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How can I support children's learning through ICT: a
self- study of my own teaching

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Abstract

In this study, I illustrated how I, as an early childhood teacher, could improve my own teaching by exploring innovative uses of ICT with young children. To do this, I conducted a small scale qualitative study based on action research. The action was the exploring and reflecting on the innovative use of ICT by interviewing a purposive sample of four teachers in the greater Auckland region who were experts in the use of ICT. Based on text analysis of the data from the interviews, the findings showed the most meaningful ICT uses by the teachers resulted in enhancing relationships, expanding on inquiry based teaching approach and improving communication and documentation processes. To improve my teaching practice, I also reflected on ICT innovations in relation to my own values. Ultimately, it was the competence of the teachers and the collective thinking between colleagues that could make ICT initiatives work best for the purpose of enhancing learning, not the technical aspects of the technology. The findings are significant to help teachers draw an action plan for improving their own teaching practice.

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Attestation

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Ethics approval

This study was approved by Auckland University of Technology Ethics Committee, 13/ 90 on 17th May 2013. Ethics Committee letter of approval is attached as appendix 1.

Chapter 1

Introduction:

We don't receive wisdom, we must discover it for ourselves after a journey that no one can take for us or spare us. In this voyage of discovery, we must not be seeking new landscapes but to have new eyes.

Marcel Proust

Background to the study

During my earliest days of teaching young children, I encountered the novel idea of supporting young children to 'problem solve' and 'peer mentor' through computer games such as 'Freddie Fish', 'Darby the Dragon', or 'Me and my dad'. To me, the children looked totally fascinated, engaged, happy, learning both independently and from each other, and this was happening while I was learning alongside them. Reflecting back on those days, the big issue was not that I was learning at a different and much slower pace than the children, but that I was not sure information computer technology (ICT) was an appropriate learning experience to continue. I had no teacher training in ICT and felt concerned that there were times children were obsessed with computers. I remember many times, I felt I had to step back and reassess. Now, I still feel the same! Especially after I came back from an e-Learn Conference in Hamilton in 2013, where I met and was inspired by numerous CORE Education researchers and teachers who were passionately leading their own professional learning workshops on educational technology. That was a great opportunity for networking and reflecting for me. In a matter of a decade, it felt amazing that so much had changed and so much was still the same. The debate is shifting in the way that early childhood teachers have mostly moved away from being the digital immigrants that Prensky (2001) once described, to a state where they must make choices about innovations they are confronted with every day. This is where the role of the teacher in confronting and controlling the educational process should be noted. I, for myself, know that I want to move forward in a direction where there is hope that ICT can hold greater promises.

During the last ten years, as if it was not enough that every new innovation challenged me, I was also doubtful whether ICT served a human purpose (Sutherland, 2004). Could it have brought me back to questioning what really mattered? To clarify my thinking, I use the

metaphor of a coin that has two equal faces, one is the infrastructure and technical issues, the other one is the pedagogical face of ICT. One without the other will not make good sense or guarantee good value.

In the history of technological advances, Feenberg (2001) referred to Plato's view that technology (for example, writing) has the power to destroy dialogic relationships. This view is now regarded as a deeply flawed view as there is a consensus among teachers and educators that the social impact of ICT depends on how it is designed and used. I could not agree more with this view.

It has been suggested that there was a pressing need for 'theoretically informed research' in the area of ICT (Bennett, Maton, & Kervin, 2008, p. 776) and that there was a notable lack of research into how this particular way of constructing knowledge was understood and how it informed early childhood teachers' roles (Hargraves, 2011). So I engaged in this research to inform myself to be better able to steer the future development of ICT for the young children I teach, who are digital natives, and so are part of a population who will use technology in relatively advanced ways (Palfrey & Gasser, 2011). Finding my way through this digitally mystifying world enables me 'to find the knowledge to find the power' (Salmond, 2013) to guide young children for a better future- oriented learning in life as "one thing is for certain, the future is not what it used to be" (Wenmoth, 2012, p. 203).

Taking young children as taonga (that in Māori culture means a treasured thing, whether tangible or intangible) (Salmond, 2013), I believe that my teaching must go beyond traditional didactic approaches to suit the intellectual, social, motivational, and emotional needs of the new generation (Bennett et al., 2008), where engagement with the ICT world of innovations could be a very legitimate ocean to delve in.

Theoretical perspective and research design

The main theoretical perspective that guided me throughout this study was constructivism, that allowed me to focus on the art of learning, or learning to learn, and on the significance of tools, media, and the context (Ackermann, 2007). Constructivism, according to Papert's definition, is about producing the most learning for the least teaching (Papert, 1998, cited in Ackermann, 2007). I chose constructivism as the main theoretical perspective to adopt for this investigation as it is based on learning as an active co-construction between children and

adults, emphasising the role of the teacher as someone who is constantly in the process of exchanging ideas with significant others (Nuttall, 2003). This theory of constructivism is informed by action research (Whitehead & McNiff, 2006) as the notion of teacher- as-researcher informs this study (Burton & Bartlett, 2005).

Additional theoretical perspectives that I have referred to in relation to ICT in teaching are sociocultural theory as explained by Smidt (2006) and Bronfenbrenner's ecological systems theory (Burt, 2012). These various theories and action research methodology have been discussed in detail in the methodology chapter.

This thesis documents the growth in understanding and practice that occurred as a result of my self-study, as an early childhood teacher, into teaching practices and values which supported me to articulate and develop a personal ICT action plan for improving my own teaching in the future. To do this, I conducted a small scale qualitative study. The action I took was the exploration and reflection on innovative uses of ICT by interviewing a purposive sample of four teachers in the greater Auckland region who were experts in the field of ICT. The main findings from the interviews showed that when teachers try new ICT ideas, their values determine the ways that they can adapt to the change and the way that they can use the new ICT initiative to improve their teaching and learning practice. Based on an analysis of the data, I drew up a strategic plan for introducing ICT innovations for my teaching context in relation to my teaching values. The purpose of this research was to assess my own teaching and extend my expertise, rather than assessing children's learning.

Today, there is so much ICT available, as people from all over the world are constantly developing new innovations. Thus, one good way for the early childhood teacher who wants to improve teaching and learning in general and the use of ICT in particular is to reflect - in-action, as this can help to focus on the process of learning (Boud, 2001). While some contemporary early childhood teachers are reluctant to intervene in children's play (Ryan, 2005), others such as de Lissa have urged the teacher to remember that she is an educator, and to come forward, sometimes to guide, sometimes to influence, sometimes definitely to teach (Whitehead, 2008). Although this dilemma applies to all teaching, it specifically applies to the introduction of ICT in early childhood.

In completing this thesis, I tried to understand and learn by exploring current ICT innovations in the early childhood education centres I visited and by interviewing the teachers involved,

so that I could make cycles of changes in my own teaching context. Exploring and experimenting in one area of ICT, such as the use of digital microscopes, led to further changes in my teaching practice and assumptions about the use of ICT. I documented these in my journal, to ‘grow and develop within my profession’ (O'Connor & Diggins, 2002, p. 47). To address the implications of learning about ICT, I focused my efforts on sustaining the values at the heart of the ICT related educational experiences. I also selected and included ICT strategies in my teaching that were in harmony with the values and philosophy of myself and my Centre. Describing my values helped me to realise that they were not going to be enshrined within the terms of my teaching contract, rather they could only be preserved and respected when embedded within my teaching and evident within the shared and lived culture of my early childhood centre (Codd, 1999).

Thesis overview

The thesis follows the traditional structure. The chapters are as follows:

Chapter 1: Introduction where I look at theoretical perspectives with regards to ICT that might have an impact on an early childhood teacher's attitude and teaching practice.

Chapter 2: Literature review where I critique current literature to find areas for extension of knowledge in this area.

Chapter 3: Methodology that explains theoretical perspectives and the research design I engaged in a systematic way in gathering relevant data through interviews.

Chapter 4: Findings and data analysis where I explore and analyse data from interviews using a self- study method inspired by action research, for my own growth and understanding.

Chapter 5: Discussion and thoughts where my values guide me to notice and respond to what can be of significance.

Chapter 6: Conclusion to draw my own action plan for making positive changes in enhancing, enriching and updating my own teaching practice in particular and my teaching team in general.

Conclusion

The world is now awash with digital resources, such as interactive, online learning tools, that can help make teaching and learning more engaging and more effective (Kaye, 2014) or it can make the teachers feel insecure and threatened (Genet, 2013) . Therefore, in this research, I intend helping teachers like myself to take advantage of ICT so as not to feel threatened by it, but to use it to enhance learning in early childhood educational settings.

Chapter 2

Literature review

A considerable amount of literature has been published on the evolutionary nature of ICT (Ham & Wenmoth, 2010) that indicates that as the new generation is being immersed in information and computer technology (ICT), teachers and educators should continue to explore, trial, implement, revise and recommend ICT at all levels of the New Zealand education system (Billowes & Alexander, 2010b; Bond, 2010; Hatherley, 2010; King, 2010; Tait, 2010; Tame, 2010). Ala- Mutka, Punie and Redecker (2008) state that teachers should continue to explore and experiment with different ICT tools and approaches such as multimedia, visualisations and digital representations because they can enrich children's learning environments and improve teachers' practice.

Given the rapid expansion of digital technology, the definition of ICT could be broad for the early childhood teacher. It can encompass a vast range of electronic technologies that are used for the communication of information, as well as for enhancing efficient teaching and learning. This includes computers, such as laptops, the internet, blogs, wikis, video cameras, mobile telephones, printers, scanners, tablets, interactive whiteboards, electronic toys, digital recording devices, iPads and digital microscopes to name a few (Ministry of Education, 2008). For the purposes of this research, ICT is defined as technology- based innovation used as a tool to enhance communication, and as an effective tool for teachers' to improve teaching and learning. Goodfellow (2011) suggests that the concepts of digital literacy is expanding as more technology is becoming available in the hands of the learners and many of the teachers. He expects teachers' learning, capability and confidence should be developing in this area due to an increasing level of connection and accessibility to digital technology. I have used these two areas of ICT to structure the literature in this chapter.

The first part of this literature review focusses on infrastructure and discusses issues of accessibility and connectivity, such as ultra- fast broadband, cloud computing and the extent to which connectivity can be included to strengthen teaching practice. To conclude this section, I consider some philosophical and theoretical trends relevant to technology, followed by discussions and examples of digital technology found in the literature to indicate there is room for extension of teachers' practice, as exposure with ICT is where the world is going, and teachers like myself should become more informed about ICT.

The next section relates to the ICT literature, especially research completed in recent years by CORE Education's educators and researchers, which indicates enhancing teachers' ability and confidence is vital in selecting and using ICT tools from the vast sea of available ICT innovations. The literature review then explores research that has been completed, mostly in the last decade, to highlight the different purposes for which ICT has been used in the teaching and learning environments. This section also highlights the need for teachers, who are contemplating inclusion of ICT, to research this area. I refer to ICT's role in redefining education, in emancipating and transforming the teacher and in supporting young children's engaged minds. This is especially so when ICT relates to relationships, as teachers and parents in our community within Aotearoa New Zealand now show less scepticism of the internet. The literature indicates that many users of the internet now prefer the web to any other source of information, confidently browsing, and increasingly creating or enhancing relationships from online connections, so acceptance has already occurred with the use of the internet in the lounge and kitchen within our daily lives (Davison, 2014).

Therefore, over the last decade, because technology has been evolving, the beliefs and skill levels of children have continued to challenge the expectations from teachers, necessitating programmes for building teacher capability (Billowes & Alexander, 2010a). From doing this study, my aspiration is that I become more competent and can go through an 'organic growth', integrating ICT into my teaching practice (Billowes & Alexander, 2010b, p. 51).

ICT infrastructure

ICT infrastructure can be defined as the visible computer and communication devices we use to connect to each other and to the outside world (Zwimpfer, 2010a). Looking back more than a decade ago, with the Ministry of Education's publication of *Interactive Education* (Ministry of Education, 2003), attention was first brought to building schools' technical infrastructure where major initiatives and ICT projects included recycled computer schemes, national ICT Helpdesk, introducing laptops and ICT infrastructure grants and support for wireless broadband access to remote schools (Ham, 2010). *Interactive Education* (Ministry of Education, 2003) and *Digital Horizons* (2003) were good steps forward in recommending better ICT infrastructure strategies and policies. However, the government's commitment to ultra- fast broadcasting, and Ministry of Education's implementation of a National Education

Network resulted in increased access to ICT to create better interactive opportunities (Zwimpfer, 2010b).

During 2002- 2006, the second key strategy document *Digital Horizons* (Ministry of Education, 2003) was published, that included new projects such as a central video conferencing bridge, a software that allowed multiple parties to see and talk to each other on line, and new Microsoft software updates (Ham, 2010). During 2006- 2010, the third key policy document released was an e- learning action plan focusing on standardised infrastructure with new projects, laptops, guidelines for updating the Network, systems and advanced fibre network and developing IT administrators who could install or upgrade computer components and software, provide routine automation, maintain security policies, troubleshoot, train and/or supervise staff, or offer technical support for projects (Ham, 2010). Since then, initiatives such as ultra-fast broadband and school network upgrades have ensured all schools' connectivity once they received their fibre drop (Ministry of Education, 2013). Similar trends have followed for early childhood centres and Kindergartens. Martin (2008, p. 154) suggests that digital technology will become 'both the means and the symptom of social change' for achieving what Vygotsky calls the highest levels of thinking through social interactions for teachers as well as learners (Woolfolk, 2004). As an example, in the AUT early childhood centre, access to high- capacity ultra-band broadband, and fibre- based links that were previously limited, since 2012 have been extended from the teachers' office space to the whole early childhood centre's building in 2014. Consequently, with infrastructure in place, what remains to be explored is the pedagogical aspect of the ICT innovations for me, the teacher. This is because it is best when teachers ensure the increasing scope of ICT infrastructure remains synchronous with good pedagogical practice (Zwimpfer, 2010a).

ICT as a medium for redefining learning, and for emancipating and transforming teachers

In this day and age, the meaning of learning can be understood and interpreted differently from what it used to be years ago. Ackermann (2007) spoke of psychologists and pedagogues such as Piaget, Papert but also Dewey, Freynet, Freire and others from the open school movement who gave insights into rethinking education, imagining new environments and putting new tools, media, and technologies at the service of the growing child. Accordingly, learning, especially today, is not about transferring facts and information from the teacher (as

the knowledgeable) to the children (as the learners). Instead, today's education, as Ackermann (2007) states, should be reflected as the way we put our own words to the world, or find our own voice, and exchange our ideas with others. Furthermore, education today can be interpreted as a valid way to understand how ideas are formed and transformed, for the teachers to think about expression of their ideas or values through different media, where digital media and computer-based technologies can be a powerful medium in the 21st century (Ackermann, 2007).

Gibbons (2007) states that teachers' critical thinking is needed to assess design and use of technology in order not to be reduced to technical rationalisation and to become able to actively interpret and negotiate learning aspects. One philosophical view of technology is Bowers' view, that as Gibbons (2010) explains, rather pessimistically views all the social, political and economic relationships produced by and hidden by technology are considered as exploitive tools for utilizing Earth's resources. Bowers is less concerned with any positive roles technology may be able to claim for offering any new educational solution. Moving away from this extremist view, and adhering to another more moderate rational view, I refer to Gibbons' (2010) interpretation of Heidegger's substantive theory. Gibbons (2010) argues that this philosophical view regards technology as constituting a new type of cultural system that restructures the entire social world as an object of control and reveals our own reality. Taking on this philosophical view, I pose the question of what constitutes the teacher, the parent, or the child's meaningful relationships with ICT because as Smidt (2009) emphasises, being in touch with the reality of education means to appreciate that there are many different learning and teaching modes and teaching should reflect these.

To understand the relationship between humans and technology, another philosophical view in the ICT literature is Feenberg's (1999) view that suggests people co-exist with modern technology to live a full and rewarding life. This theory can help to question the role of teachers in the design and use of technologies for the classrooms in ways that influence teaching and learning through appropriate use of ICT. Accepting Feenberg's (2002) interpretation also means that technological innovations are central to the social and political structure of modern societies. Therefore, the real issue is not technology or progress per se, but the variety of possible ICT paths of progress from which the teacher can choose. If the teacher believes, as Papert (2004) did, that knowledge is actively constructed by the child in interaction with his/her world through making new discoveries, or if the teacher believes, as

Vygotsky (1997) did, that social interactions are necessary for establishing high levels of thinking where extensions of human capabilities and contexts for social interactions could support learning (Sutherland, 2004; Wenmoth, 2012), opportunities to explore ICT as a medium seem justified in education. We might even need to go beyond Vygotsky to see what children are constantly being and becoming through the use of ICT (Wood, 2012).

Central to the Gibbons' (2007) review of the philosophical views of ICT is the importance of questioning and the value of difference. Teachers and educators hold different values regarding ICT and so consequently need to reflect on dealing with these conflicting values. According to Gibbons (2007), what seems promising is that increasingly ICT provides solutions to its own problems and hence leaves people wondering whether the technology is the problem or whether people have to catch up with it.

An increasingly important issue in the education field is the recognition that there are different ways that different individuals develop their thinking. Where ICT innovations are inevitably present, part of developing emotional intelligence for a teacher is to be able to navigate the social environment, recognising and working through these differences (Barbey, 2014). Confronted with ICT innovations, an intelligent approach for a teacher would be to use the opportunity as Ackermann (2007) explains to experience being situated, connected, and sensitive to variations in the environment and to consider, experiment or reflect on the use of ICT. However, Gibbons (2010) highlights a different aspect to this assumption that in New Zealand early childhood settings, teachers are often reluctant to engage with ICT innovations, especially as many have not had any ICT teacher training. Therefore, increasing the role of ICT in the early childhood centre can provoke mixed emotions. This highlights the teacher's responsibility for informed critique and to exercise a sense of caution before making any major changes.

On the other hand, Baloch and Kareem (2013) speak of situations where people want to do too much too quickly with ICT. This can happen for teachers as well and is closely related to the challenge of living in the technological wave as the quantity of information becomes so vast and is changing so fast that teachers might become less and less able to cope. The ongoing challenge is how to only pay attention to what ICT is meaningful and applicable to each unique context (Norman, 2013).

Martin (2008) highlights the vital role teachers can play in supporting the children's learning journey to become digitally literate in exploring ICT innovations. Martin (2008, p. 164) suggests that teachers should not be seeing their role as implementing everything they explore, rather they should be more concerned with the way they critique, reflect, identify and make judgements about 'generic cognitive abilities, processes or meta- skills' involved with ICT innovations. Therefore, for optimal use and design of ICT in the curriculum, as Bennett, Maton, and Kervin (2008) believe, more considered research that includes the perspectives of teachers is needed to firstly understand the situation. As Gibbons (2007, p. xiv) states "it is often through questioning the assumptions that certain power relationships are revealed associated with play and technology".

Papert's "diving into" situations approach illuminates the importance of connectedness rather than separation and also suggests one powerful means of gaining understanding is to examine, research and investigate closely, rather than looking at things from a distance (Ackermann, 2007). Sometimes for an individual teacher this kind of diving into unknown situations is at the cost of experiencing a momentary sense of loss of confidence or identity, which becomes itself a crucial part of learning (Ackermann, 2007). As Ackermann (2007, p. 10) describes:

Only when a learner has actually travelled through a world, by adopting different perspectives, or putting on different "glasses," can a dialogue begin between local and initially incompatible experiences. Both "dwelling in" and "stepping back" are equally important in getting such a cognitive dance going.

In recent years, there has been an increasing amount of literature on the way teachers are becoming more engaged at a deeper, more critical, and more meaningful level with ICT innovations. This dialogue should continue, for example, through e- fellowship programmes that endorse inquiry- based approaches to implement ICT in teaching and learning programmes (Kellow, 2013). Gerbic (2010, p. 136) advised planning for a more "skilled curriculum or learning design" and "getting the blend right" between face to face learning and ICT- related mediums to create more successful new learning potentials with ICT. This approach can be further researched in early childhood educational settings.

Several researchers, for example Ackermann (2007) and Gibbons (2010), have described how people can be defined through values and beliefs, the language that we use, the way we fashion our knowledge, the way this knowledge then contributes to how a society views and

defines us, and importantly how we view and define ourselves. These writers describe how the beliefs we hold about children's learning are deeply grounded in our own convictions about what it means to be knowledgeable, intelligent, experienced, and what it has taken to become so. Whether implicitly or explicitly stated, these convictions drive our attitudes and practices as parents, teachers, and researchers. Therefore to rethink education and learning, to transform and emancipate the teachers as learners, teachers like myself can research with ICT so as not to become technocentrically consumed with ICT, but to extend knowledge and experience for introducing new purposeful ICT into teaching and learning situations.

ICT and early years

This section is a review of some ICT technology in educational settings in the last decade. In this literature, it is clear that the voices mostly missing are those of the early childhood teachers themselves. This indicates it is timely that more research is done and more space is given for teachers' stories about technology, as ICT can not only transform our daily lives, but it can also transform learning and teaching (Ministry of education, 2005).

Some ICT literature in the early years sounds more optimistic for encouraging teachers to build on learners' home experiences as research shows technologies from an early start is likely to be advantageous (McPake & Plowman, 2010).

Even though ICT is now used slightly more in early childhood educational settings within Aotearoa, as Gibbons (2010) states, the decision to use or not to use the ICT innovations rests mainly with the teachers. ICT use is supported by New Zealand's main early childhood curriculum document, *Te Whāriki* (Ministry of Education, 1996b) and *Quality in action* (Ministry of Education, 1998). These documents advocate for teachers to increase young children's participation in the symbol systems and technologies of ICT for personal, social, and cultural purposes so that they become confident and competent in culturally valued enterprises, express emotion, make connections across places and times, contribute their own abilities and viewpoints to the community, communicate with others (including appreciating the ways in which the available cultures communicate and represent), and make sense of their worlds. ICT as a pedagogical tool can be built by teachers as fully autonomous social beings who are inspired by socio- cultural theory. When early childhood teachers learn to overcome the domination of traditional academic practices (Coutts & Kaye, 2012) and because ICT is not the domain of any one particular culture, it can be used as a cultural tool in many

societies. This is one good reason it should be incorporated into teachers' on-going reflection on teaching practice to maximise multiple teaching and learning opportunities.

Smidt (2009) states that it is possible to use computer games or other passive experiences with children, such as the time they spend watching television, to encourage children to think about, question and reflect on what they hear and what they see. Smidt (2009) refers to Loris Malaguzzi who talked about children having a hundred languages, meaning that children have many ways of representing what they feel and think about their world and their experiences in it. Here ICT can stand up as one effective medium. As game playing is becoming more popular among young children, it deserves a great deal more attention (Thai, Lowenstein, Ching, & Rejeski, 2009), because it helps children learn not only to follow an interest of their own, but also to create an opportunity where peer learning can occur. Similarly, Feasey and Still (2006) consider the central premise of using ICT successfully in early years education as children working at their own pace. They recommend early childhood teachers follow children's interests, using ICT as a medium to engage children's minds and support independent learners and decision makers, who can take control of their own learning environment. In particular, Martin (2008) suggests that policy makers and teachers look reflectively at digital literacy with models of socio- cultural and intellectual empowerment that can transform children's thinking capacities.

It has been suggested that teachers select and use ICT to empower children to build positive learning dispositions. This can become the foundation for building success in the early years and beyond (Crick & Yu, 2008). Success for all children in the early years can be explained when the teachers feel capable of planning, implementing, and evaluating a curriculum that is designed to enhance children's learning and development through the provision of learning experiences throughout the early years (Education Review Office, 2012). Shifting from a developmental approach to a dispositional focus in the recent decade requires teachers who are committed to change, extensive time and resources (Turnock, 2009) to make a curriculum suitable for individuals' learning needs, for children as well as teachers. A dispositional focus is when teachers work with a dispositional framework to analyse and describe the learning they see. A dispositional curriculum would describe learning as being able to try something new, being playful, persisting, using trial and error, making mistakes, choosing hard work, keeping going when things get tough, being brave, and curious (Claxton & Carr, 2004). A developmental approach, on the other hand, deals with the developmental

characteristics of children at ages zero to two, two to three, four to five and the implications of these characteristics in the selection of play equipment and setting up the learning environment, based on the proven fact that young children respond best when caregivers use specific techniques designed to encourage and stimulate progress to the next level of development (The World Bank Group, 2011).

