

**THE IMPLEMENTATION AND INTEGRATION OF  
INFORMATION AND COMMUNICATION  
TECHNOLOGIES IN EARLY CHILDHOOD  
EDUCATION: TEACHERS' PERSPECTIVES**

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## **Abstract**

This study reports on the implementation and integration of Information and Communication Technologies (ICT) within Early Childhood Education (ECE) from the perspective of a small group of early childhood teachers. Traditionally the bulk of the literature pertaining to ICT was predominantly focused on the compulsory sector, with any reference to early childhood education reporting on debates surrounding the pros and cons of young children's use of computers.

While much of the current literature provides some valuable information with reference to ICT within the different education sectors, research specifically related to early childhood teachers' perspectives was relatively limited. Therefore, an investigation such as this would be a timely and useful study to bring to light the responses and views of early childhood teachers in this technologically saturated era, particularly as in recent times there has undoubtedly been a significant increase in the profile and positioning of ICT in ECE.

The study adopted a qualitative approach to the research and participant involvement was in the form of questionnaires and focus group discussions with kindergarten teachers. The findings revealed several key themes, firstly the place of ICT in the early childhood teaching and learning environment; secondly the role of the early childhood teacher; the impact of ICT on children's learning is the third theme; the fourth theme is the benefits and challenges of ICT in the early childhood context and finally sharing understandings and expertise of ICT. The themes are described in chapter four of this thesis. Chapter five discusses these themes in light of the literature, resulting in a number of implications arising from the study. These implications have particular significance for those involved in early childhood education; including children, their families, teachers, professional development providers, teacher education sites, funding providers

and policy makers, if the potential for ICT in ECE is to be harnessed in ways that are beneficial for young children's learning.

Recommendations from this study, also argue for further research to be undertaken, alongside recommendations for improving practice as it is increasingly apparent that regardless of their own views, teachers cannot ignore the impact of ICT in their own and children's lives. Subsequently, in order to understand more critically the influence of ICT, the following recommendations are made. The first recommendation, for future research focuses on the perspectives of children and families in relation to ICT in ECE and whether their experiences mirror or are contrary to the views expressed by teachers. Secondly, an in depth investigation into teachers implementation of ICT to find out how teachers understand, recognise and respond to the increasing visual worlds of young children. The third recommendation, would examine early childhood teacher education students' perspectives of ICT in ECE.

It is concluded therefore, that in order for the implications of ICT in ECE to be fully realised, opportunities for teachers and others to critically engage in the ICT in ECE debate must be afforded. These opportunities must also include, knowing about the nature of technology itself if, informed and conversant decisions about the type of place ICT could have in the teaching and learning opportunities offered to young children, are to be made. The potential, of ICT lies with skilled and knowledgeable teachers who are prepared to explore and investigate these possibilities judiciously. Furthermore, as the findings of this present research assert, the views, understandings and prior experiences held by early childhood teachers towards ICT, can significantly enhance or inhibit the ways in which they subsequently employ and interact with these resources within the early childhood teaching and learning environment.

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# CHAPTER ONE

## INTRODUCTION

The initial interest in the presence of Information and Communication Technologies (ICT) in Early Childhood Education (ECE) stemmed from this researcher's extensive teaching experiences in the early childhood sector, where it was evident that ICT was becoming an increasing fixture in the teaching and learning environment. More recently, this interest shifted into a slightly different direction when working with early childhood student teachers within the teacher education context. It became increasingly apparent that teachers and student teachers displayed varying views of the part they considered ICT played or should play within these settings, coupled with how they chose to employ (or not) ICT resources. Research undertaken by Nuttall (2003) emphasises the importance for teachers to have regular opportunities to "make explicit their knowledge and assumptions about their role [as teachers]" (p.182). Therefore, this study aims to contribute to engendering rigorous discussions amongst teachers about their understandings of their role as early childhood teachers, in relation to ICT.

There is little doubt that ICT plays an escalating and significant role in the everyday lives of people in these current times. As Yelland (2006) notes, "the very nature of our work and leisure time has been transformed, due to the presence of Information and Communication Technologies (ICTs)" (p.12). This transformation, however, needs to be questioned, as change does not necessarily mean positive outcomes are the result. Early childhood education settings have also begun to reflect this transformation, albeit in various ways (Zevenbergen, 2007).

The expectation, however, for this presence to be more visible within early childhood education settings, appears to be rapidly increasing with the relatively recent launch of the ICT strategy *Foundations for Discovery* (Ministry of Education, 2005). Similarly, this expectation was also reflected within the compulsory educational sector where a raft of Ministry of Education contracts and initiatives, such as *Digital Horizons* (Ministry of Education, 2003), have been established over recent years. Although, as these documents indicate, ICT was already an established part of the compulsory educational sector some time before moving into the early childhood sector (Edwards, 2005). These Ministry documents, alongside several other writers (Bolstad, 2004; Ramsey, Breen, Sturm, Lee, & Carr, 2006; Visser, 2000; Yelland, 2006), identify the pivotal role the teacher plays in how ICT is implemented.

While there is an array of publications related to the topic of ICT in ECE, the research base specifically related to the role of the teacher from the teachers' perspective appeared to be less evident, particularly in relation to the early childhood context. If, as purported by these previously mentioned studies, ICT offers valuable opportunities to enhance young children's learning, then it is critical that the overall position of ICT in ECE is brought to the surface and openly addressed and examined from all angles. This examination is of particular importance as Brown and Murray (2006) claim that by taking a "the technology is here, so just accept it" (p.44) stance is problematic, as the underlying non neutrality of these technologies can often go unrecognised.

Moreover, by merely supplying schools and early childhood centres with digital technology, it is highly unlikely to enhance children's learning in the way that it is promoted, particularly as teachers may not be fully equipped or experienced with ICT to confidentially utilise these resources, in ways that are purposeful and meaningful for children. It is also suggested that children's prior experiences and knowledge of ICT that they bring with them to the early childhood or school context can often go unrecognised, thereby the potential for learning through

these opportunities can be missed (Somekh, 2007; Zevenbergen, 2007). Therefore, in order to realise the potential for children's learning, which ICT is suggested to offer and to examine the often taken for granted responses and engagement with ICT, this role needs to be more explicitly identified and investigated further.

Previously the bulk of literature in relation to ICT in ECE had been centred predominantly on the appropriateness or not of the use of computers within ECE (Edwards, 2005; Haughland, 2000; Stephen & Plowman, 2003a; Stephen & Plowman, 2003b) and whether this use was detrimental or beneficial for young children's learning. The emphasising of computers as being ICT, thus ignoring the multitude of communication related media, dominated the discourse surrounding this topic, presenting a potentially narrow and limited interpretation and view of ICT. Concerns still continue to be expressed regarding the effects of computer use on children's development, although these concerns are somewhat subsiding as other technologies (such as digital cameras, electronic whiteboards, digital microscopes, laminators) are being more widely used (Anderson, Rooney, & Vincent, 2007; Edwards, 2005).

