student outcomes in relation to ICTs and Multiliteracies. Each teacher will receive a TRS day to write this report.
Leader’s role:

- Use the Action Research Methodology with the researcher to monitor, re-plan, implement and reflect on professional development.

- Support candidates in inquiry project through stimulating critical discussion, providing direction (more or less which ever is required), Just in Time ICT support, challenging instructional practices.

- Organising the one hour weekly Inquiry Project time so that valuable outcomes are achieved. This may include working with the candidate on
  - The threaded discussion forum- collaboratively contributing and designing the two week online discussion;
  - Critically reflecting on readings;
  - The research process of planning, acting, observing and reflecting;
  - Arranging ICT skills training using the ICT support personnel;

- Meeting with candidates per week in agreed time

- Visit classroom of candidate periodically

- Use as a data collector (video tape lessons)

- Encouraging the candidates to attend the Half Day Inquiry Project PD meeting in June & September and the culminating function in November.

- Ensure that mandatory requirements are met such as
  - Reflective journal
  - Threaded discussion- participation and leading the discussion
  - Staff meeting presentations (5min) in May & August
  - Writing a report
Appendix 5.3

Griffith University- Suncoast Cyberschools research project

Inquiry Project support booklet

The action research spiral based on Kemmis and McTaggart (1988)
The inquiry process is fundamentally about improving practice. It provides structure for looking at the way we teach and what learning outcomes are being achieved. It uses an active reflective process, which can lead to change in classroom practices.

Use your reflective journal to record thoughts, ideas, data and understandings. You can use a word processor if you prefer or combine the two. I encourage you to express your thoughts in drawings as it can aid the learning process. This project is grounded in research and as such requires data to assess its effectiveness. Your reflective journals are a very valuable source of data. Consequently it is intended that these will be collected at the end of this project. Anonymity will be preserved.

**Steps in the Inquiry process:**

1. **Deciding on your investigative question(s).** Check that your questions

   Focuses on multiliteracies classroom practices
   Relate to use of ICT
   Are specific
   Do-able this year
   In your control to change

   Encompasses a change in strategy or practices, which aims at greater student learning outcomes and greater understanding about those practices.

   Rich questions will include reference to teaching practices, student outcomes and multiliteracies.

   At some stage throughout the workshop you need to fill out the *Inquiry project Form* and have it confirmed by the researcher. This form needs to be signed by the respective parties and a copy made for each. An extra copy for the researcher is also required. There is a copy of this document on the Learning Place Website.

   To ensure that you receive ICT skills and background literature for your inquiry please fill out the *Support Requirements form* and give it to the researcher.

2. **Record the existing situation- Reconnaissance.**

   In action research you are aiming to understand what you ‘wonder’, to understand and implement change. You will need to document the situation before as well as after. You can plan to do some specific observations, surveys or interviews or even a lesson that will lead to thoughts about your existing situation. Think about what data you want and which data collection tool would be most appropriate (see section on observation techniques below). Remember you are focusing on ICT and Multiliterate practices.
Consider these questions. Try to provide as much detail as possible:

Are you responding to an intuitive feeling? If so what evidence could demonstrate this? Or have you observed overt occurrences? If so document these.
What are your current teaching practices relevant to the situation?
What are your current student practices relevant to the situation?
What are your preconceived thoughts and notions in regard to the situation and this investigation?
What are your current beliefs, values and attitudes in relation to the use of ICTs in your classroom?
What are the general ideas and thoughts presented by other teachers, your school and community on ICTs and Multiliteracies and your chosen inquiry topic?

Record this data in your reflective journal. In the section called Planning (step 4) you will be asked to construct a plan for the implementation of a strategy. In this plan there is a section on the ‘existing situation’ where you are asked to document the answers to these questions. This will form part of the data for this Project.

As a result of analysing your existing situation you may decide to change your investigative questions. This is perfectly fine. At any stage in the action research process backward, horizontal movement may take place. Just ensure that you document this in your reflective journal and indicate your reasoning. It is your thoughts that are highly valued.

3. Relevant Literature.
You need to find out if there is any relevant literature to aid your particular Inquiry. Your researcher/academic will search for literature for you however, you can also search the Internet as there are many Online Journals, use ERIC (educational database) that is available at most libraries, or look on the Cyberschool website as it has links to educational resources. If you find some good references these can be placed on the Learning Place Web forum for all of the candidates to read. Notify the researcher of these via email.

4. Planning.
This is your most important step. You need to make a detailed plan of what you are going to do and how you are going to monitor the change process. You may need to access literature support for research methodology. Your research contact can support you in this area. You can also collaborate and design your own observation tools, surveys, interview
questions. Once these tools have proven effective you can share these with all of the other candidates by posting them on the Learning Place Web Forum.

