Declaration

Name of candidate: Daljit Kaur

This Thesis/Dissertation/Research Project entitled Teachers’ perspectives on the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Education.

Candidate’s declaration
I confirm that:

• This Thesis/Dissertation/Research Project represents my own work;
• Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.
  Research Ethics Committee Approval Number: 2011-1227

Candidate Signature: ..........................................................Date: .................

Student number: 1230718
Teachers’ perspectives on the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

Daljit Kaur

A thesis submitted in partial fulfilment of the requirement for the degree of Master of Education
Unitec Institute of Technology
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Abstract

This research examined teachers’ perspectives on the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand. The research literature explained that in New Zealand there is scarcity of literature about teachers’ perspectives on the impact of different kinds of ICT in early childhood services. Therefore, to explore teachers’ perspectives must be beneficial to enhance our knowledge and for centres and participants to reflect on their practice for further development of the practice. A qualitative case study methodology was employed for this small-scale research. This included an anonymous questionnaire completed by teachers in two preschools and in-depth interviews. This research increases our knowledge about uses and challenges of ICT among early childhood educators. The results of the study showed that the teachers had variable access to training, as some teachers attended professional development courses, whereas others learnt about ICT from their colleagues and family members. The teachers in the study perceived that ICT is valuable for children’s learning. They believed that ICT increased learning opportunities as children used internet websites/Google to search for information about their favourite topics. They commented that ICT helped to make connections with parents/families, which enabled them to contribute to their children’s learning. They highlighted that children used cameras for taking the photos to revisit, check their learning and share it with parents. They commented that ICT offered children opportunities for listening to songs and stories. The study confirmed that teachers used ICT in their teaching practice. The teachers commented that they used ICT for writing learning story observations and for sharing them with parents. They used ICT for reflecting on their teaching practices and for finding more information about children’s favourite topics. They used internet websites for creating the resources and learnt poi dances. The study results revealed that ICT increased ways of communication with parents/families. The study suggests early childhood centres for arranging and supporting teachers for attending professional development related to ICT. It suggests providing the children with opportunities to use ICT along with other curriculum areas. The findings suggest teachers to use ICT for communication with parents.
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Chapter One: Introduction

Introduction

This chapter contains an overview of this thesis. It contains information about Information and Communication Technologies (ICT) research, research background, and research aim and questions. Later, it provides an overview of the thesis chapters. In 2001, the Ministry of Education in New Zealand developed a draft strategy for ICT use in school sector (Ministry of Education, 2001). In 2005, the Ministry of Education launched ‘Foundations for discovery’ to promote ICT in early childhood education (ECE) settings in Aotearoa. It shows ways to increase ICT use in early childhood centres by teachers, managers and to enhance children’s learning (Ministry of Education, 2010). In the past ECE centres and teachers made their own decisions about extent and nature of ICT use for children’s learning (Bolstad, 2004). However, research related to teachers’ perspectives on the impact of ICT in early childhood settings is less obvious. Therefore, it will be valuable to study teachers’ perspectives to shed a fresh light on this topic to increase our knowledge and it will provide participants and early childhood centres opportunities to reflect on their practice for further development of the practice.

In this thesis, the generic term ‘parents’ refers to children’s parents, families, and guardians. During the presentation of findings, the generic term ‘teachers’ consists of centre managers, and teachers in two early childhood centres (preschools).

ICT research

This research aims to contribute to the increasing body of literature about ICT in ECE context. While there has been a range of research undertaken in international contexts, there has been limited research done on the impact of different kinds of ICT in ECE settings in Aotearoa/ New Zealand (Bolstad, 2004). This research aims to contribute to this knowledge. Recent research has mostly explored the use of computers and digital cameras as tools for enriching the learning environment (Bolstad, 2004). ICT offers a range of possibilities for people in the early childhood field and a wide range of tools, including computers, digital cameras, the internet, e-mail, programmable
toys, and other information and communication devices. Further research is needed to examine the impact of different kinds of technologies on children’s learning and teaching in specific ECE learning and teaching contexts (Bolstad, 2004). Accordingly, this research will investigate teachers’ perspectives on the impact of different kinds of ICT in two ECE learning contexts. It will examine their views of the potential ICT has for fostering learning opportunities for children and for increasing parental participation. It will also explore teachers’ views of how ICT supports their teaching such as for creating resources and documentation. It will also examine teachers’ views about issues and challenges associated with ICT.

The Ministry of Education (2005) describes ICT as “items of equipment (hardware) and computer programme (software) that allow us to access, retrieve, store, organise, manipulate, share and present information electronically” (p. 14). In this research context, ICT refers to the use of electronic and digital tools including computers/laptops, e-mail, internet websites, printer, digital/video cameras, fax machine, battery operated musical instruments, electronic musical instruments, phones, tape recorder/player, CD/DVD players, television, photocopier, speakerphone, overhead projectors and interactive whiteboards.

The literature review in this research has five major themes: The policy contexts for ICT in New Zealand ECE settings, debates about ICT use in national and international ECE contexts, ICT and learning, ICT and parents, ICT and teachers. A qualitative interpretivist case study methodology has been adopted to examine teachers’ perspectives in two preschools. The anonymous questionnaire and the interview are used to gather qualitative data in the research.

**Background to the study**

My research interest is in the early childhood education field. I bring to research a background of my own teaching experience in ECE field. I have been working in early childhood settings for the last nine years and six months in Aotearoa/New Zealand. From my experience, I found that teachers have a range of different perspectives about ICT. This research will examine teachers’ perspectives on the impact of ICT in two preschools in Auckland.
This research encompasses views of teachers working in early childhood centres in West and South Auckland about ICT in their practice. The study will include two preschools to gain in-depth knowledge about teachers’ views regarding the impact of ICT in early childhood curriculum. There is a dearth of research related to teachers’ perspectives in relation to the impact of ICT in the early childhood centres. Therefore, a research study like this would be valuable to highlight the views of teachers.

The Ministry of Education (2002) affirms that in New Zealand, ECE is valuable for building foundations for a child’s ongoing learning and development. New Zealand ECE centres enrol children from birth up to the age of five years old and have their own philosophies, and follow the national bicultural early childhood curriculum, *Te Whaariki*. *Te Whaariki* provides the framework for learning and teaching of infants (birth to 18 months), toddlers (1 to three years) and young children (two and a half to five years) (Ministry of Education, 1996). *Te Whaariki* describes curriculum as “the sum total of experiences, activities, and events, whether direct or indirect, which occur within an environment designed to foster children’s learning and development” (Ministry of Education, 1996). In *Te Whaariki*, the main aim is for children “to grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society” (Ministry of Education, 1996, p. 9). Keesing-Styles (2002) suggests that *Te Whaariki* is flexible enough to apply in any ECE service context (for example, education and care centres, play centre, kindergartens, language nests, te kohanga reo, and home-based services). In the early childhood settings, interest areas (organized spaces for play, learning and interaction) differ from the program goals and in the majority of interest areas blocks, manipulative, writing materials, science resources, maths resources, dramatic play, technology equipments, musical instruments, art materials, movement, library resources, water, and sand are commonly found (Jackman, 2009; Prairie, 2005).

This research will enhance our knowledge about the impact of various ICT tools in ECE settings. It is hoped that the study will provide opportunities for the centres and participants to reflect on their own practice and lead to further development of the practice.
Research aim and questions

Research aim

The aim of this research is to investigate teachers’ perspectives on the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

Research questions

1. What are teachers’ perceptions of the impact of ICT on:
   - children’s learning?
   - teachers’ teaching, such as in creating resources, and documentation?
   - parental participation?
   - other factors?

2. What are teachers’ perceptions of the issues and challenges associated with ICT use in the early childhood education (ECE) contexts?

Thesis organisation

This thesis is organised in the following six chapters -

Chapter One provides an overview of the research such as, introduction, the research rationale, the research background, the scope of research, and research aim and questions.

Chapter Two consists of an overview of literature related to ICT in the early childhood context. The themes chosen are the policy contexts for ICT in New Zealand early childhood settings, debates about ICT use in national and international contexts, ICT and learning, ICT and parents and ICT and teachers.

The methodological approach and data collection methods used in this research are examined in Chapter Three. A rationale for the methodology is discussed and the use
of the anonymous questionnaire, and the interview data collection methods is justified. The chapter also explains the data analysis and the ethical issues.

Chapter Four presents the findings of data collected through the anonymous questionnaire, and the interviews in the research carried out in Auckland. The key themes which emerged from the data are presented.

Chapter Five discusses the findings and the themes that emerged from the data gathered throughout this research investigation and in relation to literature. The discussion also includes relevant literature.

Chapter Six contains conclusions and recommendations. The chapter concludes with the limitations of the research, and suggestions for further research.

**Conclusion**

In summary, this chapter has summarised the background for the research. The research aim and research questions have been presented. It also contains an overview of the chapters used in the thesis. The following chapter reviews the literature about ICT in ECE contexts.
Chapter Two: Literature Review

Introduction

This literature review contains national and global context related to ICT in ECE context. The literature review begins with a brief discussion of the policy contexts for ICT in New Zealand early childhood settings, and after that examines the debates about ICT use in the national and international context. The review next considers the literature about use of ICT for children’s learning. It also considers the uses of ICT for children’s parents/families participation in ECE. Finally, the review considers teachers practice about ICT in ECE. The literature review introduces research questions for framing the study.

The policy contexts for ICT in New Zealand ECE settings

A draft strategy in 2001 was developed by the Ministry of Education for ICT in school sector (Ministry of Education, 2001). In ECE centres in 1998, digital format and images were used for writing learning stories. In 2004, a review of international literature about ICT revealed the importance of ICT incorporation in ECE (Bolstad, 2004). In 2005, the ICT strategy was important for ECE settings to support and guide the development of ICT in a planned and considered way to maximise ICT benefits for ECE settings (Ministry of Education, 2005). Gibbons (2006) affirms that “Ministry of Education has clearly indicated an exceptional role for ICT in early education” (p. 10).

In the compulsory school sector, during 1995, technology’s first national curriculum statement was developed and acknowledged technology as an essential learning area in the New Zealand Curriculum Framework (Ministry of Education, 1995). In 2007, the Ministry of Education stated technology is a vital learning area of the New Zealand Curriculum (Ministry of Education, 2007). The Ministry of Education (2007) states that technologies are valuable to participate in society as informed citizens, and for access to technology-related careers.

The Ministry of Education developed Foundations for discovery: Supporting Learning in Early Childhood Education through Information and Communication

Children, educators, parents and families/whanau using information (for example, sending faxes to people in the community) and recording learning experiences (for example, using digital and video cameras) in ways that enhance children’s learning, and communication about and reflection on that learning. (p. 2)

The ECE ICT framework (Ministry of Education, 2005) supports increasing participation in quality ECE services, improving quality of ECE services, and promoting collaborative relationships goals identified in Pathways to the Future: Ngā Huarahi Arataki (Ministry of Education, 2002).

The Ministry of Education (2005, p. 2) reveals that “People of all ages use ICT on a daily basis, from mobile, telephones, digital cameras, DVDs and the internet, to the less visible ICT in supermarket scanners or remote controls.” The Ministry of Education (2005) highlights that ICT is changing our living and learning ways in the world. Therefore, it is imperative for early childhood teachers to use ICT in ways that extend their practice and infants, toddlers and young children’s learning (Ministry of Education, 2005).

In their 2005 documents, Foundations for discovery: Supporting Learning in Early Childhood Education through Information and Communication Technologies: a Framework for Development the Ministry of Education highlighted the importance of ICT in ECE for providing new opportunities for children to develop skills and attitudes such as communication, collaboration, reflection, exploration, literacy (visual, digital/technological, and information literacy) and relationship skills necessary for effective participation in their current and future lives (Ministry of Education, 2005). The Ministry advocates a range of ICT tools, including mobile telephones, digital cameras, DVDs and the internet on the basis that ICT can be used to extend teaching practice and encourage children’s learning (Ministry of Education, 2005).
In New Zealand ECE centres, the use of ICT tools is consistent with *Te Whaariki* principles, strands, and goals. The ECE ICT Framework vision is drawn from *Te Whaariki* aspiration statement:

> The thoughtful and meaningful use of ICT in early childhood education services can support children to grow up as competent and confident learners and communicators, healthy in mind, body and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society. (Ministry of Education, 2009, p. 2)

This means that “learners in ECE services should have the opportunity to experience enhanced learning opportunities through the meaningful use of ICT” (Ministry of Education, 2009, p. 2). There is a gap in the literature as not much is written about teachers’ perceptions on the impact of ICT in ECE settings; therefore, this research aims to investigate teachers’ perceptions on the impact of ICT in ECE services.

**Debates about ICT use in national and international ECE settings**

The use of ICT in ECE settings is debated nationally (Gibbons, 2006) and globally (Siraj-Blatchford & Whitebread, 2003). The first national survey undertaken in late 2003/early 2004 by the New Zealand Council for Educational Research (NZCER) (Mitchell & Brooking, 2007) found that in ECE settings at some centres, there is a high use of ICT, and at some, there is less use of ICT by children and to support children’s learning. Lack of funding is a main issue for implementing ICT in ECE settings. Hatherly (2009) notes that ICT requires centres to have a different budget mindset as it requires more maintenance than buying blocks which need no maintenance. Beach (2008) states that in New Zealand, the Netsafe Kit outlines a programme of cyber safety for ECE services and assists services to minimise risks associate with ICT. The Ministry of Education (2005) explains that the risks related to ICT in early childhood services are inappropriate online information, images, health and safety related to ICT tools use, information suitability for children’s learning and development stage and informed consent ethical concerns, and protecting children’s privacy when publishing material online, transmitting information and images.
International research has also found that the use of ICT varies in ECE centres (Siraj-Blatchford & Whitebread, 2003). Zevenbergen (2007) describes that although the impact of technology is recognised in social and learning contexts, technology uptake in ECE contexts is limited. Children’s health issues are also a key reason for lack of ICT’s implementation in ECE services. Laeser, Maxwell and Hedge (1998) (as cited in Lai, 2001) state that teachers need to be aware of health-related risks with more computer use such as eyes’ discomfort, wrist pain, shoulder pain, musculoskeletal injuries and overuse syndrome. On the other hand, Oldridge (2007) explained that ICT is not always seen as suitable in the learning contexts needed for young children’s development. Concerns have been expressed in reference to overuse-related problems; eye problems, repeated stress, and even about the effects of radiation. However, these effects were seen to be mitigated by ECE teachers ensuring an appropriate ergonomic environment for children and use of appropriate posture etc (Oldridge, 2007). Early childhood education centres lack of funding to purchase ICT tools was also a main issue for the successful incorporation of ICT in early childhood centres (Blagojevic, 2003).

Gibbons (2006) have pointed out that many children in New Zealand have access to computers in their homes, and are entering the early childhood centres with skills related to ICT, and it requires, early childhood educators to make digital experiences accessible for children to cater properly for digital natives. Prensky (2001) states that digital natives are generations of people have grown up surrounded by digital technologies and have immense knowledge about technologies. Alternatively, digital immigrants are generations of people who learnt about technologies usage through practice (Prensky, 2001). Zevenbergen (2007) describes that digital natives’ homes are confident with technology gadgetry and are surrounded by their experiences with technology. Prensky (2001) argues that digital natives are more connected with technologies than their predecessors (Zevenbergen & Logan, 2008). As ECE teachers respond to various needs of children so too provision can be adapted in ICT (O’Hara, 2004).