In the last decade or so, however, these interpretations have been challenged with the emergence of literature which presents a contrary perspective. This perspective has evolved, in part, as a result of an ever increasing body of literature from early childhood contexts both nationally and internationally, with early childhood education being considered by several writers as leading the way in the innovative and creative use of ICT. *Foundations for Discovery* (Ministry of Education, 2005) illustrates this shifting understanding by stating,

ICT use in early childhood education does not mean 'children using computers'. It is about children, educators, parents and families/whānau using information (for example, sending faxes to people in the community) and recording learning experiences (for example, using digital or video cameras) in ways that enhance children's learning, including communication about and reflection on that learning. (p.2)

Current literature also argues that the role the teacher undertakes, regardless of the context, significantly influences and alters the ways in which ICT is integrated within the teaching and learning environments (Edwards, 2005; Visser, 2000; Zevenbergen, 2007). Additionally, as the presence and profile of ICT within ECE is increasing, it is timely that a research study such as this investigates this presence and implementation from the perspective of teachers in the field.

### **Aims and Objectives of the Study:**

The overall aim of this study was to explore the role of the teacher, in relation to implementing and integrating Information and Communication Technologies (ICT) within the Early Childhood Education (ECE) context. The research questions which guided this study were developed in response to the limited literature that specifically addressed the perspectives of teachers in early childhood settings. As a result, the following key questions emerged to inform and shape this thesis.

### **Research Questions:**

1. How do teachers understand their role in implementing and integrating ICT in ECE?
2. How does a teacher's understanding of her/his role influence the implementation and integration of ICT in ECE?
3. From a teacher's perspective what role does ICT play in the learning and teaching environments in ECE?

A qualitative approach to research underpinned this study. As the intention of this project was to elicit the participants' perspectives of their role as teachers in relation to the implementation and integration of ICT, this approach was deemed as most appropriate. The study was also keen to draw out and describe richly detailed data situated and embedded within these participants own contexts, offering as Davidson and Tolich (2001) assert, "a rich but narrow insight" (p.116) into this particular issue. Therefore, in order to ascertain the

insights of these early childhood teachers, questionnaires, along with focus groups were the data collection methods used for this research. The group dynamics of focus groups, were particularly useful in creating opportunities for the participants to as McLachlan (2005) claims, “bounce ideas off each other” (p.115) and to offer aspects or ideas previously unknown or expected to the researcher.

### **Presentation of the Thesis:**

This thesis is presented in six chapters.

Chapter one presents an overview and rationale for the study with the research questions forming the framework. This study was undertaken due to the increased expectation of ICT in the early childhood context and to explore how a small group of early childhood teachers responded to this expectation.

The second chapter outlines research and literature that exists in relation to ICT both within the compulsory and early childhood sectors. The bulk of literature pertaining to ICT in ECE previously focused on the presence of computers, which potentially reflected a narrow view and interpretation of ICT. More recently, this has shifted to show how the potential of ICT can be enhanced when integrated within the holistic way of learning and teaching, reflected within the early childhood environment.

Chapter three outlines the research design. The theoretical framework, alongside the methods employed to gather and analyse the data, are also described. This study took a qualitative approach to the research, with the principles of the early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996) embedded within the research design. Collecting the data involved two methods, questionnaires and focus groups.

Within chapter four the findings of the research are presented and disseminated in relation to the key themes which emerged from the data. These themes show

that the teachers in this study mainly incorporated ICT within their teaching and learning environments to document children's learning. They considered that using ICT supported the visibility of children's learning experiences and this enabled families and communities to access this learning more effectively. A consequence of this was the enhancement and strengthening of relationships with the early childhood teaching and learning community.

Chapter five discusses the findings and the themes that emerged in relation to the literature and to the initial research questions. These findings promote the notion of ICT integration, describing how the effective and purposeful use of ICT can enhance children's learning experiences. However, there is also a note of caution and urgency expressed for early childhood teachers to engage with ICT more critically.

The final chapter, chapter six, presents the conclusion and subsequent implications for this study along with recommendations and suggestions for future research and for improving practice. These recommendations include undertaking research pertaining to ICT utilisation from the perspective of children and their families. Another aspect, worthy of investigation, is early childhood student teachers' perspective of ICT in ECE.

## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

In this chapter the existing literature base pertaining to Information and Communication Technologies (ICT) is examined, predominantly from the Early Childhood Education (ECE) perspective, but also in relation to the compulsory schooling sector.

There is little doubt that ICT plays an ever increasing and significant role in the everyday lives of people in the Western world. As Yelland (2006) notes that “the very nature of our work and leisure time has been transformed due to the presence of Information and Communication Technologies (ICT)” (p.12), although the ubiquitous nature of these technologies is such that this presence can often go unrecognised and taken for granted. Within the education sector ICT is the term used to describe, “the equipment (hardware) and computer programmes (software) that allow people to capture, access, use and share information electronically” (Ministry of Education, 2005, p.2).

Yet the presence of ICT has not necessarily gone unquestioned particularly within the education community where the place and potential of ICT in teaching and learning has provided an ongoing, and at times contentious site for discussion and debate (Brown, 2006; Gibbons, 2006; Williams, Coles, Wilson, Richardson & Tuson, 2000). This debate has recently gathered in momentum both nationally (Brown & Murray, 2006; Gibbons, 2006; Lindsay 2006) and internationally (Stephen & Plowman; 2008; Somekh, 2007; Yelland, 2007), with the early childhood sector in Aotearoa New Zealand entering the arena more prominently by the release of *Foundations for Discovery* (Ministry of Education, 2005).

This framework was developed “to provide guidance to inform effective ICT development, use and investment in the ECE sector” (p.2). The ECE ICT Framework promotes the use of ICT as a tool for enhancing the education of young children and is situated within the overall framework of the ECE Strategic Plan, *Pathways to the Future: Ngā Huarahi Arataki* (Ministry of Education, 2002). In addition, ICT strategies from other education sectors have also provided a catalyst for the advent of *Foundations for Discovery* (Ministry of Education, 2005).

One example of this is the school ICT strategy *Digital Horizons* (Ministry of Education 2003). The early childhood focused strategy ensured that the voice of ECE was included in ways that responded to the early childhood field. This voice has recently been increased with the latest round of *Kei Tua o te Pae* (Ministry of Education, 2009) publications, which use exemplars of teaching and learning to profile the use of ICT in early childhood education, in ways that reflect *Te Whāriki* (Ministry of Education, 1996).

This chapter will review the literature on the role of ICT in ECE both past and present; the role of the teacher; ICT in homes and finally ICT in schools.

### **The role of ICT in Early childhood Education: Past and present**

Until fairly recently the bulk of literature in relation to ICT, both within the Aotearoa New Zealand context and further afield, was centred predominantly on the compulsory education sector. While ICT within the schooling sector has long been considered an integral component of the curriculum, (Ministry of Education, 1993; Ministry of Education, 2003; Ministry of Education, 2007), the use of ICT within early childhood education had been afforded less attention (Stephen & Plowman, 2003b).