Smidt (2009) explains that the research to date is in line with Vygotsky's belief in using ICT in the early years as a medium to facilitate problem solving or thinking processes within a social sharing of a problem, or of the attention to peer interaction that is essential in effective learning. The inclusion of ICT as one dominant cultural tool has recently grown in planning for and organising the learning environment, as educators plan for the use of other symbolic systems or 'languages' (Smidt, 2009, p. 140).

There is also a growing body of evidence that supports the view that digital technologies, such as online communities of teachers, can create the potential to improve teaching outcomes, enrich curriculum and even enhance learners' metacognition (Coogan, 2012). This arises the question of how early childhood teachers demonstrate they can pursue possibilities along with digital opportunities to become an enabler for e-learning (Fallon, 2010; Kaa & Parata, 2010).

Striving to reduce the digital divide among early childhood teachers requires putting aside individual prejudices and assumptions (Hatherley, 2010) to explore the impact of ICT for engaging children's minds in areas such as motivation, efficacy, and interaction (Ministry of Education, 2013).

The issue of challenging traditional models of pedagogy to move beyond a transmission of facts and data from teachers to learners could prepare the grounds for creating a metacognitive learning process that is more meaningful (Burt, 2012). With this in mind, extending children's interests through ICT could be investigated further. This requires the more experienced teacher to demonstrate curiosity and courage to embark on a learning journey through research about ICT (Claxton, 2002). Claxton (2002) questions the purpose of education and recommends that adults should be preparing young people for a learning life for the future, emphasising a mindset of learning- power which focusses on the learning dispositions of resilience, resourcefulness, reflectiveness and reciprocity in young children's learning journeys (Claxton, 2002). Similarly, Dweck (2006) emphasises that if we want our

next generation to grow up as resilient, resourceful, reflective people, we ourselves, as teachers, should learn to believe that these abilities can be cultivated and we need to learn to work with a growth mindset.

Several studies have revealed that the real challenge is not for the teacher to teach children how to use ICT equipment, but to develop an environment where children can access ICT on their own terms allowing children to recognise important experiences, and engage with them so these become part of their own learning stories (Feasey & Still, 2006). This way, as Bolstad (2004b) recommends, teachers have a better chance to construct a less stigmatized and more strengths-oriented concept of themselves when they engage with ICT in a wider sense, distancing from what it means to be a technophobe or a technophile.

Siraj-Blatchford and Siraj-Blatchford (2003) state that there used to be relatively little literature published on evidence-based guidance available for ICT use in early childhood education. However, numerous studies have argued for preparing young people for the future, not only by encouraging teachers to ‘connect and share’, but also to ‘learn and do’ with ICT innovations, as this process, once started, won’t stop (Pesce, 2013).

Yelland and Gilbert (2014a) researched the use of tablet technology in early years and advised that teachers should take the time to play and become familiar with Apps. This would ensure that they suit their goals for learning to the particular age range of children, because often the claims of the ICT developers are over inflated and the scope of the App could be very limited. In their project, they tried to explore the possibilities for learning and concluded that even though we should recognise the potential of tablet technologies for knowledge building, meaning making and learning, reconceptualising curriculum goals requires teachers to go beyond using new tablet technologies as playthings to become creators, innovators and to support them in their reflections about the things around them (Yelland & Gilbert, 2014a). Therefore, teachers should work collaboratively to incorporate tablets into their pedagogical repertoires to complement each other’s’ teaching skills (Yelland & Gilbert, 2014b). They achieved this by creating contexts for learning activities that occurred at the individual, small group and whole group levels, where senior teachers and student teachers could work collaboratively in a pedagogical partnership which engendered confidence in using tablets with young children. The researchers stated that multimodal learning is facilitated when tablets are used in early childhood contexts. They also noted that opportunities for learning with tablets can be transformative and enable modification and

redefinition of traditional activities with dynamic and positive learning outcomes. Therefore, professional learning contexts should be designed to share exemplary practices that build on, extend and transform traditional learning to enable new ways of thinking about multimodal learning that facilitate 21st century skills (Yelland & Gilbert, 2014b).

Teachers developing their own perspectives and capacity to continue acquiring new skills and knowledge with technology should be encouraged to become enablers for economic and cultural developments in children's emergent curriculum (Kaa & Parata, 2010). For example, by exploring a digital microscope or social networking, technological skills can be harnessed and a platform can be made to ensure success for the present generation in a future they can be in charge of (Kaa & Parata, 2010).

A number of studies argue for the use of ICT to enhance young children's curriculum in a way that reflects the holistic way children learn and grow (Ministry of Education, 1996b). Making sense of ICT as a valid socio- cultural tool, has been emphasised in the following sections of the literature to extend different areas in the curriculum.

ICT and literacy/ numeracy

Literacy learning outcomes, through literacy programmes such as Sunshine Online (a web-based, cross-platform, child-centred literacy resource) can be used to enhance learning and strengthen home and school links and support home-school relationships (George, 2013). Becoming numerate, using ICT, has been another potential for the teachers to extend young children's learning in using, building and creating designs for specific purposes (similar to a communicate inquire, create module) (Yelland, 2005). The thinking teacher should be investing in and updating on technologies such as iPads that are now one of the latest 'must have' gadgets for learning (Kellow, 2013). To view the iPads as multimodal literacy tools with interactive digital contents can in many ways help and foster teaching and learning dispositions and benefit the learning outcomes (Claxton, 2002). However, a key problem could occur if the teachers are not integrating the use of the iPad technology in their educational settings with vision (Banister, 2010). This highlights the need for the teachers to stay selective about the apps, as well as possibilities and research options for the benefit of enhancing teaching and learning long- lasting effects (Banister, 2010). In particular, when it comes to ICT innovations related to iPad technology, as Colbert (2012) cautions with over 275,000 apps currently dedicated to iPads, one big dilemma is where to begin and what to use

the iPad for. Sometimes using ICT wisely could be demonstrated in the practice of ‘less is more’ as when there are too many apps for children, they could just switch between apps and not learn with any depth (Colbert, 2012).

Even though new research compares and claims that New Zealand children lack real skills, for example, only eight percent are able to tie their shoe laces by the age of five while more than fifty percent know how to use an iPad (Barback, 2014), the teacher should not avoid ICT, as it would be unrealistic to keep ICT from children until they are considered old enough. Instead, teachers should try to notice and reflect on numerous learning opportunities that could be enhanced because of such intense interest of young children in iPads (Barback, 2014). Referring to this research, early childhood council chief executive Peter Reynolds stated that this is a reminder that parents and teachers must take a more deliberate approach to how children are exposed to ICT (Barback, 2014). He states that it is important to use ICT as a learning tool, but also to take some responsibility and create balance to ensure that children are not overexposed.

ICT & inquiry teaching models beyond the classroom

ICT initiatives can be used by the teacher for inquiry teaching models to construct a personalised e-learning action plan that focuses on developing thinking skills, encouraging differentiation (offering different learning experiences to suit each child) and collaboration (Amos, 2013; Zohar, Degani, & Vaaknin, 2001). Creating more collaborative, supportive learning environments and enhancing opportunities to learn beyond our classroom walls through digital tools and e-learning projects can provide rich and relevant online learning experiences (Power, 2013). Through the use of Skype, teachers can share projects based on the children’s interests beyond the classroom doors (Glass, 2013) and facilitate transitional practices for young children when they use ICT as a possible bridge for learning between the two sectors of primary and early childhood education (Mawson, 2003).

ICT and science

Following the inquiry model of teaching and learning, teachers can help young children to explore viewing everyday objects with a digital microscope. This offers children something exciting that is unavailable to their naked eye, whereas supporting children to use digital

cameras independently offers them an immediate record of what they are observing, while developing their personal expertise in taking photos (Feasey & Still, 2006). So perhaps more than any other area of the curriculum, science offers the widest range of possibilities for using ICT because the ultimate aim of education should be to produce well- informed literate citizens who can construct learning themselves and problem solve in their futures (Feasey & Still, 2006).

ICT and games

Gee (2005) suggests that if children are interested, teachers should change their minds about banning computer games from schools. The view that early childhood is a time of significant discovery and development in all realms of life leads to an increasing consensus that computer games could be taken more seriously as both learning and assessment tools (Wikibooks, 2008). If early childhood teachers can extend different areas of the curriculum and integrate various skills such as language, mathematics, and science using ICT as a medium, computers are generally advised to be integrated into the curriculum as a useful element for instruction that can be applied to real problems for a real purpose (Wood, Specht, Willoughby, & Mueller, 2008). However, while the research to date has generally supported integrating computers, teachers should also take into account some critical concerns and limitations of this use (Wood et al., 2008). Here, the role of the teacher is vital as young children do not always detect or properly interpret psychological nuances or underlying emotions that might accompany ICT and they are not yet able to understand some misleading or untrue messages embedded in computer games or you- tube video clips (Lieberman, Fisk, & Biely, 2009). Even though some early childhood centres put greater emphasis on natural outdoor play and describe ICT in early years as a toxic influence, the negative problems have not been the result of the digital technology itself, but the way it is sometimes misapplied (Siraj-Blatchford & Morgan, 2013). Therefore, for young children to gain the most valuable computer skills, they need to develop the ability to use computers as natural tools for learning.

ICT and relationships

The potential of computer technology for teachers is vast and the effective use of technology can involve many teacher decisions and opportunities for teacher involvement (Cox, Webb, Abbott, Blakeley, Beauchamp, & Rhodes, 2003). ICT literature shows that when teachers are

encouraged to reflect on their role and beliefs, they feel less concerned and less pressured that they have to catch up with all the available ICT (Cox et al., 2003). This can result in technology being used as a 'servant' (to reinforce existing teaching approaches), or as a 'partner' (to change the way teachers and pupils interact with each other and with the tasks) (Cox et al., 2003, p. 3) to explore more possibilities, to become more reflective and capable in selecting the most appropriate resources in line with the teacher's values and for making more informed decisions.

Te Whāriki (Ministry of Education, 1996b, p. 46) stresses that family and community are important for making significant contributions to children's well-being, emphasising 'the critical role of socially and culturally mediated learning and of reciprocal and responsive relationships for children with people, places, and things'. Technology resources for education function best in a social environment, especially when mediated by learning conversations with peers and teachers (Sutherland, 2004). This view suggests it is up to the early childhood teacher to facilitate children's learning through collaboration with other adults and peers creating the best social environment where relationships can thrive.

There is a rapidly growing body of literature which indicates that ICT has become synonymous with the idea of connectivity as computers are not used as stand-alone devices any longer, therefore, the collaboration has become possible in a scale we could not imagine in the past (Pesce, 2013). Such connectivity requires early childhood teachers to make more concerted efforts to be resourceful, innovative and reflective when it comes to selecting and using ICT innovations in building up their hyper-connective education system (Burt, 2012). The number of early childhood teachers on social networking media such as Facebook, blogging, skypeing is increasing. This applies especially to teachers who are networking with like-minded people or learning individually through educational technology, where professional growth and relationships are enhanced through collaborative conversations in whatever forums they may take place (Moffatt, 2010).

Research on blended learning situations (where learners use ICT innovations both at home with their families and the learning institution) for adult learners has shown to be enhancing relationships, adding to the variety of communication devices used for having conversations and creating spaces for more student driven dialogue (Gerbic, 2010). Creating a similar blended learning environment (for example, through social networking or e-portfolios) in my early childhood centre could enhance communications with parents and children. As well, it

could increase my confidence in becoming more ICT literate, thus improving my teaching and learning opportunities. This is an area that I would like to experiment and reflect on further with ICT. This is of particular relevance, considering that one key indicator for teacher registration standards in New Zealand is to reinforce close working relationships between the early childhood centre and parents, caregivers and whanau, as well as to become proficient in ICT (New Zealand Teachers Council, 2014).

Zuboff (1988) emphasises that it is in the complementarity of human and computer capabilities that productivity increases. Taking productivity as one enabling element to help people maintain more stable relationships with others, children and families could become global citizens who can keep in touch with each other (Coutts & Kaye, 2012). An interesting metaphor on how digital technology can strengthen us, is likening ICT to when an audience gathers around a digital campfire to hear their story and polish the rough edges of their lives so that they feel whole (Tempest, 2012, March). This sense of virtual togetherness can bring people closer to each other when parents of a child authorise other parents or family members in New Zealand or overseas to share joy and pride in their child's learning stories, or to give comments and ideas, in their child's e-portfolios.

The excellence of teachers' documentation can be attributed to relationships we make and as Carr (2001) recommends teachers should try to make learning outcomes in learning stories visible to better share young children's special moments. How ICT can assist in telling children's stories in unique ways not told before, in binding community together and strengthening a sense of togetherness, will be reflected on in this study.

On the basis that making 'genuine relationships' and 'strengthening ties with Whānau' (the extended family) is seen to be of significant value in early childhood documents (Ministry of Education, 2004, p. 3), ICT innovations should be used by teachers for developing a platform which allows collecting, organising and presenting digital evidence in a variety of media types over time for different purposes and audiences (Chau & Cheng, 2010). However, I don't want to be reduced to technocentric areas, and ask whether ICT still serves human purposes (Sutherland, 2004).

Even though with ICT in Aotearoa New Zealand, there has been some allocated budget and emphasis on upskilling teachers (Armstrong & Casement, 2001; Gibbons, 2007; Thompson, 2005), providing teachers with opportunities to think, explore, reflect and justify their actions

and the values that underpin their practice should be of even more practical value and that remains a main purpose of this study. As Coogan (2012) recommends having professional learning which is situated and authentic for teachers who are keen on ICT can be one promising area to develop more fulfilled relationships. An example is the professional learning seminars that I attended in 2014 (CORE Education, 2014) that provided me with a good opportunity to build new relationships and network with my colleagues on what children liked to experiment with, especially on iPad technology and how teachers could support meaningful learning. Another example is when I learnt about sharing photos, videos and stories about the children's e- portfolios (after getting permission), that is like an open invitation to the parents, whānau and other teachers to contribute to children's learning.

For this to happen, as Daniels, Cole, and Wertsch (2007, p. 188) state choosing a 'have a go' attitude is necessary, and through this journey what might at first appear as a failure to communicate could become the key to entering into a new area of instruction. Using ICT innovations can help the teacher to add to the conversations that exist between parent and child, society and child, and teacher and the child, or teacher and the parent. Such conversations could influence the ways learner thinking develops and social actions are constructed through a community of practice (Wickman & Ostman, 2002).

Chapter 3

Methodology

Introduction

“The aim of methodology is to help to understand in the broadest possible terms, the process of the inquiry” (Cohen, Manion, & Morrison, 2003, p. 45). This chapter outlines the methodology and research design that I chose as being suitable for this research study. The theoretical underpinning for this study is constructivism, informed by socio-cultural theory (Ackermann, 2007) and Bronfenbrenner’s ecological systems theory (Rogoff, 2003) that have been chosen as the most relevant supporting theories for this research.

Constructivism was the main theoretical methodology for this study, as it is a good approach to help the teacher to consciously think about the dynamics of change and study practice in ways that are situated, connected, and sensitive to variations in the teaching environment (Ackermann, 2007). Constructivism sees thinking and learning as an individual thing where new knowledge can be built upon prior knowledge (Ackermann, 2007), informed by socio-cultural theory that sees thinking and learning as distributed amongst the community of practice (Rogoff, 2003). Bronfenbrenner’s theory also informed this study, as this theory helped me to see all learning as occurring within a context that shapes the way people think and learn (Rogoff, 2003).

World view

In this chapter, I have set out a series of interconnected ideas that underpin how I approached the research topic. To explain my view of the social world, I reflected on my world view by considering the assumptions that acted as a starting point for this study and explained this in terms of macro, mid-range and micro level theories.

A macro theory gives an overall framework for how learning, and society in general, works, while mid-range theories focus on theories that inform this research by looking at individuals and their consequent interactions in the learning context (Mutch, 2013). The macro theory used in this study was constructivism, followed by the socio-cultural and Bronfenbrenner theories for the mid-range theories. The micro theories dealt with particular

phenomena of ICT in educational situations in this study in a more concrete manner (Mutch, 2013). The micro theory I used was the self- study method.

Macro level theory

Constructivism

Constructivist theory was used as the main theoretical framework for this study as it related to the general field of discovery of learning allied to theorists such as Piaget and Bruner that assumes that learners actively construct or build knowledge beyond what they already know (Johnston, 2015). In constructivist theory, the emphasis is placed on the learner, and the ways the learner interacts with objects and events to gain an understanding of the features held by such objects or events (Johnston, 2015). This view helped me to inquire into my own teaching practice whilst also remaining open and responsive to changing influences in the teaching and learning environment (Dalli, 2010).

The constructivist perspective provides strategies for promoting learning by all (National Council of Educational Research and Training, 2005), and assumes that learners should actively construct or build knowledge beyond what they already know (Howard, McGee, Schwartz, & Purcell, 2000), using strategies such as scaffolding that require the teacher to facilitate problem-solving, while controlling the learning environment so learners can take things step by step, expanding their base of knowledge without excessive frustration, as Smidt (2009) has eloquently pointed out. The scaffolding is what makes learning an active process as *Te Whāriki* (Ministry of Education, 1996a) asserts learning happens when new ideas are constructed based upon current or past understandings. My own observation (in the early childhood field) is that going through this process is not easy for the teacher and therefore it requires ongoing reflection.

Constructivism involves metacognition that refers to the teacher's ability to understand and manipulate his/ her own cognitive processes. Therefore, it involves thinking about thinking and purposely making changes in how we think (National Council of Educational Research and Training, 2005). Reciprocal teaching is another highly successful constructivist teaching method that helped me to provide an environment of open dialogue between myself as the learner and the teachers I interviewed or observed, as well as between myself as the learner and the children with whom I interact. When used with children, scaffolding can start with a

simple question and answer and go beyond this. This can result in endless possibilities by using strategies such as alternating turns on leading discussions that enable the teacher to assume both a leadership and instructional role (Spodek & Saracho, 2005).

A Constructivist approach, as the main theoretical framework for my inquiry, helped me to discover possibilities in my teaching practice, and to realize some of my still unrealized potentials (Whitehead & McNiff, 2006). It implies that learners should be encouraged to construct their own knowledge instead of getting answers from an authority, be it a book or a teacher. This results in learning in realistic situations instead of decontextualised formal situations (Kanselaar, 2002). One good way to describe constructivism is that it is a useful framework for producing the most learning with the least teaching (Papert, 1993). Taking this approach guided me as a teacher to focus on my own individual learning by staying open to new possibilities and experiences while exploring ICT for my own learning journey.

Hence, constructivism as the chosen world view and macro level theory for this study ensured a strong research design, that also allowed me to have a research paradigm that was congruent with my beliefs about the nature of reality (Mills, Bonner, & Francis, 2006). A practical application of this theory for myself was that when I shifted from basic levels of operational engagement to higher levels of thinking (Hill, 2004), constructivism provided a framework. This way, I focussed on my role as a facilitator who should be activating prior knowledge for learning new concepts, going beyond teaching explicit instruction towards guided participation (Rogoff, 2003) by observing, understanding, and exploring children's real world with and alongside them, and other teachers (Ministry of Education, 2007).

According to constructivism, people are all products of their own social experiences where our constructed reality arises from the interactive processes we go through. Therefore, the teacher researcher who chooses to get involved with inquiry teaching is learning through such processes (Jordan, Carlile, & Stack, 2008). For this study, constructivism is closely related to the mid-range theory that is socio- cultural theory, which will be discussed next.

Socio- cultural (cultural-historical) theory

Smidt (2009, p. 47) speaks of Vygotsky's sociocultural theory as a framework for the teacher to understand what is meant by the term 'cultural' and how knowledge is passed on from generation to generation by focusing on the social side of learning as children's consciousness comes from others- adults and other children- and it exists only in response to a world which is social. The chosen theoretical background for this study is related to constructivism that is informed by the belief that wherever diversity reigns, traditional teaching methods will not work. Instead, auto-determination and negotiation are needed (Ackermann, 2007). Auto- determination is a trend that concerns teachers' inherent growth tendencies and relates to their innate psychological needs, such as motivation and the choices they make without any external influence and interference (Gagne & Deci, 2005). Negotiation relates to dialogues that teachers engage with for self-management, reaching an understanding and resolving points of differences (Ministry of Education, 1996b). Together, these characteristics can help the teachers to balance self- expression and exchange ideas with others.

Sociocultural theory, relevant to this study, is defined as a theory that brings together the history of the development of the individual in relation to the history of both proximal (near) and distal (far) contexts (Marsh, 2004; Marsh & Hall, 2003). Constructivism in a social sense is rooted in Vygotsky's socio cultural theory and contends that knowledge should not be transferred from teacher to student, but must be constructed in student's minds to emphasize the social context of learning. This implies that knowledge is mutually built and constructed. Therefore, rather than feeding information to the student through direct instruction, the teacher should also be learning while maintaining the role of facilitator in the learning process (Clemons, 2006). A sociocultural approach "values the knowledge the child possesses and creates spaces for the construction of new meanings and understandings" (Harwood, 2008, p. 4). Vygotsky (1997) emphasised that socio- cultural theory can challenge the teacher in researching the real world and thinking about the best ways to engage other teachers with active participation through social interactions because the highest form of thinking and learning happens this way. Of significance in Vygotsky's writings is the social situation in which the learning happens (Spodek & Saracho, 2005). According to Smidt

(2006), socio- cultural theory can be used as a basis for reflection on society's symbolic tools or the community systems which shape the development of thinking by early childhood teachers. For teachers in 21st century, it is impossible to ignore or avoid ICT as a symbolic tool and that is why more innovative ICT is becoming an essential part of teaching and learning environments (Yelland, 2005).

Te Whāriki, the New Zealand early childhood document, is a framework for providing tamariki/children learning and development opportunities within a sociocultural context (Ministry of Education, 1996b). The sociocultural principles that underpin early childhood documents such as *Te Whāriki* (Ministry of Education, 1996b) assert that learning is an active process where learners construction of new ideas or concepts based upon current or past understandings occur through interaction with people, places, and things (Ministry of Education, 1996b).

Guided by socio-cultural theory, as a teacher, I observed mentorship to encourage other teachers to trial ICT innovations. As a result of this, I resolved to support other teachers when needed to extend learning through increased participation, that could at first be peripheral, and then gradually evolve in engagement and complexity (Lave & Wenger, 2003). According to Vygotskian perspective, the cognitive, social and emotional self- regulations are viewed as an integral unit, rather than separate domains and the teacher is regarded as an adult with authority who steps in and solves a problem if peer mentoring is not moving forward the way it should. Hence, the learners learn how to manage their time and their attention, with the help of an attentive teacher to monitor their learning (Pesce, 2013). Keeping this theoretical perspective in mind and inspired by research, I formed a partnership with my community of learners for creating the process of co- construction of knowledge and culture, using ICT innovations.

Inspired by Vygotskian view that highlights the importance of social interactions, culture and language for cognitive development and learning, this study helped me in improving my teaching to create zones of proximal development using ICT innovations. These are the areas at which a learner can perform a challenging task, given appropriate help of a teacher (Woolfolk, 2004). If today's teachers learn to communicate in the language and style of those they teach, this does not mean changing the meaning of what thinking is, but it does mean going faster, less step- by – step, more in parallel with the learner. Hence the teacher is also thinking about how to teach not only traditional content but also future content to a

large extent (Prensky, 2001). This study helped me to think and learn more about ICT that is socio- culturally relevant to include in my teaching practice.