The Centre of Innovation (COI), initiated by the Ministry of Education was funded for early childhood services and enables services to engage in a three-year research study with researchers (Gibbs & Poskitt, June 2009). A study by Ramsey, Breen, Sturm,
Lee and Carr (2006) found that the use of ICT enhanced relationships with and between children, teachers, parents/ families and communities. In addition, Colbert (2006), points out that in the New Zealand context, there is research about ECE centres using ICT in an innovative way for supporting children’s learning; however, there is little research around identifying what this use was and the learning consequence of this. This research aims to address this gap in the field of knowledge by investigating teachers’ perceptions of the impact of ICT in two early childhood contexts.

**ICT and learning**

Technological advancements in the late twentieth and early twenty-first centuries have brought about some fundamental changes in the availability of ICT as a tool for learning and social activities, i.e. they have provided a huge range of equipment for work and leisure activities of adults as well as for children’s play and education. Early childhood practitioners and researchers have focused on researching about use of technologies and their influence for children’s learning and development (Nutbrown, 2011). ICT use is a key issue in the literature in relation to children’s learning. However, Bolstad (2004) describes that in the ECE context, most research has focused on use of computers, and digital cameras for children’s learning and development.

There is an abundance of literature about the computers use in early childhood settings. Ellis and Blashki (2004) explains that as young as two-year-old children are observed having benefited from the educational play with computers (as cited in Gibbons, 2006). Gibbons (2006) reveals that children in Aotearoa/New Zealand and Australia have access to computers in their homes, and they are entering the early childhood centres with skills that were not part of skills in the past decade. This makes it necessary to develop a curriculum for introducing technologies to children’s learning experiences. Early childhood teachers need to make digital experiences available for children in their everyday life at the early childhood centres to properly cater for digital natives (Gibbons, 2006). Perry (2002) states that:

> As educators and parents think about the future, they need to realize two things: technology is not going to go away, and we are in the
midst of a major sociocultural quantum shift. These technologies are revolutionizing the world our children will live in. So our task is to balance appropriate skill development with technologies with the core principles and experiences necessary to raise healthy children. (as cited in Jackman, 2009, p. 287)

Taylor (2000) describes that in the future for children and families to have success in life, computer literacy skills are necessary for larger than 60 percent of new jobs (as cited in Blagojevic, 2003). Boyd (1998) suggests that it is highly valuable for children to have computer skills for their living in the future world (Boyd, 1998). Lai (2001) expresses that computer skills are important for children for their future success, and to participate in the living world. Ellington, Percival and Race (1993) reveal that nowadays computerized equipments are ubiquitous in our world countries, for example, barcode scanning at supermarket, video games, bank and bills’ statements and digital telephone equipment.

Somekh and Davis (1997) affirmed that children playing educational games on computers were learning actively. Thus computers are valuable as cognitive tools to enhance children’s learning (Somekh & Davis, 1997). Harper (2008) expresses that educational games are motivational for children and offer an enjoyable learning way for children to develop science, math, critical thinking, literacy, decision-making and problem-solving skills. However, it is valuable to do the evaluation of games before purchasing as it helps to know that it will help the learner to develop specific skills (Harper, 2008).

Children develop social skills when they sit together in front of a computer (Oldridge, 2007). Technology expands children’s worlds in new ways such as using blogs helps children to learn through collaboration (Hatherly, 2009). A study in USA found that computers enriched project-based and hands-on curriculum, and computers increased children’s level of cooperation, and independence (Anderson, 2000). Clements and Sarama (2003) also describe how computers in ECE facilitate social, emotional, cognitive, creativity, language and reading skills development (Clements & Sarama, 2003). Computers in early childhood support literacy, social, language, maths and science skills development (Hayes & Whitebread, 2006). Boyd (1998, p. 29) states computer’s benefits are:
General enjoyment, general computer operation skills, written, oral and visual language skills, communication skills, self-esteem and confidence, cognitive skills, concentration and motivation, social and group work skills, self-management and independence skills, information-gathering skills, presentation skills, mathematical skills, motor skills and work and study skills. (p. 29)

Furthermore, the Alliance for childhood in America (Cordes & Miller, 2000) has highlighted dangers of computers in childhood and explained the need to refocus on the healthy childhood essentials, such as close relationships with adults, outdoor activity, nature exploration, time for unstructured play (especially make-believe play), music, drama, puppetry, dance, painting, arts, handcrafts, physically engaging activities, conversation, poetry, storytelling, and reading books aloud (Cordes & Miller, 2000). Another report by Alliance for Childhood (2004) “Tech tonic” explains that children will become prepared and will get inspiration to protect the earth and its living beings through their relationships with nature, caring adults, practical work and play, and the arts, but not through virtual ones (Alliance for Childhood, 2004). On the other hand, Lloyd (2010) explains that ICT has potential for enhancing children’s learning about sustainability and environmental issues.

In early childhood children using cameras can express themselves, and this is valuable for exchanging and creating meaning. Children’s photos offer an opportunity for listening to children and to create a platform for multiple listening between children, adults, and parents (Clark, 2005). Hatherly (2009) points out that in the ECE services we need to provide children with opportunities to use digital cameras to take photos, as digital/ video cameras are powerful for encouraging children to think about what they are doing. Rinaldi (2001) describes that storytelling, and photography are important with opportunities to revisit and this opportunity to reconnect to experience is thought to help memory development as children will try to remember their past experiences (as cited in Hatherly, 2009). Entz and Galarze (2000) and Fraser and Gestwicki (2002) describe a digital camera as having many advantages such as instant imaging, choice to select from the large amount of photos and ability to enlarge and crop the image. This means that we can look at images of children’s work or trips, and this is useful as a visual reminder of experiences and provides children with the opportunity for reflection (as cited in Prairie, 2005). Oldridge (2007) also suggests that digital cameras are valuable for supporting children’s emotional development as
they could express their feelings. These findings highlight the importance of the range of ICT tools in relation to children’s learning. This research will focus on one aspect of this: teachers’ perceptions of the potential role of ICT tools in learning.

**ICT and parents**

In New Zealand, many parents support the use of ICT by their children in early childhood services for progressing their children’s learning in the 21st century (Oldridge, 2007). Haugland (2000) affirmed that parents can benefit by working alongside teachers to choose apposite software, and using the internet for their children’s learning. Bolstad (2004) suggested that further New Zealand research is needed to investigate the impact of ICT tools for parental participation and to suggest useful, practical approaches and raise issues relevant to the New Zealand context. This research will address one aspect of this gap by investigating teachers’ perceptions of the role ICT tools have in fostering parental participation (electronic/cyber communication) in ECE settings.

In the past there has been an abundance of literature, which explains that parents/families participation in early childhood settings is valuable for children’s learning and development. *Te Whaariki* states that “Children’s learning and development are fostered if the well-being of their family and community is supported; if their family culture, knowledge and community are respected and if there is a strong connection and consistency among all aspects of the child’s world” (Ministry of Education, 1996, p. 16). *The desirable objectives and practices in Quality in Action* mentioned that:

Management and educators of early childhood services, in partnership with parents/guardians and whanau and by acknowledging them as first educators and by working together to develop shared goals and expectations promote and extend the learning and development of each child attending or receiving the service, through the provision of quality early childhood education and care. (Ministry of Education, 1998, p. 14)

In ECE centres, it is important that teachers and parents/families work together for children’s learning. Qualification and Curriculum Authority (2000) highlights that “when parents and practitioners work together in early years settings, the results have
a positive impact on the child’s development and learning” (as cited in Nutbrown, 2011, p. 103). A successful relationship and good communication with parents and staff is vital for children’s learning. There is a gap in literature about teachers’ perspectives on the impact of ICT for communication with parents in early childhood centres. This research will highlight teachers’ perspectives on the impact of ICT for communication with parents.

In the past Vygotsky’s theory, Bronfenbrenner ecological systems theory and Rogoff’s theory have highlighted the importance of children’s parents for children’s learning and development. Lev Vygotsky’s sociocultural theory (McInerney & McInerney, 2006) explains the importance of social interactions and language embedded in the cultural context for children’s learning. Vygotsky placed prominence for children’s learning on relationships, culture and interactions (Hatherly & Richardson, 2007). Vygotsky (1978) states that:

> Children first develop lower mental functions such as simple perceptions, associative learning, and involuntary attention. Through social interactions with more knowledgeable others, such as more advanced peers and adults, children eventually develop higher mental functions such as language, logic, problem-solving skills, moral reasoning, and memory schemas. (Jackman, 2009, p. 10)

According to Vygotsky, learners are influenced by parents, siblings, friends, teachers, and peers (Borich & Tombari, 1997).

Rogoff (1998) encourages early childhood teachers to explore deeply into cultural practices and do planning with better cultural understanding and provide richer and extra suitable mediation (Fleer, 2002). It encourages teachers to think about their practice to know about the diverse ways of various cultures. It allows teachers to know about the instructional methods which are culturally appropriate to use with the children, and also allow children to learn appropriate cultural knowledge (Borich & Tombari, 1997).

Urie Bronfenbrenner explains that interactions and relationships in learning environments (for example, teachers and parents/families working together) are valuable for children’s development (Berk, 2004). Bronfenbrenner affirms that cultural beliefs and practices influence children (Berk, 2004). Children’s connections
across different settings affect children such as home and early childhood centre’s teachers link and so on (Berk, 2004; Bronfenbrenner, 1979).

To support the development of children understanding parents’ perspectives and the ways they are similar to and different from teachers provides the basis for working together (Okagaki & Diamond, 2000). It highlights the need for teachers and parents to work together for children’s learning. In the past, Vygotsky’s theory, Bronfenbrenner’s ecological systems theory and Rogoff’s theory recognise children’s parents/families value for children’s learning. It requires that teachers look for various ways to extend their communication with parents. This research will explore teachers’ views about the use of ICT for communication with parents.

In early childhood settings, assessment enhances children’s learning and is important for sharing information with children’s parents/families. The Ministry of Education (1996, p. 29) highlights that assessment is useful to give “information about children’s learning and development to the adults providing the programme and to children and their families.” Furthermore, Carr (2001, p. ix) explains that “assessment is used to identify strengths, weaknesses of individuals, institutions, and whole education system and it is also a powerful source of leverage to bring about change.” Kei Tua o te Pae: Assessment for Learning: Early Childhood Exemplars (Ministry of Education, 2009) demonstrated that ICT assists teachers to document children’s learning using digital and still photographs in conjunction with computers to make children’s learning visible to children and children’s parents/families (Ministry of Education, 2009). There are New Zealand studies (Lee et al., 2002; Wilson et al., 2003) (as cited in Bolstad, 2004) showing that early childhood centres used ICT to produce multimedia learning stories co-authored between children, staff and parents. Narrative assessment occurs by using the learning story model of assessment and addresses socio-cultural perspectives on learning i.e. communities of practice and co-construction of learning (Lepper, Williamson & Cullen, 2003). Carr (2001) argues that learning stories represent formative assessment, and it is an ongoing process of teaching, learning and development and advises the participants’ directions for further learning and development. Learning stories are an observation of a child and contains information for parents that their child’s learning and development is valued and encouraged. Learning stories are kept in children’s portfolios and help early childhood
teachers to understand children’s interests/ideas and look for diverse ways to extend these (Carr, 2001).

Some research suggests that ICT helps to extend teachers electronic/digital communication with parents/families for children’s learning and development. Tiene and Ingram (2001) highlight that computer networks suggest a range of ways to increase the online communication. Furthermore, the Ministry of Education (2010) illustrates that digital technologies can be used to link with families in early childhood settings by sending photos through the e-mail, posting them on a blog and can be accessed anywhere, and families can respond back at a time convenient to them. Ray and Shelton (2004) point out that technology offers children’s parents/families chances for communicating with their children’s teachers in early childhood centres (as cited in Eliason & Jenkins, 2008). A similar study by Boardman (2007) points out that a study in Tasmania and the Australian Capital Territory highlighted that cameras, and voice recorders are valuable to facilitate children’s learning and the collection of authentic proof for assessment. Thus, this is precious for reporting children’s learning to their parents/ families (Boardman, 2007). This research aims to add to the available knowledge in this area by investigating teaching perspectives on the role of ICT in facilitating parental participation (electronic/cyber communication) in early childhood settings.

**ICT and teachers**

ICT has an apparent role in early childhood centres and how it is included in the early childhood curriculum depends on teachers (Oldridge, 2007). Children’s effective use of ICT is influenced by the role of teachers such as teacher’s beliefs, philosophy and pedagogical theory in ECE (Hayes & Whitebread, 2006). Teachers’ facilitation and involvement by using a variety of strategies is vital for ICT successful incorporation and use in early childhood curriculum for children’s learning. Patterson (2004, p. 29) found that “teachers expressed a need to feel confident and competent using ICT themselves before working with children.”

In the past, Seymour Papert (1993) claims that “teachers are determinedly holding on to outdated values in their own interests” (as cited in Gibbons, 2006, p. 10). To improve pessimistic affect of vested interest (ignorance of uses of technology),
Lawrence Peters (2003) argues that “educators must adopt new ICT-oriented philosophies and practices analogous with those of the information technology industries. Hence the vested interests of technology industries supersede the vested interests of educators” (as cited in Gibbons, 2006, p. 10).

ICT in the early childhood education field has potential to enhance children’s learning. However, it requires early childhood teachers to be highly skilled and trained to use ICT (Siraj-Blatchford & Whitebread, 2003). Patterson (2004) reports that “appropriate use of ICT has potential to expand and develop skills and understanding of children in early childhood setting” (Patterson, 2004, p. 25). Perry (2002) explains that teachers and parents need to provide children opportunities for developing technology skills as in future technologies are revolutionizing children’s living world (Jackman, 2009). O’Hara (2004) suggests that teachers need to consider ways in which ICT can be incorporated into the existing provision to extend and enhance children’s learning (O’Hara, 2004). Teachers in early childhood centres need to provide equal opportunities for children to use ICT (Blagojevic, 2003). Past research highlights that teachers need to provide children opportunities to use ICT. However, there is a gap in literature about teachers’ perspectives on the issues related to using ICT. This research will explore teachers’ perspectives about the issues related to the use of ICT in early childhood settings.

Teachers need to select the best software for children when they are knowledgeable about how children learn and grow. Haugland and Wright (1997) affirm that teacher’s proficient use of ICT acts like a model for children. Haugland (2000) points out that to increase children’s learning selection of developmentally appropriate software and developmentally appropriate websites are essential in ECE services. NAEYC (1996, p.11) position statement: Technology and young children- ages three through eight promotes that professional judgement by the teacher is required to determine if a specific use of technology is age appropriate, individually appropriate and culturally appropriate” (as cited in Prairie, 2005, p. 162).