This lack of attention did not necessarily mean however, that ICT was non-existent or not implemented within early childhood contexts. Several studies

suggest, that small groups of early childhood teachers have been implementing and integrating ICT within their teaching and learning contexts over a number of years (Carr, Cowie, Gerrity, Jones, Lee, & Pohio, 2001; Colbert, 2006; Lee, Hatherly & Ramsey 2002; Wilson, Clarke, Maley-Shaw & Kelly, 2003). These pockets of innovative practice are contributing to increasing the profile of early childhood education both nationally and internationally (Claxton & Carr, 2004). There are however, significant challenges that are considered to stand in the way of progressing this further, such as equity of access, funding of equipment and professional development provision.

A key initiative, Centres of Innovation (COI), instigated by the Ministry of Education several years ago, has begun to contribute towards addressing these challenges. Strategies such as these have also begun to build a valuable research and literature base of ICT in ECE within the Aotearoa New Zealand context (Ramsey, et al., 2006). The findings from these studies found that the meaningful use of ICT significantly contributed to enhancing and strengthening relationships with and between teachers, children, families and communities (Colbert, 2006; Erb, 2008; Ramsey et al., 2006).

The (COI) Ministry funded initiative enables early childhood centres to engage in a three year research study, with outside researchers supporting their investigations. The study, undertaken by Ramsey et al. (2006), describes their involvement in the Centre of Innovation (COI) project. Their research focused upon *Strengthening learning and teaching using ICT*. Ramsey et al. (2006), found that the integrated use of ICT, “widened the participating community, to include families and whānau in a mutual learning and teaching endeavour with the teachers and children, [with] children and families bec[oming] teachers too” (p.i). One example of practice describes how the sharing of DVD’s and the children’s portfolios highlighting children’s experiences in the early childhood setting enabled extended family, both within New Zealand and beyond, to access these experiences, which they may not have been able to otherwise. Similarly, as

Wilson, et al. (2003) note in their study, using ICT in the early childhood context opens up possibilities for parents to engage with and see the diverse ways children learn. This same study also identified one of the benefits of using ICT for teachers as “inspire[ing] teachers and increase [ing] professional satisfaction” (p.46). These studies could be seen to have contributed to challenging and shifting the traditional notions around the use of ICT within early childhood settings. Similar studies, undertaken by Patterson (2004) and Visser (2000), have added to questioning previously held views

### **Computers in early childhood education**

The literature has revealed a significant shift in perception, particularly during the past decade, about the presence and purpose of ICT in the early childhood sector. Previously, the main body of literature was centred around debates as to whether the use of computers within early childhood education was appropriate or not, and whether this use was detrimental or beneficial for young children’s learning (Edwards, 2005; Elkind, 1996; Haughland, 2000; Stephen & Plowman, 2003a; Stephen & Plowman, 2003b).

Traditionally, the computer was the most commonly used and associated ICT tool (Edwards, 2005). The criticism of this use was mainly related to how computers were used or presented to children, with Elkind (1996), offering a cautionary note to this use. Elkind (1996) voiced concerns, about the seemingly isolated use of the computer within classrooms (or early childhood environments), without due consideration of the social ways in which young children learn.

The Alliance for Childhood (2000) argues, for the removal of computers in American schools, as they consider that the use of computers is dangerous for children’s physical, emotional and intellectual development. Similarly, Healy (1998) claims, that computers are damaging for young children’s development. On the other hand, Jones (2002) disputes these claims, as his research indicates

that children were spending far more time watching television than working on computers.

Other writers, such as Healy (1998), express a deep concern about the blind enthusiasm displayed towards computers in education, with those who are in the technology business benefiting most. Healy (1998) advocates for “rethinking methods, asking children to tussle with real and intellectually challenging problems, and trusting them to be responsible in new and unsettling ways” (p.296). Furthermore, as Visser (2000) notes, “simply installing a computer in a centre or a kindergarten does not necessarily lead to an ICT culture supportive of children’s learning” (p.11). Ramsey, et al. (2006) support this claim, as they maintain that adding more technological resources do not on their own strengthen children’s learning, rather it is when there is a synchronicity of the many “mediating devices” (p.ii) that ICT may increase these possibilities.

Conversely, the study undertaken by Lee and O’Rourke (2006) proposed, that the use of the computer with four and five year olds contributed to enhancing young children’s learning, particularly their social interactions. Moreover, Lee and O’Rourke (2006) assert that “the mere presence of a high-quality computer in an early childhood classroom [environment], has afforded teachers an opportunity to examine their values and beliefs in relation to technologies and to critique its role in early education meaningfully” (p. 6). This view, however is countered by Stephen and Plowman (2003a), who suggest that computers have not revolutionised young children’s experiences nor the practice of teachers, as in their view they have “entered the classroom [early childhood context] as a useful supplement to existing provision, another centre or activity” (p.35).

Furthermore, if they were used to teach specific skills by a “drill and practice” (p.35) approach, as described by Stephen and Plowman (2003b), this was seen to provide less effective learning opportunities for children. These studies are not proposing, however, that the use of computers should be outlawed, but they are

questioning the value and benefit for children's learning when used as Lee et al. (2002) suggest, solely as a "games machine rather than a tool for learning within the context of the wider curriculum"(p.15). Other studies identified sustained use of the computer as being detrimental to children's health (Healy, 1998), although these studies were mainly centred on older school children rather than on the early childhood sector.

Haughland (2000) presents a more positive view around the use of computers and advocated for children to be empowered by computers, through their effective and meaningful use. Findings from research undertaken by Haughland (2000) suggest that when computers "are connected with young children and integrated into the curriculum, the benefits to children become clear" (p.18). Furthermore, Haughland (2000) identifies several gains in children's learning (for example conceptual understanding, development of abstract thinking, increase in verbal skills and problem solving) through the effective and purposeful usage of computers.

Whilst these debates still appear on the landscape and certainly served to dominate the discourse of ICT in ECE over the past two to three decades, current literature indicates a changing perception of ICT in ECE. This is attributed, in part, to the growing number of early childhood centres engaging with a raft of technologies, rather than being solely focused on computers per se. Additionally as Edwards (2005) remarks, this initial focus is now being replaced by *how* computers are being used rather than *will* they be used. It appears, therefore, that the use of ICT has now significantly broadened, with computers being seen as only one of many tools (Colbert, 2006; Hong & Trepanier - Street, 2004; Ministry of Education, 2009).

Some of these technologies, however, have long been part and parcel of early childhood settings, without necessarily being recognised so specifically as *being ICT*. These included tape recorders, fax machines, overhead projectors,

photocopiers, telephones, to name a few. Video cameras, digital microscopes, electronic whiteboards, digital cameras, laptop computers, and computer software, for example, are now predominantly being used as a way of enhancing and making visible young children's learning, rather than as disparate pieces of technical equipment for children to learn about (Erb, 2008; Ramsey, et al., 2006; Tringham, 2006).

By 2008, documents such as *Foundations for Discovery* (MoE, 2005) clearly signaled the Ministry position as to their intentions and expectations of how and why ICT is deemed of value, and where this could sit within an early childhood framework. The strategy, along with other aforementioned documents, send a clear message to the sector that there is a firm expectation that ICT has a place within ECE. This stance is reflected within the following statement (Ministry of Education, 2005), "this ECE ICT Framework is intended to provide guidance, to inform effective ICT development, use and investment in the ECE sector" (p.6).