Consider these questions to stimulate thought: (you do not have to formally answer these)

**Planning**

- What is the nature of the activities you want to change- in terms of the interactions taking place between the teacher, students, content, and processes?
- Exactly what aspects of present practice are you going to try changing?
- What are you specifically going to do?
- What will change in terms of the resources being used?
- How will the products of work differ?
- How do you think this will affect your students? Consider their actions, language, and thinking.
- What kinds of problems can you foresee?
- What would help others accept these new practices?
- Can you explore these changes with your students and colleagues? Can it be an educational process?
- Will these changes ensure a different working relationship with your students and colleagues?
- Do you need to make changes in the organizational structure in order to make educational changes?

**Monitoring**

- How are you going to monitor the outcomes or the change process?
- What data collection techniques are you going to use? When?
- Are you going to record everything in your reflective journal? If not what else?
- How will the data you collect count as evidence? Be specific.
- Are you going to use student reflections/journals as a form of evidence?
- Do you need your leader to observe you or videotape lessons?

You need to make a clear detailed plan of action. This should start with a brief rational for specific changes you plan to make. This rational can draw on evidence found in your existing situation. Then outline a more detailed plan and schedule of work (what doing, when, where, and how) and lastly how you plan to monitor this action phase. An *Inquiry Project Planning Sheet* is available for you to use that can be downloaded from the Learning Place Website.
The first draft should be negotiated with your leader and revised in light of this feedback. Completed Inquiry Planning Sheets need to be emailed to the researcher by Friday the 11th April. These will be posted on the Learning Place Website and the first two weeks of discussion will focus on the development of these plans facilitated by the researcher.

| 31st March - 11th April | Researcher |

5. **Action.**
When carrying out your plan things are unlikely to go exactly as intended. You cannot plan for all of the circumstances that will take place and you will probably need to modify your plan almost immediately. This is usual. Make sure you record the deviations from the plan and try not to stray too far away. Deviations can be written in your reflective journal.

During this action new insights will arise. These need to be recorded in your reflective journal clearly as they will inform your subsequent planning. Your reflective journal is the key to your investigation. It should contain a record of your ideas and impressions and will allow you to record more accurately what actually happened as you proceed. Jot down key points, memory joggers and brief notes. Even draw some pictures of what is happening. These will all help later when you come to write up this project.

Keep a close eye on how productive your monitoring is being- are you getting the data you expected? Keep it practical – you can’t record everything.

6. **Observation.**
There are many different observation techniques you can use. Choose those that are a part of your usual teaching practice and or those that would be efficient and effective for you. Your research contact and leader can support in the development of any of these. Here are some suggestions.

- Student diaries- children systematically reflect on how they learnt and the effect of the teaching practices, activities; be specific when asking children what data you want
- Supporting documents- handouts to students, units of work, copies of tests, assessment items (as long as they were designed to exam the qualities you are investigating), any documents associated.
- Tape recordings- of discussions in class, interviews and project meetings to obtain accurate dialogue and opinion.
- Closed or open surveys- use of Likert scale where questions require a
ticked response such as ‘strongly agree’ to ‘strongly disagree’, or a space for a written response.

- Interviews- can range from an open discussion to a tightly structured sequence of questions. These can be recorded for accuracy and transcribed latter. Interviews give the respondent the opportunity to express their views. Interviews can yield quotes that can be used as data to illuminate outcomes.

- Visual record- video tapping a lesson or students at work so that this can be analysed at a latter time. This enables you to take a step back and look at what is happening in a situation. Be clear on what you are looking for. You can combine this with interviews to draw out specific data such as “what were you thinking when….”.

Some things to observe:
You may wish to check from time to time on changes in language use associated with the concept of Multiliteracies.
What ways of thinking about things are you fostering?
What interactions do you observe between yourself and your students, content and process knowledge?
What is changing? Are these new practices educational? Who says so? What makes them educational? What is the influence of ICT?

As you organise your data you will start to analyse it, making sense of what happened. This is an important first step. Aim to write a narrative account of what happened. Write down any speculations you have. You may even make a few assertions and claims that cannot be backed up with data. Note these for further investigation in your next cycle. Then take a step back and look at your data objectively. Share it with your leader. Write down what you found.

7. Reflection
At the end of an action cycle you should reflect critically on what has happened and the data you have collected. To reflect is to analyse, synthesise, interpret, explain and draw conclusions. You already have an account of what happened. Now you must look more deeply at it. You are aiming to draw some broad conclusions. Write your reflections in your reflective journal. Think about:

What have you learnt?
Draw on your understanding of the original situation. How have things changed? (physically, interactions, classroom structures)
What worked/ did not work? Why?
How has your understanding of your teaching practices changed?
What does the literature indicate?
What implications this has for your next phase/plans.
What change occurred/did not occur? Why?
What were the barriers to change?
How can you improve the likelihood of change in the future?
What rethinking of your Inquiry Question is needed?