The role of ICT in ECE centres depends on teachers’ competence and the extent to which it is included in the early childhood curriculum (Oldridge, 2007). As O’Hara (2004) describes it, there is less use of ICT in some early childhood centres due to teachers lack of ICT experience, limited training opportunities in use of ICT,
insufficient equipment, and more focus on literacy and pre-math’s skills development. Gimbert and Cristol (2004) found “there is a concern that preservice students don’t receive technology instruction that prepares them to use technology in teaching across the curriculum and in the appropriate use of technology with young children” (as cited in Wortham, 2006, p. 187). Laffey (2003) and Pollman’s (2000) research highlights that teachers-in-training are learning to use ICT in ECE settings (as cited in Bolstad, 2004). The NZCER first national survey in late 2003/early 2004 (Mitchell & Brooking, 2007) and the second national survey in 2007 (Mitchell, 2008) found that teachers felt they require advice and information about ICT use.

Professional development courses and mentoring by competent staff members and use of websites with lesson plans to develop technology skills can assist teachers as they develop ICT skills (Blagojevic, 2003). Teacher’s training underpins technology’s successful incorporation in ECE (Haugland & Wright, 1997). Hassel (1999, p. 9) states that “professional development is a process of improving staff skills and competencies needed to produce outstanding educational results for students.”

Research highlights that attending professional development courses and networks related to ICT is beneficial for teachers as it increases their knowledge of ICT. By attending professional development courses it will increase teacher’s knowledge to improve their practice, thus it influences children’s learning and development. The Ministry of Education (2005, p. 5) reveals that “educators can also use ICT to access professional learning and networks and for accessing and sharing resources and information.” Lai (2001) explains that School of Education at University of Otago established a network “The New Zealand Learning Network” (NZL Net) for teachers to get together online for access to discussions, new resources, advice from experts and share their own ideas (Lai, 2001).

Teachers can use ICT to enhance their communication with parents/families about their children’s learning (Ministry of Education, 2005). Carr (2001) describes that learning stories are used by New Zealand teachers for assessment to document children’s learning. The learning story model of assessment has benefited children as they can see what they do is imperative, appreciated and valued (Carr, 2001). Wilson, Clarke, Maley-Shaw and Kelly (2003) explain that ICT and learning stories use
creates a listening context such as learning to listen and narrate. The pedagogy of
listening is highly appreciated by Reggio Emilia teachers as it lets children see what
they do and say is important, listened to and much cherished (Wilson et al., 2003).

*Kei Tua o te Pae: Assessment for Learning: Early Childhood Exemplars* (Ministry of
Education, 2009) guides the assessment undertaken in the early childhood settings and
contains examples of teachers using ICT for documentation of children’s learning and
development (Ministry of Education, 2009). In early childhood settings “assessment
of children’s learning and development involves intelligent observation of the
children by experienced and knowledgeable adults for the purpose of improving the
describes that “assessment is the ways in which in our everyday practice we observe
children’s learning, strive to understand it and then put our understanding to good
use” (as cited in Carr, 2001, p. 19). In New Zealand, the early childhood education
field before *Te Whaariki*, assessment was done to describe learning outcomes in terms
of physical, language, intellectual, social and emotional skills (Carr, 2001).

The Ministry of Education (2005) describes that ECE educators have a critical role in
appropriate use of ICT through careful planning, creation of meaningful experiences
and modelling. ICT provides opportunities for ECE teachers to increase their
professional knowledge by attending professional development online networks, e-
learning, video conferencing and educators can communicate with each other using
online networks. Teachers’ motivation and readiness are tremendously valuable for
ICT successful use in ECE (Ministry of Education, 2005).

In the past there is a gap in literature as not much is written about teachers’
perspectives on the impact of ICT tools on their practice. This research will examine
teachers’ perspectives about the impact of ICT on teachers’ teaching such as for
creating resources and documentation. In the early childhood field, teachers provide
children with opportunities to play with a range of resources to enhance their learning
and development. In previous research in New Zealand, there is minimal information
available about teachers’ use of ICT for creating resources. The Ministry of Education
(2005) suggests that teachers can use ICT for accessing and sharing resources. Thus,
it will be valuable to study teachers’ perspectives about use of ICT for creating
resources. To study teachers’ perspectives about their use of ICT for documentation
of children’s learning through learning stories will be important to highlight teachers’ use of ICT for writing and sharing learning stories with parents.

**Conclusion**

This literature review underpins this research to investigate teachers’ perspectives about the impact of ICT in early childhood settings. The next chapter will explain the methodology and data collection methods employed to obtain the data sought to achieve the research aim.
Chapter Three: Research Methodology and Methods

Introduction

This chapter examines the methodology and data collections’ methods, which have been used in this research. The rationale for the selection of the methodological approach and the data collection methods employed is explained. The research design involved case study of teachers’ perspectives in two early childhood centres using the anonymous questionnaire and the interview to gather qualitative data. This chapter also discusses the ethical issues relating to this research and explains the data analysis process used.

Qualitative research methodology

In this research, the chosen research methodology is a qualitative research methodology. This approach is appropriate as a way of exploring teachers’ views about ICT and its impacts in ECE settings. Qualitative research is used to find out what people feel and look for in-depth meaning of peoples’ opinions and emphasises the worth of participant’s views (Bryman, 2008). Merriam (1998) argues that in qualitative research an emphasis is on understanding the phenomenon of interest from participants’ perspectives.

The research was conducted using a qualitative methodology as the emphasis was to find out teachers’ perspectives on the impact of ICT in two case studies in early childhood settings. In the research, teachers’ perspectives were sought about their experiences on the impact of ICT on their own practice and on children’s learning and development. The qualitative research methodology is valuable to find out about peoples’ experiences and the meaning they give to these experiences (Morse & Richards, 2002). Gillham (2000) points out that qualitative methods focus on evidence from what people tell you what they do and to make meaning from it.

This case study research uses qualitative methods to gather qualitative data. Woodside (2010) explains that case study research is often associated with using qualitative research methods. Qualitative research puts emphasis on words for data collection and analysis (Bryman, 2008).
Interpretivist paradigm

The study investigates the impact of ICT in two case studies in ECE settings. Thereby, to gain the required information the perspective about experiences of teachers was required through their own interpretation. Therefore, the research is situated in the interpretivist paradigm. Cohen, Manion and Morrison (2001, p. 183) describe that “to see the situation through participants’ eyes guides this research.” Bryman (2008) explains that qualitative methodologies and methods are usually interpretive. Bryman (2008) states that interpretivism is grasping subjective meaning of social action to value differences among people and the natural sciences objects. Naughton, Rolfe and Siraj-Blatchford (2001, p. 35) explain that “interpretivism seeks to explain how people make sense of their circumstances, that is of the social world.” Denzin and Lincoln (2000, p. 15) suggest that “all research is interpretive; it is guided by a set of beliefs and feelings about the world and how it should be understood and studied.”

The case study research design

The case study research design is most suitable as it provides in-depth understanding about the situation and meaning for persons involved (Cohen et al., 2001; Cohen, Manion & Morrison, 2007; Merriam, 1998). The purpose of this study is to investigate perspectives of teachers on the impact of ICT in ECE settings. A case study focuses on “individual actors or groups of actors and seeks to understand their perceptions of events” (Cohen et al., 2001, p. 182). Merriam (1998) states that case study research involves discovery, insight and an understanding from the perspectives of participants and offers promise for making valuable contribution to education practice and knowledge base.

In this research, I have investigated perspectives of teachers about the impact of ICT in their ECE context. A case study is conducted mainly for in-depth study in the natural context (Bassey, 1999). Yin (2003, p. 13) defined case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context.” Simon (2009, p. 21) points out that “case study is an in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, programme or system in a ‘real life’ context.”
This research is an interpretive case study as the researcher has collected the information about the research with the intent of interpreting the phenomenon. Merriam (1998) describes that in case studies the researcher collects information about the problem with the intent of interpreting the phenomenon. The investigator takes all the data and develops categories that conceptualise different approaches to the task. Thus, in interpretive case studies, the researcher uses the data to analyse, and interpret the phenomenon (Merriam, 1998).

The contexts

The researcher initially contacted nine ECE centres (Personally visited seven ECE centres and used e-mail to contact two ECE centres) between March 2011 and October 2011. Convenience sampling was used to select two early childhood centres (Two sessional preschools) in Auckland as an appropriate sample for the time frame. Gall, Borg and Gall (1996) explain that convenience sampling purpose is to select a sample that suits research purpose. The researcher has obtained consent (see Appendix B, and Appendix C) from two early childhood centres (sessional preschools) to conduct the research in August 2011 and October 2011. The researcher has chosen two early childhood centres (one preschool in West Auckland and another preschool in South Auckland), who initially showed willingness to participate in the research.

Participant selection

There is a dearth of research related to teachers’ perspectives in relation to the impact of ICT in early childhood centres. A key prominence is placed on capturing the teachers’ voice as they play a major role in influencing ICT in early childhood education centres. After getting approval from Unitec Research Ethics Committee in November 2011, the researcher sent participant information sheets (see Appendix D), the anonymous questionnaire (see Appendix E), consent to participate in the interview form (see Appendix F) and interview questions (see Appendix G) to individual participants in two early childhood centres on their centre’s address through the post in November 2011.
The anonymous questionnaires were sent through the post to seven teachers in the centres. Post-paid envelopes and collection boxes at the centres were provided to participants for returning the questionnaire and consent to participate in the interview forms. In the questionnaire participants were not asked to identify themselves to ensure the confidentiality and anonymity of the participants. The seven participants who chose to participate in the research posted back the questionnaire by late February 2012; to protect their identity these participants used a separate collection box at the centre. Of those who indicated an interest, five participants were selected for an in-depth interview that explored the key issues that arose out of the anonymous questionnaire and the research questions. A purposive sample of data collection is used as I have chosen the participants from which maximum data can be obtained, and who have shown an interest to participate in the interview by filling the consent to participate in the interview form (see Appendix F). Gall, Borg and Gall (1996) explain that in purposive sampling, emphasis is on selecting the individual from which in-depth understanding can be achieved. The interviews were completed by the middle of March 2012. All the interview participants were voice recorded using a ‘laptop’ and transcripts of the interviews were given to the participants for ‘member’ checking.

**Methods of data collection and analysis**

Research methods are ways to collect data in different styles such as the questionnaire, the interview and many more. Bryman (2008) and Cresswell (2002) describe that research methods are techniques and procedures for data collection in the research. Bassey (1999), Merriam (1998) and Bassey (2012) suggest that case study method has no unique method for data collection and analysis, thus the researcher can use whatever methods of data collection seem suitable and practical. Therefore, the questionnaire and the interview were the chief data collection methods in this research to gain in-depth knowledge about teachers’ views on the impact of ICT in early childhood settings. Brown and Dowling (1998) stated that questionnaires were valuable to gain in-depth information about what people know, think, and do or what they have done. Cohen et al. (2001, p. 267) suggests that “interviews enable participants - be they interviewers or interviewees - to discuss their interpretations of
the world in which they live and to express how they regard situations from their own point of view.”

**The questionnaire**

In this research, participants were given information about the research. The questionnaire (see Appendix E) was sent by mail to the participants in the early childhood centres to find participants views about the research issues. Cohen et al. (2007) point out that it is questionnaire participant’s own choice to be involved in the study.

The questionnaire participants were required to return it by the due date written on the questionnaire. In this research postal questionnaires were used to find out about the participants’ views on the research. It was always kept in mind that “in using postal questionnaires the researcher operates at some distance from the respondents” (Brown & Dowling, 1998, p. 69). Bell (2005) explains researchers need to tell the respondents about the date and day when the questionnaire is to be returned.

In the research, follow-up was done by phone, and the study importance and the value of the respondent’s participation was re-emphasised. Bailey (1994) suggests that follow up can be by mail and by telephone (as cited in Cohen et al., 2007).

**The interview**

Prior to commencing the interview each participant completed a consent form (see Appendix F) agreeing to participate in the interview and for the interview to be audio recorded using a digital voice recorder (laptop). Cohen et al. (2007) and Fontana and Frey (2005) describe that the ethical dimension of the interview needs to be kept in mind that informed consent is required to guarantee confidentiality and no harm to anyone involved. Once the transcripts of the interview were completed participants were given an opportunity to check and/or make any changes to the transcript.

In the research, the interviews were conducted with the participants in a face-to-face situation in the participant’s workplace after and during participants working hours at a time and date appropriate to them; the interviews were audio recorded and took one-hour maximum to complete. Cohen et al. (2007) suggest that it is important for the
interviewer to introduce herself/himself to the respondent and to explain the purpose, scope, nature and conduct of the interview, the use to be made of the data, ethical issues, and the likely duration of the interview to maintain trust between researcher and interviewees.

The open-ended research questions of the interview (see Appendix G) were made available to participants in advance along with the purpose of the research. Cohen et al. (2007) state that questions about the interview need to reflect what the researcher is trying to find out and that open-ended questions have immense benefits as they are flexible, encourage cooperation and understanding, allow the interviewer to explore in depth. Open ended situations’ drawbacks can be unanticipated answers, which are off the topic or vague (Cohen et al., 2007).

Data analysis

This qualitative case study research included qualitative analysis. Qualitative research produces a large amount of data in the form of words (Wellington, 2000). The researcher has analysed the anonymous questionnaire data by carefully reading the responses many times to gain an in-depth understanding and to identify themes. Castle (2012, p. 116) explains that reading the data multiple times is valuable for the researcher as it helps to determine “what text is saying and interpret the text by bringing meaning to it.” The researcher used colour codes on the data and collected electronically all the responses according to questionnaire questions in a table format using Microsoft word. It was valuable to make similarities and differences more obvious and helped to identify categories or themes.

The first step for the interview data analysis was listening to the audio-recording and transcribing and checking them with participants before using them for the analysis. The second step involved reading the data many times and involved manually coding of data. In the third step, codes were developed into categories or themes. Merriam (1998) describes how categories or themes are abstractions indicated by data, and not the data themselves. According to Castle (2012) categorizing and coding data is “similar to unitizing the data in the sense that you are breaking down the data into meaningful bits and labelling the bits in a way that makes sense considering the
patterns in the data” (p. 117). Merriam (1998) suggests that categories have to reflect the research purpose.

The themes were chosen from frequent answers for research questions. Castle (2012) suggests that after categorization and coding the researcher can analyze for what themes or major concepts are reflected in the categories and codes. “Themes can be viewed as clusters of similar categories and codes that cluster together based on a common element” (p. 122).

Ethical considerations

As the Unitec requirement the researcher obtained approval from Unitec Research Ethics Committee (UREC). This research complies with the ethical requirements of Unitec Research Ethics Committee (see appendix H)

For the research, it was important to seek permission from the centre owner/centre manager via a formal letter to conduct the research. In the research, early childhood teachers in two preschools were requested to take part in the questionnaire and the interview data collection techniques. Informed consent involved information about research purpose and nature on the information sheet. The researcher sent the questionnaire by post to two early childhood centres and requested early childhood teachers to fill in the anonymous questionnaire. The questionnaires were given to participants without a consent form, and returning of the completed questionnaire was seen as their consent. Five early childhood teachers who indicated their willingness for participation in the interview were approached to take part in the interview.

The name of centre, participants, and information provided by the participants were kept confidential. Participation in the research was voluntary, and the participants were able to withdraw at any time during the research until two weeks after the completion of interviews. The researcher will keep the data confidential and data, including tape recordings, notes and the anonymous questionnaires stored properly for the appropriate period of time. Bryman (2008) states that in research, there is a need to maintain confidentiality of records, and to make sure that participants are not identifiable when findings are published. In the research, early childhood teachers were informed that their responses will remain confidential, and they can access
information gained from them. The research participants were informed to have access to final report.