Bronfenbrenner's theory

The other mid-range theory that I used is Bronfenbrenner's ecological systems theory that explains the importance of contexts on learning (Rogoff, 2003). My reflections were informed by Bronfenbrenner's theory that looks at all learning as occurring within a context that shapes the way we think and learn (Rogoff, 2003). This theory helped me to look closely at the concept of connection between different worlds of a young child, where each individual child and the larger contexts are conceived as related in a hierarchical fashion as the 'larger' contexts affect the 'smaller' one, which in turn affect the developing child (Rogoff, 2003, p. 45). This theory supported my thinking and learning as it is shaped by the relations among the multiple settings in which I became involved (Rogoff, 2003). In other words, I exercised caution about separation of these contexts, or these nested systems, as the combination of these individual and cultural processes shaped my thinking and made meaning for me as a researcher (Rogoff, 2003, p. 48). In line with this theory was my relational pedagogy that supported me to become an informed, thoughtful and intentional contributor, so my learning deepens. This resulted in me becoming more mindful of what experiences a child brings to the learning and what I as a teacher should know (Meade, Williamson, Smart, Smorti, Robinson, & Lind, 2013).

On reflecting how context affects my individual learning and development, I believe the teacher should constantly learn about the social context of the child that begins at birth and is embedded in social and cultural interactions throughout life in a range of contexts, starting with the most influential context of the child's home and then the child's community and educational settings (Hamer, 2010). As I teach, I need to help children engage with others within their immediate contexts, so I can observe, explore and co-construct skills, meanings and understandings with those around me (Hamer, 2010). In other words, exploring and reflecting on ICT innovations for use in my teaching, requires me to constantly think, question and make meaning with the other teachers around me.

Micro level theory

The theoretical background of constructivism used in this study was informed by action research (McNiff, 1993), as I aimed to link theory and practice so that theory questioned my practice and my practice questioned the theory (Winter, 1989). This informed my own teaching (Stringer, 2004) to reach a better shared understanding for my own community of practice and to stay deeply grounded in values and cultures of my local context, to grow personally and professionally from engagement with this action research, as a researcher who inquired into my own teaching (Somekh & Zeichner, 2009). With a constructivist theoretical background, supported by socio-cultural theory as well as Bronfenbrenner's (Rogoff, 2003) nested systems theory, I used a self-study method to investigate my own teaching using an interviewing research design. This supported me to deliberate as an individual learner to find a deeper understanding of ICT innovations that I could use in the context of my own teaching environment. This allowed me to choose and implement what best fits as distributed learning and teaching opportunities for my own community of learners. In this self-study, the challenge was to get involved in my individual thinking and learning, in ways that I needed to resolve the tension between becoming embedded and emerging from embeddedness when needed (Ackermann, 2007).

Topic

With introducing or implementing ICT in my teaching and learning, I opted for the creation of a strong version of constructivism for learning that did not demand (of myself, of children and other teachers in the team) more than we could deliver (Goodman, 2010). To start, my aim was to create a "buy-into self-chosen" ICT system for myself, and in constructing that system, I thought more consciously about my values, to prioritize and modify them as needed. This is in line with principles of self-regulation and self-construction advocated by DeVries and Zan who support constructivism as a leading learning paradigm in the 21st century (Goodman, 2010).

The reason for choosing this topic, as Gee (2005) explains, was that teachers must become more involved, try, experiment, design and use the most appropriate technology for learning in line with their educational values and principles. Therefore, early in this research process, my purpose was to develop my own thinking, and be in charge of my own learning when it comes to exploring new ICT for improving my teaching. Even though I regard thinking,

getting involved and experimenting highly, these are not the core values that drive and motivate me as a human being and a teacher. This led me to identify my own core values, by reading back through all my interview transcriptions, my journal entries and the photos and observation notes from my visits to other centres. Hence, part of the research process was identifying my core values.

Methodology

The method I chose self-study was, as Meade (2011) suggests, the main reason that ICT is not effective in early childhood education is that the teachers are not well informed so more knowledge is needed about improving teaching practice. Referring to the core components in a teacher's professional work (teaching, learning and development, adult communication and collaboration), a self- study is a method that can further review and improve the value of education and care in an early childhood centre (Ministry of Education, 2000a). Self- study involves reflecting on my practice and this is an effective way of inquiring into my teaching (Gerbic & Maher, 2008; Grey, 2010; Hargraves, 2011). This is valid because research shows that while the importance of play in early education has grown as an area of interest in the last decade, critical reflection in early childhood education in general has remained marginalised (Hultqvist & Dahlberg, 2001). Therefore, for an early childhood teacher, the self- study method is an enabler for teachers to document the growth in understanding and practice of teaching and learning that occurs as a result of self-study. This methodology has a number of advantages, such as offering multiple possibilities to support teachers to reflect upon their own practice while engaging with teaching and learning situations (Grey, 2011b; Hargraves, 2011; O'Connor & Diggins, 2002). Justifying a self- study research method, for an early childhood teacher, is similar to doing a preservice or inservice programme that is recommended to help with constructivist teaching practice to gain a deeper understanding (Ray, 2002). A self- study method has the potential to expand my knowledge and expertise with ICT innovations, and enhance my professionalism by involving critical inquiry about my teaching practice (Dalli, 2008). This is in line with the constructivist paradigm, where negotiations and ongoing inquiry should be built into a teacher's continual struggle for dialogue and professionalism, as Grey (2011b) describes new knowledge can be added to the existing repertoire. For these reasons, I chose a self- study method for this research.

Self- study as action research (Whitehead & McNiff, 2006) supported me to reject the possibility of any one view of best practice (Davis, Sumara, & Luce-Kapler, 2000) and instead I focussed on my own personal learning and the way I recognised my educational values through my practice (McNiff, 2013; McNiff & Whitehead, 2006). Studying my own teaching and learning, I thought about the application of my values for best selection and design of ICT innovations in my teaching practice. Self- study method as a form of action research helped me to consider my choices to carry out a systematic investigation into my own behaviour, and the reasons behind that behaviour, to show the process I went through in order to achieve a better understanding of myself, so that I can continue developing myself and my work (Owen, 2006). Built into this kind of action research is the proviso, that if as a teacher, I am dissatisfied with what has already happened, I find the confidence and resolution to attempt to change it, as I choose not to be content with the status quo (McNiff, 2013).

Research questions

My overarching question was “how can I improve my own teaching by exploring through innovative use of ICT with young children?” This required me to engage with and reflect on what other researchers have done with ICT innovations, to consider my own values, and engage and investigate my research question by exploring innovative uses of ICT in early childhood education that led to changes for improving my own teaching and learning practice.

My sub questions for the qualified teachers were:

- How have you been using innovative ICT in ECE?
- How have you decided on the use and design of ICT innovations?
- Could you show me exemplars of this?
- What values underpin your use of ICT?
- Has the learning of children and teachers been enhanced through the use of ICT?
- Has the relationships with parents been enhanced/ strengthened?
- Has children’s documentation been enhanced?
- What limitations/ barriers have you encountered?
- How do the teachers teach the children cybersafety?

Sample size

Four qualified teachers, who had implemented ICT innovations in their teaching and learning, were interviewed. This sample size of four gave me a wide enough variety of responses and examples of innovative ICT use, while not being an overwhelming sample for a sole researcher. If any of the four teachers declined the invitation, I could invite others to participate until four teachers agreed to participate. This was purposive sampling, where I handpicked the cases to be included in the sample on the basis of their judgement of their typicality so that I could build up a sample that was satisfactory to their specific needs (Cohen et al., 2003, p.103). It was “deliberately and unashamedly selective and biased” (Cohen et al., 2003, p.104).

Method

For this study, I applied and received ethics permission from AUT University Ethics Committee. Interviewing qualified teachers, who had implemented ICT innovations in their teaching and learning, followed by writing reflections to think about my own learning and the changes that I wanted to make, helped me to expand my own thinking and to internalise new learning to inform my evolving teaching practice. Through the process of internalisation, my teaching practice evolved. This was according to Smidt’s (2009, p. 67) categories of ‘intermental’ learning at the first level, which occurred through interactions between myself and the other teacher engaged in the interview (as a joint sociocultural activity) and later became ‘intramental’, meaning that the learning took place within myself through thinking and reflection. Smidt (2009) relates this model of internalisation as closely linked to the ideas of Vygotsky and particularly to the notion of the zone of proximal development (ZPD), referring to the gap between what the learner can do unaided and what the learner might do with help. The foundational principle of Vygotsky’s cultural-historical theory, where learning begins at birth and continues throughout all of life (Gredler & Shields, 2008), guided me in choosing an interviewing method for gathering data from more informed teachers. This allowed me to see opportunities for furthering my own learning as “all learning is social: the roles of others cannot be ignored” (Gredler & Shields, 2008, p. 141).

To identify teachers who were experts in ICT for interviewing, I used the Core Education web-site (Ministry of Education, 2012) that showcased teachers who have had e-Fellowships in the greater Auckland region. Using the core education web-site, I contacted the CORE early childhood coordinator for Auckland region to ask for guidance in choosing my participants. This way, I found four qualified teachers previously engaged in ICT research who agreed to participate. After choosing four teachers through purposive sampling, I visited these teachers in their centres to learn how they integrated ICT into their teaching and learning. I interviewed the teachers using semi-structured interview method. Semi-structured interviews were chosen as I was aware to a certain degree of what I didn't know and therefore I was in a position to frame questions that would supply the knowledge required. On the other hand, relying on what the respondents were telling me, I could leave some room for flexibility and freedom (Cohen et al., 2003, p. 44). Semi-structured technique was appropriate for the development of the interview questions and reflecting on my own teaching. I analysed the data collected from these interviews as outlined in the findings chapter to see how these innovations related to my values for ICT selection, expansion and use in my own teaching and learning context.

Data collection

Data was collected using two approaches. Firstly four qualified teachers were interviewed and secondly, I wrote field notes that were my own impressions of each teacher's use of ICT, their work environment and my own reflections of my own experimentations and learning. In other words, in order to reflect on how each visit and interview informed my own teaching practice, I wrote field notes (Whitehead & McNiff, 2006). For each interview, I wrote a reflection in a learning journal on digital affordances of the new technology I encountered and its potentials for my own teaching with regards to my core values.

Afterwards, I recorded and transcribed the interviews. My field notes and self-reflections, as well as analysis of the data, helped me to show how my learning was enhanced (Whitehead & McNiff, 2006). The results helped me make changes in my own teaching practice and form an ICT action plan for my Centre.

Throughout the process of my own learning, writing my own reflections was similar to creating a social interactive learning environment for myself that helped me to absorb and adapt to what was happening. This was similar to how Vygotsky describes children,

especially toddlers and young children, who often speak aloud to themselves as they are trying to understand something. This self-talk helps them to work things out in their own minds (Corzo Zambrano & Robles Noriega, 2011). This signified the process of thinking that developed in this study for me as I wrote my reflections in my journal, I was metaphorically thinking aloud, something that was needed for internalising the ICT innovations that I encountered. This is because adults also need to think things through in the process of learning, and according to Vygotsky's observations, this is vital for internalising thinking and learning (Corzo Zambrano & Robles Noriega, 2011). Interestingly enough, recently neuroscientists have discovered that all of the brain is more plastic and changeable, even in adulthood, it is much more than we ever thought before (Gopnik, 2009). Therefore, it is never too late for senior teachers like myself to learn ICT skills.

Data analysis

In order to analyse the data, I tried to find order and understanding through content analysis that is recognised as a systematic approach for interpreting and analysing narrative data (Taylor-Powell & Renner, 2003). I read and re-read through my field notes and after listening to the recorded interviews several times, I transcribed them, constantly thinking about the purpose- that was to improve my own teaching and learning. Next, I identified themes emerging in each interview from which I formed some coherent categories (Taylor-Powell & Renner, 2003). Using an inductive analysis approach, I defined these categories in more depth, sometimes changing them to fit better. I compared and analysed this data systematically to draw relevant meaningful conclusions for the purpose of my study. For interpreting the data, I tried to make sense of the information by reviewing and reflecting on the process. This will be discussed in greater detail in the following chapters.

Summary

In this chapter I have outlined the methodology and research design that framed my research. I also outlined and discussed the theoretical underpinnings to this small scale qualitative study. I explained how the data was collected and analysed. In the next chapter I will outline and discuss the findings.

Chapter 4

Findings and data analysis

Introduction

This chapter discusses the data analysis and findings in detail. I analysed the data gathered through four interviews and my own reflections trying to find order and understanding through content analysis. This involved identifying themes that emerged to form the basis for some coherent categories (Taylor-Powell & Renner, 2003).

Coding the data from interviews

The data from the interviews was coded by identifying the themes that emerged from the interviews. This was an iterative process formed by repeatedly working with the data. An iterative process is achieved through making a decision or reaching a result by repeated rounds of analysis, where the objective is to bring the desired decision or result closer to discovery with each repetition (Murcko, 2014). For a limited amount of my data that could fit into more than one category, I used cross-indexing to ensure that the data is correctly categorised (Taylor-Powell & Renner, 2003). I used this symbol (+) to show cross-indexing and tried to use these themes and connections to explain my findings. I made changes such as adding two more themes for the data that did not fit into my initial list. To interpret the data, I attached meaning and significance to the findings, stood back and thought about what I learnt throughout the process, so that I could develop an ICT action plan to apply to my own educational context (Taylor-Powell & Renner, 2003) and improve my own teaching. This chapter discusses this process in detail. Through constant comparison of the data, I tried to illustrate themes (Robson, 2002), elaborating on each concept in terms of its properties, and thus articulating them more clearly (Punch, 2005). The main themes I identified were:

- Relationships/ communication
- Inquiry based learning/ appreciative inquiry approach
- Documentation
- Cybersafety

The table below gives a general overview of the coding process. The main themes will then be discussed in general.

Presentation of data with a table/ a graph

In the following table, I present all the data that is explored in the four interviews with regards to using ICT as a tool with these emerging themes in this study: relationships, inquiry based learning, documentation and being cyber safe. Afterwards, the information is colour coded and summed up to offer a more conclusive picture. Yellow represents first theme: relationships, green for second theme: IBL, blue for third theme 'documentation' and purple for the fourth theme: 'being cyber- safe'. This table forms a summary of the themes.

Table 1: Summary of interview themes

Teacher using or exploring ICT for enhancing opportunities for:	Interview 1	Interview 2	Interview 3	Interview 4	My reflection
Relationships, unpacking own learning	✓	✓		✓	✓
Teacher excitement	✓				
Emotional intelligence		✓		✓	✓
Sense of belonging	✓				✓
Integral part of teaching	✓				
Sharing/ producing info with parents	✓	✓	✓	✓	✓
Teacher Finding courage		✓			✓
Teacher overcoming fear		✓			
Teachers' positive attitude	✓				✓
Communication by Facebook page		✓	✓		
Blogs for all children					
Blogs for children with	✓				

special rights; selectiveness and purposefulness					
- portfolios/ blogs for selected children	✓		✓		✓
e- portfolios/ blogs for all children		✓			
Transitioning children into centre; building trust				✓	✓
Transitioning children out of centre; continuity		✓	✓		
Revisiting learning big screen	✓	✓		✓	✓
IBL on big screen for projects	✓	✓		✓	✓
Dialogue with resistant teachers		✓			
Dialogue with ALL parents		✓	✓	✓	
Tuakana teina learning child to child			✓	✓	
Following child interests inquiry	✓		✓	✓	
Immediateness of following children's interest			✓		✓
Targeting shy children good at ICT (better self- image)		✓			
Parent understanding, parent workshops	✓	✓			✓
Peer learning- teacher to teacher		✓	✓		✓

Immediateness of communication	✓	✓	✓	✓	✓
Fun and friendship big screen	✓	✓	✓	✓	✓
Immediateness of documentation		✓	✓		✓
Multiple voices in learning stories	✓	✓	✓	✓	✓
Relating to real world/ what really matters in curriculum	✓	✓	✓	✓	✓
Sharing social aspects of communicating with parents, trust	✓				
Thinking teacher	✓	✓	✓	✓	✓
Trialling more, more courageous					
Teachers as learners	✓	✓			✓
Focus on process	✓	✓	✓	✓	✓
Problem solving teacher with learners		✓	✓	✓	✓
Problem solving teacher with teachers	✓		✓		✓
Self- regulating skills				✓	
Focus on process of learning	✓		✓	✓	✓
games for learning as well as following interest			✓		
Allocating time and PD by management	✓	✓	✓	✓	✓
Making Resources		✓			
More complex learning for children	✓		✓	✓	

More challenging learning for teachers		✓			
Revisit learning/ Digital diary	✓	✓	✓	✓	✓
Aesthetically pleasing displays	✓	✓	✓	✓	✓
Creativity					✓
Seeing gaps, uncertainties		✓	✓		✓
Making leaders		✓			
Seeing potentials/ possibilities		✓	✓	✓	✓
Time saving documentation					✓
Positive feeling; enhancing self- identity				✓	
Cultural relevance		✓			
Sense of belonging	✓		✓	✓	
Selectiveness for excellence				✓	
Reflection on practice/ seeing where the value lies				✓	✓
Cybersafety with teacher setting up privacy for blogs	✓				
Cybersafety with teacher watchdog filters				✓	
Cyber safety with IT expert/ ITstaff help		✓		✓	✓
Cybersafety with teacher workshops	✓	✓		✓	
Cybersafety with teacher	✓	✓	✓	✓	✓

monitoring/ supervision					
Cybersafety info access through policies and DVDs				✓	✓

Combined data of emerging themes:

The data from the four emerging themes from the interviews as well as my own reflections identified four main themes as a focus on relationships followed by an inquiry based learning approach, documentation and being cybersafe. This showed what matters in selecting, designing and using ICT innovations that suit my own teaching and learning environment to improve my teaching and learning practice. The data from interviews and my reflections shows the frequency of the emerging themes highlighted through this study. Caution should be taken in interpreting the numbers, as they simply represent the frequency of the emerging themes mentioned in the interviews from the teachers' perspectives, where a lower number should not indicate a theme of holding any less significance compared with others. The themes are overlapping and inter- related in many aspects with each other.

Table 2: grouping themes into categories

ICT for:	Total
Relationships	32
IBL/ AIA approach	23
Documentation	5
Being cybersafe	6

Relationships

Data from all four teachers interviewed shows that their primary focus has been on using ICT innovations to improve relationships. Reading through my own reflections, I repeatedly come to the point that relationships lie at the heart of everything else in early childhood education. This theme precedes the other emerging themes as without relationships, the teacher is very unlikely to succeed in any other aspect of her teaching. By building and maintaining positive

relationships, I can empower myself and relate to what matters most, which is people. Closely related sub- themes were identified in the interview data with this emerging theme that follows:

- Teacher's well-being and emotional intelligence (+)
- Peer learning, principle of Ako
- Communication (immediateness affects the excellence of care and education, hence affecting relationships).

Teachers' well- being and emotional intelligence (Wenmoth, 2013)

The data from all four interviews, as well as my own reflections, show that when ICT was used by teachers to focus on building and maintaining positive relationships, it enhanced teachers' general well-being and supported high emotional intelligence (Wenmoth, 2013). Also it related to more peer learning and more effective communication skills in teaching practice. This is in line with the New Zealand early childhood curriculum that invites teachers to reflect on a holistic approach that highlight relationships (Ministry of Education, 1996b).

The first interviewee was a leading teacher in a non- profit community licensed Creche for children (0- 5 year old) age group. This teacher had developed a passion for using ICT to making long- lasting relationships for supporting children with disabilities or "special rights" and their families. She stated how each teacher needed to develop emotional intelligence to know it is not always easy to engage with everyone, and to be able to show sensitivity to allow the process to develop over time. She stated:

It has not always been easy to join in ICT initiatives as you do have the teachers who are thinking we don't need this, [they might think] it's all about the screen time, and they [the children] need to get out and play, [otherwise] they don't develop socially and those sort of things. So I suppose with our values is that, we had to unpack what we actually thought we were doing, what was important for our children, and then how were we providing that... with the blogs, um, in terms of, when we were initiating them with children with special rights, the sensitivity was needed about when to introduce that idea to parents, you know, as those parents went through, and coming to terms that their child might be different , can be quite sensitive, and so understanding that, it is quite a process, and you might not want to be bombarded the first day you come through the door 'oh yes, we do this and that' and introducing it at that time.

Similarly, the third interviewee was a teacher in a sessional Kindergarten- Centre of Innovation- with a mixed age group of (3-5) year olds, regarded ICT's role as a helpful medium for building relationships with families as well as children. She stated:

I use ICT initiatives such as Skype for strengthening relationships to increase sense of belonging....this has totally enhanced relationships with parents and I think we haven't ever had anything negative about it.

The fourth interviewee was a head teacher in a Kindergarten day model for children (3- 5 years old) in Auckland where children were split into two groups based on age (older children attended slightly more than the younger ones: older ones attended three 6 hour days per week, and younger group attended two 4.5 hour days per week). She valued using ICT innovations as integral to strengthening relationships with both parents and teachers (especially the ones who were resistant to ICT) and pointed out that sometimes giving this time is what is needed for conversations and reflection to happen throughout the process of introducing ICT technology in ways that are sustainable and meaningful. She stated:

A lot of conversations we were involving [the use of ICT such as laptops and iPads]. And now we are positive, although some teachers were very resistant before.

She also emphasised:

ICT is an amazing tool for producing information with parents in things like how learning happens in Kindergarten because it's such an easy way of providing for relationship is ICT.

In my own reflections on relationships, either on a personal or professional level, time has been essential as well as 'the unpacking' that often I need to do on a daily basis.

Conversations and negotiations with the teaching team, over time, have enabled me to recharge myself for reaching a better shared understanding and for establishing trust with people (children, parents or other teachers). This concept can be linked with my developing level in emotional intelligence in becoming more resilient.

The data from the first, second and fourth interviews as well as my own reflections show that growing teacher's emotional intelligence (Wenmoth, 2013) happens best when there is space created for dialogue. I was creating and nurturing a more positive attitude, when I developed courage as a learning disposition and overcame fear that was often the main reason for me, in not trying ICT innovations in the past.

In my own reflections, I related to sense of shared understanding and enthusiasm from senior teachers when trialling new ICT initiatives, such as e-portfolios. I also related to a sense of frustration when there was not much interest from other teachers in trialling ICT innovations. Could this have been a fear of failure on their part that was becoming part of our invisible emotional baggage (Wilkinson, 2008) that sometimes we as teachers drag behind us? To answer this question, I had to unpack the purpose for myself. To overcome the sense of frustration, and to stop myself personalising things, I focussed my thinking on how I could foster the development of free will that makes me true to myself in order to deal with my shallow side, as this is what makes me healthier and better in what I do (Penny & Bussey, 2011). ICT initiatives used with 'free will' and 'good thinking' motivate and excite me as a teacher and I see that sometimes my excitement can excite other teachers and children, strengthen relationships and motivate more learning for all.

Peer learning and Ako principle

The principle of Ako, that regards teaching and learning as a reciprocal process (Haiyan & Walker, 2014) can be used to explain explorations in the use of ICT innovations that involves peer learning. The interview data showed that for the first and second interviewees, the peer learning was more about the learning that could happen between and among teachers. The third and fourth interviewees, talked more about peer learning that could happen among children, where the learning was between the more capable and the less capable children. The data from all four interviewees and my own reflections show that peer learning and Ako principle when used to support ICT innovations, were regarded as valued learning strategies by early childhood teachers.

In line with the Ako principle, is the development in the teacher of a strong 'learning to learn' attitude. The first interviewee indicated that the teachers who were ready to learn, had developed the courage 'to take a little bit of risk' along with 'a learning to learn' disposition. She stated:

They [the teachers in this centre] are willing to take a little bit of risk, but not without researching first.