Remember that you are trying to change, and mastery of a new approach takes time and practice. You are also trying to change within a situation that works with older practices. You probably have a clearer idea about some of the things you need to learn if you are to do better next time. You need to plan how you are able to do that learning. It may involve more reading, more skills and more collaborative discussion. Learning what you need to learn is one of the most important outcomes of this stage.

Critical reflection is more fruitful if it takes place within small group discussions where ideas and impressions can be shared. It would be beneficial to share some of the data you have collected and indicate what you think it shows. This discussion will stimulate your reflection and pose new ideas, questions and suggestions for further inquiry. Use the Learning Place Web Forum, which you will be familiar with now. You will also have the opportunity in June and September to share these thoughts with the other candidates participating in this project. You will be notified of these Half Day Inquiry Project meetings nearer the time.

Before proceeding, draw your reflections together in an interpretative statement drawing conclusions about your inquiry question, initial reconnaissance, initial plan and what you have learnt from your first action step. Write a statement synthesising your conclusions.

Now begin to draw implications for your next action step: write a statement of the rationale for the improvements you will now be seeking to make. You are now moving into your next cycle- Replanning. Go back to that section and move through the cycle again. A cycle can be as short as one lesson or as long as a unit of work. To see results you need to keep your cycles short so that you are analysing the data and focusing on the change process. You can move through as many cycles as your Inquiry question requires. It usually takes three or more loops to complete an Inquiry project.

Use the Reflective Statement – Second Cycle form to formalize this stage. It is available on the Learning Place website. A copy needs to be emailed to the researcher. There is a form for each subsequent cycle. Each cycle needs to be documented using these forms and then emailed to the researcher.
8. **Publication**

Your Reflective Journal will be your main source of data to help you write your inquiry project. This written report can be a narrative of your learning journey, an explanation of the cycles that occurred, the data and the changes to your own teaching that transpired. The reading supplied to you ‘Disasters and Metacognition in the SOSE classroom’ by L. Boyle is an example of a narrative produced by a teacher as publication for her Inquiry Project.

After you have produced your first draft and have received a TRS day to this end, you will be invited to attend a Tuning protocol session lead by Iona. Copies of your Draft will be forwarded to those attending your sharing session. You will receive copies of drafts from all those attending as well. There will be five candidates in each Tuning Session. We will tune each other’s publications. If you need further support at this time your leader and the researcher will be available.

Researchers Contact Details:
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Australia
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FAX: 3875 5991
S.Prestridge@griffith.edu.au
Appendix 5.4

Griffith University- Suncoast Cyberschools research project

Leader’s role in Inquiry Project

- Use Action Research Methodology with the researcher to monitor, re-plan, implement and reflect on professional development.
  - Record thoughts, ideas and occurrences associated with the Inquiry Project in your reflective journal. For example record what happens in each meeting with your candidate(s). This data will inform monitoring of the professional development.
  - The first monitoring meeting will be after school or breakfast on May 26th. Further details to follow.

- To support candidates in inquiries through stimulating critical discussion, providing direction (more or less which ever is required), Just in Time ICT support, challenging instructional practices.

- Organising the one hour weekly Inquiry Project meeting so that valuable outcomes are achieved. This may include working with the candidate on
  - The Threaded discussion forum (directions below on how to access) collaboratively contributing and designing the two week online discussion;
  - Demonstrating how to download and upload documents from the Cyberschool Blackboard community site;
  - Using the Cyberschool’s webpage to access resource such as Literature, tutorials, useful websites;
  - Critically reflecting on readings;
  - The research process of planning, acting, observing and reflecting;
  - Arranging ICT skills training using ICT support personnel;
  - Organising classroom visits at other school

- Meeting with candidates per week in agreed time

- Visit classroom of candidate periodically

- Used as a data collector (video tape lessons)

- Encouraging the candidates to attend the Half Day Inquiry Project PD meeting in June & September and the Culminating Function in November.
• Ensure that mandatory requirements are met such as
  ▪ Reflective Journal
  ▪ Threaded Discussion- participation and leading the discussion
  ▪ Staff meeting presentations (5min) in May & August
  ▪ Publication with TRS day- once first draft is available candidates
    will be invited to participate in a Tunning Protocol session lead by
    Iona.

What to do in the first few meetings:
• Concentrate on documenting the ‘Existing Situation’ and developing a Plan- Steps 2 & 4 of support sheet. This is a crucial stage as the degree of detail and depth provided here will ensure a sound foundation for the following cycles of inquiry.
• All candidates need to fill out an Inquiry Project Planning Sheet, which can be downloaded from the Learning Place Website. If you are having trouble doing this please contact me. This is due on the 11th April (2 weeks following the Inquiry PD Day) but there is a week buffer for those who need the extra time, before the holidays.
• Participate in the threaded discussion forum as I will be focusing on supporting these Planning sheets.

| 31st March - 11th April | Researcher |

• Once I receive these Planning sheets I will review them for depth and clarity. If I feel that the candidate needs to think more deeply about some of the questions raised I will contact you and attend a planning meeting so that we can collaboratively extend these.