**Conclusion**

This chapter discussed how the qualitative case study was designated, keeping in mind the research aim and research questions. The anonymous questionnaire and the interviews were employed to collect data required for the research. Finally, ethical issues have been discussed. The next chapter will present and analyse data collected for this research.
Chapter Four: Research Findings

Introduction

This chapter will present the findings of the data gathered during the research process. This chapter will, firstly, explain background and demographic data. Secondly, it will highlight usage of ICT by children and teachers within the two preschools. Thirdly, it will highlight teachers’ views about the impact of ICT on learning. Fourthly, it will describe teachers’ perspectives on the impact of ICT on teaching. Finally, the issues and challenges associated with ICT in ECE will be presented. The themes will have sub-themes to make the findings explicit.

Background and demographic data

Preschool A is a community-based preschool licensed for 30 children aged from two to five years old. The centre offered both full-day and part-time care for the children. At the time of research, Preschool A had one centre manager and three teachers. The teachers were female, and all had ECE qualifications. Two staff members had Bachelor of Education (B.Ed.) in ECE, and the other two had Diploma in ECE. The centre manager and two teaching staff were working full-time, and one staff member was working part-time. Three teaching staff were New Zealand European, and one was New Zealand-born Samoan.

Preschool B is a sessional preschool with 30 children aged from two to five years. The centre offered two sessions everyday five days a week. There were two teaching staff and one centre manager. All the staff members were female and had ECE qualifications. The centre manager had a Family day care certificate; one teacher had Diploma in ECE and one teacher had B.Ed. in ECE. The centre manager and two teaching staff were working full-time.

Seven participants from two preschools have filled in the anonymous questionnaire and sent it back by mail (see Table 4.1).
Table 4.1 The anonymous questionnaire participants

<table>
<thead>
<tr>
<th>Anonymous Questionnaire Participants</th>
<th>Type of Preschool</th>
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<tbody>
<tr>
<td>PA1</td>
<td>Preschool A</td>
</tr>
<tr>
<td>PA2</td>
<td>Preschool A</td>
</tr>
<tr>
<td>PA3</td>
<td>Preschool A</td>
</tr>
<tr>
<td>PA4</td>
<td>Preschool A</td>
</tr>
<tr>
<td>PB1</td>
<td>Preschool B</td>
</tr>
<tr>
<td>PB2</td>
<td>Preschool B</td>
</tr>
<tr>
<td>PB3</td>
<td>Preschool B</td>
</tr>
</tbody>
</table>

A total of five teachers from the two pre-schools took part in an interview (see Table 4.2). In Preschool A two teachers took part in the interview which took place in their workplace, i.e. early childhood centre after their work time on 29th February 2012 and 1st March 2012. Three staff members in Preschool B took part in the interviews in the participants’ workplace during their work time on 23rd February 2012. The interviews were audio recorded using a digital recorder (laptop), and the researcher checked them with the participants for any comments before using them for the research.

Table 4.2 Demographic data on the interview participants

<table>
<thead>
<tr>
<th>Interview Participants</th>
<th>Qualification (Early Childhood Education)</th>
<th>Ethnicity of Participants</th>
<th>Position</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>B.Ed. in ECE</td>
<td>NZ European</td>
<td>Teacher</td>
<td>Female</td>
</tr>
<tr>
<td>T2</td>
<td>Diploma in ECE</td>
<td>Samoan</td>
<td>Teacher</td>
<td>Female</td>
</tr>
<tr>
<td>T3</td>
<td>Family day care certificate</td>
<td>NZ European</td>
<td>Centre Manager</td>
<td>Female</td>
</tr>
<tr>
<td>T4</td>
<td>B.Ed. in ECE</td>
<td>Fiji Indian</td>
<td>Teacher</td>
<td>Female</td>
</tr>
<tr>
<td>T5</td>
<td>Diploma in ECE</td>
<td>Indian</td>
<td>Teacher</td>
<td>Female</td>
</tr>
</tbody>
</table>
ICT use

Teachers noted the availability of ICT for teacher use within their centres. They also described children’s use of ICT within their respective centres. This section has two subheadings namely: range of uses and differences between Preschool A and Preschool B.

Range of uses

All participants noted their use of the range of available ICT, and all expressed a desire to learn more about ICT for teaching and learning purposes. Table 4.3 presents the ICT tools which teachers used in the preschools.

Teachers’ use of ICT in Preschool A included computers/laptops, internet websites, Google, Facebook, Kidz Online, blogs, e-mail, computer games, Kidz Pix, Comic Life, printer, digital/video cameras, photocopier, phone, overhead projector, data projector, television, speakerphone, radio, digital microscope, keyboard, stereo/iPods and listening posts for music and movement, CD/DVD players, tape recorder/player and fax machine. Two interviewees in Preschool A commented that they didn’t have interactive whiteboard in the centre; however, they believed interactive whiteboards are valuable for children’s learning. One teacher explained it:

*I have never used an interactive whiteboard here; apart from my lecturers using it at the uni, we had one at the uni, but I have never used one within my teaching (T1).*

In Preschool B teachers’ use of ICT was similar, e.g. computer/laptop, internet websites, Kidz Online, e-mail, printer, digital/video cameras, fax machine, photocopier, phones, musical instruments, tape recorder/player, stereo/iPod and books with CDs/Cassettes and CD/DVD players. The centre did not have television, overhead projector, data projector and interactive whiteboards; however, the teachers believed that television, overhead projector, data projector and interactive whiteboards are good for the children. It was highlighted as follows by one teacher:

*Overhead projectors are good for children. Interactive whiteboards are good for them as well (T4).*
Table 4.3 ICT facilities used by teachers

<table>
<thead>
<tr>
<th>ICT</th>
<th>Preschool A teachers</th>
<th>Preschool B teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers/ laptops</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E-mail</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Internet websites</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Facebook and Blog</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>KidzOnline</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Comic Life</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Printer</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Digital/ video cameras</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fax machine</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Battery operated, and electronic musical instruments</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Phones</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tape recorder/player</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CD/ DVD players</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Stereo/iPod</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Television</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Photocopier</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Digital microscope</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Speakerphone</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Overhead projector/data projector</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Interactive whiteboards</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Note: ✓ Indicated Yes answer × Indicated No answer
Differences between Preschool A and Preschool B

In Preschool A, children had more opportunities for using ICT on their own and alongside their teachers. However, in Preschool B children had fewer opportunities to use ICT on their own and alongside teachers. In both preschools, children used a range of ICT available within the centre (see Table 4.4). In Preschool A, teachers commented that within the centre teachers provided children with opportunities to use two laptops, searching on internet websites, printer, cameras, keyboard, tape recorder/player, CD/DVD players, speakerphone, television, photocopier, digital microscope and overhead projector on their own and along with them. However, teachers commented that children used e-mail, fax machine, phones, listening box, and stereo/iPod along with them. In Preschool B, teachers stated that the children had opportunities to use computers/laptop, digital/video cameras, musical instruments, tape recorder/player, and CD/DVD players on their own and along with teachers. Within the Preschool B, children used e-mail, internet websites, printer, fax machine, phones, photocopier, and speakerphone along with their teachers.
<table>
<thead>
<tr>
<th>ICT</th>
<th>Preschool A</th>
<th></th>
<th>Preschool B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children using on their own</td>
<td>Children using with teachers</td>
<td>Children using on their own</td>
<td>Children using with teachers</td>
</tr>
<tr>
<td>Computers/ laptops</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E-mail</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Internet websites</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Printer</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Digital/ video cameras</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fax machine</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Battery operated musical instruments, electronic musical instruments</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Phones</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Tape recorder/player</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CD/ DVD players</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Television</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Photocopier</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Speakerphone</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Overhead projectors</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Interactive whiteboards</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Note: ✓ Indicated Yes answer × Indicated No answer
The impact of ICT on learning

Teachers highlighted ICT’s positive impact on their own and their children’s learning. In this study, teachers believed that ICT increases learning opportunities for children. This section has two subheadings: teachers learning to use ICT and ICT increases learning opportunities for children. The following section presents the quotes from the participants regarding their views about the impact of ICT on learning. The significance of findings and later links to the literature will be discussed in chapter Five.

Teachers learning to use ICT

Teachers said that they were still learning to use ICT and their experiences of ICT professional development varied. They commented as follows regarding the professional development:

- *I had no formal training in the area of ICT. However, I am quite comfortable and confident in using it and learning alongside the children (PA1).*
- *I have been to one professional development course on ICT and have also had in-house PD (PA2).*
- *Photostory, blogging workshops at conference – the importance of keeping ICT knowledge current in the 21st century (PA3).*
- *I attended one workshop but it mainly covered internet links. Head teacher did a workshop on the “blog,” mainly learning alongside my team (PA4).*
- *Through in centre training by the centre curriculum manager (PB1).*
- *We had basic computer skills training and we also do our programme planning using computers (PB2).*
- *I have had no formal professional development in using ICT (PB3).*

These comments suggested that some teachers had attended professional development courses, whereas some had no formal training.
Teachers’ expertise in using ICT varied and some teachers had more experience. However, they reported learning from each other. Interviewees indicated that they are learning to use ICT within the centre, and their use of ICT increased in the past few years. The following quotes from research participants exemplified this:

Within the centre, I have learnt to use more of computer, and different forms and programs of Comic Life. And Blogging we set up blogs so that was new ICT learning for me and also learning the overhead projector, running it through the computer (T1).

I have learnt everything here, working with my team. When I first started here I did not really have much experience with laptop because I did not have laptop at my home, Where I used to work it was not rich in ICT, but this is such a rich environment that I know from my experience (T2).

I use it more every day, get more experience, practice, that makes me better every day; I learn new things on the computer (T4).

One teacher mentioned that she learnt to use ICT by practice, from other teachers through the internet, through networking with other teachers and at her home from family members:

The electronic overhead projector, the new one it is teaching me to learn how to set things up use different ICT stuff together the different tools together like the overhead projector today. The old one the manual one laptop and digital camera all those three have been used today, but I have to find out myself, discovering it by myself or just hearing ideas from other teachers through internet, networking with other teachers as well that is really good. Or another thing was learning from my husband (T2).

The significance of the findings will be discussed in Chapter Five.

**ICT and learning opportunities for children**

Teachers believed that ICT usage increases learning opportunities for children through searching on the internet websites/Google. Teachers noted that many children
could search on their own by themselves or along with teachers together to find information of interest. This was highlighted as follows by the teachers:

*For example, getting the laptop to research alongside the children in finding info of interest. Children gain competence in knowing and finding answers together (PA1).*

One teacher mentioned that children were familiar with internet websites/Google, and children are encouraging the teachers to use them:

*Children are saying to us – you wanna Google it. They are familiar with it; they got other places to find other things to use (T2).*

Teachers in the study believed that ICT is an important tool for children’s learning. The comment below is an example of how teachers used internet websites/Google to find information to further extend children’s interest in their topic of interest:

*ICT is very important in responding to children’s learning needs. For example, if we are doing a topic about insects, we want broader information on it, and then we can jump on the internet and get loads of information. Then we can extend their interest (T4).*

Furthermore, one teacher stated that, ICT offered opportunities for more in-depth learning:

*Access to digital technologies enables children to grow with the times – it opens up the doors for more in-depth learning” (PA3).*

As one teacher noted ICT offered children a new curriculum area for exploring and for supporting learning in other curriculum areas. She believed that it increased opportunities to gain technical knowledge for using ICT:

*Offering them a new curriculum area to explore, using the mouse for instance, lot of children learning to use the mouse, touch pad mouse on the laptop, so the different way, and I think huge thing which today I have noticed for instance is that, young girl who is quite new, and one of the older children sits with her for good half an hour, she supported her and taught her how to use the mouse, and how to work the programme Kidz Pix, so building those relationships and those*
connections between children without an adult there, that we can stand back and watch children take on leadership roles. It supports them hugely I think in all areas of curriculum (T1).

A number of participants commented that ICT use extended children’s learning opportunities as it helped to make connections with children’s parents/families, which enabled them to contribute to children’s learning as well:

*It is a valuable way of developing, learning opportunities for children because it provides … a link between family, home and the preschool environment (PB1).*

Cameras were seen as an important way for children to revisit their learning and check their own learning. The following quotes illustrate this:

*Cameras, printers are used most; the reason being that the children can visit and revisit their learning (T1).*

*Children can take photos of their own learning (PA2).*

One example given highlighted children’s use of the camera to share the construction of blocks with parents. This record was also able to be kept in the learning portfolios:

*They wanna take a photo of it, then document it, put it in their portfolio, take it home to show their mum and dad, Look at it what I built today, and they know it is something they can come back, bring it back again, and revisit, just use the photograph to rebuilt it; It might change, probably take another photo as well and see the changes that the differences what they added onto that (T2).*

Teachers highlighted the value of stories and songs available on CDs/DVDs as learning opportunities for children. Two teachers noted that children like watching ‘Desi Boyz’ at the moment on the computer. It was highlighted as follows:

*CDs and stories available they are excellent learning opportunities. Now something so concrete that children are getting to watch like “Story of Cinderella” they love it when I put it on the computer, they can see it happening; they like to listen to the story, so which is interesting. When you are reading a story to the children. Here it is right in front of them. They are not having a*
chance to think. A large forest, that is when they are imagining it.

This is something; you are watching in front of you (T5).

Two teachers commented that songs available on DVD players are a worthwhile mechanism for children to appreciate the musical diversity and to gain knowledge about diverse cultures. One research participant said that they played various cultural songs for children to appreciate the musical diversity and to gain knowledge about various cultures:

*DVD player’s children watch it, and they get lots of information, i.e. songs, different cultural songs (T4).*

Another two teachers mentioned the value of tape recorders/players, listening post and stereo/iPod for listening to songs/stories. The teachers said that they played songs and stories to children using the listening post in groups:

*We have tape recorders, and we got a little microphone; children can record themselves, and we play that back. Stereo and they use the listening post where we play stories and songs, where six to eight children can sit with head phones and listen (T1).*

Teachers in the study believed that ICT use supports children’s verbal and non-verbal communication development and as a way of sharing home experiences with their friends. One teacher noted that:

*They are bringing their connections of home, so they take pictures at home, and they bring into the centre (T1).*

Others noted that children got opportunities for communication with parents using the fax machine:

*We faxed the parents at work so that's another way just a little note or thanks mum, or happy birthday mum, and it does work, so the child just draws a picture, little message, and it just brightens up parent’s day. They do know that we do know about things happening in their lives, and that we value it as well (T2).*

Teachers said that when children are dancing to music together at that time social developments occur:
When you are doing music - song ‘Desi Boyz’ the children really enjoy listening to that, and ‘I want to dance with you’. Those are all social developments happening (T5).