The second interviewee was a curriculum leader in an early learning Centre that was operated by a hospital in Auckland, and was offering three separate rooms for different age groups (0-2 year olds in baby room, 3-4 year old room in transitioning rooms and 4-5 year old

preschool rooms). She emphasised that the teachers who implemented ICT innovations could help transitioning teachers who were less motivated or found it hard to join in with any ICT innovations. The strategy of delegating jobs to the more interested and more capable teachers, had created more excitement and more chance of participation for all teachers. She stated:

We asked a teacher from each centre to take responsibility for supporting the development of the teachers so if we had someone who was really strong enough in ICT, they were in and able to whip out anything in 2 minutes or something. Then, they were the ones we asked to support the other teachers. So that helped otherwise, it was just myself who would have to think how am I gonna do this for 30 teachers. But also, by having that group, by having 3 ICT experts, I suppose, they started talking together it gave teachers an area to grow in. So these teachers who had a strength gained a little bit of leadership development in that area and they still get called upon to help and those sorts of things and getting more excited by those ideas and they could help others. They helped to run after-work workshops, so if people needed help to, for example set up a blog, these teachers were our support people, so there is all that, that helped with our relationships with each other and also.

In relation to the peer learning among children, she stated that relationships could be enhanced beyond the teachers' expectations through the use of ICT medium.

...the excitement in him [a shy young child] about being able to do something positive [a computer game] and being asked to help others really changed our relationship with that child, and our view, which was a really nice example I found where everyone was at a point where they don't know what to do, to see him [the shy young child] in this whole new light, and the relationship then shifted with all the teachers and he was ended up like our expert child, which is a nice thing because he was ready to go to school and it was then when he left to go to school you felt like there had been huge progress, mainly in the relationships between, you know.

Communication:

Even though interviewees used different ICT to enhance communication with their targeted individuals and groups (teachers, children and parents), they were all acting thoughtfully and intentionally. For example, the first interviewee's focus area on communication was specifically related with making individual blogs for children with special rights. She explained this made significant improvements in the teaching and learning opportunities presented to the child, because a strong partnership could happen as a result. She justified that she had to be more selective about what kind of communication should be filling up the teacher's time, and what the purpose was behind the communications that took priority. So she was selective to ensure excellence. She explained:

The children with special rights have an individual plan, not every child in the centre, just those who have got a specialist working with them. For example, the physiotherapist can see how he is using the walker and you can see where he is having steadier, but he can reach off with one hand. And then 2 weeks later, you can see the progress where he is actually able to control the walking frame with a slower more steadily instead of going all over the place... So this was the walker and his dad had seen his video (him using the walker) and he knew that J liked making volcanoes in the sandpit. So he said 'oh, his hands are obviously tied up all the time for pushing the walker' so how he would have made it more functional for him to be in the Crèche environment, so he added a tray and modified the walking frame so he walked along for his volcano and carry the vinegar and baking soda to there, instead of holding them in his hands, that would be too hard as he will be using his hands for moving his walking frame...

The first interviewee talked about using videos to reflect on learning that had happened. She linked this to having a more holistic view of the teaching and learning process, to see the bigger picture in early childhood curriculum. She stated:

When we watch videos, learning can be revisited, and the experience can be relived just like a digital diary.

The fourth interviewee also used videos regularly as an ICT medium to revisit and reinforce learning as research (Dahlberg, Moss, & Pence, 2007) shows that every time an experience is repeated, something new is learnt. She stated:

That's what we found out that as a powerful communication tool, in terms of connections with the parents and the wider community and with everyone really, and for children's self-identity when they see themselves on the screen and they see themselves as positive competent learners.

All interviewees used video clips of children's real lives on the big screen and expressed that ICT helped them to make more immediate and real communications. In addition, all interviewed teachers used emailing, for example, to send newsletters to parents. Other forms of ICT had been chosen by each teacher to communicate with parents. For example, the second and third interviewees used Facebook. It was obvious that each interviewee had thought about their unique context to choose the most appropriate ICT innovation to enhance communication.

The second interviewee emphasised that the ongoing nature of communications that was binding their community had made her more inclined towards introducing blogger. She stated:

We introduced blogger. And that has been an up and down experience. We still do have blogs for children and the blogs are pretty much just the portfolios, so they are online portfolios, so teachers are writing learning stories putting together learning stories and uploading them onto the blog. We were the ones responsible for starting the blog but the families were the ones who were given the information for the blogs they chose if they wanted a blog or not. And we did that because the blog belonged to the family and the child and they had the ownership of it, and they invited us, they invited the teachers as the authors.

The second and third interviewees were happy with Facebook pages for communication and collaboration purposes with parents. The second interviewee stated:

Through the use of our centre Facebook, the relationship with parents has been enhanced. I think mostly because it [the Centre Facebook] has given us another avenue for connecting with families and those families who don't have necessarily the time to talk at the centre when they drop off their kids and then there are parents who spend time uploading their own stories, blogs, email, because we are on site, an onsite day care and on network with ADHB (Auckland District Health Board) so children can email their parents during the day and the other thing that we do with our email, is emailing our daily pages.

The fourth interviewee emphasised that the big screen was a medium for teachers and children to communicate and bond with each other better. She stated:

We use a lot of, like, 'capturing devices' like we use videos, capturing children so they can watch themselves on television....friendship and collaboration with peers and teachers provides a social framework for children. Positive relationships, a sense of belonging and shared experiences are valued and nurtured.

ICT innovations can be used to positively impact on relationships, because it involves the teacher with the social side of communication and the sharing aspect of information with parents, especially the ones we don't often see in the Centre. On this matter, the second interviewee stated:

As long as there's communication with the families, they just have to trust that when we set these things up, that we are respecting them and that sort of thing. So that was a big thing going through the confidentiality of things. Respect, trust, communication all ties to relationships.... In terms of communication and collaborative relationships with families and non- teaching support, it's also about building that relationship with the parent that we don't see, that's not always in the centre.

The fourth interviewee pointed out that the competence of the teachers showed in how they chose ICT to share real aspects of the people's lives and interests into the Centre and improve relationships. She stated:

I think it's [relationships] definitely been enhanced with the individual children being able to take the cameras home, and it's been a definite sharing, and I think as I have seen there is a degree of positivity right in there. I think that children can share what they have been doing here, or when they get excited that they can create DVDs at the Kindergarten that they are excited to take them home, they're quite proud to take them home, and this has obviously strengthened [relationships], we also email, we email photos and we Facebook and things, and have our website.... All those links between the family and the centre strengthens all those relationships and we also share this with running a digital story telling workshop for parents. So then the parents got to see what could be done with the technology as well.

My own reflections show that using ICT technology such as digital camera by children, or the big screen with the children's videos of interest could help me to feel more connected and establish a greater sense of belonging for improving relationships.

One other area of contemplation for me was from the fourth interviewee who explained that ICT could be used by the teacher to support children's sense of well-being. Children's sense of well-being during transitioning is directly related to their well-being, the first strand in Te Whāriki (Ministry of Education, 1996b), New Zealand's early childhood curriculum document.

During my visit to the fourth interviewee's centre, I observed how a child who was not very settled and was transitioning into the Centre, was supported using ICT. The child was helped in a process where the teacher and the parent worked together displaying his favourite song at mat time on the big screen. Using ICT, the teacher got to know the child and his interest better, which also helped other teachers and other children to get to know the new child better. This allowed an emotional bond to be established very quickly using ICT as a medium. In my reflections, this is something that I have taken on gradually in my own teaching, by using a big screen to display our diverse community and individual children's interests to create a sense of well-being, harmony and togetherness.

The fourth interviewee stated:

That my home and my family mattered, just like what you saw today that M and H were sharing, as they are a bit tentative, younger children, H's fairly new, M has lost a lot of friends to the older group, feeling a little bit unsure, so that [displaying those

two transitioning children's favourite music videos on the big screen] was a tool to help them transitioning.

All these quotes point to the empowering and enabling aspects of ICT innovations that the interviewed teachers used to improve communication and for developing positive relationships that enhance their general well-being, emotional intelligence (Wenmoth, 2013) and communication skills.

Inquiry based learning approach

It was found that all four interviewees highlighted how ICT supports inquiry-based learning. The inquiry based learning (IBL) approach encourages problem solving, inferring, estimating, predicting, generalising and creative thinking that are all considered to be higher order thinking skills (Miri, David, & Uri, 2007). The concept of inquiry based learning is congruent with relational pedagogy that means having 'in mind' what a child brings and what a teacher knows (Meade et al., 2013, p. 11). With an inquiry approach, the teacher, at the very least, promotes joint participation in investigating in a sustained way (Siraj-Blatchford, 2011). The structure of the inquiry model starts with who (know your learners), then why (vision for learning in a digital world), how (inclusive blended inquiry), what (the right tools for the job). Effective teachers have adaptive powers and use future focused dialogues to lift up their teaching, so the balance of these two will integrate a model of inquiry learning (Spencer, 2014).

It was no surprise to me that all interviewed teachers were strongly inclined towards using ICT innovations for this approach because the New Zealand early childhood curriculum invites teachers to encourage teaching and learning in ways that encourage discovery, invention, innovation, imagination and experimentation (Ministry of Education, 1996b).

The data from the four interviews, as well as my own reflections, show that ICT innovations can be used to enhance inquiry based learning for improving the teacher's teaching and learning practice. On this emerging theme, the data from the four interviews show that the interviewed teachers wanted to use ICT for engaging in inquiry teaching, not technicality.

The first interviewee stated:

I think that how you decided on the use of it (ICT) was first by having a go at the technology, seeing how it could be used, then lead us to how we adapt that in our

situation and could we do this with it. So we had to first know some of the possibilities before we could then go and take it further into what we wanted, how we wanted to use it.

She also mentioned that as teachers we should unpack what we do to find gaps and to think how we can use ICT initiatives to help us achieve what we want to achieve:

We soon realised that actually, we may not be, by resisting, not having these things available, ... So it was more about, I suppose, teachers and us asking ourselves what is it that's around our philosophy? What are we providing in terms of meeting that? And we had some gaps. So gaps in what we say, how we believe children learn and then actually what we are providing in the programme wasn't necessarily matching.

The fourth interviewee stated:

We also use the big screen a lot, within projects and things, like we did one with our little baby bird, where children investigated and saw how a baby bird hatched, so being able to use internet and obviously you tube, being able to watch it close up on the big screen was quite amazing. For example, seeing how butterflies were hatching. So we are using it a lot for nature. And for those sort of things and also for dance. Sometimes we want some catchy tunes for dance.

The second interviewee stated:

It's the process of learning, so for us let's not worry about the games even if we have a few here, but it is about how I support learning through inquiry, is it going to stimulate children's learning, new ideas and creativity, It's [ICT is] like any other piece of equipment here for us.

Using you- tube videos and google search engine are becoming common ways for myself to extend children's topics of interest into an inquiry learning that can influence my teaching practice. This influence can be positive or negative depending on what I value and recognise as meaningful teaching (Archard, 2013). This is perhaps what can draw in the child's peers, prompting a discussion and sharing of thoughts, which can bring out a whole range of working theories about the topic of interest, leading to developing children's working theories (Archard, 2013). Working theories contain a number of ideas, skills, and knowledge that develop over time and that can be modified and adapted through observing, participating, and discussing with others (Hedges & Jones, 2012; Ministry of Education, 1996b).

The third interviewee commented on the immediateness of inquiry learning when teachers use ICT as a medium. She stated:

We use you- tubes a lot so sit and look at something that is happening and what they have been talking about, it's beyond. We would have had to get in the car and go to library and if we were lucky there would be something on it, but we can look at it now immediately. So they haven't lost interest. It's still there and it's still foremost in their mind. So I think, it's been able to have knowledge that connects to knowledge immediate, rather than delayed.

The first interviewee described her own use of ICT in her teaching practice for inquiry based learning, 'as a tool for helping to research our question', also as 'an additional integrated tool' for reflection. She explained that ICT could be best used for improving her teaching when she uses it to makes changes, to extend learning and for small group projects to find a deeper focus so that more complex learning happens. She stated:

I think, in terms of using ICT, we would look at it, as an additional integrated tool for supporting learning. So therefore, in terms of children's learning, we don't see it as replacing hands on experiences with natural environment and the social connections with teachers and with other children.

For ICT innovations to work with an inquiry based learning approach, the first interviewee pointed out that teachers should be introduced to ICT when they feel ready.

For the possibilities to present themselves in a positive way, time and enough PD should be allocated where a value- driven outlook could derive and guide the changes that could improve the teacher's teaching.

One other area that the first interviewee spoke about was when using ICT is allowing the teacher to see the gaps and uncertainties better because ICT allows the teacher to review her teaching practice, for example, by watching videos of her own teaching and her own interactions to develop a better understanding to improve teaching and learning. Ongoing reflection and dialogue in teaching practice also relates to improving teacher's emotional intelligence (Wenmoth, 2013).

Ongoing reflection in inquiry learning approach in my own teaching practice appeared many times in my own reflective journal when I thought about 'the purpose', 'the whys' and 'the hows' of using ICT in my own teaching and learning. This led to conversations with other teachers, parents and children when thinking about introducing a new ICT innovation. To develop my understanding of inquiry-based learning with ICT innovations and to enhance my own thinking skills, I attended 2013 in Hamilton Conference organised by CORE and the ECE Conference on Celebrating Resilience in Auckland in 2014. Attending these

conferences gave me more opportunity to think, take the time to select the appropriate ICT innovations that were suitable for my own teaching context and to develop my resilience to allow others in the teaching team to move forward at their own pace and within their comfort zone with ICT innovations. I learnt that ICT innovations could be a useful medium to engage the teacher with 21st century learners, in the early childhood education field, just like all other education and training sectors. As Miri et al (2007) suggest our ever-changing and challenging world requires learners to go beyond the building of knowledge capacity to develop higher order thinking skills. Yet, for transforming my teaching and learning, new technologies are not enough per se, even though they can make me feel excited. What makes transformation possible is reflective practice and dialogue within my community of practice.

The fourth interviewee spoke of teachers who learn to self- regulate ICT technology that can be described as a ‘higher order thinking skill’. She stated:

Initially we sort of monitored it but now it’s pretty self- regulating and it’s what we wanted it to be. Because initially with ICT, it takes a lot of input from adults and then they learn to fly with it, also learning from peers, supporting the younger ones, so with a lot of that it suggests that children go and find so and so to come and help you. It also quite cyclic, for ICT, has been strong as other children came through, they learnt from the older children and then we had a massive exodus to school and it was like having to start off again. So that’s how we reintroduced some of those skills into the next group. We had two distinct age groups and children who were more capable were helping the ones who needed help.

She also gave the example where children used ICT (photography and digital microscope) as one way to become engaged in inquiry learning, she stated:

The amazing thing was our children’s’ photography that really captured our imagination and that they were really artistic, you know, like looking at the world with their own eyes, that was their lens of photography that was very important. Mm, and they used the cameras to document our trips, children taking our cameras during our excursions s well, so that was sort of the first stage and I think then because we were really into nature, and our gardens are quite big with us, we got our digital microscope and that was quite incredible as well, we use that quite successfully.

This was an area that I felt inspired about and introduced the digital microscope in to my own teaching environment.

The third interviewee stated that it was important for teachers to role model ICT as a medium in inquiry learning:

We're only learners. Not necessarily good at everything. We wouldn't call ourselves any experts in this field, but there are ways you can find out and solve it. And we are pretty determined to solve things. So we think we're role modelling and problem solving and all those things that are really important.

The second interviewee sums it up well:

It was our understanding of where we are as a team in terms of our thinking and working through those things first to be on board.

Therefore, as the data from all four interviews and my own reflections show when ICT is used for improving and complementing teaching and learning, not just for technicality, it is more than a quick fix. This is because it is planned with a purpose in relational teaching that is in line with inquiry learning. Letting go of anything that is not contributing to improving my teaching practice, especially if it has been chosen without thinking, can help me in moving in this direction.

Documentation

The third emerging theme from the findings from all four interviews, as well as my own reflections, show that ICT can be used for improving teachers' documentation.

The data from the first and second interviews, as well as my own reflections, shows that one way for the teacher to improve her teaching is to use ICT innovations as a powerful medium to reflect the children's real lives in the curriculum and follow their interests in a more meaningful way. In addition, ICT technology can help the teacher to have more choice in documentation and assessment, thereby, improving teaching practice. My own reflections show that ICT innovations have been worthwhile for documentation purposes such as e-mailing, e- portfolios, blogs and iPad applications.

The First interviewee stated that emailing had become a very reliable and consistent way of sharing parents' documentation and communication. For example, when a teacher was supporting one particular child in inquiry based learning with his interest in where the water came from, the teacher used software Smilebox to document and share the learning with parents, and the parents sent an email to commend the effort put into supporting their child with this inquiry learning project. The following is an email sent by a parent to the first interviewee that documents communication:

“Thank you for taking the time with him. He has talked about it all day non- stop. It’s obviously catching his imagination and boosted his self- esteem. We really appreciate the fabulous job you do” and “this is a fantastic amazing idea, the smilebox”.

The first and fourth interviewees stated that ICT can be used by the teacher to improve the presentation of teaching materials and for making teaching resources in ways that are more meaningful and at the same time more aesthetically pleasing. The fourth interviewee stated:

It is real life experience, so it’s about seeing where the value lies and what it can be used for, and for us, as a sessional community based Creche, it was, we just got such positive feedback from parents and the children and all those relationships, connecting us out there with the community... But having done that professional development and seeing that there are lots of benefits with our using of ICT- ICT as a supporting tool for children’s learning and adults’ learning as well.

The second interviewee stated:

We began with the digital cameras,... and we still do have blogs for children and the blogs are pretty much just the portfolios, so they are online portfolios, so teachers are writing learning stories (using Comic life) putting together learning stories and uploading them onto the blog.... We decided to change our centre newsletter to be more provocative or use it more as a resource to possibly get our parents thinking.

All interviewees stated that ICT could help teachers make learning visible, to display and be better connected that could be taking them back to relationships, the first emerging theme again. In my own reflections, I integrated this approach to documentation when I have used iPad applications to better display children’s learning in the environment. I have especially used it to show the process of documentation of children’s inquiry based learning and to present learning stories of children by using more versatile templates and designs, where children can design their own templates and even record their own voice on a learning story. The exploration has helped me to become more resourceful in my documentation.

The third interviewee saw ICT as saving time that often is a barrier to good documentation for most teachers and enables documenting with purpose and thinking of the learning while it is still relevant and taking place. She stated that as the teachers were practising and getting used to ICT innovations for their documentation, the integration of ICT resulted in improving their teaching practice. She stated:

I think that has got to do with our learning and our scope And how much time we have got. You know, that’s the reality of it, so our documentation takes many forms.

And we use things like Snapfish, and things like that are now part of our documentation.

The second interviewee compared documentation of learning stories before and after the use of blogs. She stated:

Before the stories the learning was very individual, the one teacher owned the knowledge of the child, whereas now we realise the benefit of collaborating and including multiple voice and including whānau in it.

Therefore, ICT can help the teacher to improve documentation not only by making learning visual in ways that save time and are more aesthetically pleasing, but also for providing multiple voices in children's stories, in particular the child's own voice or design for the learning story. In addition to reflecting on how to document, as a teacher, I also need to think about 'what to document' to fit the purpose for the documentation, as this way I can link with the reality of our ever changing world, and that is why, for early childhood teachers, a disposition to welcome change is necessary (Salmond, 2013).

Cybersafety

Grey (2011a) defines cyber safety issues as the risks and dangers that could be unknown to previous generations not used to ICT innovations. She explains that, although ICT offers children wonderful opportunities for learning, it can also expose them to threats that many parents might not be aware of. Grey (2011a) suggests that early childhood teachers should give children a chance to learn about cyber safety issues, as children growing up in today's world, need to become accustomed to this normalised feature of their world and deal with threats associated with it. Grey (2011a) recommends that as soon as young children begin to engage with cyber technologies, they should also begin cybersafety education, and for this education to be effective, she suggested that early childhood centres work in partnership with parents. Because the use of online technology is fast expanding, teachers should also be taking cyber safety steps to have greater awareness and be proactive in protecting children's identities and rights (Mishna, Saini, & Solomon, 2009). On you- tube, this can be done when the teacher watches the contents beforehand. However, if the laptop/ iPad is connected to the big screen, cybersafety softwares could be installed on the Centre laptop to give warning to the teacher to avoid fraudulent sites or set ups that look like a real one (Ballew, 2010). Data from the four interviews and my own reflections show that all teachers regarded cybersafety of great importance and had cybersafety measurements in place.

The first interviewee who was making blogs for children with special rights, stated:

When we set up blogs, we change the privacy setting, so that the toolbar at the top is removed and we have just an icon that you click on to take you to your homepage so there is no way that anyone looking at that blog with a child, they can go to anyone's else's blog. ...and usually we are explaining when we are going to the computers with children. We have to go to somewhere that we know like askjeeves.com which is a site for children to ask questions. Usually children go there with guidance with that so children don't access internet. Because they are in that age group they don't access internet by themselves. So it is always under supervision, usually we've looked first to make sure that it's appropriate. Everyone [of the teachers] is recommended to attend a workshop on online safety first, and then answer some questions such as asking for permissions from families for their image to go online, and there is a video on how to set up a basic blog, and then one for privacy setting and one for removing the navigation bar. So you can see that on the blog's site, there is no arrows to go to the next blog.

The second interviewee stated:

We [teachers] did a cybersafety training, from NetSafe. We got certificates for cyber safety so the teachers were familiar with it. We were introduced to Hector, the dolphin, there is a programme that you can put it on and if children trying to access a page that is not OK, the dolphin comes up over the screen....and because we are a hospital site, we are blocked, so we can't get Facebook, Trademe, ...so that's about safety.

The second interviewee also explained that for watching you- tube, the teacher contacted IT staff who gave her a "log on" so the teacher could break through the block.

The third interviewee stated:

We just monitor what's going on. Most of them [children] seem to have some cybersafety from home and know what they are and what they aren't. On the ipads, we can just put a button to save from going on the internet, so we can do it easily. So I guess we control it, we keep an eye on it.

The fourth interviewee's centre seemed to offer some of the most conclusive safety measurements that complemented each other. She stated:

It [cybersafety] isn't something that comes out greatly with us. Because I think, of the way we are using some of some of the tools. We do close the video if something accidentally comes up, we flick it off before hector the dolphin comes up. Occasionally we might see something that might not be appropriate, we shut this down. ... Watchdog filters out our work pretty simply, and it is structured so children can't get into everything. And laptops are just supervised use with teachers all the time. And every teacher in our centre must attend an internet safety workshop from

our association. Our association has also policies that we adhere to and we sign and parents also have to give permission for their children to use ICT.

Overall, cybersafety awareness and precautions should not deter the teacher from trying new ICT innovations as the risks are manageable and can be minimised with appropriate measures. In my own teaching and learning context, the cybersafety is managed by teacher supervision as well as help and advice from IT staff, from AUT University. I also have access to AUT cybersafety policies and DVDs through AUT University's website and AUT University's library. As a result of this research, I initiated cybersafety procedures within my own centre.

In summary, for teachers to maintain an appropriate level of cyber-safety, the teacher must think and make conscious decisions on 'how to use' the ICT technology as well as 'what to use' it for.

Emerging themes from interviews

To identify the themes, I employed a textual or content analysis approach, which involves coding statements based on their key concepts into themes and revisiting themes several times to delineate and refine them (Taylor-Powell & Renner, 2003). The qualitative data provided a rich understanding of the issues faced by the qualified teachers whom I interviewed. Wood, Specht, Willoughby and Mueller (2008) explain that most teachers' concerns involve the effect of technology on themselves, with secondary emphasis on how computers affect the children and families they work with. This implied that sometimes when teachers wish to support the integration of the ICT, they were confronted with limitations that highlight why early childhood teachers like myself should engage in research that can enhance their competence.