Additionally, the emergence of literature, which presents a reconceptualised and broader perspective of ICT appears to have lessened earlier concerns about the negative impact ICT may have had on young children (Yelland, 2006). Although these concerns have not been entirely eliminated. This shifting perspective has evolved, in part, due to the increasing body of research from early childhood contexts both within Aotearoa New Zealand and beyond, with the early childhood sector being considered by several writers as leading the way in the innovative and creative use of ICT (Brown, 2006; Erb, 2008; Jordan, 2006).

Moreover, Brown (2006) attributes the launching of the ICT strategy *Foundations for Discovery* (Ministry of Education, 2005) as stimulating this innovation. Several of these studies, strongly advocate for the use of ICT in ECE, when integrated within the everyday learning and teaching context of early childhood education (Colbert, 2006; Jordan, 2006; Lee & O'Rourke, 2006; Ramsey, et al., 2006). These studies highlight in particular, the way in which ICT can provide an

effective vehicle to make visible and enhance the learning of young children. One example of this is described by Colbert (2006), where children's story telling was seen to increase in complexity through publishing these in book form. The children told their stories and either illustrated them with drawings or by digital photographs which the children then downloaded and inserted into their books. Several children expanded upon this idea of storytelling, by videoing events of interest and making these into a movie. The Garageband programme was utilised to add music to their stories.

Furthermore, it is also suggested that the use of ICT by young children and their teachers has been attributed in part to transforming learning in several early childhood centres (Jordan, 2006; Lindsay, 2006). These centres incorporated ICT grounded within the "purposes, practices and social context of early childhood education (Bolstad, 2004, p.vii). This view is similarly supported by Ramsey et al., (2006) who state that "ICT was [is] integrated with the implementation of *Te Whāriki*" (p.2). This notion of integration is also explicitly stated by Ministry of Education (2005),

ICT use in early childhood education does not mean 'children using computers'. It is about children, educators, parents and families / whānau using information...and recording learning experiences...in ways that enhance children's learning, and communication about and reflection on that learning.  
(p.5)

The bulk of current literature clearly indicates, therefore, that there is a rapidly increasing presence of ICT in the teaching and learning environments within early childhood education. This appears to be due to a number of reasons. Firstly, there is the acknowledgement of the integral and inescapable role that technology already plays in young children's lives. Secondly, there is also the notion that in order to effectively participate in this increasingly technological world, children will benefit from being exposed to and learning about ICT in early childhood education. This position is supported by Haughland (2000) who claims,

that for children “to become productive adults in an increasingly computer-orientated society, children should have the opportunity to become comfortable with computers early in their lives” (p. 12).

However, using ICT to solely prepare children to become *productive adults* does not appear to be the underlying agenda, or the intention, of many early childhood teachers. Their expectation is directed towards enhancing teaching and learning, through building and strengthening children’s identities as learners, particularly using documented narrative assessment portfolios, which children themselves have actively contributed to and participated in (Ministry of Education, 2009).

These portfolios contain a raft of written and visual documentation, which are usually created by utilising an array of ICT resources. They are seen as a valuable window into children’s learning experiences and are considered to significantly increase opportunities for enhancing communication and deepening relationships between children, their families and the early childhood community (Hatherly, 2006). Furthermore, Hatherly (2006) claims, that the portfolios have the potential to become “literacy artifacts” (p.3), which due to their highly visual nature, through the integration of samples of children’s work and photographs in particular, enable children to access them more readily and ‘read’ their experiences.

Additionally, as Hong and Trepanier-Street’s (2004) study advocates that by embedding the use of ICT within the teaching and learning approach, informed by the early childhood centres in the Northern Italian city called Reggio Emilia, the opportunities for children’s learning is extended and teachers’ knowledge and understanding of children is further informed. A range of technologies are utilised within these settings, to document children’s learning, making this learning visible. Rinaldi (2006) suggests that “documentation is seen as visible listening, as the construction of traces (through notes, slides, videos, and so on) that not only testify to the children’s learning paths and processes, but also make them

possible because they are visible” (p. 68). Furthermore, as Hong and Trepanier Street (2004) propose, the effective use of technology enhances the teacher’s success at understanding young children’s learning and becoming a more reflective teacher.

### **The perspectives and practice of teachers**

The expectation for teachers in early childhood education to implement ICT within their teaching and learning contexts appears to be growing (Bolstad, 2004; Ramsey, et al., 2006; Visser, 2000; Yelland, 2006). These writers identify the pivotal role the teacher plays in how effectively ICT is subsequently implemented. However, as these studies suggest, more needs to be done if this understanding is to be explored further. Moreover, as Patterson (2004) claims that, this shift must also be accompanied by a close examination of the theoretical frameworks, which contribute to informing and shaping the perspectives and practice of teachers.

The perspectives and practices of teachers, and how they influence and shape the implementation and integration of ICT, is perhaps the most important and significant theme that emerged from the literature. This thread consistently appeared throughout the literature from both the early childhood sector (Edwards, 2005; O’Rourke & Harrison, 2004; Patterson, 2004; Visser, 2000; Wilson et al., 2003) and the school sector (Murray & Campbell, 2000; Stratford & Brown, 2002; Ward, Robinson & Parr, 2005). Visser (2000) highlights, this notion in relation to the early childhood context when suggesting that “benefits of the computer [or other ICT resources] are entirely dependent on the pedagogical approach of the adults, and the teaching strategies that are put into place accordingly the decisions the adults make will determine learning outcomes for children” (p.11).

The reviewing and shifting focus, around ICT in ECE, could be seen to have been both influenced and informed by a corresponding shift in thinking about the

theoretical perspectives, which inform and shape teachers' practice. Contemporary researchers, such as Cowie and Carr (2004); Dahlberg, Moss and Pence (1999); Fler and Richardson (2004b); Nuttall and Edwards (2004), and Rogoff (2003), strongly advocate for a more critical examination and realisation of the theoretical perspectives, which underpin the practice of teachers within early childhood education. These authors suggest that unless these perspectives are revealed and debated, current theories of teaching and learning will not be so readily recognised and implemented (Hatherly & Richardson, 2007).

It is proposed, that this shift in perspective surrounding theories of teaching and learning has contributed to embedding a socio-cultural approach to the integration of ICT. Furthermore, as Patterson (2004) proposes, when a socio-cultural approach is embedded within the implementation of ICT, the potential for learning for young children is significantly enhanced. In addition, Patterson (2004) claims that teachers need to link "the use of ICT to contemporary learning theory" (p. 30) in order to effectively operate within the current learning environment.

Moreover, Lindsay (2006) proposes that teachers not only need to understand the actual tools themselves that is, the technical application of ICT's, "but also how we may utilise and develop them using various learning theories, teaching styles and skills" (p. 40) in order for a deeper level of understanding to be applied. Subsequently, the challenge for early childhood teachers is to consider what theories of teaching and learning inform and influence the way in which these are applied. However, the research base specifically related to this role from the teachers' perspective appears to be relatively limited, particularly in relation to the early childhood context.