Most teachers believed that ICT use such as cameras and overhead projectors supports social development as children work together. The following statements are representative:

*When sharing they take photos of their work together, or we use the overhead projector and all share as community of learners or group together. They see work together and they get to share, what they have seen and what they have taken pictures of, their experience with their friends (T1).*

*We use overhead projector a lot to explore light and shadow (T1).*

*Overhead projector we just did it today, so, which is a good example the painting that the children had, so we started. I took photos, photocopied them black and white, and then it is using the tools together that makes the big impact as well. After that they have done that they draw it onto Perspex the clear and then put it onto overhead projector, and it makes it bigger. I think that was quite a good one today, where we were trying to figure out reflection of light how did it work (T2).*

Teachers believed that ICT supports creativity. One teacher made the following comments to support this view:

*When children they got the Kidz Pix on the laptop, they create pictures, words and writing. And they know it is different ways to create artistically, and it can come through the printer, and we can write a story about that (T1).*

The significance of these findings will be discussed in Chapter Five.

**The impact of ICT on teaching**

The teachers in the study highlighted ICT’s positive impact on their teaching practice. Teachers highlighted its value in four areas: writing learning story observations,
extending teachers’ own knowledge, communicating with parents and making children’s learning visible to parents. Each of these areas will be considered separately here, and their significance will be discussed in Chapter Five.

**Writing learning story observations**

Teachers noted that they used ICT for documenting children’s learning, such as through learning story observations. Teachers commented that they used ICT to write learning story observations for children’s portfolios to make children’s learning visible to parents/families and to look for various ways to further enhance children’s learning. The following comment was made by one teacher regarding their usage of ICT for learning story observations:

*We use ICT tools as a record of assessment through learning stories with photos for portfolios & Kidz Online (PB1).*

One teacher commented that they used digital cameras to take photos, laptops to write stories and comic programmes for writing learning stories:

*Where it is biggy was our documentation, where you got the digital camera to take the photos, you got the laptop that helps you to write up the stories and create it. We use comic program so that help us set up from the laptop (T2).*

Further, teachers stated that they sent learning story observations to parents through the e-mail to make children’s learning/progress visible. This was highlighted as follows by teachers:

*We were sending learning stories observations to children’s parents e-mail (T5).*

Teachers stated that it was convenient for teachers to use ICT to write learning story observations and for parents to provide feedback about that. They noticed that it was easier to get feedback from parents on learning stories through portfolios, email, Facebook and Kidz Online.

*We do write learning story observations. And they do a parent’s voice back; so they get sent home, so the parents can write a story*
We have the portfolios, where they can write responses back to us, we do have lot of parents’ voices (T1).

Mainly getting parent comments/contributions on a learning story put up on Facebook from one of the teachers or adding their own stories of their child’s learning outside of the centre (PA4).

Through our Kidz Online programme parents are able to make comments (PB1).

**Extending teachers’ own knowledge**

Teachers commented that ICT enabled them to follow children’s interests/ideas and provided more ways to find information to support children’s learning:

Laptops, computers, Kidz Pix, computer games, listening posts, iPods, Comic Life, overhead projectors, cameras, photocopiers, e-mails, digital microscope, Google – all enable me to follow children’s interests and extend on their learning (PA3).

One teacher stated that they used ICT to gain more knowledge for themselves to further extend children’s interests/ideas:

Technology is such a door opener, got a lot of questions doing research for the children as well. It is quite nice; I mean not all the teachers will know everything. So that will just open up an idea to maybe we should Google it - go to the websites, or we have got books to go hand in hand (T2).

Three teachers said that they used internet website and Google to find information of interest to further extend children’s interest in their favourite topic. The following examples illustrated the use of ICT to further enhance children’s interest in project topics:

At the moment, there is a huge focus on animals and when we don’t know the answer, we say to the kids lets go and find out the answer, and we bring that out, and we use Internet Explorer and use Google and search for the information for the children. Daily, constantly all
the times (T1).

We are talking about the rainforest. Straight away we don’t have books related to the rainforest in your preschool, so where we can get it. We can straight way Google it and have a look what is a rainforest. At least, children get to know straightaway and get the answer. If we don’t know the answer, and we tell them we can find out. So they learn that teachers have a way to find out. You can go on the internet to find out (T5).

Two teachers reported that internet websites made information from all over the world available. However, one teacher further mentioned that she learnt poi dances using internet websites:

I feel digital technologies have opened a wide world to the children and teachers and enables us to have access to information that brings about increasing opportunities for children (PB3).

Internet websites we are using it a lot now. I think it is the one best thing of globalisation is this. Often we do not find relevant books everything straight away. And it shows a lot of pictures to the children. Especially I have used to teach myself how to do poi dance. I have found using these websites very well (T5).

Two teachers commented that ICT tools were valuable for them as a way of extending children’s learning by reflecting on their teaching practices:

ICT is very valuable in responding to children’s learning needs. Help us to reflect on our teaching practices how we can make it better for children’s learning (T2).

One teacher commented that CD players supported them for development of a positive atmosphere at mat-time and during children’s arrival time at the centre. It is evident in the following comment:

Definitely, the CD player especially during mat-time or just setting a mood, when children arrive that could be just happy music playing in the background at the children arriving just to set mood to the children (T2).
Teachers mentioned that their use of ICT for creating resources varied within the centre. One teacher pointed out that she used ICT to further enhance children’s interest in a project topic. When children were interested in a topic, she said teachers provided a variety of experiences to further enhance children’s interest. She used internet websites to make animal cards to further enhance children’s interest in animals. She commented that use of ICT supported her to make cards:

\[I \text{ like making up resources the little cards. Our focus has been on animals; we do got lots, but there is one I know that children are not playing cards, so I will make animal cards. So it is all from using those. If we don’t have those it would be lot harder. You would not be able to provide own resources. Making your own resources is a biggy too (T2).}\]

Two teachers said that they used ICT such as the internet to search for information and laminator to laminate it. Comments included:

\[It \text{ supports in many ways, like creating documentation, using the internet to find more information, any information about any topic, te reo, songs and we get lots of resources from the internet and print it, laminate it and use it with the children (T4).}\]

Another teacher commented that she has created resources for maths and songs from the internet, whereas she has not done the stories yet.

\[I \text{ do lot of creating resources, and then I laminate it. I have a lot of maths things like matching. I have done songs but not stories from the internet (T5).}\]

However, one teacher stated that she made stuff at home, and at uni:

\[I \text{ have my stuff at home that I made at uni. Most of our resources are bought or parents make it for us, or we get through conference or workshops. So we don’t tend to make a lot ourselves. Somewhere, we type up, our Christmas concert; we made big out on a poster, type it up for children to read the words (T1).}\]
Communicating with parents

Teachers believed that ICT increased communication with parents/families. Teachers believed that parents found it more convenient to communicate with the centre using tools such as e-mail and Facebook. The participants commented as follows:

*E-mails and Facebook pages enable parents to communicate with you (us) at suitable times for them – chn fed & in bed – parent has time to e-mail or message (PA3).*

Teachers acknowledged the use of fax machine and email for communication with parents:

*E-mail sometimes. fax machine – we have tried few times (T2).*

Teachers acknowledged the use of e-mail for sending the newsletters to keep the parents informed of children’s topics of interest and centre’s events and common news such as staff changes.

*Our newsletter is sent out to parents via e-mail keeping parents informed of the regular events, topics of interest and general news (PB1).*

*E-mail is a great way to let them know what learning is taking place. Newsletters are also being sent by e-mail is a great way to communicate with parents and families (PB3).*

*We have a newsletter, which is sent out each term and this is to keep the parents up to date if a new teacher that may start, or if we have a trip coming up, or one of the teachers is going away; We have students here; it is means of communication (T1).*

However, one teacher expressed concerns that she preferred to use the phone instead of e-mail:

*I sometimes feel that parents don’t check e-mail, so I rather use the phone. E-mail is an option (T5).*

One teacher stated that in the preschool, they used the telephone to notify parents and for contacting other services:

*Definitely, telephone for contacting parents whose children become*
sick to notify them if we got a trip in two more days and we still have not heard from them just to notify them. We have a waiting list, if available space comes through we will contact them. Or someone hurt themselves during the day that we think needs to be contacted. Contacting other services that help us as well, could be just a school definitely that keeps us safe (T2).

Three teachers acknowledged that they used Kidz Online for communication with parents about their children’s learning. Four teachers mentioned that Facebook and blogs had increased their communication with parents/families living nationally or overseas. The following quotes from teachers highlighted this:

We have a blog system which parents can log into. We also have a page on Facebook which we have found to be a great communication tool for families/parents and community (PA1).

One teacher suggested using Skype for contacting grandparents living overseas. She stated:

I think it is mainly grandparents who are out, and it is really hard trying to contact them during the times of the countries. Skype would be really cool (T2).

One teacher noted that ICT use was more eye-catching for some parents in the centre:

Knowing our parents a lot of them got time to sit and read. Anything on the screen seems to catch, and just having short messages. For some reason, I don’t know it is like giving them book they will only read one page if they are not happy with it; they don’t want. If they see something or if it was a book, or if it was same story on TV, they will sit there. That is an example (T2).

One teacher stated that few parents had knowledge of setting up websites, and they helped them. She stated that:

We do have I think two or three parents that have knowledge of setting up websites; they have done it; it is part of their daily job, so that is how they are helping us (T2).
Further, this teacher pointed out that tech-savvy parent help to fix the computer within the centre:

> With the changes in Facebook and all those programmes coming up, we got parents that are quite good computer workers; they fix our computers (T2).

**Making children’s learning visible to parents**

Teachers commented that ICT provided teachers with chances to share children’s centre experiences with parents. They stated as follows regarding their use of text accompany the photos in the stories to make the children’s learning visible to parents:

> From us, we take pictures, when we document not only can read the words what stories about what their children have been doing they can also see. Their not always be lots of words for them to read because they can see it from their photos. And some of the photos say more than words (T1).

Another teacher stated that use of photos is valuable for parents whose second language is English to help them understand the story or give them a hint to talk to the teacher about their child’s learning:

> For children’s learning photos explain a lot more than words. A lot of our parents English is second language as well. So I find that it helps them understand what is happening, what the story is about, and if they don’t at least it gives them a prompt to come and ask the teacher, they got something to link and start the conversation with (T2).

One teacher pointed out that for wall displays, they used text accompanying the photos to update the parents about their children’s learning and their interests. She gave the following statement to support this:

> We have wall display, which is using photos and computer to write the words… that is another means of showing them what their children are doing, where they are, and what they are interested in (T1).
Three teachers acknowledged that they sent learning stories and programme planning to parents through Kidz Online to inform the parents about their children’s learning:

*Kidz Online we send it straight away to parents- parents can see, whatever their child is doing. We do programme planning online – parents can see that as well (T4).*

Furthermore, teachers commented that ICT provided opportunities for children’s parents to share children’s home experiences with the centre:

*Our parents they bring in photos and their memory sticks, their cameras of their holidays, of their family/whanau wall at the moment, so that enables them to be part of centre environment of having their family picture their and being able to part of that (T1).*

Teachers said that parents could use e-mail, and phone to share children’s learning experiences as well:

*They can send e-mails to us what their children are doing. They can ring us.*

One teacher commented that during movie nights and parents evenings they used data projector to play movies of children’s play to inform the parents about their children’s interests:

*They come in for we have movie nights and parents evenings, where we used data projector and parents can see what children are doing with the movie of children’s play, so I think it enhances built relationships stronger; parents sense of belonging, and being able to see their children part of centre, and that we acknowledge their child through the photos, and their words. They visibly see it themselves (T1).*

Teachers believed that the use of photos in children’s portfolios, and on Facebook helped to make children’s learning visible to parents. The following comments highlighted this:

*We take lots of photos of children display them for parents and children’s portfolios (PA1).*

*For instance, how we changed from blog to a Facebook page, a
We have parents that are working full time. We put our zoo trip photos for them to be able to see that. They can see what their children are doing, and they are part of centre, although they are not coming in and out of our centre. So they get to be a part and write where we can just show the children, look Mums just said wow you look so fantastic, you look so busy, so that is a huge communication for parents (T1).

One teacher said that she used a photocopy machine to photocopy children’s art work, so that we can keep one copy for display, and children can take another one to their home:

They got any other work that we want to display up here, and they wanna take it home. We got a photocopier that does colour and black and white. Children go do their photocopy, it all through support as well (T2).

It is in the area of their teaching practice that teachers found ICT to be of most value. The significance of this will be discussed further in Chapter Five.

**Issues and Challenges**

Although the majority of findings so far have concentrated on the positive value of ICT for children’s learning and teaching practice, there were a number of key issues and challenges for teachers using ICT in the two study preschools. This section will explain issues and challenges associated with ICT in ECE. These included lack of availability of professional development, scarcity of resources, and time and the need for balance in ICT use.

**Lack of availability of professional development**

The findings here link strongly with the earlier findings that many teachers are still struggling to learn to use ICT in the centres. Teachers agreed that professional development courses were important for learning about ICT. Teachers noted their desire to attend professional development courses related to ICT as a way of improving their own practice. The following quote indicated the need for more professional development for increasing teachers’ knowledge about ICT:
More professional development geared up to teach young children to use ICT effectively (PA4).

One participant reported that finding time to attend professional development courses is a big challenge.

"Time” for professional development in training of the use of ICT (PB1).

Another teacher stated that we needed to write reflections to make time to do more professional development to learn about ICT.

Write reflections on making time to do more professional development on it; I suppose I don’t say it is a huge issue or difficulty at all (T2).

The significance of this will be discussed further in Chapter Five.

**Scarcity of resources and time**

The issue of time and resources was also highlighted as barriers to ICT. Teachers commented that they used all ICT equipment available in the preschool. However, they expressed concerns that the centres need to buy more resources. One teacher stated that due to lack of resources whenever children used ICT, turn taking difficulty occurred:

*Some of the children they want to use it first. Turn taking difficulty, so we have to tell them to wait for their turn. They rush into doing at the same time (T4).*

Later, this teacher revealed the initiatives the centre could take to solve the turn-taking difficulty:

*Probably more resources, more computers and stuff” (T4).*

Two teachers were concerned about funding to buy more resources. These teachers suggested as follows:

*More funding money to buy more resources (T1).*

*To solve financial restraints more money allocated for ICT budget (T3).*
Time and learning skills were also seen as a major issue by two teachers. One teacher commented as follows:

*Learning the new ways and time. We don’t have time in a day to sit down and say I don’t know what I am doing. A lot of things you know with our blogs, we changed our blogs because lots of us were not using it because we got to remember the password. So we find an easier way, we now have locked Facebook website that you have to be or a parent have to be accepted and invited because that is more user-friendly. Be as busy teachers, so time and learning skills my own skills at the internet* (T1).

Three teachers mentioned the requirement to have more time off the floor to learn all the new system, and to use ICT tools. One teacher mentioned that:

*Maybe if we have a reliever for so many hours, who would step in while a teacher use computer with the children and is off the floor* (T3).

Another teacher expressed that we need to make time for programme planning:

*We have to have time to use ICT. But we have to take time for that, we have to take time out for that. With our programme planning, we have to make time* (T4).

One teacher noted that some parents had shown concern over children’s usage of ICT as they believed they can break them. The following quote from one teacher is an example of this concern shown by parents:

*We have just started to learn to bring our laptop out, don’t just bring it out when children need it or having those ones out. We needed it as well we can discover together with the children. It just leading where some parents do not like the fact their children touching things that think they might break it. That is the whole reason coming here to learn whatever tools are available for them, make the most of it* (T2).

Further, this teacher suggested that we needed to encourage children to use ICT and make explicit its benefits to parents:
Just to showing the parent that is what we are here for. We are here to let them experience, not stop them from exploring. When they get out there, they get little bit older that’s what they gonna be using laptops. We are just the first step to help them (T2).