Summary

In summary, ICT innovations are best used when relationships are established and the teacher can focus on inquiry learning approach (ABL) or take on appreciative inquiry approach that supports peer learning (Jenkins, 2013), developing thinking skills to engage with learning as an inquiry (Miri et al., 2007). When the teacher used the most appropriate ICT innovations to suit her teaching and learning context for time- saving, eye- catching and more- in- depth documentation, teaching practice was improved and relationships were strengthened. All in

all, I learnt that being cybersafe should be alongside every step of my journey if the e-learning is to improve my teaching practice.

Chapter 5

My reflections and final thoughts

Learning alongside young children, feels like learning to fly as the poet, Rumi (Chandler, 2014) says:

“You were born with potential.

You were born with goodness and trust. You were born with ideals and dreams. You were born with greatness.

You were born with wings.

You are not meant for crawling, so don't.

You have wings.

Learn to use them and fly.”

My final thoughts set out an overview of the findings from all contexts that were influential in improving my teaching. In doing so, I answer the overarching question which is: How can I support children's learning through ICT?

Introduction

The centre visits and interviews along with my reflections helped me to see the potential in integrating e-portfolios, emailing, and other ICT innovations for more frequent documentation, and enhanced communication with parents to strengthen relationships. In addition, when the teachers were working through an inquiry based learning, the findings showed that children's learning environments were enriched, because they looked more versatile and more ICT opportunities for learning existed. Finalising my thoughts and reflections, I have set out the following main points:

- Time
- Purpose
- Introducing ICT initiatives
- Ipads for teachers
- IT helpdesk
- Encouraging and mentoring

- Planning for achievable goals for changing attitudes

Time

Time has always been and still is my most challenging factor, hindering valued and real – time (immediate) documentation and communication with our parents and colleagues. This has made me more inclined to use e- portfolio. I used Storypark for 6 months as a trial and then trialled the on-line portfolio called EDUCA. Both were good to speed up documentation, and enhance the excellent interactions among colleagues, as well as between parents and myself. This helped me to move forward with a constructivist view in mind, because this approach made it easier for me to build on the prior knowledge where all the learning was more visible at all times, and was accessible with a few clicks. Parents love seeing learning stories for their children. However, these stories are often sent home well after a photograph has been taken. Therefore, teachers need to document more robust observations that makes visible each child's progress (Woulfe, 2014), as soon as possible after the actual learning has taken place. Hence, ICT tools that enhance immediate documentation have value.

Transitioning primary care teachers

Since the beginning of 2014, I have been trialling *Piccollage*, *Educreators* for writing learning stories that enhance communication with parents. I have also used *i-movie* to make children's movies for resting or mat times. Some of the teachers I work with, however, did not share my enthusiasm. The intention was to gradually increase the level of participation and confidence of the other teachers, by starting with primary care teachers who were transitioning children. Primary care teachers are primarily responsible for the care duties of the toddlers who turn two years old and show readiness to join the older group (two to five year olds). The idea of having one primary care teacher stems from Resources for Infants and Toddlers (RIE) philosophy (Petrie & Owen, 2005) that focusses on creating a stronger sense of security and emotional well- being for the child who only needs to deal with one primary care giver. This teacher could also be in charge of making an e- portfolio for the child who is transitioning. Therefore, each time a child was transitioning, we introduced a few children and families into e- portfolios, in a relaxed way, so there was minimal extra work for teachers involved. For more confident teachers like myself, a bigger group of older children for whom I was the primary care giver, had their learning documented in e-portfolios. Within a few months of implementing this, I noticed that individual teachers were showing initiative and

interest in working with e- portfolios and this was helpful in getting more feedback from the parents.

i-movie clips of bike day and our most significant hui of the year, the Noho Marae, were particularly successful, as the social aspects of learning were documented allowing the children to revisit these occasions. E-portfolios proved they had the potential to improve the children's sense of belonging, a sense of togetherness and created a more positive self-image, for all people involved to feel they owned it and to feel proud of it.

Purpose

The question I had at the beginning of my reflections was what happens if I feel lost, as there seems to be so much ICT to learn about and it is changing constantly. However, after analysing all four interviews and examining the rest of my reflections carefully, I came up with this point: that if I keep thinking about the clear purpose of why I am doing what I am doing, and continue to discuss it with others, I will continue to learn and understand, as Grey (2011b) regards professional dialogue as an important aspect of professionalism for early childhood teachers.

Introducing ICT initiatives

I am still focussing on building on what I already know allowing myself as a teacher learner, to make mistakes, and learn from them. I have accepted that in order to make progress and learn, I need to 'have a go' by overcoming my fear of technology, and by developing dispositions of curiosity, courage and persistence to be a more successful learner first, before becoming a successful teacher. This reflects the goals set out in *Te Whāriki* for children that also apply to adult learners such as teachers. Allowing myself the time to reflect was essential for my learning at a deeper level, in addition to interviewing the other teachers as a way of learning.

As a result of discussions with my colleagues, we adopted the practice of e-portfolios and emailing learning stories of children and videos as a way of speeding up the flow of information. In all cases, this had immediate, encouraging, very positive response from parents that has strengthened our relationship. I am happy with this initiative, but it resulted in more ongoing learning as my next learning was to learn how to convert files into from mp4

to mp3. I have also been learning to download you- tube videos (in mp4 format that is compatible with our big screen) so to follow children's interests and engage in small projects, social or cultural events of significance to our community, in an inquiry learning approach. This emphasises my point that learning never ends.

IPads for teachers

After my visits and reflections, I realised that children's learning environments were enriched, and teachers' communication and documentation were enhanced, with iPads, because they were more versatile and so much potential for ICT opportunities in learning existed. An example of this is learning that can take place for small group projects following children's interests. Thinking about budget restraints, I thought at first that the cost could be a hindrance. However, I started to notice that most iPad applications cost nothing, or only a minimum fee, and were almost as effective as some computer software that required purchasing licences. An example of this is the free *Piccollage* application on my iPad to write learning stories and make displays, instead of *Comicliffe* that has a cost. An advantage of using iPad technology, such as *Piccollage*, was that I can use them while working with the children, to empower children by documenting their own learning so that they can have their own voice recorded in a story or design their own page. It seems pretty simple and manageable software, and it improves the quality of assessment when the learner becomes engaged in the documentation and assessment of his/ her own learning. This way, documentation becomes part of the learning process, belonging to the child as well.

As a result of visiting one of the centres my view totally changed towards having games on iPads. Games were observed only in one of the four centres I visited but it was powerful enough to have an impact on me, because a game that comes from the child's interest, could teach him/ her much more complex and much more relevant skills, and could also give the child a greater sense of ownership.

I read Jo Colbert's (2012) article on learning opportunities through games in iPads as well, and it sounded plausible as a way to enrich children's learning. As a parent of two boys who love to play online games, I could connect so well with this concept. If there is an interest, why not nurture it?

In the future, I would like to explore skypeing, smartboard, more about digital microscopes and iPads. I see the potential of networking with other ECE centres through this ICT technology. With Skypeing, I know how to use the technical aspect but I have decided not to rush until I know why I am skypeing, and how this will enrich the children's learning.

IT helpdesk

One advantage I have as a learner is that I have access to an IT helpdesk. Having this connection with AUT helps me in the technical sense as I don't have to worry about this aspect of ICT. For example, my reflection journal records "I began using a digital microscope. I began using an old desktop and IT is helping to fix the CD tray. I see the digital microscope as a tool to support thinking and learning conversations in doing any inquiry based project. I will continue to explore its use further."

Encouragement and mentorship

With e-portfolios, I have trialled both *Educa* and *Storypark*. After a 6 months trial, the benefits of having e- portfolios with minimum effort and cost commitment, visibility of consistent documentation and visibility of parent engagement, is obvious. I observed how e-portfolios were also used for teacher registration and appraisal issues and no additional IT infrastructure was needed. e- portfolios like *Educa* support empowerment and belonging (Li, 2014), because the teacher can easily see the learning story in relation to the provided links to the Centre's strategic plan or to learning outcomes extracted from *Te Whāriki* (Ministry of Education, 1996b). Grey (2008) experimented communicating online with early childhood teachers and educators and reflects on appreciating the positive effects of connecting and improving one to one communication.

Despite this, thinking and talking with other teachers, I noticed that some qualified teachers felt reluctant to join in e- portfolios because they looked at it as a commitment that they might not be able to honour in the future. For example, they might not know how to do things properly and might make mistakes. This is where encouragement and mentorship was beneficial, for changing the thinking and participating in an ICT initiative.

For e- portfolios, at first, I felt doubtful as I thought that *Educa* could be a commercialised product with a \$2 charge per child per month, and preferred blogs that could be set up for free

by myself. However, secure steps are needed to be taken to ensure online safety. Yet, observing *Educa* updates and collaborative links with teaching and learning documents convinced me that it is worthwhile to adopt as the system is automated and so frees me from extra IT problems. Another advantage is the regular links we are sent by administration for any new comment, learning story, or photos. However, I still think having a blog is also worthwhile to investigate, as it is free of charge.

On the other hand, our Centre 2013 parent survey results show that some of our parents prefer teachers to spend time with the children, rather than setting up blogs on the computers that takes them away from the children. This is when I thought that e- portfolios could be complemented with a centre blog for the best results in committing teachers to use ICT to update, communicate and document, so the teachers' priority would be spending maximum amount of time with children.

My thinking was also influenced by my attendance at a conference in Auckland where *Educa* presented an updated site with goals and educational aspirations for teachers in the early years. This influenced me to revisit my purpose for using *Educa*, so I decided to implement either *Educa* or *Storypark* for a small group of children for whom I have primary care giving responsibility. A small group would guarantee that I can achieve my set goals, can enhance flexibility and lessen the fear of technical challenges I might encounter at the beginning, resulting in better and more frequent communication and documentation, and a greater chance to plan more complex learning experiences and strengthened relationships.

For joining in e-portfolios, I had already joined *EDUCA* on an Educational Leadership Project and was experimenting with *Storypark*. I wanted to wait to know more about my own capabilities and confidence. That was in line with my values to join in an e- portfolio ICT incentive when ready. I felt I had to grow my own emotional intelligence (Wenmoth, 2013) and a trial period of 6 months definitely gave me time to overcome any initial fear. This way, I am confident as a teacher that I had a choice and a voice in trying something new, so my anxiety and stress is much less and I feel there is more chance for building and strengthening respectful relationships. I believe that is the most crucial element for success in any ICT initiative is that when people feel they are understood and empathised with, they respond and a bond is formed (Biro, 2013).

Nevertheless, sometimes postponing implementing an ICT initiative leads to doing it properly. Giving myself time to reflect, learn, select and design what suited my teaching and learning helped me to reconstruct and critique my own knowledge, which led to my own emotional security and peace of mind.

Plan for achievable goals for changing attitudes

As a teacher I was committed to ongoing learning about ICT. However, I felt there were colleagues that questioned the whole issue of ICT in early childhood education. This gave me additional reason to plan it carefully to reduce frustration and stress as much as possible. If I set goals that were not too hard to achieve, I felt inspired and motivated. There was a chance that my colleague would see the value as well. Values of open dialogue, respect, resilience, optimism and courage certainly helped me on a daily basis. I reflected and expanded on these values in relation to their particular relevance and the way they supported me to improve my teaching and learning. The details of this are discussed more fully in the discussion chapter that follows.

Summary

What was most influential in improving my teaching and learning, with regards to the most appropriate ICT innovation in this self- study, related to my enhanced understanding about: setting achievable goals to motivate myself and others, finding the purpose and having the courage to do the unfamiliar or the new, giving myself enough time to reflect and connect, and to maintain a dialogue to think with others, and to encourage and mentor others when needed. In the next chapter, the discussion chapter, I synthesize my thoughts to answer my overarching question: How can I support children's learning through ICT?

Chapter 6

Discussion chapter

Introduction

In this section, I articulate the core values I have formed in relation to teaching and learning opportunities with ICT innovations. I outline an action plan for implementing ICT into my teaching (appendix 2). I also discuss how my teaching has improved by doing this research, as this was the aim of the research.

These core values have been formed as a result of my self- study. I have formed values of:

- Democracy and open dialogue
- Respect
- Creativity
- Resilience
- Optimism and courage

These core values also underpin the leadership I wish to enact when implementing ICT initiatives within a teaching team. This chapter discusses these values in detail.

Democracy & open dialogue:

Throughout this study, it became apparent to me that the early childhood curriculum and the sociocultural framing that I was implementing to improve my teaching (Ministry of Education, 1996b), as well as the Code of Ethics' guidelines for Registered Teachers (New Zealand Teachers Council, 2004) supported and guided me towards good values, such as the importance of democratic pedagogy. For me to be implementing appropriate ICT innovations by myself and for other teachers, thinking about how to enact values, such as democratic decision making, courage and open dialogue, was necessary. For example, when trying something new, courage is like a catalyst and it was important to strengthen relationships because they determine how the new idea is accepted by the teaching team, which in turn, highlights the need for open dialogue. Similarly since the value of democracy may be prone to different interpretations according to the context (Bush, Bell, & Middlewood, 2009), engaging in dialogue was needed so teachers can think with others and

assess different interpretations and viewpoints. This helped the teaching team to focus on assessing democratic learning and teaching communities, while enriching the early years' curriculum and teaching practice (Carr, 2001). In this study, and my own digital experiences, 'semiotic democracy' was emerging, meaning that my teaching and learning was involved in "the practice of the remaking of culture by young people" (Palfrey & Gasser, 2011, p. 198). For example, the conversations with other teachers determined if the ICT initiative fitted our unique teaching objectives, and if it was an achievable goal and a practical idea, or not. As this teaching and learning culture was prone to shaping and reshaping, the teachers understood that they can put aside debilitating images of themselves making mistakes to focus on the learning process in exploring ICT. I learnt that keeping these core values in my teaching and learning ethos, will help me to remember that 'democracy is not a process for allowing a majority to rule over minority interests antagonistically, rather it is 'a process of persuasion through which we seek to create and maintain a good life in common' (Horrocks & Pratchett, 1995, p. 1222), to enlarge the interests of learning for myself through debate and discourse with others, and enrich the learning programme of children through the experience of citizenship (Horrocks & Pratchett, 1995). From Horrocks' and Pratchett's (1995) explorations of ICT with regards to democracy, I continue to relate to community democracy or strong democracy for my own teaching and learning context where citizenship and the common good will be the key features. Accordingly, when I explore a new ICT initiative with strong democracy in mind, the focus will be on interactive capacities of the ICT to improve information and discourse over all issues so as to enhance participation. After all, if education is to make the world a better place to live for us and for people of generations to come, holding these values in my teaching and learning will help me to hope for a better future. My observations in all centres I visited showed me the most effective ICT initiatives (such as the enhanced rate of parent responses in e-portfolios) occurred due to the dialogue and shared thinking with children, teachers and parents which occurred in a face-to-face situation and was then reinforced with ICT by way of e-portfolios..

Working in a team that is culturally diverse, provided me with a good chance to reflect on different viewpoints and perspectives for introducing new ICT initiatives. In the visits that I had to other centres, I noted that dilemmas could occur where definitions or understandings of democratic solutions varied among teachers. This difference of opinions could also occur between the teacher and the parent. What is interpreted as cultural norms and non-offensive by one adult, may be regarded as inappropriate by another adult. From the study, it appeared

that making an effort and spending some time to converse with other teachers and parents about the core values for the early childhood centre saves teachers from feeling isolated, and can enable the teachers to view pedagogy from more than one perspective – to go beyond the one view that is felt as the most comfortable one (Ministry of Education, 2009a).

Additionally, in all interviews, the data showed that listening to others' points of view and trying to understand others' point of view could develop trust and strengthen relationships. Therefore, I learnt that the active involvement of the teacher is a fundamental part of the teaching process. The planning and implementation process for educational technology should involve teachers' face to face interactions with people, because educational technology that has not had that interactive component, has never succeeded (Feenberg, 2001).

To choose an ICT initiative (for example, a song to display on the big screen for the children), open dialogue in my interactions with young children, and with other teachers or parents, the implementation of the ICT initiatives will be sustained. It also provided opportunities for myself to discuss rights, responsibilities, rules, and fairness with children and colleagues (Ministry of Education, 2009b). To prepare myself to engage with change and to transform and improve my teaching practice (Servage, 2008), I look at engaging in open dialogue for making a positive difference to the well-being of the young children, for maintaining trusting relationships and for improving my own teaching and learning (Bryk & Schneider, 2002).

Respect

Sergiovanni (2001) regards respect as one of the fundamental rights in democratic societies. By emphasising respect in my teaching, I can provide a teaching and learning environment that children want to maintain from the moment they enter the centre - one that is welcoming and invites children to learn. According to the positive guidance policy of the workplace, respect also applies to respect for self and communications with people, resources and with the environment. The impact of respect with ICT innovations in this study, required me to avoid making simplistic and stereotyped understandings of other cultures and role model a respectful approach to all people. In selecting and implementing ICT innovations, I felt strongly that respectful communication was vital with both teachers and parents.

Grey (2011b) states that professionalism is demonstrated in respectful interactions. . Creating a respectful culture ensures a greater willingness to co-operate (Dahlberg et al., 2007; Rinaldi, 2006). Throughout this process like any other long- lasting change, my reflections showed me that slowing down and using some time to reflect is sometimes necessary and respectful. It was respectful when each new ICT initiative was not rushed, and when other teachers were given a choice and enough time to observe and see the purpose, reflect and consider joining in with the ICT innovation when they were ready.

The study findings showed that ICT innovations improved my learning and teaching practice and expanded my communication avenues. The impact was in the form of having more choices in teaching and learning, and communicating better and faster. As Gerbic (2010) suggested, when the curriculum takes advantage of the difference for learning (2010), the learning is best reconstructed. Similarly, Oliver and Trigwell (2005, p. 21) stress that with different teaching media, the teacher is more likely to experience more learning and better variation on the subject:

...based on the idea that for learning to occur, variation must be experienced by the learner. Without variation, there is no discernment, and without discernment, there is no learning,learning occurs when critical aspects of variation in the object of learning are discerned.

In other words, face to face interactions would provide an opportunity for discussing and reflecting on different aspects of new ICT initiatives and making adjustments if necessary.

The other area that relates to the value of respect is young children's choices and privacy. With the increasing number of social media networks, there seems to be a debate now on who has the right to make the decision on digitally sharing everything about a young child's life, sometimes starting just moments after birth. This is a good reflection point for myself questioning at what point does it look like we are outsourcing our children's photos as memories to machines? And what right do I have as a teacher to do that? What about the parent who decides about sharing photos for a new born baby? This remains a grey area that I am still reflecting on.

One value that stood up in all my reflections was how to encourage my own creativity in my exploration, selection and trial of ICT innovations. The literature suggests that the creative assets of childhood are best nurtured from the early years where a tolerance for ambiguity, non-linear thinking and receptivity to ideas exists as these characteristics may be discarded at an older age by adults (Jalongo, 2003). From my journal entries, I noted that as an adult, connecting with the child at play, as the prototype for fluid-adaptive thinking that is both serious and playful, (Rea, 2001), can be challenging. I noted in my own reflections on my own teaching that I was sometimes interrupting children's thinking, or crushing their 'play plan', because of the assumptions I had made, or because I was not waiting long enough for the play plan to unravel itself or because I viewed my role as someone who should intervene constantly or come up with ideas for the children. Reviewing the literature, I reflected on what Brownlee (2007) calls nurturing creativity in young children, especially in the area of experiencing art mediums and techniques. Some of her advice for the teacher is: try not to constantly interfere in what children are doing, and allow children to respond to their own creative impulses. I tried to apply this with the ICT innovations that I was encountering, for example, the digital microscope, and allow children's fluid thinking to take over, by not constantly interfering. Instead, I allowed children to follow their interests to explore items of nature that they were curious about. This was in line with constructivist underpinning of this study, where I am learning as an individual to allow for creativity that could spurt from children's thinking, because for children to fully experience the world around them with all of their senses, develop intelligence and their spirit through play, I should be supportive and reflective, even by trying to learn from children by entering the state of being 'totally engrossed in the moment-to-moment wonder of our world' (Brownlee, 2007, p.15). Another example from my observations was while trying some ICT teaching aides, the teacher stepped back and allowed children to choose a song or video clip for dancing, exercising or resting times. The teacher's role was the facilitator, and a learner along with children, as some aspects of the iPad were new to her.

Resilience:

Developing resilience starts early in life and should be regarded as a continual process throughout life, that is important for coping with changes (My ECE, 2014). To grow up with ICT, as a teacher who has only experienced ICT in adulthood, I knew that enhancing my resilience to cope with frustrating situations was crucial. I needed this also for enhancing my ability to recognise what information was most effective for improving my teaching practice and where were the reliable people or places (such as safe sites) I could go to for help and guidance when I needed to learn (Palfrey & Gasser, 2011). As an adult learner, there are times that I felt an ‘information overload’ with ICT, which is the feeling of being overwhelmed with the amount of information with which I was confronted, that led to anxiety and even contemplating giving up on the learning process (Palfrey & Gasser, 2011). I set a goal for myself to grow my own resilience, to develop better coping skills and the means of interacting with new ICT to make more informed decisions (Palfrey & Gasser, 2011). I wanted to focus on the fact that there is more opportunity in the contexts of learning, innovation and activism (Palfrey & Gasser, 2011), so I attended a three- day Early Childhood Council Annual Conference on *Celebrating Resilience* in 2014 that helped me learn and practice more resilience when exploring ICT innovations during this research.

Reflecting on the values of creativity and resilience, I have come to the conclusion that when I try to keep an open mind and focus on thinking, or nurturing creativity in myself, I probably need a lot of practice, as I have come from an educational background that almost crushed all my creativity. Making mistakes were inevitable, and I needed to accept my mistakes as part of my learning process, so this is where showing resilience was needed. It is well said that being receptive to new ideas means being receptive to the idea that mistakes are a necessary part of the process (Pauleen, 2007). Hence, it is well said that mistakes are to be encouraged, not just tolerated (Stewart, 2014). Reflecting on my mistakes, the learning happened when I accepted them and learnt from them - for example, by better managing my time and attention, by focussing on the purpose for which I was using each particular ICT innovation, and also in navigating all relationships involved, especially those teachers or parents who may have been negative or suspicious about trying ICT innovations in early childhood education. That brings me to my next value: optimism.

I like the definition of optimism that it is to create a positive strength, for a sunny and solid future-mindedness that can be deployed throughout life, not only to come back from failures, but also to establish the foundation for success and vitality (Seligman, 2011). In particular, this study helped me to be more optimistic, and feel more in line with the ethics framework in early childhood education (that presents a shared concept of professional responsibility that should affirm teachers' commitment to the core values of the field) (Feany & Freeman, 1999). In my explorations with ICT innovations in this study, what my core values meant in practice and how I committed to them, helped me to develop an insight for having courage and hope that I can learn, that making mistakes are a part of my learning and that I can bounce back after failure or mistakes. For ICT initiatives, I learnt that as long as I am wrapped up in my own fear, I feel powerless to help myself to teach or care for children (Jacobson, 2008). For these reasons, I have adopted optimism and courage as my core values.

Impact of findings

The findings of this study show that with ICT innovations, nurturing the teachers' creative thinking was much more likely to happen when they engaged in the process of thinking, and talking together. According to Guilford (2014), for adults to re-develop creativity, divergent thinking is required to develop fluency, flexibility and originality of the thought process. The findings also showed that ICT innovations, such as social networking media, blogs and e-portfolios improved relationships, communication and documentation highly. I expected this as these ICT initiatives provided more avenues for spontaneous dialogue, and early childhood documents show that dialogue with parents strengthens relationships (Ministry of Education, 2009a). Therefore, implementing ICT initiatives, helped to maintain a more welcoming environment that actively encouraged parents to stay involved and spend time with their children whenever they could (Terreni, 2003).

Additionally, whilst undertaking this research, by reflecting on a constructivist theoretical framework to my own teaching and learning, I noted an improvement in my own teaching and learning. Firstly, I was adopting a number of ICT innovations that served the teaching purpose, fitted my time constraints, so I planned more achievable goals that were in line with my developing core values, and searched for a balance in my own teaching and learning.