Madden, Nunes, Mcpherson, Ford & Miller, (2007) claim that our "perceptions of a technology are affected by the age at which we encounter it" (p.234). Hence, it would seem, therefore, that the student teachers in current times may have a

closer affinity with technologies than many of the teachers that they may work with. The increase in funding pertaining to ICT in schools probably means that student teachers entering the tertiary sector may possess some knowledge and skills, however, the number of mature students entering the teaching profession could mean that this experience is not reflective overall. A recent project undertaken in the UK (Madden, et al., 2007) found that many teachers felt that their ICT skills were more limited than their students and were aware of being less competent users. This contributed to their reduced levels of confidence when working with ICT in the classroom.

It is also suggested that teachers need to acquire skills and knowledge around the use of ICT, to realise the potential for learning and teaching which ICT can offer. As Laffey (2004), suggests that the confidence and perceptions of teachers about ICT has an impact on what or how ICT is offered. On the other hand, Stephen and Plowman (2003b) cite Mioduser et al., (2000) who argues that often a “hardware based enthusiasm then pedagogical reflection approach to ICT” is the case (p.225).

Brown (2007) however, takes a different position and argues that sometimes the introduction of new technologies themselves, can serve to provoke teachers to consider new ways for teaching and learning. However, the implementation and integration of ICT needs to be supported with professional development for teachers, as suggested by (Stephen & Plowman, 2003a). This professional development needs to be centred on current theories of learning and teaching in order to be effective and of value for both teachers and children. Unless these skills and knowledge are combined with and informed by current theories of teaching and learning, it is suggested that the rich potential for learning for and with young children may not be fully realised (Patterson, 2004; Visser, 2000).

Siraj-Blatchford and Whitebread (2003) propose that the guidelines identified by The Developmentally Appropriate Technology in Early Childhood (DATEC)

project, provide a useful framework for teachers and parents to consider when determining the appropriateness or not of ICT applications in the early years.

These guidelines are as follows.

- Applications should be educational
- Encouraging collaboration
- Integration and play through ICT
- The child should be in control
- Applications should be transparent and intuitive
- Applications should not contain violence and stereotyping
- Awareness of health and safety issues
- The educational involvement of parents.

## **ICT in Homes**

The importance of the family on children's learning has been long been recognised and this position is clearly articulated within the early childhood curriculum *Te Whāriki* (Ministry of Education, 1996). Here the relationship between the family and the early childhood setting has been placed in a central position, as reflected within the following statements, "the wider world of family and community is an integral part of the early childhood curriculum" (p. 42) and also that "children and their families experience an environment where connecting links with the family and the wider world are affirmed and extended" (p.56). In the *New Zealand Curriculum* (Ministry of Education, 2007) this is stated less explicitly, although there is an assumption that the curriculum has some relevance and connection to student's lives as illustrated in the following excerpt, "the curriculum has meaning for students, connects them with their wider lives, and engages the support of their families, whanāu, and communities" (p.9).

Similarly, other studies such as Jones (2006) suggests that "teachers [need to] develop reciprocal relationships with families in part to identify the knowledge, skills, and experiences of families that could be shared with the teachers to

enhance classroom [early childhood] practice and student's learning" (p.27). These encounters not only enable the experiences of young children to be shared and appreciated within the wider family group, but may also serve to increase opportunities for parents to understand more clearly what children are investigating and learning. An example of this is relayed by Cagliari and Giudici, (2001), where parents were expressing their concerns over the utilisation of ICT in an early childhood setting, with one parent reflecting that, "I think the fears we have as adults, are linked to our lack of knowledge about the innovations that these technologies introduce into our lives" (p.143). This same notion may well reflect some teachers' responses.

Moreover, Siraj-Blatchford and Siraj-Blatchford (2006) claim that children's overall academic performance is enhanced when there is collaboration and connections between the family and teachers, both within the early childhood and compulsory schooling context. Siraj-Blatchford and Siraj-Blatchford (2006), propose that shared experiences between adults and children enhance learning, whether this is with the computer or other ICT resources.

Siraj-Blatchford and Siraj-Blatchford (2006) findings show, "children's computer use in schools or early childhood settings is directly influenced by their out of school experiences" (p. 56). In addition, the degree of ICT competence children acquired in the home depends upon a number of factors including access to equipment, support for learning to use it and the particular interests and aptitudes of older family members (Siraj-Blatchford & Siraj-Blatchford, 2006).

However, given the advantages for children's learning that the forming of these responsive and reciprocal relationships generates, Somekh (2007) claims that there is still a marked difference between children's experiences of ICT in the early childhood or school setting and in the home environment. Downes (2002) alleges that "many children enter school with informal competencies and predispositions for learning that have developed from the use of computer

technologies in their homes” (p. 184). This view is strongly supported by Somekh (2007) who considers that the “mismatch between school and home is a cause for concern as it indicates lost opportunities for ICT to transform schooling” (p.41), although due to the nature of early childhood education, this mismatch is probably less likely to be so marked within this context.

The development of children’s portfolios, particularly in early childhood education has, however, notably contributed to increasing and opening up opportunities for relationships to be fostered between the home and the early childhood centre and, in some instances, contributed to increasing understandings between sectors (Jordan, 2006). The visual nature of these portfolios, along with resources such as DVD’s of children’s experiences, have significantly expanded the potential for parents to gain a deeper insight into their child’s learning experiences (Boardman, 2007; Hatherly, 2006). Rinaldi (1998) explains how documentation panels of children’s encounters create places of engagement and dialogue, “the panels displayed on the walls, and the slides and videos become occasions for intense daily communication and reflections, they support the memory and interactions for children, teachers, and parents” (p.121). Similarly, studies undertaken in the primary context (Garry, 2005; Robertson, 2003; Tringham, 2006) showcase that the use of technology can increase opportunities for home / school communication. However, these studies appear to be the exception rather than the norm.

The literature also indicates that the effects of young children’s access to and use of home computers is still being explored. Becker (2000) ascertains that in the United States “the digital divide separating children in socioeconomically advantaged homes from children in socioeconomically disadvantaged homes is mammoth” (p.56). These findings concur with research undertaken by Brooker and Siraj-Blatchford (2002) in the United Kingdom and an Australian research study carried out by Downes (2002), where it was shown that while nearly half the children participating in the study had access to technology within the home,

the frequency, however, ranged from none to frequent. Additionally, these studies highlighted the considerable inequality of access, with some ethnic minority groups being especially disadvantaged.

Moreover, studies undertaken by Somekh (2007) found that differences in family life and family aspirations led to differing patterns of computer use. This may be compounded by the teacher's lack of recognition and value of the ICT skills of the children as "schools [and early childhood centres] need to find ways of using ICT that give young people the transformed learning opportunities that some are already experiencing with ICT at home" (p.41). Furthermore, the implications of her research argue for schools and early childhood settings to "incorporate ICT more prominently into the school-family dialogue" (p.42). Research undertaken by Yelland (2007) supports this notion since "information about the child from such contexts enriches the schooling experience as teachers are able to plan for learning more effectively when they recognise the richness of the total experiences that a child has" (p.85).