The research participant expressed that in early childhood settings, teachers are most important to support the children to provide them experience. They are not for preventing the children from exploring any area of the environment. Furthermore, this teacher stated that when the children grow up they will use laptops. In the next chapter, the researcher considers the significance of the findings.

The need for balance in ICT use

Teachers also emphasised that there is a need for balance in the use of ICT within the centre. One teacher had concerns about children’s development of pre-reading and pre-writing skills if they are over dependent on ICT:

I don’t think children should be limited to ICT tools. They are a part of everyday life. A balance I believe children get a lot of ICT support and opportunities in exploring ICT. I am worried children may lose the basics of writing and using real books for researching topics. ICT is easy and fun for all. It has become a part of our lives; we however need balance in all we offer children and to support their learning and development fully (PA1).

Another teacher also commented on the importance of balance for children in the centre:

I don’t mind the laptop; I don’t mind the photography but there is iPads it does worry me. Some centres I have visited during my practicum in training, Everything is so pushed towards ICT, because it is so nice and new and then I get scared children will not learn how to catch a ball have gross motor skills, which then turn when they go to school hold a pencil and concentrate. So I do have issues and when I see children sit on the laptop for half an hour so that is it, let’s go. You do need try to move them on at some point
every day or all day. I think children get a lot of ICT at home, television, computer games. So I worry about that (T1).

Further, this teacher expressed that it was not an issue in her own practice, as within the centre, they encouraged children to take turns and staff members were aware that children need a balance with ICT usage:

I monitor children, I observe, I reflect on where they are, we don’t have that issue here. Laptop - They learn that we need to take turns so it is five to ten minutes each. I would not say it is a huge issue as we all agree as a teaching team. And we discuss these constantly and reflect all the times. So it is not an issue. We are aware that our children need a balance. Those who are interested in we need to support to extend their interest further, we don’t want to hold them back, as long as they are also enjoying the rest of curriculum areas (T1).

Another teacher pointed out concern about manual communication and stated that writing is not seen as important as it was in past:

My biggest issue with children I am not seeing it here because I know we are still providing it. Where is the communication manually that is writing starting to be not as valuable as it was in older days. So ICT is taking over that (T2).

Further, this participant suggested that within her own practice, they were still offering children opportunities to learn about manual:

We are still offering those opportunities for them to use the manual. We still got old way of communicating with peoples by writing letters, still keeping that as well as well teaching them what is happening with the changes (T2).

The challenges facing teachers with ICT are significant findings in the study and will be considered further in Chapter Five.
Conclusion

This chapter examined the findings of the anonymous questionnaire, and the interviews conducted in this qualitative case study. In the beginning of this chapter background and demographic data about the participants was described. This research highlighted ICT’s positive impact on learning and teaching within preschools. It has also highlighted issues related to ICT in ECE context. The next chapter five will discuss the implications of the key findings in detail and will link the findings to the literature.
Chapter Five: Discussion of Findings

Introduction

This chapter discusses the findings that emerged from data gathered and analysed in this research. Further in this chapter links between the literature review, and the findings are identified. The discussion presents the impact of ICT use on learning, and teaching context of early childhood settings. It also looks at the issue and challenge related to ICT in ECE settings. The main themes had a number of sub-categories (see Figure 5.1), and they will be discussed in-detail in this chapter.

Main themes

The impact of ICT on Learning
- Teachers learning to use ICT
- ICT and learning opportunities for children

The impact of ICT on Teaching
- Writing learning story observations
- Extending teachers’ own knowledge
- Communicating with parents
- Making childrens’ learning visible to parents

Issues and Challenges
- Lack of availability of professional development
- Scarcity of resources and time
- The need for balance in ICT

Figure 5.1   Sub-categories of main themes
The impact of ICT on learning

While teachers highlighted the use of ICT’s positive impact on children’s learning, they also commented that they were still learning to use ICT. The discussion that follows will focus on the following: (1) teachers learning to use ICT; and (2) ICT and learning opportunities for children.

Teachers learning to use ICT

The findings from the research showed that teachers were still learning to use ICT, and they had diverse experiences about ICT professional development. Teachers expressed a desire to attend more professional development courses for increasing their knowledge. This finding is significant for this study as links strongly to findings in the literature. As for example, Jalongo and Isenberg (2000) have pointed out that teachers are responsible for their own learning and teacher learning effects the children’s learning. **Te Whaariki** states “management must ensure that training is available to enable the adults who work with children to have knowledge and skills necessary to support the children’s learning and development” (Ministry of Education, 1996, p. 27).

The findings showed that the teachers were learning to use ICT within the centre from their colleagues, and their use of ICT had increased over the past few years. One teacher mentioned that she learnt to use ICT from her family members. This finding links to recent Ministry of Education initiatives for ICT success in New Zealand ECE settings. The Ministry of Education (2005) developed Foundations for Discovery for early childhood services for using ICT in their contexts. However, it is a centre’s own choice to use ICT. The Ministry of Education in New Zealand initiated the ECE ICT Professional Learning (ECE ICT PL) programme to provide support and guidance for early childhood centres to use ICT (Core Education, n.d.). Thus, this research is important to highlight that teachers used a range of ways to increase their knowledge about ICT and showed a willingness to attend further professional development courses to enhance their knowledge. The issue is what type of support is available for teachers who wish to attend professional development. This study recommends
arranging and supporting the teachers for attending the professional development courses related to ICT.

**ICT and learning opportunities for children**

The participants in this study believed that ICT increased learning opportunities for their children. Participants reported that using computer internet websites increases learning opportunities to search for information to further enhance children’s interest in a topic of their interest. This finding is consistent with literature, for example, Anderson (2000) explains that use of computers enriches project based or cooperative learning (as cited in Jackman, 2009). They stated that ICT offered new learning opportunities as children on their own or along with teachers use the computer to search for information of interest on Google/internet websites. Wang et al. (2008, p. 50) also emphasize that “the internet is a powerful research tool, but appropriate teacher guidance, and modelling are essential for helping young children find information, think about it critically and develop self-protection skills and a sense of efficacy.”

The findings highlighted ways in which ICT offered children a new curriculum area to explore, and the fact that it enhanced learning in other curriculum areas. This is consistent with literature: as Jackman (2009) also stresses that in early childhood we need to provide children with opportunities to use ICT along with other curriculum areas. Further, research participants commented that ICT use is an important way for children to develop technical skills. This links to the work of Love, Burns and Buell (2007) who suggest that children learning to use keyboard and mouse build technical agility and confidence. The finding has implications for teachers: it suggests the importance of using ICT in a variety of curriculum areas in early childhood settings.

In this study, the participants found that ICT was an important way of making connections with parents. This links clearly to the New Zealand national early childhood curriculum, *Te Whaariki*, intention that “children’s learning and development are fostered if the wellbeing of their family and community is supported; if their family, culture, knowledge and community are respected; and if there is a strong connection and consistency among all the aspects of the child’s world” (Ministry of Education, 1996, p. 42). *The Desirable Objectives and Practices in*
Quality in Action (Ministry of Education, 1998) also states that “management and educators of chartered early childhood services, in partnership with parents/guardians and whanau, will promote and extend the learning and development of each child attending or receiving the service, through the provision of quality early childhood education and care” (Ministry of Education, 1998, p. 14). The research finding is significant as it highlighted the potential of ICT for increasing teachers’ communication with parents and families.

The research participants used tools such as the camera as a way of offering children the opportunities to revisit their work artefacts and to check their learning. These findings are consistent with the literature as several studies (Hatherly, 2009; Ministry of Education, 2009; Wang et al., 2008) have explained that digital cameras are important for children to visit and revisit their learning. Hatherly (2009) proposes that in the early childhood settings we need to provide children with opportunities for using digital cameras to take photos, as cameras are influential for encouraging the children to think about what they were doing. Furthermore, the participants stated that children used cameras to document their own learning for sharing it with their parents. Wang et al. (2008, p. 49) point out that “in children’s hands, digital cameras are a powerful learning tool. Children can take digital photos to document their learning interests and their favourite books, activities and friends.” The findings highlighted that cameras are valuable for children to revisit their learning, and to share their learning experiences with their parents. It is interesting to note that when children were documenting their own learning using cameras, it is their stories that come through rather than teachers.

The use of CD/DVD players were seen as valuable for children for listening to stories and songs. This view is supported by Jackman (2009), who added that ICT tools were valuable for children such as DVD/CD players for music and stories. The participants valued the use of stereo/iPod, computers, tape recorders/players and listening posts for listening to songs and stories. O’Hara (2004) also points out that listening to taped stories, singing, telling stories, and recording are valuable for children’s learning. The findings highlighted ways in which children listened to songs and stories using listening post in groups. Arthur, Beecher, Death, Dockett and Farmer (2012) report that listening posts encourage collaborative relationships and learning.
Teachers noted the value of music on DVD players as a way for children to gain knowledge about various cultures. The literature too reinforces this finding, *Te Whaariki* highlighted the value of children to gain knowledge about cultures (Ministry of Education, 1996). As Gibbs (2006, p. 182) notes, “ethnic and cultural diversity is a feature of today’s early childhood centres.” Rogoff (2003) also points to the importance of cultural connections for the development of new cultural ways of learning from each other. In New Zealand, early childhood centres follow Aotearoa national bicultural early childhood curriculum *Te Whaariki*, which is a bicultural and socio-culturally oriented curriculum. As *Te Whaariki* (Ministry of Education, 1996, p. 18) states “the early childhood curriculum supports the cultural identity of all children, affirms and celebrates cultural differences and aims to help children gain a positive awareness of their own and other cultures.” Gibbs (2006) points out that culturally sensitive teachers show respect towards cultures and help to bring social justice.

The teachers in this research valued the use of ICT for children’s verbal and non-verbal communication development. This is a significant finding, as The Ministry of Education (1996, p. 72) affirms “Language is vital part of communication. In early childhood, one of the major cultural tasks for children is to develop competence in and understanding of language.” Teachers believed that when children are using photos to share their home experiences they communicated with each other, their parents and the centre. Children also had opportunities for communication with parents using the fax machine.

The findings suggest that ICT supported creative endeavour. Duffy (1998) defines creativity as:

> The ability to see things in fresh ways, learning from past experiences and relating this learning to new situations, thinking along unorthodox lines and breaking barriers, using non-traditional approaches to solving problems, going further than the information given, creating something unique or original. (p. 143)

Clements and Sarama (2003) state that computers promote creativity. Siraj-Blatchford (2003) also explains that ICT can encourage creativity, problem solving, discussion, risk taking, and flexible thinking and this can be attained in play-centered and responsive environments.
The teachers believed that ICT supports social development. They said that when children are dancing to music together at that time social developments occurred. Beckley (2012, p. 199) suggests that “social developments occur when children learn to live with others in a social environment. Therefore, consideration needs to be given to ways of promoting an effective social context in the early years to help children thrive and support each other’s well-being.” The findings highlighted that social developments occurred when children used overhead projector together to share their work collectively. Furthermore, the teachers stated that some children using the overhead projector looked at the light colour patterns and their works as enlarged pictures. The findings highlighted that social developments occurred when children shared photos of their work together.

Chapter Six will identify a number of recommendations for these findings.

The impact of ICT on teaching

In the findings chapter 4, four major influences of ICT on teaching practice were found. These included: writing learning story observations, extending teachers’ own knowledge, communicating with parents, and making children’s learning visible to parents.

Writing learning story observations

The study participants highlighted that they used ICT for writing learning story observations as part of the assessment for children’s portfolios to make children’s learning visible to parents. In this study, one participant commented that they used a digital camera to take photos, a laptop to write and Comic Life for learning story observations. This finding links strongly with current literature, for example, Barrett (2004) points out that “in years gone by, we would store artifacts, such as work samples and observational notes, in boxes and filing cabinets. Digital cameras and other electronic equipment have simply changed what and how we collect and save the artifacts” (as cited in Walters, 2006, p. 9). Furthermore, Carr and Lee (2012) also point out digital technologies have transformed the ways learning stories can be created, and they are used for tracing children’s ICT learning journeys and for highlighting the value of image based ways of thinking.
The creation of a Learning story involves an observation of a child, and provides information to parents/families about their child’s learning. It helps teachers to understand children’s interests/ideas and together teachers and children can look for various ways to extend them. As Carr and Lee (2012) note learning stories developed following on from the development of New Zealand national bicultural early childhood curriculum *Te Whaariki* and early stories were written by hand and were structured around five actions (i.e. taking an interest, being involved, persisting with difficulty, expressing an idea or a feeling, and taking responsibility) developed from five strands of *Te Whaariki* (belonging, well-being, exploration, communication and contribution). Moreover, they point out that in ECE settings learning story observations presentation have developed alongside the explosion of ICT for documenting children’s learning and for gathering the information (Carr & Lee, 2012). Furthermore, Carr and Lee (2012, p. 113) explained that “learning stories are often, now, image-based.” The findings suggest that the ICT makes children’s learning visible to children’s parents through learning story observations in their portfolios. This finding links to the work of Carr (2001) who states that children’s portfolios often include learning stories, photocopies of their work, their comments and photos. Billman, Geddes and Hedges (2005) and Carr (2001) note portfolios are important as a communication tool to share information with parents and to further support the children’s interests.

This research found that teachers were sending learning story observations to parents through the e-mail as a way of making children’s learning visible to the parents. It also provided parents an opportunity to give feedback. Furthermore, they acknowledge the use of portfolios, e-mail, Facebook and Kidz Online for sharing learning stories with parents as parents added comments on them and they even liked to add their own stories of their children’s learning. As Arthur et al. (2012) note portfolios encourage three-way communication between staff, parents and children as families and children can add to the portfolios by analysing portfolio items, contributing photos and making comparison between home and centre experiences. The finding has implications for teachers; it suggests a range of ways such as, email, portfolios, Facebook and Kidz Online for sharing learning stories with parents.
Extending teachers’ own knowledge

The findings highlighted ways in which ICT enabled teachers to follow children’s interests/ideas and provided more ways to find information to support children’s learning. The teachers used ICT to gain more knowledge for themselves and to extend children’s interest in their topic of interest.

These findings are consistent with literature, for example, O’Hara (2004) points out that early childhood teachers need to look for ways in which ICT can be incorporated in the existing provision to extend children’s interests. Helm and Katz (2001) point out that “children’s interests can be extended through a series of integrated connected experiences when they investigate a topic related to their interests over a number of days” (as cited in Arthur et al., 2012, p. 259). As Edwards, Gandini and Forman (1993) argue in the context of Reggio Emilia in project work children are given an early experience of knowing and understanding a topic in depth. Such early experiences of feelings of mastery may lay the foundation of a lifelong disposition to seek in-depth understandings of topics worthy of their attention (Edwards et al., 1993).

Some of the study participants valued the use of internet websites for finding information from all over the world. One study participant recognised the use of internet websites for learning about poi dances to incorporate that in her practice within the centre. Te Whaariki also acknowledges that “New Zealand is the home of Maori language and culture: curriculum in early childhood settings should promote te reo and nga tikanga Maori, making them visible and affirming their value for children from all cultural backgrounds” (Ministry of Education, 1996, p. 42).