How to access the Suncoast Cyberschool Community:
Go to Education Queensland Website
Click on The Learning Place
On the right hand side of the page there is a small list of items. Look for Blackboard Login. Click on this and then Login. You will see this (image). Now click on Suncoast Cyberschool down on the lower right hand side & Explore.
How to get to the Threaded Discussion Forum:
On the right hand side there is a list of blue icons. Click on Communication then Discussion Board. Click on Inquiry Project 2003. The first thread is there to respond to titled - Inquiry project plans.

If you have any concerns or problems please contact me:

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### Appendix 5.5

**Griffith University- Suncoast Cyberschools research project**

**Reflective statement- Second Cycle**

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<thead>
<tr>
<th>Candidate</th>
<th>Leader</th>
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<table>
<thead>
<tr>
<th>School</th>
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**Interpretative statement** - drawing conclusions about your Inquiry question, initial reconnaissance, initial plan and what you have learnt from your first action step:

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**Rationale for Second Cycle**: write a statement of the rationale for the improvements you will now be seeking to make

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**Continued rationale**
Action Plan – second cycle

Schedule (what doing, when, where and how)

Schedule continued:
Monitoring techniques and plan:
### Classroom Visit proposal form

<table>
<thead>
<tr>
<th>Outcomes to be achieved and how the visit relates to my Inquiry Project</th>
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<table>
<thead>
<tr>
<th>Candidate</th>
<th>School</th>
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<table>
<thead>
<tr>
<th>Project Team Member</th>
<th>Principal</th>
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<table>
<thead>
<tr>
<th>Classroom Teacher visiting (incl. School’s name)</th>
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<table>
<thead>
<tr>
<th>Date &amp; Time of visit (eg. 9am to 10am)</th>
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This proposal for a classroom visit is based on the candidates needs in regard to their classroom inquiry. We understand that what will take place during the visit will inform the inquiry and be documented in the reflective journal.

Candidate ……………………… Date: / /   Principal ……………………… Date: / /  

We agree to the proposed classroom visit.

Classroom Teacher………………….. Date: / /   Principal ……………………… Date: / /
### Half day Inquiry Project session on multiliteracies

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td><strong>Session 1</strong></td>
<td><strong>Candidates will informally share their project in small groups to facilitate growth in community. Project items to shared could include:</strong></td>
</tr>
<tr>
<td>(8:30am – 9:45am)</td>
<td><em>reason for Inquiry</em></td>
</tr>
<tr>
<td></td>
<td><em>situation prior (teaching style, students and beliefs)</em></td>
</tr>
<tr>
<td></td>
<td><em>Inquiry question and progress so far</em></td>
</tr>
<tr>
<td></td>
<td><em>changes that have occurred</em></td>
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<td></td>
<td>Morning Tea Provided</td>
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<tr>
<td><strong>Session 2</strong></td>
<td><strong>Workshop on Multiliteracies. Margaret Fletcher from the school of Cognition, Language and Special Education, Griffith University, will present a practical approach to Multiliteracies in the classroom where teachers will develop a framework for multiliterate pedagogy.</strong></td>
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<tr>
<td>(10:00am – 11:20am)</td>
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<td>Closure and feedback</td>
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Appendix 5.8
Griffith University- Suncoast Cyberschools research project
Final report worksheet

What have you done in your classroom with ICT to achieve multiliterate outcomes?

Genre: narrative/reflective story
One experience or a series of events
Use subheadings

Things to cover:
What was your investigative question

Your pre-existing situation:
- Teaching practices/student practices with ICT prior to this project
- Beliefs about using ICT in your classroom
- Preconceived thoughts about your topic
- Multiliteracies –personal understandings, colleagues understanding and community awareness

The data collected eg section from children’s journal/work
Include:
- observations
- interviews
- your journal- including drawings/pictures

Features of the professional development that have been beneficial- might mention one and how helped
- Threaded discussion
- Multiliteracies workshop
- Claymation workshop
- Support person/leader at your school- one hour meeting
- Talking to your staff
- Project sharing session
- Journal writing
- Readings

Your understanding of multiliteracies now and classroom practices
Your confidence with ICT including skills and use in classroom-mention teaching strategies and how these have changed.


Garcia, L. (1999). *Helping teachers increase the use of multimedia instructional technology into the curriculum through staff development workshops:* Nova Southeastern University, Fischler Centre for the Advancement of Education.


Multimedia product