Whilst the relationship between home and the compulsory school sector appears to be somewhat lacking in the literature, documentation of the partnerships between families and early childhood centres is more evident (Gould & Pohio, 2006; Ministry of Education, 2009; Reggio Children, 2001; Siraj-Blatchford & Siraj-Blatchford, 2006). Nevertheless, as Yelland (2007) warns, "we must be careful that our education system doesn't become outdated for the children we are now trying to teach" (p. 66).

Furthermore, when the family, and knowledge of the child, is viewed as an integral part of the learning community, as Yelland (2007) urges "strong, responsive, reciprocal relationships can then be formed between the family and the early childhood centre or school, supporting the child's sense of belonging" (p 2). In addition, Yelland, (2007) claims that many of the things students do in real life are frequently ignored and that "the relevance of school will be

continually brought into question by students whose daily lives are growing increasingly different from what they are experiencing in their classrooms” (p.12).

## **ICT in Schools**

ICT in the compulsory schooling sector has attracted a significant body of research and literature. These include studies undertaken by Hay (2001), Cross and Brown (2007), Murray and Campbell (2000), Stratford and Brown (2002), and Ward, et. al (2005). Studies such as these indicate how the presence of ICT in schools continues to generate rigorous discussion. In the vision statement of the Ministry of Education (2003) ICT strategy *Digital Horizons* it states that “all learners will use ICT confidently and creatively to help develop the skills and knowledge that need to achieve personal goals and to be full participants in the global community” (p.3).

This strategy was initially developed nearly a decade ago, in response to the increasing influence of ICT within the everyday lives of people, combined with the view that creativity and critical thinking are valuable assets for students to develop to enable them to successfully engage with and contribute to teaching and learning communities now and in the future (Ministry of Education, 2003).

While internationally and nationally educational policy promotes ICT as a means of meeting the needs of the 21<sup>st</sup> century and beyond (Ministry of Education, 2003; UNESCO, 2002; Ward, et., al 2005), the bulk of the literature (Cross & Brown, 2007; Loveless, 2003; Stratford & Brown, 2002) indicates that schools are still grappling with implementing ICT within the classroom in an integrated way. Hay (2001) claims that ICT integration has meet with mixed success, due to a number of key issues, with the lack of ICT leadership being the underlying cause. Whereas Williams, Coles, Wilson, Richardson & Tuson (2000) suggest that the conflicting array of views and perspectives pertaining to ICT is problematic for teachers, thus inhibiting their understanding and application.

Furthermore, Williams et al., (2000) found that when teachers had a positive view towards ICT, they were more likely to use it in the classroom. In addition, the same study found that if teachers used ICT in their home environment they were also more likely to display positive attitudes towards ICT and subsequently use it in the school context.

Other writers, such as Cross & Brown (2007) report that “attempts to transform schools through technology have been like running to catch a moving train” (p.33) such is the pace of technological change, even though successive governments have invested heavily in funding for ICT implementation. Moreover, Cross and Brown (2007) argue that whilst there are pockets of teachers who are keen to experiment and engage with new technology in the classroom, for most there are issues of time constraints and a general lack of conviction about ICT.

Nevertheless, recent studies of innovative practice reflect a gradual shift in addressing a more integrated approach in special education and mainstream settings (Cross & Brown 2007; Erb, 2008; Garry, 2005; Tringham, 2006; Tringham, 2007). The case study Cross and Brown (2007) examined describes how one classroom developed a digitally enhanced approach to teaching and learning whereby students along with a “leading-edge ICT teacher” (p.33) had access throughout their day to an extensive array of new digital technology. In this classroom, “the learning was centred on the thinking, with an integration of digitally enhanced equipment, rather than directly teaching computer skills *per se*” (p. 36). This approach encouraged the students to take risks and work together on solving problems.

On the other hand, Somekh (2007) criticises the hidden resistance to ICT when ICT is taught by ICT specialist teachers, rather than being infused within the curriculum. However, this approach is less likely to be undertaken within the early childhood sector, where a holistic approach to teaching and learning is promoted and teachers themselves utilise ICT. Nonetheless, as Yelland (2007) argues,

without due consideration of the work of teachers and a broader vision of the role of schools in a democratic society the use of new technologies will have a minimal impact on teaching and learning despite their ubiquitous use in our lives outside of schooling (p.12).

Furthermore, Yelland, (2007) claims that “new technologies are tools that enhance and add to existing ways to explore ideas, create, research, and disseminate new knowledge acquired in the classroom. They provide, opportunities to engage students and to draw on their diverse learning styles” (p.172).

The E-Learning teaching Fellowships Programme, introduced by the Ministry of Education in 2003 was established to improve the professional capability of teachers and increase the use of effective e-learning strategies in schools This initiative is seen to provide a means to begin to address problems teachers face in using ICT in meaningful ways in the classroom. This programme enables teachers throughout the different sectors to be released from their teaching role for a year and undertake research to explore as Tringham (2006) describes, “new and exciting ways of meeting student’s needs by combining teaching practice and cutting edge technology” (p.4).

## **Summary of themes**

Several key findings have been revealed in the literature. The first aspect relates to the on going debate about the positive and /or negative consequences of young children’s use of computers. Secondly, whilst it appears that this debate continues, the literature base pertaining to ICT in ECE has begun to shift. Several case studies undertaken more recently in the Aotearoa New Zealand context have contributed to building a valuable research and literature foundation highlighting how the use of a range of ICT resources can enhance children’s learning when integrated in meaningful and purposeful ways. These case studies also illustrate how ICT can facilitate a raft of communication channels, through which relationships with families and communities can be strengthened. Thirdly,

how this is enacted, is heavily dependent upon the perspectives and practices of teachers and what place they consider ICT should play in educational settings.

The fourth finding highlighted in the literature is related to the possible mismatch between young children's experiences of ICT in the home and the educational context, particularly when compared with the school setting. The literature also indicates that unless teachers recognise this discrepancy, valuable opportunities for learning can be missed. Finally, when ICT is integrated and embedded within the learning environment and not seen as separate or outside of the learning and teaching framework, research indicates that more authentic and meaningful learning opportunities and experiences, for teachers, children, families and the community can be realised.

## CHAPTER THREE

### METHODOLOGY

#### Overview

In this chapter the research paradigm or philosophical framework, which informed and shaped this research approach and process will be conveyed. The methodological orientation utilised will be examined and discussed, along with the methods and techniques employed in order to gather and analyse the data. The principles of *Te Whāriki* (Ministry of Education, 1996) are drawn upon to position the research within the early childhood context. Consideration of socio-cultural theory embedded within *Te Whāriki* also guided the choice of research methodology. In addition, this chapter describes how ethical issues were addressed, alongside an outline of the role the researcher undertook. The notion of rigour (Eisner, 1998) and how this was applied within a qualitative research approach is also explored, with a description of the participants concluding this chapter.