The findings of this study also showed that the teachers' reluctant attitude is most likely to change when they see other teachers' ICT engagement. For example, the implementation of e-portfolios for all children resulted from having a high response level from our parents that all teachers valued highly. Therefore, I learnt that to set up digital technology correctly, the teacher should try not to do it equitably and feed the hungry first! (Hammonds, 2013). This meant that the more interested and the more capable teachers with ICT should be supported by management to start making small changes early, and adapt the bigger changes that are to come later (Johnson, 1998). This is in line with the respect principle to allow time and space to each child, family and the colleague to join in when they feel ready. This showed how ICT initiatives can reinforce some good values, such as respect, for teachers, that was necessary for me so I could reflect on the consequences of my interactions carefully as these interactions can benefit or harm people (Sergiovanni, 2001). In all the centres that I visited, I observed an anti-discriminatory approach, backed up by values, reinforcing respect for all teachers in knowing how others' contributions are valued, in playing by the rules and not taking advantage of others (Sergiovanni, 2001). This resulted in improving the professional practice of all, having more motivation and a positive attitude to join with the ICT initiative.

The findings showed that technical issues with ICT or the number of ICT gadgets or programmes came second. What mattered most for the teachers was how to use ICT as a mediating tool for enhancing relationships, participation, and as a meaning-making device for bridging between participants in the learning community (Ramsey, Breen, Sturm, Lee, & Carr, 2006). For example, with ICT innovation of iPads, I noted that all the centres I visited, were not downloading all the apps, instead each selected three or four good apps for their own unique context.

The study also showed me that providing equal opportunities for all interested teachers for training and access to the relevant ICT enhanced participation and cooperation. For example, when all teachers had their own individual iPad, they were much more likely to participate and show an interest in learning new ICT skills.

Impact on practice

The findings impacted on my practice by enhancing my desire to be more reflective and responsive to change, because I saw the purpose. For example, the e-portfolio initiative that the teachers in the under-two area and I had already started trialling, became a conversation

topic of interest between myself and other teachers who had not adopted this ICT innovation yet in the over-two area. The impact that this dialogue had was to see the others' points of view, to encourage participation by making children's learning more immediately visible, and by discussing the benefits as an assessment tool that could be used for learning. For the infants and toddlers who now had an e-portfolio, it was respectful to continue this when they joined the older children's group. I felt strongly that for portfolios to be used as a tool for reflection and assessment, and to be more than a showcasing of some of the children's work, all teachers' participation was needed. Now, even the more reluctant teachers have joined in, some with a smaller number of e- portfolios, to take the time that they need in making respectful relationships with each child and family online. Similarly, all the teachers I interviewed, regarded enough time in building trusting collegial relationships with other teachers essential, in order to develop confidence and become motivated in trying a new ICT initiative, such as e-portfolio or blogs.

Another impact of this study on my practice is still happening as I am trying to learn from my mistakes. One mistake I made is that sometimes I liked to repeat the same teaching without thinking. Reading the literature on creativity helped me to see that there was hope that I can become more creative in my thinking and teaching. Creativity, as a phenomenon of trying something new or valuable and intelligent, is more concerned with the process and tied to people's social and emotional capacities, so even adults can re-nurture it within themselves (Barbey, 2014). Taking this as a new starting point for my creative learning and teaching, I focussed on how to assess the evolution of my emotional intelligence (Wenmoth, 2013), so the ICT resources do not define me, and I try not to get thoughtlessly obsessed with certain ICT initiatives. Therefore, my aim is not to focus on using a certain number of ICT innovations, but to think about how to engage in intelligent and creative ways with ICT to expand knowledge (Wenmoth, 2013). This is where ICT can be used as a servant to reinforce existing teaching approaches (Cox et al., 2003).

Microscopic: Micro effects of the research

A review on how this research will impact on a micro scale showed that my learning increased, my teaching improved, and, above all, that communication with children, parents and other teachers improved significantly. I also found that there is potentially so much room for growth in cybersafety issues in my teaching context and for using appropriate ICT for

inquiry learning. As I learnt more ICT, and thought about its appropriate implementation in my teaching, my interactions with the parents also improved. Some parents had asked me for a forum, where I used ‘*imovie*’ ipad application to display a video for this presentation. While the forum provided an opportunity for discussion and dialogue with parents, on an issue that they had nominated themselves (that is, ‘positive guidance’), the implementation of ICT innovation created excitement, enthusiasm and much more interest. The advantage of using ‘*imovie*’ application compared to more traditional computer softwares on laptop was the minimal time it required – just a few minutes to make a movie! When I visited different centres, I noted that ICT innovations were often used for enhancing relationships. For example, I read in one of the Kindergarten’s blog, that blogging is central in fostering closer relationships with children, families and the community and one function of the blog is for the five year olds leaving the Kindergarten to know that they become global citizens who can keep in touch if they want to (Coutts & Kaye, 2012). The study showed that creating an education community using ICT initiatives is a growing trend as early childhood teachers find the courage to try new ICT innovations. In the above example, the New Zealand Ministry of Education’s leader of e- learning research and innovation, states that even though blogs were not initially designed for education, teachers have picked up on them because they are suited to the dispositions that many teachers are after in their practice (King, 2009).

Even though quality indicators are difficult to define, they can be reflected on through responsive interactions and family/whānau partnerships that I believe were positively enhanced throughout the study. (O’Leary, 2004; Pakai, 2004). Throughout this study, I could observe enhanced social interactions and strengthened relationships, including those between adults and children, and between professionals and family/whanau. This approach helped me to have a future perspective.

Macroscopic: Macro effects of the research

Digital technology as one part of children’s real world was one strongly anticipated impact of this study, as part of the socio- cultural construction of communities of learners in my teaching and learning context. In all of my interactions and reflections, ICT appeared to be more prevalent than I initially thought, and much ICT that were used by children and their families were inexpensive or free of charge, and so showed that equity of access is now more attainable (Burt, 2012).

One other aspect of learning that impacted on my practice was that, with ICT innovations such as Skyping, I started using the notion of “enabling constraints” to set up the limits that can help me and the teaching team for collective engagement of learning (Sumara & Davis, 2010, p. 4). By way of a familiar example, a sport’s rules or a nation’s laws are enabling constraints that operate, in the main, by defining what cannot be done (Sumara & Davis, 2010). Similarly, I engaged in conversation about what can’t be done with ‘Skyping’ so the teaching team could think together and document the learning in our centre’s ICT policy (as a key policy for our practice). Similarly, my reflections showed that choosing and implementing digital technology wisely did not happen easily if I got too excited and wanted to try too many applications. I noticed that trying to do too much, was at one point reducing the value of my interactions and the quality of learning stories. I set myself my own ‘enabling constraints’, that I would not try too many iPad applications. Less applications with iPads enhanced my meaningful engagement with children, parents and teachers, leading to deeper learning for myself. My most frequently used applications are *imovie* and *piccollage* at this stage, as well as setting up music and video folders for mat times, resting times and music.

This study helped me to constantly reform my learning so I reached some kind of balance between change and stability, and this had an impact on most of the other teachers (as they started to tell me themselves), so that they too valued this learning and wanted to think about doing research, such as self- study, in the future. One teacher mentioned that while she did not regard fancying technology as the panacea, she liked to try new ICT in her teaching. This impact is about having sound educational values behind the ICT initiatives, that guide the teacher to scaffold learning (Kelly, 2003).

Due to this study, when I try an ICT innovation and do not find myself capable or confident, I look at it as going through fragility of thought, for a transitional period, like diving into an unknown situation, that results in experiencing a momentary sense of loss, but that will later become a crucial part of my learning (Ackermann, 2007). Papert's view that both “dwelling in” and “stepping back” are equally important in getting such a cognitive dance going on for new and deeper connectedness and learning to happen (Papert, 1998, cited in Ackermann, 2007, p. 10), is another anticipated impact of the study for myself and my teaching practice.

Impact of methodology

This study helped me to relate to ICT in a positive way, to resist its negativity and enhance my own teaching and learning capabilities, through self- study. Exploring what other teacher researchers in this field had done, helped me to reflect on what I can do to upskill myself in offering new opportunities for children's learning, or to improve my own communication and partnership with other teachers and parents. I expect that I have become more reflective throughout this research, because of the process that I went through.

Self-study of my teaching practice has made me more informed and conscious of asking questions, rethinking my own learning, sometimes even to unlearn and relearn. Because when I behave like this, I have acted like a researcher, and ultimately my teaching practice improves for the benefit of fostering learning dispositions in myself, as well as those I teach and the colleagues with whom I interact on a daily basis (Claxton, 2002).

As the teacher who is constantly interchanging as a learner, the impact of the methodology of action research and in particular self- study, was to help me to conceptualise myself as the researcher, rather than to only conceptualise myself as the researched (Nelson & Fivush, 2004). Self- study method was the most valid way to scrutinise my own practice and the values that underpin my teaching, as Grey (2010) regards this method as an appropriate way for an early childhood teacher to improve teaching and learning.

Interviewing, as my main method of data collection, was appropriate to the study because it allowed data collection with greater depth than other methods (Cohen et al., 2003). There were no problems in collecting the data this way, as the expert teachers were happy to share with me, a colleague, their own learning that related to ICT. What surprised me, though, is the level of resistance of some senior teachers to ICT innovations. Nevertheless, I wouldn't do anything differently, if I have to do this research again, as this method of researching had great relevance to the time I live in, to today's era of living, that is 'the third wave' (that follows the first two waves of agricultural and industrial waves/ revolutions in the history of mankind), because it is natural that I should ask myself questions before I automatically do things out of habit (Norman, 2013).

Recommendations for action

Based on my research I have formed the following goals for improving my teaching in the area of ICT, with the use of ICT:

Short- term goals for my action plan

- Encourage and mentor other teachers to contribute to e-portfolios, *i-movie*, *pic-collage*,
- Explore more learning and teaching opportunities with digital microscopes
- Induction of one new teacher to the new ICT initiatives
- Update ICT objectives in the centre annual and strategic plan (as a result of a meeting and group discussions on 19th December 2014)
- Replacing two office computers from university from Cyclone
- Developing my teaching values, and sharing with the teaching team. For example, discussion and shared thinking on why a song for mat time or resting time was chosen, an educational/ cultural video clip on the big screen and/or for engaging in an inquiry based project

Medium- term goals for my action plan

- Implement all teachers' suggestions and discussions to the initial draft of our centre ICT policy, and display it for teachers and parents (to review and comment)
- Check with IT to ensure cybersafety measurements will be put in place
- Liaise with student services to update the centre website
- Send a second ICT survey to parents
- Organise parents' ICT forum evenings if there is an interest
- Training on time- management for all teachers in 2015 (as discussed in Teacher Only Day in 2014 as a priority) to support their interest and commitment to using ICT in the teaching practice.

Long-term goals for my action plan

- Ongoing ICT policy review
- Sharing with parents and seeking feedback on ICT use within the centre
- ICT IDP for teachers (group and individual) (for 2015 and 3 year plan)
- Forming an ICT team from interested senior teachers to lead and network

I hope that most the lasting impact of this study on me has been for mindful teaching (Barcelos, 2013a) as I have transitioned from a teacher who was so worried with following the plan and getting to the end of class to a teacher who now tries to be in the “here and now” of the learning (Author, 2010; Schoeberlein, 2009), to be more “present”, that is, mindful of teaching moments, and the “WOW” moments of teaching (cf. Murphey, 2012). I have learnt to become a more playful teacher, as Morris (2012) suggests, I now try to answer “yes” and “and” (the two rules when improvising with others: confirm what they say and add something) to telling a different story by allowing myself to improvise and go with the flow. As I relaxed more into being and accepting the person that I am, I have also become more playful. This has led me to look for ways to have a more relaxed and fun experience of teaching. I have added affirmation songs (Murphey, 2007), such as different versions of the ‘Happy’ song so we have the right emotional atmosphere for learning.

Throughout this study, especially during my observations in the centres that I visited, and in the interactions with ICT innovations, I focussed on how I could learn to learn from children, the same way the less skilled children (not necessarily younger), were learning from the more skilled children. The impact on me is that just because I am an adult, I should not assume that I know better or more or less. I now believe that the same way of thinking that applies for little children who act like little scientists, can apply for me! By looking at how children are learning constantly from everything that is happening around them, I try to learn just like them. I confront myself with the fact that, as an adult, I am probably habituating (that means getting used to always teaching the same thing, in the same old way) and as I am habituating, I might lose awareness towards learning new skills (Gopnik, 2009). So this study has helped me to learn, to look for opportunities to open myself to the knowledge that comes from trying things out. Exploration and curiosity are important and valued ways of learning not only for young children (Ministry of Education, 1996b), but also for adult learners.

According to Bereiter (2002), education’s future is a two part story, where the first part starts with digital revolution, globalisation, major demographic and economic changes, massive growth in new networked forms of knowledge and knowing that many of the 21st century problems will not be solved with 20th century thinking. This study helped me to make an effort to project my thinking into a time that is different to my past, to bring forward the parts

of my past teaching that are good, but continue thinking for constructing my preferred future (Gilbert, 2005). Bereiter (2002) claims that the second part of our unfolding future story relates to the education system that needs to do better, by replacing the mind-as-container metaphor with one that envisions a mind capable of sustaining knowledgeable, intelligent behaviour without actually containing stored beliefs. Hence, I feel this self- study was very timely.

Another important impact on me was the power of dialogue, for example, that the ‘skyping’ should be discussed before it happens with other teachers, so the purpose becomes clear and any concerns are raised before it is too late, (so it does not become a relationship breaker among the teachers). This motivated me to share some thoughts with the teaching team about skyping in our Teacher Only Day, and invited others’ thinking, so different possibilities were discussed that helped me in putting some cybersafety measures in place.

Additionally, for effective use and appropriate selection of ICT initiatives, this study had the impact on me that for creative thinking to happen, the teachers should try to go one step beyond intelligent thinking, and capitalize on seemingly random connections of concepts (Guilford, 2014). For me, one good way to do this was to engage in shared thinking (for example, on choosing the most appropriate learning related songs or videos for cultural festivals) with other capable teachers who use ICT.

This study provoked me to review and re-develop my core values that were explained earlier. These values help my thinking, and are in line with moral leadership that I would like to enact in compensating the limitations of constructivist framework for teaching and learning of young children (Goodman, 2010). In addition, this study helped me to create a balance in my professional and personal life, with ICT technology present daily.

Lastly, and most importantly, the impact of this study on me is that I am selecting and using ICT innovations to strengthen relationships with children, families and other teachers, from different cultures, so we can think together for cooperative interchanges. *Te Whāriki* (Ministry of Education, 1996b) in particular advocates for teachers to teach basic life skills through valuing positive relationships with the whole community (Ministry of Education, 1996). The *Exemplar Book 2 of sociocultural assessment, He Aromatawi Ahurea Pāpori* (Ministry of Education, 2004) also emphasised that multiple cultural lenses on learning and assessment should be acknowledged. *Te Whāriki* (Ministry of Education, 1996, p. 30)

recommends early childhood teachers encourage families' engagement and involvement with children's learning and development as well as assessment and evaluation of the curriculum. This is where digital technology can be used as a medium to investigate (Ministry of Education, 2000b). I can do this for myself, and as a teacher, I can also help the teaching team (as their leader) to construct values through our social interactions, where we come to figure out solutions to problems in environments that are real, caring and cooperative.

Through this study, I spent a long time thinking about my values that helped me to embed an ethical perspective within my teaching practice when it comes to ICT innovations. The impact on me was that I became more educated as a "good computer ethics education is impossible without well- educated teachers" (Goujon, Lavelle, Duquenoy, Kimppa, & Lauren, 2007, p. 190). The study also showed me that part of understanding how failure happens is central to why failure happens (Gladwell, 2000), therefore, enhancing my reflective practice to discover for myself why certain ICT technology did not work (such as the bookmaker iPad application), also helped me to plan for future ICT initiatives to happen in a more achievable way (for example, by breaking it into steps or making it into a shared project for myself and another teacher). Either way, I learnt that failure does not necessarily reflect one's ability in performance (Gladwell, 2000), and becoming a better teacher involves the willingness to let myself fail sometimes because in teaching and learning I have to deal 'as a daily exercise of vulnerability' with uncertainties, complexities, messiness, feelings and emotions (Barcelos, 2013b, p. 2).

Conclusion

Finally, to improve my teaching practice with regards to my values and ICT innovations, I refer to Stephen Covey's (2014) advice that I must begin with the end in my mind, to think about the purpose (of why I am doing what I am doing). However, while I still believe that ICT is best when not replacing face to face interactions, I also see that ICT challenges me in finding some criteria in my need for balance. This makes sense to me as deciding to learn more of digital technology in my teaching, coincides with the advancement of technology in an era (called 'the third wave') that is not going to cease, and is visible in my own everyday life and the lives of the children that I teach. What I would like to find is a sense of balance, to watch for what Turkle (2011) warns against, that is the fascination and love of technology, instead of sound engagement with it. Throughout this study, I found out questioning why I

was doing what I was doing with ICT, often helped me to see the consequences that have to be paid for such rapture. The next chapter is the conclusion chapter.

Chapter 7

Conclusion chapter

This study set out to investigate how I could step back, as a teacher who wants to improve my own teaching, to assess and rethink my own practice through exploring ICT innovations of other expert teachers in centres that I visited and, based on interactions and interviews that I completed there, to improve my own teaching practice. Overall, the important finding that emerged in this study for me was the importance of what Gilbert (2006) calls “catching the knowledge wave” by a teacher like myself who intends to use education for future-mindedness and to establish the habit of collective thinking. I believe that this area is the most significant growth I have had in my practice as I select and use some of these ICT innovations to try out in my own teaching and learning context. Even though I was too ambitious at first by choosing too many initiatives, I learnt to slow down through reflecting and rethinking my own thinking. I learnt that this should be an ongoing part of the learning that can be embedded in my teaching practice.

Main findings of this research

Looking back at my reflective journal, I repeatedly come across ‘ICT for relationships’ ‘improving communication’, improving documentation’ and ‘inquiry learning approach’. Reflecting on my own teaching context, I see that we spend so many hours of our lives in the centre. Many of our children of mixed age group (0-5) are there every working day for the whole day, 5 days a week. For myself and the other full time teachers, in many ways, the centre is our second home. I see that my self- study journey and delving into my own teaching practice trying to find my way with exploring new ICT initiatives, has led me on a path of discovery that had had mutual learning outcomes for me and the colleagues that I work with. I now believe that the relationships that everyone forms are the most important aspect of life in the centre.

With children

When I followed an interest or experienced something new with children about ICT innovations, I was role modelling collaboration, respect, trust, integrity, leadership to children, to set the bar of how we are as a centre, a family, and our values. For example, when I made folders of MP3 and MP4 files that were a collection of children's everyday videos or audio clips of interest, I could see the purpose and I could see that children really responded with their happy content expressions, while being curious to learn and remaining fully engaged. The interactions improved relationships because there were meaningful conversations.

With adults (teachers as well as parents)

My learning with adults was often about 'shared responsibility', 'shared ownership' and using 'opportunities' to grow. I felt great that I was being 'trusted' and 'supported' by other teachers and parents who saw my passion with regards to my explorations with ICT initiatives for improving my own teaching and learning. I also offered my support to the teachers in the team who were showing leadership and strength in this area already. An example of this was couple of teachers in our infant and toddler side who joined in a trial of e-portfolios. As a result of exploring and experimenting with different ICT initiatives, I have learnt to rely on collective thinking, not just my own individual judgement, especially for ensuring cybersafety issues and pedagogical intent (that is, the purpose of what I do in my teaching practice). For example, through a conversation with a colleague about a video clip that I had downloaded for children's resting time (to follow a child's interest), I learnt that the music could do the young child harm because of its frequent flashing lights. My colleague had read about neuroscience research that indicated that if music contains many flashy images, it is not appropriate for young children to watch. I deleted it from the list of children's favourite music folder, and felt good that the shared thinking with a colleague, made me improve my teaching. So, the learning was that in following children's interests, it is very wise to engage myself in thinking with others to decide why I am doing what I am doing and to see the purpose and other possibilities better. I noted that often, all the teachers and parents have relevant knowledge, not just the one doing the research. That is why, making myself available for questions, discussions and sharing ideas and information is what

I would like to continue in the future. This approach is in line with moral leadership model that I like to enact in my leadership that is based on respect, and trust (Goodman, 2010).

Another outcome was a better review of centre practice, because of partnership between myself and the teaching team and the parents, for example, when we wrote the first draft of ICT policy. Having a very diverse teaching team and parent community, the learning opportunities are vast and valuable. To improve my teaching practice using ICT initiatives (for example by downloading a cultural dance from our own children's different cultural backgrounds), I am trying to learn and teach about our own people as it involves me in expanding our own community's sense of belonging (Ministry of Education, 1996b).

Working with other teachers and parents with ICT initiatives is also another learning outcome for pursuing inquiry learning. For example, the interest in Indonesian shadow puppets, that initially was introduced by one of the teachers in our Cultural Day celebrations, led to inquiry learning on 'puppet shows' for interested children, where I added some you- tube videos, role played and turned to a popular play theme for an extended period of time for children.

Another learning outcome for me was to question the content of 'mat time' and try to improve my teaching by seeing 'mat time' as an opportunity to empower children, by supporting a forum for the children to discuss and put forward a number of their own diverse ideas. This is where using appropriate ICT excites me, because my teaching practice turns to relational teaching experience where the knowledge is challenged and constructed by the learners and the teachers (Archard, 2013). In each example above, ICT has contributed to the sustainability of the learning episode and has supported interactions that has brought on debate, investigation, and planning by children and the adults (Archard, 2013).

Implications of findings

What this research means for me in terms of early childhood practice is understanding the way ICT can be used as a strength so it can help teachers to align with the values and the culture of the early childhood centre to bring forward whatever is the best from our past into our future (Jenkins, 2013). This study also implies the importance of writing reflections and engaging in inquiry learning for early childhood teachers to grow professionally. While regular short- term reflections will give the teacher a good way to look at strengths, an appreciative inquiry approach of acknowledging the strengths of what teachers do, will help

the teacher to add to the body of knowledge for long term plans (Gilbert, 2009, cited in Jenkins, 2013). Through this study, I trialled and explored ICT innovations, using conversation and dialogue, in ways that substantially improved my relationships. Because I wanted to build on my strengths and improve my teaching practice, the collective thinking of people was to be taken into consideration (Yoder, 2005). The implications of developing my core values, throughout the study, helped me to revisit and feel confirmed that our teaching team has an awareness of democracy that is alive (Bolstad, 2004a; Moss, 2009). This discussion with the teaching team was beneficial as it demonstrated the potential to guide the development of a pedagogy that recognises the child and their ways of being, and includes the child's experiences and knowledge about things that matter to them in their real lives.

Limitations of the research

Even though this study was an in-depth exploration of ICT innovations into my own teaching practice, the research was limited in several ways. Firstly, it had limitations by virtue of its scope, as it was a small scale study where only four teachers were interviewed. The other limitation is that one method of data gathering was used, so the results should be interpreted with caution. Another limitation was the lack of interest of some teachers, often senior, who cannot yet overcome the challenging aspects of IT in the 21st century, and the time needed to cope with it or to feel ready to embrace it. This is recognised as a challenge for the early childhood sector to combat some of the ambivalence toward ICT by some teachers, and some families and whanau, so this resistance to ICT remains in some early childhood centres despite ICT being acknowledged both as a feature of many young children's worlds, and as a tool that supports aspects of their learning (Archard, 2013). However, I tried to look at it as part of the learning process and anticipated this negative reaction in any such learning journey from only a few within a teaching team.