The research findings highlighted ways teachers used ICT to gain more knowledge for themselves to extend children’s learning by reflecting on their teaching practices. This is consistent with the findings of Karstadt, Lilley and Miller (2000) who point out that children’s learning and development occur when adults extend children’s interests/ideas, encourage greater understanding, have knowledge/skills, and a keenness to reflect on own practice to learn from it. Jalongo and Isenberg (2000) also state that teachers growing as professionals need to reflect on practice, learn from it, and gain
knowledge to help them teach better in future, and move towards self direction and self-evaluation and work hard to complete their roles requirements.

The study highlights that the use of CD players for creation of the positive atmosphere at children’s arrival time and during mat-times. It is obvious from teachers’ perspectives that their use of ICT for creating resources varied within the centre. According to the research participants, for creation of resources they used internet websites for finding information about children’s topic of interest, te reo, maths and songs. When they found the information, they printed and laminated the resources to use with the children. The research participant stated that when children were interested in a topic, they provided different type of experiences and resources to further enhance their interests. This finding is consistent with the Reggio Emilia approach as noted above where teachers provided children with a range of experiences and resources to further enhance their interest in their favourite topics. The research participants suggested that they got resources from parents and through conference and workshops as well. The findings highlight that the teachers have not created the stories yet by using the ICT.

Communicating with parents

The findings in this study highlighted ways in which ICT has made it more convenient for teachers to communicate with parents. All the research participants used e-mail and fax machine for communication with parents. In addition, four participants recognized the use of Facebook and blogs, and three teachers said they used Kidz Online for communication with parents. However, some teachers noted issues with online communication and preferred to use the phone instead of e-mail, as parents sometimes didn’t check their e-mails. Furthermore, the findings highlighted that the teachers used email for sending the newsletter to the parents to inform the parents about programme planning, general news and about the regular events. They used telephone to notify parents if their children become sick or if there is a trip, or to contact the new parents if an available space comes on the waiting list, and to contact a school.

The value of ICT for promoting good communication with parents is noted in the literature, for example, the Ministry of Education (2010) affirms that communication
with children’s parents/families is highly valuable for children’s learning and development and ICT can offer various ways to enhance communication with parents/families and community. For example, through communicating with parents teachers can gain more knowledge about children’s culture, and how best they can support their learning and development (Terreni, 2003). The New Zealand early childhood curriculum, *Te Whaariki* (Ministry of Education, 1996) and *Desirable objective and practices* (Ministry of Education, 1998) suggest that family and community is vital for children’s learning. *Te Whaariki* principles and the Belonging strand explained the significance of socio-cultural factors, i.e. family and community for children (Ministry of Education, 1996).

One of the interesting results of the research was that although teachers were not asked directly, the teachers believed that use of e-mail provides opportunities for parents to respond back at any time. It links strongly to the literature, for example, Arthur et al. (2012, p. 63) found that “e-mail is also an effective communication tool for many families as they are able to respond to messages in their own time.” Furthermore, Arthur et al. (2012, p. 62) point out that “many families who do not have time to spend at the setting appreciate the use of technology as a communication tool.”

The research participants acknowledged the use of Facebook, and blog for communication with parents/families living nationally or overseas. The Ministry of Education (2010) illustrates that in today’s globalised world, digital technologies can be used to link with families in early childhood settings such as, photos can be sent through e-mail, posted on blog at anytime and can be accessed anywhere, and families can respond back at a time convenient to them. Tiene and Ingram (2001) highlight that internet and computer networks suggest a variety of ways to increase the online communication.

The findings noted the value for using Skype for communication with parents/families living in New Zealand and overseas. As the Ministry of Education (2010) argues using Skype is another good way to encourage children to communicate with other children in diverse centres and in various countries in the world. The research findings highlighted that for some parents within the centre, ICT use was more eye-catching as they were showing great keenness in watching a story on TV. One teacher mentioned
that ‘tech-savvy’ parents helped them to fix the computer within the centre and also helped them with centre’s website setting up.

**Making children’s learning visible to parents**

The findings highlighted that photos are important as they make children’s learning visible to parents. From comments by the research participants, it is clear that photos that accompany the text made a significant contribution to share children’s experiences with parents and to make children’s learning visible to parents. The teachers commented that use of photos provided children’s parents’ chances to share children’s home experiences with the centre.

They recognised that even parents whose second language is English can understand what it means, and it gives them a hint for talking to the teacher. These findings are consistent with literature, for example, Walters (2005) also describes that digital photography can bridge communication limitations experienced by those whose second language is English, or are illiterate, or are non-English speaking, or have speech or hearing impairments or those who have distance or a physical challenge and have limited access to the early childhood setting (as cited in Walters, 2006).

The study findings pointed that photos of children that accompany the text in stories for wall displays, Facebook, Kidz Online and portfolios made children’s learning visible to parents. The findings also stated that during movie nights and parent evening’s teachers used data projector to play movies of children’s play to make children’s learning visible to parents. This links with *Te Whaariki* statement “families should be part of the assessment and evaluation of the curriculum as well as of children’s learning and development. Parents and caregivers have a wealth of valuable information and understandings regarding their children” (Ministry of Education, 1996, p. 30). The Ministry of Education (2005) in *Foundations for discovery* explained that using ICT for facilitating learning by communicating with parents/families about their children’s learning could provide children with opportunities to celebrate their learning. The findings have implications for teachers to use data projector to play children’s play movies and to use learning stories having photos accompany the text for portfolios, wall displays, Kidz Online, portfolios and Facebook to make children’s learning visible to parents.
These findings provide the basis for a number of recommendations in Chapter Six.

**Issues and Challenges**

Significantly, in relation to their positive perspectives on the value of ICT for children’s learning and teachers’ practice, the teachers in this study encountered some key issues and challenges related to using of ICT in their early childhood centres. These included lack of availability of professional development, scarcity of resources, and time and the need for balance in ICT use.

**Lack of availability of professional development**

There was a wide variety in the expertise of teacher participants which had a significant impact. Participants frequently learned about ICT from each other. However, they also expressed a desire to attend more professional development to increase their knowledge about ICT. This is important, as Hatherly (2009) states teachers need to act as professionals who knows about knowing and learning. Staff member’s professional development improves their practice; therefore, it increases children’s learning and development. Education Review Office (2000a, p. 3) (as cited in Lai, 2001, p. 65) affirms, “Professional development is any activity that develops an individuals skills, knowledge, expertise and other characteristics as a teacher.” ERO (2000a, pp. 2-3) accepted that the main aim for professional development is improving teacher’s practice to bring the quality learning for the children (as cited in Lai, 2001, p. 65). This research has significant implications for teachers to attend professional development courses to increase their knowledge about ICT.

Blagojevic (2003) points out that early childhood teachers need to attend professional development courses to develop knowledge and skills required to use it regularly for ICT successful integration. The Ministry of Education (2005) also reveals that “educators can also use ICT to access professional learning and networks and for accessing and sharing resources and information.” Jalongo and Isenberg (2000, p. 397) explain that “there is no way to become completely prepared to teach, because even if you could be completely prepared for today, tomorrow will bring about changes that will demand new understandings and skills.” This study highlights that
teachers need to keep looking for various ways to enhance their knowledge about ICT to improve their professional practice.

**Scarcity of resources and time**

The findings indicated that lack of resources and time are a barrier for ICT in ECE settings. In the study the majority of participants commented that the biggest issue is lack of time. The findings highlighted that teachers need to have more time off the floor to learn about ICT tools. The teachers point out that due to scarcity of resources turn taking difficulties occurred. Moreover, they explained that centres need more funding to buy more resources. As Blagojevic (2003) puts it lack of funding is another main challenge facing early childhood centres increasing to have effective ICT use.

The research findings highlighted that some children’s parents’ beliefs about ICT tools usage need to change. As the research conducted by McPake and Plowman (2010, p. 225) found “many parents are unsure of the value – or the dangers – of introducing their children to technological activities at a young age, and practitioners, as they seek to understand children’s early experiences, may find that parents look to them for reassurance and encouragement.” As research participants noted teachers in early childhood settings are the first for supporting the children into ICT use.

Teachers wanted to provide an environment for children to have experiences with a range of resources. The literature also highlights that early childhood teachers need to provide children opportunities for exploring the environment. As Rodger (1999, p. 18) states “teachers prepare the environment for children to learn through active exploration and interaction with adults, other children and materials.” The participant highlighted that the laptop is a children’s future technology as the children will use it when they grow up. *Te Whaariki* affirms that “learning begins at home and early childhood programmes outside the child’s home play a significant role in extending early learning and in laying the foundations for successful future learning” (Ministry of Education, 1996, p. 9).

**The need for balance in ICT use**

The research participants identified balance as a big challenge and stated that they needed to balance the use of laptops, etc. within the centre. Otherwise, they were
concerned that children might lose the basics of writing and using real books for searching. On the other hand, teachers also stated that they didn’t want to hold back the children from exploring their interests. Thus, there is an implication for teachers to support the children to further extend their interests in laptops, as long as they are participating in the other curriculum areas.

These findings are consistent with literature, where Siraj-Blatchford (1998, p. 119) found that “children who spend too much of their time sitting in front of a computer screen are undoubtedly missing out on a range of other important activities and experiences. But as part of a balanced curriculum computers offer much value.” Therefore, it is important that early childhood teachers provide children opportunities to use ICT along with other curriculum areas. Furthermore, Grey (2011, p. 80) explains that early childhood education should regard ICT “increased use as an opportunity to impart safe and responsible practices to children so that they become ethical cyber citizens of the future.”

The findings highlighted that within the centres, ICT is taking over manual communication and children to develop pre-writing are not seen as important nowadays as it was in the past. Hill-Clarke and Robinson (2004) suggest that teachers should provide meaningful writing experiences to the children. Makin and Whitehead (2004) illustrate that teachers need to offer children access to writing materials and opportunities for writing. Therefore, it has an implication for teachers to offer balance to the children to use ICT along with other curriculum areas.

In response to the challenges identified here, Chapter Six will provide a number of recommendations.

**Conclusion**

This chapter presented a discussion relating to research questions outlined in Chapter One. The discussion has provided the information to draw conclusions, which will include discussion of the limitations of this research and recommendations for further research will be described in the next chapter.
Chapter Six: Conclusion

Introduction

This final chapter discusses the conclusion that emerged from the data gathered and analysed in chapter Five. Furthermore, this chapter also discusses the significance of the findings and the limitations of the research and makes recommendations for further research. This research makes visible teachers’ perspectives about the impact of ICT on learning and teaching in early childhood settings. The results of this study’s research reveal that the participants believed that ICT have a positive impact on children’s learning, on teachers’ practice, and increases communication between staff and parents in ECE settings. It has also looked at the issues and challenges related to ICT in early childhood settings.

The aim of this research was to investigate teachers’ perspectives on the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

The following research questions were the basis of this study:

1. What are teachers’ perceptions of the impact of ICT on:
   - children’s learning?
   - teachers’ teaching, such as in creating resources, and documentation?
   - parental participation?
   - other factors?

2. What are teachers’ perceptions of the issues and challenges associated with ICT use in the early childhood education (ECE) contexts?
Summary of findings

The impact of ICT on learning

The findings of this research indicated that the research participant teachers’ expertise in using ICT varied; however, their use of ICT increased in the past few years. The teachers indicated that they learnt to use the ICT from each other and by attending professional development courses. The results of this research revealed that the teachers believed that inclusion of ICT in the existing provision of ECE curriculum offered diverse learning opportunities for children. In the research preschools, the teachers found the internet websites/Google increased learning opportunities to find further information for enhancing children’s interest in their favourite topics. Participants appreciated the use of ICT for contacting parents and believed that it enhances learning opportunities for children.

The research participants recognised the use of listening post, computers, CD/DVD players, stereo/iPods and tape recorder/players for listening to songs and stories. The findings highlighted that various cultural songs available on DVD players are valuable for children to appreciate the musical diversity and to gain knowledge about various cultures. The teachers believed that ICT encourages communication development as children used photos to share their home experiences with their peers and used fax machine for communication with parents. They believed that ICT supports social development as children used cameras for taking photos of their work together, overhead projector to share their work jointly and were dancing to the music cooperatively within their centre. They believed that ICT supports creativity as children were using Kidz Pix to create artistically.

The impact of ICT on teaching

The research has shed new light on teachers’ perspectives in relation to the impact of ICT on their teaching practice. The study findings highlighted that ICT have a positive impact on teachers’ practice. The study highlights that teachers used ICT for documentation through learning story observations. They believed that it is valuable to make children’s learning visible to parents. They used cameras, laptop and comic
programme to write learning story observations. They used Facebook, portfolios, Kidz Online and email for sharing children’s learning stories with parents, and it provided parents with the opportunities to provide the feedback. The research indicated that ICT offered the teachers a range of significant opportunities to increase their pedagogical knowledge. They used internet websites to gain more information to further enhance their children’s interest in a specific topic of their interest. They used internet websites to gain more information about children’s favourite topics, te reo, maths and songs and then printed and laminated the resources to use with the children.

Furthermore, the research findings indicated that ICT offered diverse ways for communication with children’s parents/families. A significant finding in the study was teachers believed that ICT made it more convenient for parents to communicate with the centre. Teachers used a range of ICT tools including e-mail, blogs, Facebook, fax machine and Kidz Online for communication with parents. They recognised that they sent newsletters to parents through email to share the information about children’s topic of interest, regular events and general news. The teachers noted that for some parents in the centre the use of ICT is more eye-catching for them. The teachers acknowledge that ‘tech-savvy’ parents helped them to fix their computers and to set up the centre’s website.

The research results discovered that ICT is a valuable way for making children’s learning visible to parents. The teachers highlighted the use of photos to convey children’s learning experiences to parents whose second language is English for them to understand. The teachers believed that photos will make children’s learning experiences visible to parents to help them understand what is happening or at least give them a prompt to talk to the teacher. The teachers sent learning stories and programme planning to parents through Kidz Online to keep them informed of their children’s learning. They believed that wall displays through use of text accompanying the photos is valuable to make children’s learning visible to parents. Teachers commented that during movie nights and parents evenings they used data projector to play movies of children’s play to keep the parents informed of what their children are doing. They used text to accompany the photos for learning stories for children’s portfolios and on Facebook to make children’s learning visible to parents.
**Issues and challenges**

The research has contributed to revealing participants’ wide-ranging views about issues and challenges that they noticed in relation to ICT in ECE. Most of the teachers expressed a desire to attend more professional development courses to increase their knowledge about ICT. In this study, participants commented that a lack of resources and time are restrictions for teachers for ICT success in early childhood. This research highlighted that in early childhood settings, some children’s parents’ beliefs about their children’s use of ICT need to change. Teachers need to explain to the parents that the laptop is children’s future technology and in the early childhood field, teachers set up an environment in which children can explore all curriculum areas.

Some teachers expressed concern about balance for the amount of time children spend using ICT, such as laptops. They argued that we need to provide a balance to children which means limiting time to use laptops by children in the early childhood centres. The findings also highlighted that children are losing opportunities for manual communication and using real books for researching. Thus, it emphasises that teachers should provide children opportunities to use ICT along with other curriculum areas.

**Research significance**

The study has contributed to making visible the participants’ perspectives about the possible impact of ICT on teaching and learning within two preschools. The study has also highlighted the teachers’ perspectives about issues and challenges in relation to ICT in the preschools.