#### Research Paradigm

Aubery, David, Godfrey and Thompson (2000) claim, that “the way in which researchers carry out their work convey messages and beliefs concerning research methodology, their theoretical pre-suppositions and also their views of ‘how the world’ works” (p.29). The initial choice of the problem to study the way in which the researcher interprets the data, combined with the subsequent conclusions that are arrived at, implicitly and explicitly reflect the values and beliefs held by the researcher (Bryman, 2008; Davidson & Tolich, 2001; Hughes, 2001).

Hughes (2001) presents the analogy of a picture frame to provide a useful correlation when describing the notion of a paradigm. A paradigm therefore, can be seen to frame the research topic, with the choice of this frame influencing and

shaping how the problem or issue under investigation is viewed and approached by the researcher (Hughes, 2001). The frame chosen serves to highlight particular aspects of the research project, just as the choice of a picture frame serves to draw the viewers' attention more specifically to certain features within a photograph or painting. It is critical, therefore, as Hughes (2001) argues that researchers recognise "what we learn about the world will depend on how we see it; and how we see it depends on our choice of paradigm" (p. 32).

The research framework or views of the world, which underpinned the study in question, reflected an interpretative paradigm. An interpretative paradigm contains particular characteristics, which contribute to influencing and shaping the way in which research is undertaken. A key feature of this paradigm places understanding the world of the participants, through their own interpretations of their experiences, in a central position (Bryman, 2008). This key characteristic strongly guided this particular research to, as Cohen, Manion and Morrison (2001) note, "examine situations through the eyes of the participants" (p.22).

Hence, as the intention of this study was to elicit the views and perceptions of early childhood teachers in relation to the role they played in the implementation and integration of information and communication technologies (ICT) in early childhood education (ECE), the teachers' (participants) interpretations and sense making of that role was fundamental to this study. Additionally, as the aim was to also add differing perspectives and understandings to the emerging literature base pertaining to ICT in ECE, and to shed fresh insights into this particular dilemma, an interpretative paradigm was adopted. This approach contrasts with a positivist paradigm, where a scientific approach to research is employed. From a positivist perspective the reason for research is generally "to discover natural laws so that people can predict and control events" whereas when an interpretive perspective is undertaken, the intention is "to understand and describe meaningful social action" (Neuman, 1997, cited in Davidson & Tolich, 2003 p.27).

Therefore, the role the researcher undertakes is also indicative of these differing paradigms.

## **A Qualitative Approach**

A qualitative approach to research is usually justified both in terms of what it is and what it is not. Edwards (2001) suggests the following features, which are commonly evident within qualitative research,

- Openness about the researcher's theoretical and personal starting points;
- An ethical concern for those whose experiences are being represented;
- An attempt to reveal the richness of the field in the field's own terms;
- A need for a careful system of data organisation to support the analysis; and
- A critical awareness of what has been learnt during the research process. (p.134)

Traditionally, qualitative and quantitative approaches to research were presented as two opposing sides to a debate (Burke Johnson & Onwuegbuzie, 2004). More recently, however, the focus has shifted somewhat and these differences are not so strictly adhered to with qualitative researchers, for example, using methods which may have traditionally been attributed to quantitative research. Therefore, it may be more constructive to think in terms of what is *the best fit* for the issue, or topic under the spotlight, rather than presenting these as an either / or scenario.

Nonetheless, as Bryman (2008) explains, there are specific attributes or stances which each of these approaches contains that in turn reflect a particular position to research overall. For the purpose of this study a qualitative methodological approach was used. This was due to the research questions being predominantly concerned with gaining the participants' perceptions of their role as teachers in relation to the implementation and integration of ICT. As Burke, Johnson and

Onwuegbuzie (2004) succinctly describe, this methodological approach (qualitative) focuses on “the insider’s viewpoints” (p.20).

A qualitative approach to investigating a topic aimed to show the significance of something to the actual people involved, therefore in this case the researcher was asking a group of early childhood teachers to share their responses to the presence of ICT in their teaching and learning environments. The main concern of qualitative research is centred more on the quality and depth of the data rather than the quantity, hence qualitative researchers predominantly work within interpretivism or poststructuralism paradigms.

The aim in this study was to draw out and describe richly detailed data, which was situated and embedded within these insider’s local contexts. Davidson and Tolich (2001) refer to this as depicting “a rich but narrow insight” into a dilemma (p. 116). Therefore, the data collection methods and analysis do not purport to express and reflect the views of a large group of people, nor to necessarily generalise or translate these outcomes to other groups, rather the intention was to reveal as Edwards (2001) notes “the richness of the field in the field’s own terms” (p. 134). Thus, the voices of the early childhood teachers’ who volunteered to be participants in this study remained central in this research project.

Until fairly recently the quantitative approach was considered to hold a more dominant position in research methodology. However, of late this position has begun to be strongly challenged by an increase in prominence of qualitative methodology, particularly within early childhood research (Aubrey, David, Godfrey, & Thompson, 2000; Hedges, 2002; MacNaughton, Rolfe, & Siraj-Blatchford, 2001). Several factors have contributed towards this shift, with the role the researcher has undertaken, a pivotal factor.

A qualitative approach acknowledges the role of the researcher as being in close contact with participants and as a visible part of the research process (Bryman, 2008). This approach is in contrast to the quantitative researchers' intent whereby a distant stance is adopted in order to maintain an objective approach to the participants to avoid influencing the data. The building of relationships was considered to prevent or compromise the objectivity of the study (Bryman, 2008). Although Aubery, et. al (2000) claim that "to reject totally the quantitative perspective is to lose all right to claim factuality of one's results; to reject totally the qualitative may lose one the right to claim meaning" (p. 34). Nevertheless, this present study saw the building of relationships as being integral.

The formation of these relationships, enabled the researcher to create a sense of trust with the participants through the infusing of ethical and professional considerations. This contributed to engendering a more open atmosphere for the focus group discussions to take place in, resulting in the participants engaging in dynamic and rigorous dialogue.

Furthermore, as one of the main aims of this project was to elicit early childhood teachers' perspectives and experiences related to ICT in ECE, the chosen methodology created opportunities for all the participants concerned to share their experiences and for these experiences to inform and shape the study. *Te Whāriki* (Ministry of Education, 1996) provided a common platform or framework for these participants to express and describe their perspectives and experiences.

### **The Principles of *Te Whāriki***

The central endeavor within the context of an interpretive paradigm is to understand the subjective world of the experiences of the people involved within the research project. In order to retain the integrity of both, that is the phenomena being investigated and these participants' experiences, the establishment and preservation of respectful relationships throughout the research project were

paramount. The principle of relationships is firmly embedded throughout the early childhood curriculum *Te Whāriki* (Ministry of Education, 1996) where it is stated that “Children learn through responsive and reciprocal relationships with people, places and things” (p.14). This same notion can be applied to the teachers and the researcher in this study.

There are four broad principles at the centre of the curriculum; Relationships / Ngā Hononga; Empowerment / Whakamana; Holistic Development / Kotahitanga; and Family and Community/ Whānau Tangata (Ministry of Education, 1996). The combination of the principles, goals and strands, create a *whāriki* or mat which form the framework for the early childhood curriculum. The metaphor of the mat creates a pertinent and valuable visual image to illustrate the way in which both the researcher and the participants wove together a unique artifact or piece of research, connecting their different and varied voices.