Lastly, the shortage of time was a common problem and a limitation for all four interviewees, as well as in my own situation for it can constrain ideas, networking and sharing. However, this is an anticipated problem in the early childhood field and, despite this restraint, a more mindful teacher is more competent in the long term, by setting more realistic goals and slowing down to enjoy the journey and the learning that is happening.

This study offers early childhood teachers an example to look for multiple possibilities to keep curiosity alive (Hargraves, 2011), by engaging more in self- study research to reflect upon our own practice. Smidt (2009, p. 41) refers to Vygotsky (1978)'s 'development as a sequence of physical, social and intellectual changes that a human organism undergoes from the moment of conception until the finality of death' for offering more learning and teaching opportunities. In addition to that, one purpose of education is for people to envision the kind of future they want to create, and to do that, thinking collectively is required in a new context where knowledge exists in the network (Dator, cited in Gilbert, 2005). This is the rationale for early childhood teachers to show more interest in thinking and conversing with other teachers in educational research that moves us beyond individual intelligence towards collective intelligence. Because if, as individual teachers, we are open to debate, we will never settle for repeating all and everything from the past, and in our future instead of clones we will have clades, who are people who can work together in a series of small steps and build long- term relationships that do not necessarily lead to known situations (Gilbert, 2005). Imagine if we just repeat what we always did, what a boring unengaging place it would be for the children. On the contrary, when we choose to reflect, engage, think and work together, the future we collectively want will be much closer to reality. Following Gilbert's (2005) thinking, teachers from all levels should look at their present where a creative process can occur by embracing technology and using it for building the preferred conditions they want in future (Gilbert, 2006). I think that exploring further ICT innovations will be an interesting area for extending this self- study, for other early childhood teachers to engage with thinking and creating a more future-focussed community.

Further research is also recommended to investigate how fear can be replaced with hope as an effective way to decide on personal and social action that is needed by early childhood teachers to enhance resilience, to create a positive strength, a sunny and solid future-mindedness that can be deployed throughout life- not only to fight depression and to come back from failure, but also to be the foundation of success and vitality (Seligman, 2011).

Only in this way, can we cultivate, 'that state of being absorbed, rapt in an inherently gratifying and rewarding state' because as the psychologist Mihaly Csikszentmihalyi says we,

humans, are programmed to be learning animals, partly because the feeling of being stretched by the 'risky edge' of our experience is so exhilarating (Claxton, 2002, p. 21).

References

- Ackermann, E. (2007). Piaget's Constructivism, Papert's Constructionism: What's the difference? . *Future of learning group publication*, 5(3), 438.
- Ala-Mutka, K., Punie, Y., & Redecker, C. (2008). ICT for Learning, Innovation and Creativity. from <http://ftp.jrc.es/EURdoc/JRC48707.TN.pdf>
- Amos, C. (2013). *Using teaching as inquiry to integrate thinking skills, collaboration and differentiation; supported by e-learning*. Paper presented at the ULearn, Hamilton, NZ.
- Archard, S. (2013). Democracy in early childhood education: How information and communication technology contributes to democratic pedagogy and practices. *Early Childhood Folio*, 17(2), 27- 32.
- Armstrong, A., & Casement, C. (2001). *The child and the machine: How computers put our children's education at risk*. Melbourne, Australia: Scribe Publications.
- Ballew, J. (2010). Accessibility and security *How to do everything: iPad*. New York, NY: McGraw-Hill.
- Banister, S. (2010). Integrating the ipad touch in K- 12 education: visions and vices. *Computers in the Schools*, 27(2), 121- 131.
- Barback, J. (2014). Children better with smartphones than shoelaces - study. Auckland, NZ: internet security company AVG.
- Barbey, A. (2014). General intelligence linked to emotional, social context of life. Retrieved 2nd August, 2014, from http://zeenews.india.com/news/health/health-news/general-intelligence-linked-to-emotional-social-context-of-life_28996.html
- Barcelos, A. M. F. (2013a). We teach who we are (becoming). *PeerSpectives Issue*, 10(Spring), 2- 6.
- Barcelos, M. F. (2013b). Learning and teaching journeys. *PeerSpectives Issue*, Spring(10), 2- 6.
- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775- 786.
- Bereiter, C. (2002). *Education and mind in the knowledge age*. New York, NY: Routledge.
- Billowes, N., & Alexander, R. (2010a). Building teacher capabilities: ICT professional development (ICTPD) programme- Bridging the gap *eLearnings: Implementing a national strategy for ICT in edcation, 1998- 2010* (pp. 46- 57). Christchurch, NZ: CORE Education Ltd.

- Billowes, N., & Alexander, R. (2010b). ICT professional development (ICTPD) programme- Bridging the gap. In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 46- 57). Christchurch, NZ: CORE Education.
- Biro, M. M. (2013). Leadership is about emotion. Retrieved September 8, 2014, from http://www.forbes.com/fdc/welcome_mjx.shtml
- Bolstad, R. (2004a). *The role and potential for ICT in early childhood education: A review of New Zealand and international literature*. Wellington, NZ.
- Bolstad, R. (2004b). The role and potential of ICT in early childhood education: A review of New Zealand and international literature (pp. 1- 93). Wellington, New Zealand: Ministry of Education Te Rūnanga O Aotearoa Mō Te Rangahau I Te Mātauranga.
- Bond, T. (2010). Once were blackboards. In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 73- 79). Christchurch, NZ: CORE Education.
- Boud, D. (Ed.). (2001). *Using journal writing to enhance reflective practice*. San Francisco, USA: Jossey- Bass.
- Brownlee, P. (2007). *Magic places*. Wellington, NZ: Childspace.
- Bryk, A. S., & Schneider, B. L. (2002). *Trust in schools: A core resource for improvement*. New York, USA: Russel Sage Foundation Publications.
- Burt, D. (2012). Living and learning successfully in the global village. In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for ICT in education, 1998- 2010* (pp. 170- 176). Christchurch, NZ: CORE Education.
- Burton, D., & Bartlett, S. (2005). Teachers as reflective practitioners *Practitioner research for teachers*. London, UK: Paul Chapman Publishing.
- Bush, T., Bell, L., & Middlewood, D. (Eds.). (2009). *The principles of educational leadership & management*. Los Angeles, LA: Sage Publications LTD.
- Carr, M. (2001). *Assessment in Early Learning Settings: Learning Stories*. London, UK: Paul Chapman.
- Chandler, O. (2014). Rumi quotes. from <http://www.goodreads.com/author/quotes/875661.Rumi>
- Chau, J., & Cheng, G. (2010). Towards understanding the potential of e- portfolios for independent learning: A qualitative study. *Australasian Journal of Educational Technology*, 26(7), 932- 950.
- Claxton, G. (2002). *Building learning power*. Bristol, UK: TLO Limited.

- Claxton, G., & Carr, M. (2004). A framework for teaching learning: Learning dispositions. *Early Years International Journal of Research and Development*, 24(1), 87-97.
- Clemons, S. A. (2006). Constructivism pedagogy drives redevelopment of CAD Course: A case study. *The technology Teacher*, 65(5), 19-21.
- Codd, J. (1999). Educational reform, accountability and the culture of distrust. *New Zealand Journal of Educational Studies*, 34(1), 45- 53.
- Cohen, L., Manion, L., & Morrison, K. (Eds.). (2003). *Research methods in education*. London, UK: Routledge, Falmer.
- Colbert, J. (2012). Welcome to a world of possibilities: Exploring digital technology in early childhood education. 1- 4. Retrieved from:
<http://elp.co.nz/EducationalLeadershipProjectResourcesArticlesELP.php>
- Coogan, P. (2012). Learning from each other- Online communities of teachers. In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for ICT in education, 1998- 2010* (pp. 125- 132). Christchurch, NZ: CORE Education.
- CORE Education. (2014). Digitising appraisal and inquiry: An integrated approach to professional learning.
- Corzo Zambrano, X. P., & Robles Noriega, H. S. (2011). Approaches to scaffolding in teaching mathematics in English with primary school students in Colombia. *Latin American Journal of Content & Language Integrated Learning*, 4(2), 13-20. . doi: doi: 10.5294/laclil.2011.4.2.2 ISSN 2011-6721
- Coutts, T., & Kaye, B. (2012). "Here's my blog address- You'll be needing that". In V. Ham & D. Wenmoth (Eds.), *Elearning: Implementing a antional strategy for ICT in education, 1998- 2010* (pp. 177- 184). Christchurch, NZ: CORE Education.
- Covey, S. R. (2014). *The 7 habits of highly effective people: Powerful lessons in personal change*. New York, USA: Business Wire.
- Cox, M., Webb, M., Abbott, C., Blakeley, B., Beauchamp, T., & Rhodes, V. (2003). ICT and pedagogy: A review of the research literature ICT in schools research and evaluation series (No. 18) (D. f. E. a. Skills, Trans.). London, UK.
- Crick, R. D., & Yu, G. (2008). Assessing learning dispositions: is the Effective lifelong learning inventory valid and reliable as a measurement tool? *Educational Research*, 50(4), 387-402. Retrieved from:
<http://www.tandfonline.com/doi/abs/10.1080/00131880802499886#.Ul78rPmnpd4>
doi:DOI:10.1080/00131880802499886

- Dahlberg, G., Moss, P., & Pence, A. (Eds.). (2007). *Beyond quality in early childhood education and care: Languages of evaluation* New York, NY: Routledge.
- Dalli, C. (2008). Pedagogy, knowledge and collaboration: Towards a ground- up perspective on professionalism. *European Early Childhood Education Research Journal*, 16(2), 171- 185.
- Dalli, C. (2010). Towards the re-emergence of a critical ecology of the early childhood profession in New Zealand. *Contemporary Issues in Early Childhood*, 11(1), 61-74. .
- Daniels, H., Cole, M., & Wertsch, J. V. (Eds.). (2007). *The Cambridge companion to Vygotsky*. New York, NY: CUP.
- Davis, B., Sumara, D., & Luce-Kapler, R. (2000). *Engaging minds: Learning and teaching in a complex world*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Davison, I. (2014, Dec 10, 2011). Internet now valued part of most Kiwis' lives. *The New Zealand Herald*.
- Dweck, C. (2006). *Mindset: The new psychology of success* USA: Ballantine Books.
- Education Review Office. (2012). Inclusion of Children with Special Needs in Early Childhood Services. Retrieved 8th Jan, 2015, from <http://www.ero.govt.nz/National-Reports/Inclusion-of-Children-with-Special-Needs-in-Early-Childhood-Services-December-2012/Introduction/Success-for-All-in-early-childhood>
- Fallon, G. (2010). Pursuing possibilities through digital opportunities. In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for ICT in education, 1998- 2010*. Christchurch, NZ: CORE Education.
- Feany, S., & Freeman, N. K. (1999). *Ethics and the early childhood educator using the NAEYC code*. Washington D. C., USA: National Association for the Educaton of Young Children.
- Feasey, R., & Still, M. (2006). Science and ICT. In Hayes & Whitebread (Eds.), *ICT in early childhood*. New York: NY: McGrawHill: Authors.
- Feenberg, A. (1999). *Questioning technology*. London, UK: Routledge.
- Feenberg, A. (2001). Wither educational technology? *International Journal of Technology and design Education*, 11, 83- 91.
- Feenberg, A. (2002). Preface. Introduction. In T. p. o. t. C. t. o. technology (Ed.). Oxford, UK: Oxford University Press.
- Gagne, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26, 331-362. Retrieved from: www.interscience.wiley.com doi:10.1002/job.322

- Gee, J. P. (2005). Learning by design: Good video games as learning machines. *E- learning*, 2(1), 5- 16.
- Genet, D. (2013). Teachers' fear of technology: How does it impact the classroom? In R. McBride & M. Searson (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2013* (pp. 1309-1314). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
- George, P. (2013). *Using online literacy resources to enhance learning at school and at home: A New Zealand and an Australian perspective*. Paper presented at the ULearn 2013, Hamilton, NZ.
- Gerbic, P. (2010). Getting the blend right in new learning environments: A contemporary approach to online discussions. *Educational Informtion Technology*, 15, 125- 137.
- Gerbic, P., & Maher, M. (2008). Collaborative self-study supporting new technology: The Mahara e-portfolio project *Hello! Where are you in the landscape of educational technology?* Melbourne, Australia: Proceedings ascilite
- Gibbons, A. (2007). *The matrix ate my baby*. Amsterdam, The Netherlands: Sense Publishers.
- Gibbons, A. (2010). Reflections concerning technology. A case for the philosophy of technology in early childhood teacher education and professional development programs. In S. Blake & S. Izumi- Taylor (Eds.), *Technology for early childhood education and socialisation: Developmental applications and methodologies* (pp. 1- 19). New York, NY: Information Science Reference (an imprint of IGI Global).
- Gilbert, J. (2005). *Catching the knowledge wave?: The knowledge society and the future of public education in New Zealand* Wellington, NZ: NZCER.
- Gilbert, J. (2006). *Catching the knowledge wave*. Paper presented at the Curriculum Corporation 13th National Conference, Adelaide, Australia.
- Gladwell, M. (2000). The art of failure: Why some people choke and others panic. 84- 92. Retrieved from: <http://gladwell.com/the-art-of-failure/>
- Glass, B. (2013). *The Skype project*. Paper presented at the ULearn 2013, Hamilton, NZ.
- Goodfellow, R. (2011). teaching in higher education. *Literacy, Literacies and the Digital in Higher Education*, 16(1), 131- 144.
- Goodman, J. F. (2010). Moral education in early childhood: The limits of constructivism. *Early Education and Development*, 11(1), 37- 54. doi: DOI: 10.1207/s15566935eed1101_3
- Gopnik, A. (2009). *The philosophical baby: What children's minds tell us about truth, love and the meaning of life*. New York, NY: Farrar, Straus and Giroux.

- Goujon, P., Lavelle, S., Duquenoy, P., Kimppa, K., & Lauren, V. (Eds.). (2007). *The information society: Innovation, legitimacy, ethics and democracy*. University of Namur, Belgium: International Federation for Information Processing.
- Gredler, M. E., & Shields, C. C. (2008). *Vygotsky's legacy: A foundation for research and practice*. New York, USA: Guilford Press.
- Grey, A. (2008). On-line reflection: Does it enhance teaching practice? . *I*(4), 29- 36.
- Grey, A. (2010). *Self- review as practical philosophy: A case study in early childhood education in Aoteaora New Zealand*. (Doctor of Education), Auckland University of Technology, Auckland, NZ.
- Grey, A. (2011a). Cybersafety in early childhood education. *Australasian Journal of Early Childhood*, 36(2), 77- 81.
- Grey, A. (2011b). Professional dialogue as professional learning. *New Zealand Journal of Teacher's Work*, 8(1), 21- 32.
- Guilford, J. P. (2014). Difference between intelligence and creativity. from <http://www.differencebetween.info/difference-between-intelligence-and-creativity>
- Haiyan, Q., & Walker, A. (2014). Leading with empathy. In C. Branson & S. Gross (Eds.), *Handbook of ethical educational leadership* (pp. 112- 128). New York, NY: Taylor & Francis.
- Ham, V. (2010). It was twenety years ago today... In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for ICT in education, 1998- 2010*. Christchurch, NZ: CORE Education.
- Ham, V., & Wenmoth, D. (Eds.). (2010). *E Learning: impledmenting a national strategy for ICT in education 1998- 2010*. Christchurch, NZ: CORE Education.
- Hamer, J. (2010). Should critical literacy be a part of early childhood education in New Zealand? 2(3), 16- 27. Retrieved from: <http://www.hekupu.ac.nz/?type=search&txtTitle=Should+Critical+Literacy+be+a+Part+of+Early+Childhood++Education+in+New+Zealand%3F+&btnTitle.x=0&btnTitle.y=0&btnTitle=Go&txtAuthor=Judy+Hamer&txtWord=>
- Hammonds, J. (2013). *Getting started with ipad*. CORE seminar. Hamilton, NZ
- Hargraves, V. (2011). *Supporting children's working theories in early childhood education: What is the teacher's role?* . (Masters thesis), Auckland Univerity of Technology, Auckland, NZ. Retrieved from <http://aut.summon.serialssolutions.com/search?s.q=thesis+by+victoria+Hargraves&s.f>

vgf[]=&s.cmd=addFacetValueFilters%28ContentType%2CNewspaper+Article%3At
%2CBook+Review%3At%29

- Harwood, D. (2008). Deconstructing and reconstructing Cinderella: Theoretical defence of critical literacy for young children. *Language and Literacy*, 10(2), 1-13.
- Hatherley, A. (2010). The rise (and fall?) of ICT in early childhood education. In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 87- 95). Christchurch, NZ: CORE Education.
- Hedges, H., & Jones, S. (2012). Children's working theories. *Early Childhood Folio*, 16(1), 34- 39.
- Hill, R. (2004). Dreamweaver and Flash: Strategies for updating communication systems instruction. *The technology Teacher*, 63(7), 7-11.
- Horrocks, I., & Pratchett, L. (1995). Electronic democracy: Central themes and issues. In J. Lovenduski & J. Stanyer (Eds.), *Contemporary political studies*. Newcastle,UK: Political Studies Association.
- Howard, B. C., McGee, S., Schwartz, N., & Purcell, S. (2000). The experience of constructivism: Transforming teacher epistemology. *Journal of research on Computing in Education*, 32, 455- 456.
- Hultqvist, K., & Dahlberg, G. (2001). Governing the child in the new millenium. In K. Hultqvist & G. Dahlberg (Eds.), *Governing the child in the new millenium* (pp. 1-14). New York, NY: Routledge Falmer.
- Jackobson, T. (2008). *"Don't get so upset!" Help young children manage their feelings by understanding your own*. USA: Redleaf Press.
- Jenkins, C. (2013). *Titiri-based curriculum*. Building on strengths to meet bicultural graduating teacher standards. Auckland University of Technology.
- Johnson, S. (1998). *Who moved my cheese? An amazing way to deal with change in your work and in your life*. UK: CPI Wax & Wyman.
- Johnston, K. (2015). ICTs in education. Retrieved Jan 8, 2015, from <http://www.tcd.ie/Education/ICT/unit02/explanation04.htm>
- Jordan, A., Carlile, O., & Stack, A. (2008). *Approaches to learning: A guide for teachers*. Berkshire, UK: McGraw-Hill, Open University Press.
- Kaa, J., & Parata, N. (2010). Digital natives- The development of ICT within Ngati Porou East Coast communities. In V. Ham & D. Wenmoth (Eds.), *Elearning: Implementing a national strategy for ICT in education, 1998- 2010*. Christchurch, NZ: CORE Education LTD.

- Kanselaar, G. (2002). Constructivism and socio-constructivism. 1- 7. Retrieved from:
<http://edu.fss.uu.nl/medewerkers/gk/files/Constructivism-gk.pdf>
- Kaye, N. (2014). New provider for \$5 million digital advisory service. Retrieved 8th Jan, 2015, from http://www.beehive.govt.nz/release/new-provider-5-million-digital-advisory-service?utm_campaign=core-newsletter-gen-dec2014&utm_source=core-newsletter&utm_medium=email&utm_content=news-feature2-link
- Kellow, J. M. (2013). *Apps for inquiry*. Paper presented at the ULearn 2013, Hamilton, NZ.
- Kelly, K. (2003). Theme issue: The role of design in educational research. *Educational researcher*, 32, 3- 37.
- King, A. (2009). Sharing your story online. *New Zealand Education Gazette: Tukutuku Korero*, 88(2), 2- 3.
- King, A. (2010). Two clicks to the world- A teacher's perspective. In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 80-86). Christchurch, NZ: CORE Education.
- Lave, J., & Wenger, E. (2003). *Situated learning, legitimate peripheral participation*. USA: cambride University Press.
- Li, N. (2014). Online portfolio for ECE centres, teachers, parents and our children In EDUCA (Ed.). Wellington, NZ: EDUCA Limited.
- Lieberman, D. A., Fisk, M. C., & Biely, E. (2009). Digital games for young children ages three to six: From research to design. *Computers in the Schools*, 26(4), 299- 313. doi: 10. 1080/07380560903360178
- Marsh, J. (2004). The techno-literacy practices of young children. *Journal of Early Childhood Research*, 2(1), 51-66.
- Marsh, J., & Hall, N. (Eds.). (2003). *Early childhood literacy and popular culture*. London: UK: Sage Publications.
- Martin, A. (2008). Digital literacy and the "digital society". In C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies and practices* (pp. 151-176). New York, NY: Peter Lang Publishing.
- Mawson, B. (2003). Smoothing the path: technology education and school transition. *Research in Science Education*, 33, 503-514.
- McNiff, J. (2013, November 4th, 2013). Action research, principles and practice. from <https://elp.educa.co.nz/inquiryreview>
- McNiff, J., & Whitehead, J. (2006). *All You Need to Know about Action Research*. . London, UK: Sage Publications.

- McPake, J., & Plowman, L. (2010). At home with the future: influences on young children's early experiences with digital technologies. In N. Yelland (Ed.), *Contemporary perspectives on early childhood education*. Auckland, NZ: McGraw-Hill Education.
- Meade, A. (2011). Centres of innovation: Gaining a new understanding of reality. *Early Education*, 50 (spring/ summer), 7- 11.
- Meade, A., Williamson, J., Smart, M., Smorti, S., Robinson, L., & Lind, J. C. (2013). Adult-child sustained shared thinking. *Early Education*, 53(Autumn/ Winter), 7- 12.
- Mills, J., Bonner, A., & Francis, K. (2006). The development of constructivist grounded theory. *International Journal of Qualitative Methods*, 5(1), 1-10.
- Ministry of Education. (1996a). *Te whāriki he whāriki mātauranga mō ngā mokopuna o aotearoa. Early childhood curriculum*. Wellington, New Zealand: Learning Media Limited.
- Ministry of Education. (1996b). *Te whāriki he whāriki mātauranga mō ngā mokopuna o aotearoa. Early childhood curriculum* Wellington, New Zealand: Learning Media Limited.
- Ministry of Education. (1998). *Quality in action: Te mahi whai hua* Wellington, New Zealand: Learning Media Limited.
- Ministry of Education. (2000a). *The quality of journey He haerenga Whai Hua: Improving quality in early childhood services*. Wellington, NZ: Learning Media Limited.
- Ministry of Education. (2000b). *The quality of journey He haerenga Whai Hua: Improving quality in early childhood services*. Wellington, NZ: Learning Media Limited.
- Ministry of Education. (2003). *Interactive eucation: An information and communication tchnologies srategy for schools*. Wellington, NZ: Authors.
- Ministry of Education. (2004). *Kei tua o te pae Book 3, Bicultural assessment, He aromatawai ahurea rua*. Wellington, New Zealand: Learning Media Limited.
- Ministry of education (Producer). (2005, 20th October, 2013). Foundations for discovery. Retrieved from <http://www.educate.ece.govt.nz/~media/Educate/Files/Reference%20Downloads/foundationsfordiscovery.pdf>
- Ministry of Education. (2007). *The strands of Te Whāriki: Contribution; Ngā Taumata Whakahirahira ki Te Whāriki: Mana Tangata; Kei Tua o te Pae, Assessment for learning: Early childhood Exemplars*. Wellington, NZ: Learning Media Limited.
- Ministry of Education. (2008). *Netsafe kit for ECE*. Wellington, NZ: Learning Media.