The research participants in this study had diverse experiences about ICT professional development and their use of ICT in ECE settings increased in past few years. Participants agreed that ICT increased learning opportunities to further extend children’s interests in their favourite topics. The teachers acknowledged that ICT supported teachers to write learning story observations, to find information of interest, to create resources, and to share information with parents. The research found that ICT has increased ways for electronic/cyber communication with parents and highlighted that teachers can choose many ways to communicate with parents. The
study has contributed to making visible the participants’ views about some issues and challenges in relation to ICT in ECE. The research provided teachers with opportunities to reflect on their practice. In this research, the teachers expressed a desire to attend professional development courses to increase their knowledge about ICT, and it will be valuable for children’s learning.

The research results revealed that teachers noted that ICT is valuable for information finding to increase their own knowledge to further enhance children’s learning. This allows teachers to keep looking for various ways to find information to further enhance their knowledge.

**Limitations of the research**

All research has limitations. The limitations of this research are this is a small scale qualitative study, so while the findings cannot be generalized beyond it, it can highlight important issues for future study.

**Recommendations**

The following recommendations for future research and future practice developed in this research:

**Recommendations for future research**

The findings in this study raised suggestions for further research:

- It will be valuable for further research to study the perspectives of children and parents about children’s own access to ICT at home.

- This research included two preschools in Auckland. However, it would be useful to study the perspectives of children and parents about children’s access to ICT in different contexts, such as kindergarten, kohanga reo, pacific learning centres or full day early childhood centres. This will make other voices explicit as well.
Recommendations for future practice

The findings of this research raised the following suggestions for future practice:

- It would be valuable for early childhood centres to provide children with opportunities to use a range of ICT tools along with other curriculum areas to further enhance the learning experiences of digital natives.

- The use of ICT to write learning story observations will be valuable for centres to make explicit the children’s learning to parents/families. Therefore, the teachers can use ICT to write learning story observations and to share these with parents through e-mail, portfolios, Kidz Online and Facebook.

- The research findings suggest that to create resources teachers can use internet websites to find information about children’s topic of interest, te reo, maths, and songs. When they finish finding the information, they can use a printer to print it and laminator to laminate it before using.

- The study has highlighted the use of e-mail, phone, Facebook, blogs, fax machine and Kidz Online for communication with parents. The findings also suggest that the early childhood centres need to have a range of ICT tools available for teachers to use to further enhance their practice and to promote their communication with parents and community.

- Arranging for teachers (who are willing) to attend professional development courses to further increase their knowledge about ICT for children’s learning will be of benefit to the teachers and centres; teachers will improve their practice by attending professional development courses; and it will affect children’s learning and development.

Conclusion

The research has revealed teachers’ perspectives on the impact of ICT in two preschools. ICT has potential to increase learning opportunities for children and to improve teachers’ practice. The teachers in this study believed that ICT makes it more convenient for parents to communicate with the early childhood staff. Teachers
mentioned a range of issues and challenges such as lack of availability of professional development, scarcity of resources and time and the need for balance in ICT use. This chapter has summarised the research findings according to research questions. The research limitation has been described, and recommendations for further research and future practice are suggested.
References


Beach, R. (2008). From look at me to look at we: Why it is important to model cyberscitizenship. Early Education, 43(Autumn/Winter), 21-22.


Appendices

Appendix A: Information for early childhood centre

**INFORMATION FOR EARLY CHILDHOOD CENTRE**

**Title of Thesis**: To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

Kia Ora, my name is Daljit Kaur. Currently, I am studying for the Master of Education in the Department of Education at Unitec Institute of Technology. I seek your assistance in meeting the requirements of research for a thesis course which is an essential part of this degree. I would appreciate if your centre is willing to participate in this research. This letter is to request you to participate in this research.

I have described the research process below and would greatly appreciate your approval by filling the consent form and returning it to me.

First I will request participants to fill in an anonymous questionnaire and return it to me by mail or place it in the collection box at the centre. Then I will request the participants to participate in an interview. Next, I will select the participants on the basis of their permission for the interview. I would tape/digital record the interview and will send a copy of transcript to the participants for approval. It is the participant’s own choice to record or not to record the interview. If you have any queries about the research, please contact my supervisor, Dr. Jenny Collins at Unitec Institute of Technology by phone (+64 9 815 4321 ext 8369) or e-mail (jcollins@unitec.ac.nz).

The name of centre, participants, and information provided by the participants will be kept confidential. Participation in the research is voluntary and the participants can withdraw at anytime during research. When the data collection is complete a copy of the thesis will be submitted to the School of Education. If you require any further information please do not hesitate to contact me either by phone (0211269022) or e-mail (daljit1980@gmail.com).

Thanking you
Yours sincerely

Daljit Kaur
CONSENT FORM FROM EARLY CHILDHOOD CENTRE

TO: Daljit Kaur
FROM:
DATE:
RE: To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

We have been given and understood an explanation of this research for Master of Education. An opportunity to ask questions and for answering the questions has been provided. We know that the researcher will conduct research after getting the approval from Unitec Research Ethics Committee. It has been made clear that the name of the centre will not be used in any public reports and that any information we may have provided can be withdrawn from this research until data collection is complete. We know that the research participants will give their consent and can withdraw themselves at anytime during research without explaining any reason or any penalty.

On behalf of ( Early Childhood Centre ) I give permission for the centre to participate in this research project.

Signed:
Name:
Position held:
Date:
CONSENT FORM FROM EARLY CHILDHOOD CENTRE

TO: Daljit Kaur

FROM:

DATE:

RE: To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

We have been given and understood an explanation of this research for Master of Education. An opportunity to ask questions and for answering the questions has been provided. We know that the researcher will conduct research after getting the approval from Unitec Research Ethics Committee. It has been made clear that the name of the centre will not be used in any public reports and that any information we may have provided can be withdrawn from this research until data collection is complete. We know that the research participants will give their consent and can withdraw themselves at anytime during research without explaining any reason or any penalty.

On behalf of (Early Childhood Centre) I give permission for the centre to participate in this research project.

Signed:

Name:

Position held:

Date:
INFORMATION FOR ADULT RESEARCH PARTICIPANTS

Title of Thesis: To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

Kia Ora, My name is Daljit Kaur. I am currently enrolled in Master of Education in the School of Education at Unitec Institute of Technology and seek your help in meeting the requirements of a research for a thesis course which forms a significant part of this degree. I request your participation in the following ways …

I will be collecting data using a questionnaire and interview. Therefore, I request you to fill in the anonymous questionnaire and participate in the interview. I request you to fill in this questionnaire by completing the sheets attached, and returning them to me. You can send it to me by post in the self-addressed stamped envelope or place it in the collection box at the centre. Please return the questionnaire by 13/02/2012. Your participation will help me to collect the data I require for my study.

Please do not hesitate to contact me if you wish to talk about any aspect of it. I trust that you will feel able to take part in this research. I would like to thank you, in advance, for your precious cooperation? Questionnaires (Appendix 5) are anonymous so can’t be withdrawn after submission. However, you are welcome to ask me not to use any of the information you have given within two months of the submission.

Neither you, nor your centre, will be identified in the thesis. The results of the research will not be seen by any other person in your centre without the prior agreement of everyone involved. For interview, I will record your contribution using a tape/digital recorder and will provide a transcript for you to check before data analysis. It is your own choice to record or not to record the interview. The interview will cover similar or related questions as the questionnaire to delve deeper to gather in-depth information, seek clarification and to follow the questionnaire responses. Participation in the study is voluntary and you are able to withdraw from the study at any time until data collection is complete.

I hope that you will agree to take part and that you will find your involvement interesting. If you choose to participate in the interview please sign the consent to participate in interview (Appendix 6) and return it to me in the self-addressed envelope or place it in the collection box at the centre by 13/02/2012. The interview will take place at the centre after your working time. If you require any further information please do not hesitate to contact me either by phone (0211269022) or e-mail (daljit1980@gmail.com). If you like to know more about the research I can meet you and discuss it with you.
If you have any queries please contact my principal supervisor Dr. Jenny Collins at Unitec New Zealand. Her contacts are: Tel. +64 9 815 4321 ext 8369 email – jcollins@unitec.ac.nz

Yours sincerely

Signed

UREC REGISTRATION NUMBER: 2011-1227
This study has been approved by the UNITEC Research Ethics Committee from (16.11.11) to (16.11.12). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 6162). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix E: Questionnaire

Unitec
Te Whare Wānanga o Wairaka

Questionnaire for teachers

Name of Student: Daljit Kaur  Date: 29/11/2011

My research topic is “To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand”. The aim of this questionnaire is to gather data about educators’ views about impact of ICT in an early childhood setting. Questionnaire can be lengthy or small depending upon individual participants’ own consideration. This questionnaire will take approximately 10 minutes or longer time to complete. Please write your comment in the space underneath each question. Completion of this questionnaire indicates consent for the data to be used for the purpose of this research and any publications that arise from it.

The terms used in the questionnaire are:
Information and Communication Technologies (ICT): The Ministry of Education (2005) describes Information and Communication Technologies (ICT) as “items of equipment (hardware) and computer programme (software) that allow us to access, retrieve, store, organise, manipulate, share and present information electronically” (p. 14). In this research context, ICT refers to the use of electronic and digital tools including computers/ laptops, e-mail, internet websites, printer, digital/ video cameras, fax machine, battery operated musical instruments, electronic musical instruments, phones, tape recorder/player, CD/ DVD players, television, photocopier, speakerphone, overhead projectors and interactive whiteboards.

Ethnicity of participant:  Qualification of participant:

1. Which type of early childhood centre do you work in? Please explain?
2. What do you believe is the role of ICT in Early Childhood Education (ECE)?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

3. What training or professional development have you had for using ICT?
Comment
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

4. Which ICT tools do you use in your teaching practice? How do these ICT tools support your teaching?
Comment
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

5. How do ICT tools support children’s learning in your experience? Please comment?
Comment
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

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6. What are your views about the value of digital technologies as a way of increasing learning opportunities for children?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

7. What are your views about the limitations of ICT tools?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

8. What (if any) role do ICT tools have as a way of improving communication with parents/ families and community? Please comment?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

9. To what extent do parents/ families use ICT tools in your centre?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
10. What effect do ICT tools have in relation to parents’/families’ participation and increased children’s learning?
Comment on a particular area e.g. assessment
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

11. What in your experience what are the main issues or challenges associated with ICT use in ECE? What improvements/changes would you suggest?
Comment:
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

12. Is there anything else you would like to add?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Please return the questionnaire in the enclosed self-addressed stamped envelope and return it to me by mail or place it in the collection box at the centre before **13/02/2012**. Thanks a lot for completing the questionnaire.
Appendix F: Consent for interview

CONSENT TO PARTICIPATE IN THE INTERVIEW  
School of Education  
Master of Education  

TO: Daljit Kaur  
FROM:  
DATE:  

If you would like to participate in the interview, please fill in your contact details and return it to me in the enclosed self-addressed stamped envelope by 13/02/2012. I……………………………………………..would like to participate in the interview related to this topic “To investigate teachers’ perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand”. The interview will take place at the centre after your work time (dd/mm/yy).  

Name of Participant:  
Signature of participant:  
Date:  
Qualification: Ethnicity:  
Phone No.: Email:  
Address:  

Thank you for your interest to participate in the interview, and I will contact you soon for that.  

UREC REGISTRATION NUMBER: 2011-1227
This study has been approved by the UNITEC Research Ethics Committee from (16.11.11) to (16.11.12). If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 6162). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix G: Interview questions

Interview Questions

Name of Student: Daljit Kaur

Date:

Start time: Finish time:

I will start the interview by explaining to the participants about myself, about the research topic and how I will use the research findings. Before starting the interview I will ask the interviewee if they got any questions.

The terms used in the interview are:

Information and Communication Technologies (ICT): The Ministry of Education (2005) describes Information and Communication Technologies (ICT) as “items of equipment (hardware) and computer programme (software) that allow us to access, retrieve, store, organise, manipulate, share and present information electronically” (p. 14). In this research context, ICT refers to the use of electronic and digital tools including computers/ laptops, e-mail, internet websites, printer, digital/ video cameras, fax machine, battery operated musical instruments, electronic musical instruments, phones, tape recorder/player, CD/ DVD players, television, photocopier, speakerphone, overhead projectors and interactive whiteboards.

Proposed Interview Schedule

What is your experience of ICT in Early Childhood Education (ECE) centres?

What preparation or professional development have you had for using ICT in ECE learning contexts?
In what ways using ICT in early childhood centre add to your own professional development?

How ICT tools use support your teaching such as, for documentation, creating resources and so on?

Would you like to give me some examples uses of ICT by children in the centre?

What type of experiences have ECE children in your centre had with digital technologies?

To what extent does ICT support children’s learning?
Possible areas (assessment, communication, creativity, social development and so on)

What are some of the issues or difficulties?

What could be done to improve this in the future?

How valuable do you find ICT in responding to children’s learning needs?

To what extent do ICT tools support or increase learning opportunities for children?

What about parents and ICT – how much involvement do they have?

What (if anything) is the value of ICT for involving parents in children’s learning in ECE contexts? Do you have any examples of this?

Which ICT tools do you use for communication with parents/families and for what purpose? Would you like to give me some of the reasons why you used ICT tools for communication with parents/families and what you discussed?

How using ICT tools invite and extend your electronic/cyber communication with parents/families? How important is the information sent out through ICT tools?
What you think are the issues/challenges associated with ICT use in ECE?

How are you responding to these issues?

Name of Participant:

Signature of participant:

Date:

Thank you for your participation in the interview. When I will transcribe the transcripts I will send them to you.
Appendix H: Ethics Approval

Daljit kaur 18 Dosnyak Drive Te Atatu South Waitakere 0610

21.11.2011

Dear Daljit,

Your file number for this application: 2011-1227
Title: To investigate teachers' perspectives of the impact of Information and Communication Technologies (ICT) in two early childhood settings in New Zealand.

Your application for ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

Start date: 16.11.11
Finish date: 16.11.12

Please note that:

1. The above dates must be referred to on the information AND consent forms given to all participants.

2. You must inform UREC, in advance, of any ethically-relevant deviation in the project. This may require additional approval.

You may now commence your research according to the protocols approved by UREC. We wish you every success with your project.

Yours sincerely,

Scott Wilson
Deputy Chair, UREC

Cc: Jenny Collins
Cynthia Almeida
Appendix I: Abbreviations

**Abbreviations**

ICT: Information and Communication Technologies  
ECE: Early Childhood Education  
e-mail: Electronic mail  
DVD: Digital Video Disc  
CD: Compact Disc  
ERO: Education Review Office

The teachers’ names or names of preschools are not used to preserve the research participating centres’ anonymity. The centres are referred to as Preschool A and Preschool B.

The direct quotes from the anonymous questionnaire participants are noted with:
- PA1: Participant 1  
- PA2: Participant 2  
- PA3: Participant 3  
- PA4: Participant 4  
- PB1: Participant 5  
- PB2: Participant 6  
- PB3: Participant 7

The interviewees’ responses are noted as follows during presentation of findings:
- T1: Teacher 1  
- T2: Teacher 2  
- T3: Teacher 3  
- T4: Teacher 4  
- T5: Teacher 5