- Ministry of Education. (2009a). Promoting dialogue - Early childhood education centres of innovation. Retrieved August 14, 2012, from <http://www.educate.ece.govt.nz/Programmes/CentresOfInnovation/DocumentsandResources/ProgrammeLevel/PromotingDialogue.aspx>
- Ministry of Education. (2009b). Strand two - Belonging mana whenua. Retrieved August 12, 2012, from <http://www.educate.ece.govt.nz/learning/curriculumAndLearning/TeWhariki/PartC/StrandsandGoals/StrandTwoBelonging/Goal%20three.aspx?p=2>
- Ministry of Education. (2012). CORE Education Tātai Aho Rau : Pushing the boundaries of educational possibility. Retrieved August 12, 2012 <http://www.core-ed.org/thought-leadership/research/literacy-and-e-learning-mining-action-research-data>
- Ministry of Education (Producer). (2013, 17th October, 2013). Ministry initiatives. Retrieved from <http://elearning.tki.org.nz/Ministry-initiatives>
- Miri, B., David, B., & Uri, Z. (2007). Purposely teaching for the promotion of higher order thinking skills: A case of critical thinking. *Research in Science Education*, 37(4), 353-369.
- Mishna, F., Saini, M., & Solomon, S. (2009). Ongoing and online: Children and youth's perceptions of cyber bullying. *Children and Youth Services Review*, 31(12), 1222-1228. doi: DOI: 10.1016/j.childyouth.2009.05.004
- Moffatt, C. (2010). 'In the beginning". In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for iCT in education, 1998- 2010*. Christchurch, NZ: CORE Education.
- Moss, P. (2009). There are alternatives! Markets and democratic experimentalism in early childhood education and care (Working papers in early childhood development, 53). The Hague, The Netherlands: Bernard van Leer Foundation & Bertelsmann Stiftung.
- Murcko, T. (2014). Iterative process. Retrieved September 7, 2014, from <http://www.businessdictionary.com>
- Mutch, C. (2013). *Doing educational research (2nd ed.)*. New Zealand: NZCER Press.
- My ECE. (2014). Teaching resilience- A recipe for parents and early childhood educators. from <http://www.myece.org.nz/educational-curriculum-aspects/211-teaching-resilience>

- National Council of Educational Research and Training. (2005). Meta cognition and constructivism. In B. S. Baswan (Ed.), *National curriculum framework*. New Delhi, India: Ministry of Human Resource Development.
- Nelson, K., & Fivush, R. (2004). The emergence of autobiographical memory: A social cultural developmental theory. *Psychological Review*, 111(2), 486-511. Retrieved from:
<http://www.psychology.emory.edu/cognition/fivush/lab/FivushLabWebsite/papers/Nelson%26Fivush.pdf>
- New Zealand Teachers Council. (2004). *Code of ethics for registered teachers*. Retrieved from <http://archive.teacherscouncil.govt.nz/required/ethics/index.stm>.
- New Zealand Teachers Council. (2014). Registered teacher criteria. from
[http://www.teacherscouncil.govt.nz/search/site/professional%20relationships?f\[0\]=im_field_structure_tag_to_page%3A9&f\[1\]=im_field_structure_tag_to_page%3A6](http://www.teacherscouncil.govt.nz/search/site/professional%20relationships?f[0]=im_field_structure_tag_to_page%3A9&f[1]=im_field_structure_tag_to_page%3A6)
- Norman, G. (2013). The third wave in health sciences education. *Advances in Health Sciences Education*, 18, 319–322.
- O'Connor, A., & Diggins, C. (2002). *On reflection: reflective practice for early childhood educators*. Lower Hutt, NZ: Open Mind Publishing.
- O'Leary, Z. (2004). *The essential guide to doing research*. London: UK: Sage.
- Oliver, M., & Trigwell, K. (2005). Can 'blended learning' be redeemed? *E learning*, 2(1), 17-26.
- Owen, M. (2006). Conflict and convergence: the ethics review of action research. *Journal of Academic Ethics*, 4(1-4), 61- 75. doi: 10.1007/s10805-006-9021-5
- Pakai, E. (2004). *Te Whāriki- The Curriculum for Early Childhood Education in Aotearoa/New Zealand* Paper presented at the REACH Victoria University, Wellington, New Zealand.
- Palfrey, J., & Gasser, U. (2011). Reclaiming an awkward term: What we might learn from “digital natives”. *IS: A Journal of Law and Policy for the Information Society*, 186-204. Retrieved from:
<http://moritzlaw.osu.edu/students/groups/is/files/2012/02/Palfrey.pdf>
- Papert, S. (2004). Vision for early childhood education? A descriptive study of Head Start and Kindergarten students in discovery-based, logo-rich classrooms. *Early Childhood Research & practice*, 6(1). Retrieved from: <http://ecrp.uiuc.edu/v6n1/gillespie.html>
- Pauleen, D. (Ed.). (2007). *Cross-cultural perspectives on knowledge management*. Portland, USA: Libraries Unlimited.

- Penny, M., & Bussey, K. (2011). *Fostering the development of free will*. NZTIC Seminar.
- Pesce, M. (2013). *The sharing nexus: connecting, learning and the 21st century Educational Environment*. CORE Education.
- Petrie, S., & Owen, S. (Eds.). (2005). *Authentic relationships in group care for infants and toddlers- Resource for infant toddlers (RIE) principle into practice*. London, UK.
- Power, J. (2013). *The Fifth Wall: Digital tools that assist in collaborating, sharing, celebrating and communicating learning*. Paper presented at the ULearn, Hamilton, NZ.
- Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, 9(5), 2- 7.
- Punch, K. F. (2005). *Introduction to social research: Quantitative and qualitative approaches*. London, UK: Sage.
- Ramsey, K., Breen, Sturm, J., Lee, W., & Carr, M. (2006). Strengthening learning and teaching using ICT (pp. 1- 77). School of Education Te Kura Tui Tangata, New Zealand: Centres of innovation.
- Ray, J. (2002). Constructivism and classroom teachers: What can early childhood teacher educators do to support the constructivist journey? *Journal of Early Childhood Teacher Education*, 23(4), 319-325. doi: DOI: 10.1080/1090102020230404
- Rinaldi, C. (2006). *In dialogue with Reggio Emilia: Listening, researching, and learning*. London, Uk: Routledge.
- Robson, C. (2002). *Real world research*. Oxford, UK: Blackwell.
- Rogoff, B. (2003). Development as transformation of participation in cultural activities *Cultural nature of human development*. New York, USA: Oxford University Press.
- Salmond, D. A. (2013). *Ending keynote speaker notes*. Paper presented at the ULearn 2013, Hamilton, NZ. <http://en.wikipedia.org/wiki/Taonga>
- Seligman, M. (2011). *The optimistic child: A proven program to safeguard children against depression and build life resilience*. Boston, USA: Houghton Mifflin Harcourt.
- Sergiovanni, T. J. (2001). *Leadership: What's in it for schools?* London: UK: Routledge.
- Servage, L. (2008). Critical and transformative practices in professional learning communities. *Teacher Education Quarterly*, 35(1), 63- 77.
- Siraj-Blatchford, I. (2011). Extending children's thinking: The adult role'. Creativity plus communication plus collaboration = learning. Seminar presented at the University of Waikato.
- Siraj-Blatchford, I., & Siraj-Blatchford, J. (2003). *More than computers: Information and communication*

- technology in the early years*. London, UK: British Association for Early Childhood.
- Siraj-Blatchford, J., & Morgan, A. (2013). *Using ICT in the early years: Parents and practitioners in partnership*. London, UK: Practical Preschool Books.
- Smidt, S. (2006). *The developing child in the 21st century: A global perspective on child development*. New York, NY: Routledge.
- Smidt, S. (2009). *Introducing Vygotsky: A guide for practitioners and students in early childhood education*. London, UK: Routledge.
- Spencer, K. (2014). *Digitising appraisal and inquiry: An integrated approach to professional learning*. Paper presented at the The CORE Breakfast Seminar, Auckland, NZ.
<http://ulearn.core-ed.org/breakfast/digitising-appraisal-and-inquiry-integrated-approach-professional-learning-auckland>
- Spodek, B., & Saracho, O. N. (Eds.). (2005). *International perspectives on research in early childhood education: A volume in contemporary perspectives in early childhood education*. USA: Information Age Publishing.
- Stewart, A. (2014). Stewart's tenth rule of leadership: Nobody's perfect- Not even you. *Consulting, Leadership, Organizational Culture*. Retrieved from:
<http://hscanada.wordpress.com/2014/03/17/stewarts-tenth-rule-of-leadership-nobodys-perfect-not-even-you/>
- Sumara, D., & Davis, B. (2010). 'If things were simple . . .': Complexity in education. *Journal of Evaluation in Clinical Practice*, ISSN 1356-1294, 1- 5. Retrieved from:
<file:///C:/Users/shahla/Downloads/201007JEP.pdf>
- Sutherland, R. (2004). Designs for learning: ICT and knowledge in the classroom. *Computers and Education*, 43(1-2), 5- 16.
- Tait, L. (2010). The times they are a changing! In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 66- 72). Christchurch, NZ: CORE Education.
- Tame, L. (2010). Looking back on the ICT journey. In V. Ham & D. Wenmoth (Eds.), *E learnings: Implementing a national strategy for ICT in education* (pp. 58- 65). Christchurch, NZ: CORE Education.
- Taylor-Powell, E., & Renner, M. (2003). Analysing qualitative data. *Program Development and Evaluation*. from <http://learningstore.uwex.edu/assets/pdfs/G3658-12.PDF>
- Tempest, M. (2012, March). Un racconto magico (con la realtà aumentata) [Video file]. from http://www.ted.com/talks/lang/it/marco_tempest_a_magical_tale_with_augmented_reality.html?source=facebook#.T5EcmnN2J8v.facebook

- Terreni, L. (2003). Providing culturally competent care in early childhood services: Part 2 Developing dialogue. Retrieved from: <http://files.eric.ed.gov/fulltext/ED475306.pdf>
- Thai, A. M., Lowenstein, D., Ching, D., & Rejeski, D. (Producer). (2009, Retrieved January 21, 2014). Game changer: Investing in digital play to advance children's learning and health Retrieved from http://www.joanganzcooneycenter.org/wp-content/uploads/2010/03/game_changer_final_1_.pdf
- The World Bank Group. (2011). Early childhood development. 21 September, 2014, from <http://go.worldbank.org/BJA2BPVW91>
- Thompson, A. (2005). Govt tags \$16m to drive early childhood technology. *New Zealand Herald*. Retrieved from <http://www.nzherald.co.nz>
- Turkle, S. (2011). *Necessary Conversations Alone together: Why we expect more from technology and less from each other* (pp. 279- 296). New York, NY: Basic Books.
- Turnock, K. (2009). *"It's a shift in thinking, a shift in practice" Moving to a new assessment framework in early childhood education* (Master of Teaching and Learning), University of Canterbury Christchurch, NZ.
- Vygotsky, L. (1997). Interaction between learning and development. In M. Gauvain (Ed.), *Readings on the development of children*. San Diego, USA: W. H. Freeman & Company.
- Vygotsky, L. S. (Ed.). (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harward University Press.
- Wenmoth, D. (2012). The future- Trends, challenges and opportunities *Elearnings: Implementing a national strategy for ICT in education, 1998- 2010* (pp. 195- 203). Christchurch, NZ: CORE Education.
- Wenmoth, D. (2013). Ten trends 2013: Open-ness. Retrieved 17 August, 2014, from <http://blog.core-ed.org/blog/2013/10/ten-trends-2013-open-ness.html>
- Whitehead, J., & McNiff, J. (2006). *Action research living theory*. London, UK: SAGE Publications.
- Whitehead, K. (2008). The construction of early childhood teachers' professional identities then and now. *Australian Journal of Early Childhood*, 33(3), 34-41.
- Wikibooks. (2008). Issues in digital technology in education/computers in the early childhood classroom. from http://en.wikibooks.org/wiki/Issues_in_Digital_Technology_in_Education/Computers_in_the_Early_Childhood_Classroom

- Wilkinson, K. (2008). *Psychotherapy training and practice: A journey into the shadow side*. London, UK: Karnac Publishing.
- Wood. (2012). *Free choice and free play in ECE*. Teacher Workshop. Department of Education. Epsom Campus.
- Wood, E., Specht, J., Willoughby, T., & Mueller, J. (2008). Integrating computer technology in early childhood education environments: Issues raised by early childhood educators. *The Alberta Journal of Educational Research*, 54(2), 210- 226.
- Woolfolk, A. (2004). Comparing Piaget and Vygotsky *Educational Psychology (9th ed)*. Boston, USA: Allyn and Bacon.
- Woulfe, C. (2014). Early warnings. *New Zealand Listener*, April 16- 25.
- Yelland, N. (2005). Curriculum, pedagogy and practice with ICT in the information age. In N. Yelland (Ed.), *Critical issues in early childhood education* (pp. 224- 243). Glasgow, UK: Bell & Bain Ltd.
- Yelland, N., & Gilbert, C. (2014a). iplay, ilearn, igrow. Melbourne, Australia: Victoria University.
- Yelland, N., & Gilbert, C. (2014b). SmartStart: Creating new contexts for learning in the 21st century. Melbourne, Australia: Victoria University.
- Yoder, D. M. (2005). Organizational climate and emotional intelligence: An appreciative inquiry into a 'leaderful' community college. *Community College Journal of Research and Practice*, 29(1), 45-62.
- Zohar, A., Degani, A., & Vaaknin, E. (2001). Teachers' beliefs about low-achieving students and higher order thinking. *Teaching and Teacher Education*, 17(4), 469-485.
- Zuboff, S. (1988). *In the age of the smart machine*. New York, NY: Basic Books.
- Zwimpfer, L. (2010a). Building a national ICT infrastructure for learning. In V. Ham & D. Wenmoth (Eds.), *Elearnings: Implementing a national strategy for iCT in education, 1998- 2010* (pp. 32- 44). Christchurch: CORE Education.
- Zwimpfer, L. (2010b). Securing the foundations: Building a National ICT infrastructure for learning *eLearnings: implementing a national strategy for ICT in education, 1998- 2010* (pp. 32- 44). Christchurch, NZ: CORE Education Ltd.

Appendix 1



A U T E C

S E C R E T A R I A T

17 May 2013

Anne Grey
Faculty of Culture and Society

Dear Anne

Re: 13/90 How can I improve my own teaching by exploring innovative uses of ICT with young children (a self-study of my own teaching)?

Thank you for submitting your application for ethical review. I am pleased to confirm that the Auckland University of Technology Ethics Committee (AUTEC) has approved your ethics application for three years until .6 May 2013.

Under the section on 'What are the costs...' AUTEC requires the inclusion of the amount of time participants will give to the research.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 6 May 2016;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 6 May 2016 or on completion of the project.;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New

Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply within their.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

A handwritten signature in black ink, appearing to read 'Madeline Banda', with a stylized flourish at the end.

Madeline Banda

Acting Executive Secretary

Auckland University of Technology Ethics Committee

Appendix 2

This appendix is how I summarised my data from the four interviews before writing my findings chapters.

Table 1: interviews 1 to 4

interview data, ICT for appreciative inquiry model

- | |
|---|
| <ul style="list-style-type: none">• ICT as a tool for helping to research our question• ICT as an additional integrated tool (+)• ICT for doing changes to teacher practice (+)• Extension of children with specific ICT strengths• deeper particular focus• being introduced to something when ready to do it• using ICT for making music resource, cultural resources• use ICT (e.g. you tube videos) to follow interest, extend learning refresh memory and to repeat to get a visual picture• peer tutoring (+) |
| <ul style="list-style-type: none">• Seeing the possibilities after teacher get involved (+)• Allowing uncertainty• Seeing the potential that everybody does have positive in them• interlocking support networks among colleagues, more excitement, enhancing dialogue (+)• learning to learn (+)• learning with and along and from each other e.g. workshops (+) |
| <ul style="list-style-type: none">• using old equipment ...in a way that is innovative• research (+)• ICT as capturing devices for children in and teachers revisit/ reflect on own learning• Values: what is in these children's lives and what is relevant to them?
What do they already know because they can already share a lot of these |

skills with us. Teachers as learners. Not necessarily good at everything. pretty determined to solve things role modelling and problem solving all those things that are really important.

- Today children's learning is going to be way more complex and way more relevant to them
- Empowering children: children bring their own interests in ICT: ownership and a lot of feeling of importance that they have introduced something for the centre. And also it gives our parents to buy into.
- challenge ourselves and to challenge each other and like to be experimental e.g. teachers learning ICT for documentation *it's about 'what's on at the moment?'*

- within projects and things, like we did one with our little baby bird, where children investigated and saw how a baby bird hatched, so being able to use internet and obviously you tube, being able to watch it close up on the big screen was quite amazing. E.g. seeing how butterflies were hatching. So we are using it a lot for nature. And for those sort of things and also for dance. Sometimes we want some catchy tunes for dance.
- Chn project like animation
- supports learning through inquiry, is it gonna stimulate children's learning? New ideas and creativity
- Creating expertive leaders (+)
- child was in charge of learning
- ongoing process and we just try to keep it as open as we can to the values and the ways that we can be inspired by ICT. Ways to use the ICT is such a powerful tool, it is not having the computer in the classroom that is the major value for ICT but the way it is used and the 101 ways to bring the world of wonder to the children through ICT and empowerment.

Table 2: interviews 1 to 4

interview data, ICT for relationships, communication, growth mindset
<ul style="list-style-type: none"> • PD allocated, fund available to trial and select • Collaborative work with parents and specialist services • ICT as an additional integrated tool (+) • Positive image of chn's self- identity • Values: communication with community, child as postivie competent learner • watch videos to relive the experience • strengthening relationships • a holistic view that child gets. The family gets involved, the bigger picture.
<ul style="list-style-type: none"> • Seeing the possibilities after teacher get involved • Relationship binding uniting sharing through ICT (+) • it's not necessarily just about the equipment and all the fancy gadgets. We started to really look at the other things that might be going on for the children. And also our own shift in our belief of children that we were viewing them as confident and competent but we were not allowing them access to these tools. shifted your whole image of the child • gaps • healthy competitions through constantly being exposed to what other centres do with ICT ... was our understanding of where we are as a team in terms of our thinking and working through those things first to be on board (+) • seeing the potential in everybody does have something positive in them (+) • positive relationship facilitation through techno ICT (+) • technology helping teachers reflect on use of time (+) • interlocking support networks among colleagues, more excitement, enhancing dialogue (+) • learning to learn (+)

<ul style="list-style-type: none"> • learning with and along and from each other e.g. workshops (+) • better connecting, getting response from parents we don't see emailing • privacy, copyright, respect, trust all ties to relationships (+) • ICT in newsletters provocative or use it more as a resource to possibly get our parents thinking (+) • ICT facilitates teachers' collaboration • enhancing documentation e.g. conversation or adding milestone, learning story, to portfolios (for over 2) or daily pages (for under 2) turned into a learning focus (+)
<ul style="list-style-type: none"> • using old equipment ...in a way that is innovative (+) • research (+) • the children self regulate themselves on ipads not rigid times, this is for chn to pursue the opportunity to persist and to get to the next level. • Blogs for everyone wasn't realistic.
<ul style="list-style-type: none"> • tool to help them transitioning (+) • having ipads, digital microscope stations • pretty self- regulating • learning from peers (+) • lot of conversations (+) • Creating expert leaders

Table 3: interviews 1 to 4	
interview data, ICT for Ako	
	<ul style="list-style-type: none"> • (Seeing possibilities)centre Trial before deciding on ICT • use ICT to gather evidence& attend workshop to define research question: ICT as a tool for helping to choose our research question :mixed age learning Tuakana teina, cultural connections, supporting children with special rights • ICT for doing changes for teacher practice (+) • peer tutoring (+) • resistance to change, time, cost, kind to ourselves, technology changing all the time (+)
	<ul style="list-style-type: none"> • The process of extending the ICT from teachers only to teachers and chn and then to chn & chn • training the teachers (+) • Becoming comfortable with ICT teachers first before using with children: taking the time • Practising and learning for teachers before they do it for chn • learning to learn (+) • learning with and along and from each other e.g. workshops (+)
	<ul style="list-style-type: none"> • research (+) • Values: what is in these children's lives and what is relevant to them? What do they already know because they can already share a lot of these skills with us. Teachers as learners. Not necessarily good at everything. pretty determined to solve things role modelling and problem solving all those things that are really important. <ul style="list-style-type: none"> • Tuakana teina learning from each other, helping each other, sharing goes on.
	<ul style="list-style-type: none"> • learning from peers (+)

Table 4: interviews 1 to 4	
interview data, ICT for connecting to real world	
	<ul style="list-style-type: none"> • building digital diary using videos (+) • social collaborative way of getting a picture of the context (+) • using ICT for making music resource, cultural resources (+)
	<ul style="list-style-type: none"> • kind of amusement to use all these resources (+) • it's not necessarily just about the equipment and all the fancy gadgets. We started to really look at the other things that might be going on for the children. And also our own shift in our belief of children that we were viewing them as confident and competent but we were not allowing them access to these tools. shifted your whole image of the child (+)
	<ul style="list-style-type: none"> • Values: what is in these children's lives and what is relevant to them? What do they already know because they can already share a lot of these skills with us. Teachers as learners. Not necessarily good at everything. pretty determined to solve things role modelling and problem solving all those things that are really important. (+)
	<ul style="list-style-type: none"> • great sense of belonging • reasonable amount of work with our parents to initiate with ICT (+)

Table 5: interviews 1 to 4

interview data, ICT for emotional intelligence	
	<ul style="list-style-type: none">• ICT for doing changes for teacher practice (+)• teachers really get excited because their stories are visually appealing aesthetically appealing displays• social collaborative way of getting a picture of the context (+)
	<ul style="list-style-type: none">• Seeing the possibilities after teacher get involved (+)• The ones with an strength and interest in themselves, so they're the ones who seem to be deriving it, and that's OK that some didn't bother with ICT : balancing the ballots (+)• Relationship binding uniting sharing through ICT (+)• Practising and learning for teachers before they do it for chn (+)• Allowing uncertainty• seeing the potential in everybody does have something positive in them
	<ul style="list-style-type: none">• relaxed self- controlled approach for balancing time-wise
	<ul style="list-style-type: none">• Far better (impact), getting more positive staff towards ICT• Creating expertive leaders (+)

Action plan for AUT Early Childhood Centre

2014- 2015

Goals for selecting and using ICT initiatives for	Action	resources	When by	Person responsible
improved learning and teaching opportunities	Purchasing/ updating ICT	Individual ipad for every teacher New Ipad cable Wireless speaker for music outside	Ordered mid 2014 complete by mid 2015 for all	Centre leader
enhancing/ improving relationship, leading inquiry learning, enhancing improving communication	Team to set up group ICT objective in a meeting Making observations and using group email for shared inquiry learning for example on planning story Using Big screen for relevant you- tube videos	PD decided for 'time management' google David Spragg's website Digital microscope as a medium Updating desktop for older children's inquiry learning	For first Teacher Only Day in July 2015 and ongoing	Centre leader to arrange PD All senior teachers to lead
Documentation & communication for all children	All teachers joining in e- portfolio Review of learning stories by both teams	Storypark Induction/ Buddying up Mentorship	Ongoing	Centre leader And T.

		when needed e.g. by planning non contact, coaching to new teacher		
Cybersafety issues	Developing AUT centre's ICT policy as a team, using template from Netsafe Create awareness and dialogue for cybersafety issues among teachers	IT assistance to enquire about technical cybersafety issues on teachers' ipads Watching AUT cybersafety DVD as a team on 19 th December 2014 ICT cybersafety in induction for example talking to team before skyping	By Feb 2015	Centre leader
Improve professional practice	<ul style="list-style-type: none"> Buddying up teachers for peer reflection on the purposeful use of ICT, joining in with extra responsibilities such as logging in jobs with maintenance, Joining in with Storypark 	Videoing teaching for reflection Revisiting learning by children by watching videos on big screen	2015 and ongoing	All teaching team
Increased participation by parents	ICT Survey following the first 2013 survey Exploring our Values	2 hours non contact time for preparing survey	Survey in second half of year in	C. and S. (survey

	with children at mat times and with parents in the newsletters ICT forum on my thesis if parents interested Group emailing to communicate news/ announcements	Value discussion in whole meeting (starting 17 th Feb 2015)	2015	questions) All teachers for the 'Values' discussions
For enacting/ reviewing Centre's strategic and annual plans' goals	Review annual plan for 2015 link with AUT wider community	PD for iPad on most useful apps for children	September 2015	Centre leader R. and K.