These four principles (Ministry of Education, 1996) filtered throughout this study, guiding and informing the research process. The principles reflect a socio-cultural approach to learning and teaching, (Ministry of Education, 2004). A socio-cultural approach positions relationships as being central and fundamental to creating and enhancing optimal learning and teaching environments for and with children, their families, and teachers.

Consequently, as all of the participants (kindergarten) and the researcher (tertiary) worked within early childhood education settings in Aotearoa New Zealand, where this curriculum framework was developed, these principles were taken into consideration as bearing some influence on their and the researchers’ approach to teaching and learning within their professional practice.

### **A socio-cultural perspective**

A socio-cultural perspective to learning and teaching recognises the learner (and teacher) as drawing upon and contributing their prior knowledge and

understandings of their worlds, as they co-construct meaning within their interactions with (Ministry of Education, 1996) “people, places and things” (p.11).

Underpinning a socio-cultural approach is the credit based image of the child which, as Fler and Richardson (2004b) maintains, “foregrounds the competence and complexity of children and also the deep embeddedness they have in the community to which they belong” (p.121). The implication is therefore, that people cannot be separated from the social and cultural contexts in which they live (Rogoff, 2003). Therefore, what happens in the early childhood context should, as Ministry of Education (2004) contend, “reflect the interconnecting social and cultural worlds of children” (p.4).

This perspective challenges teachers (and researchers) to ensure the real lives of the children and families (and teachers), who attend early childhood education centres, are visibly displayed in ways that are meaningful and have purpose for children (Gould & Pohio, 2006).

A similar approach was drawn upon within this study, whereby the emphasis was on capturing the ways in which these participants interpreted and understood their social worlds and interacted and responded to ICT within the early childhood context (Bryman, 2008). In addition, as Delpit (1995) asserts “we all interpret behaviours, information and situations through our own cultural lenses; these lenses operate involuntary, below the level of conscious awareness, making it seem that our own view is simply the way it is” (p. 151).

These interpretations, however, can not be separated from the political and economic context, both globally and nationally. Stephen and Plowman (2003a) note that acquiring ICT skills and experiences are strongly promoted as “being critical for later success in the work place” (p.33). Policy makers and politicians see investment in ICT as enabling children to, as stated by Ministry of Education (2002), “be full participants in the global community” (p. 3). The influences of

these positions are inextricably intertwined, impacting explicitly and implicitly on the perspectives of these teachers.

Therefore, the varying ways in which these participants responded to and interacted with ICT engendered a multi-layered and diverse interpretation of these experiences, giving way to, as Cohen, Manion and Morrison (2001) propose, “multi faceted images of human behaviour as varied as the situations and the contexts supporting them” (p.23).

## **Research Method**

The methods, or research instruments utilised in any research project are influenced by the methodological approach undertaken (Edwards, 2001). Key consideration must be given to how the research instruments might best provide the information or answers sought, in relation to the research questions posed. As this study was seeking how early childhood teachers viewed the presence of ICT, the use of questionnaires and focus groups were particularly useful to provide this information.

The notion of a toolbox, as suggested by Hinds (2000), was a helpful analogy to consider when deciding upon the most appropriate methods to employ for collecting data for this particular study. A toolbox typically contains a range of tools, which can be utilised depending upon the specific task in hand. Therefore, as this study was a modest scale research project, which sought to engender richly detailed data from a small group of early childhood teachers, questionnaires (Siraj-Blatchford & Siraj-Blatchford, 2001) and focus groups (McLachlan, 2005) provided relevant data collection tools which most suited this research.

Using two different methods provided an effective way for the researcher to grasp a greater sense of the experiences and views of the respondents who participated in this study. There are, however, both strengths and limitations

pertaining to each of these two methods, (questionnaires and focus groups) as experienced by the researcher, and as outlined by several writers (Anderson, 2001; Bryman, 2008; McLachlan, 2005). These strengths and limitations are summarised in the following table.

**Table 3.1 Strengths and limitations of using questionnaires and focus groups as data collection methods**

Method	Strengths	Limitations
Questionnaires	<ul style="list-style-type: none"> <li>• Quicker and less costly to administer</li> <li>• Respondents able to complete in own time</li> <li>• No interviewer variability</li> <li>• Usually lends itself to quantitative methodology</li> <li>• Individual perspectives are reflected</li> </ul>	<ul style="list-style-type: none"> <li>• Can be difficult to construct</li> <li>• Individualistic response only</li> <li>• Researcher unable to probe responses</li> <li>• Potentially has lower response rates</li> <li>• Limited feasibility of asking extensive questions</li> </ul>
Focus Groups	<ul style="list-style-type: none"> <li>• Group interactions can present more detailed information</li> <li>• Provides rich qualitative perspectives</li> <li>• Group situation creates opportunities for members to hear others' views</li> <li>• Researcher able to gain a deeper understanding of why people feel the way they do</li> <li>• Elicits a wide variety of different views in relation to a particular issue</li> <li>• Explores attitudes and feelings and can draw out issues unknown to the researcher</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to manage and analyse the data</li> <li>• Time consuming to transcribe data</li> <li>• Group dynamics can sometimes present difficulties when there is a dominant participant</li> <li>• May be deemed inappropriate for particular topics</li> </ul>

### ***Questionnaires***

Questionnaires are more likely to be used as a method to gather data from a large number of respondents and are more often than not seen as a quantitative research technique (Anderson, 2001). On the other hand, for the purposes of this study, a questionnaire (Appendix 4) was considered to be a useful method to ascertain an initial understanding of these particular participants' ideas related to the presence and usage of ICT within their early childhood teaching and learning environments. The generation of these questions were based upon the issues

identified in the literature (Bolstad, 2004; Laffey, 2004; Patterson, 2004; Ramsey, et al. 2006). The way in which this questionnaire was designed, by using open-ended questions, for example, enabled the respondents own views to be visible.

Whilst this technique is often considered to be a quick and less costly way to collect data, designing an effective questionnaire can be a challenging technical process. This process required a clear focus and overview of the information that the questionnaire aimed to elicit. Careful consideration was given to the wording in order to ensure that the questions were clearly written and the language was easily interpreted. Despite these challenges, the process undertaken when designing the questionnaire proved to be a useful way to clarify and define more explicitly the range of information sought. Anderson (2001) and Hinds (2000) make several recommendations to consider, when designing and structuring a questionnaire, to address these hurdles. These recommendations include the following features.

- Being clear as to the type of information required;
- Ensuring a clear and consistent layout;
- Designing the questions in response to the information sought ( for example deciding upon using open –ended and / or closed questions);
- Sequencing the questions to create a sense of logical flow;
- Piloting the questionnaire prior to circulation;
- Developing strategies for data collection and analysis.

The above processes provided a useful framework to refer to for this particular study, particularly when envisaging what type of responses could be elicited from how the questions were framed. Consideration was also given to the sequencing and overall flow of the questionnaire. Prior to circulation the questionnaire was piloted by several colleagues to check for clarity and suitability of the questions. The feedback received from this process enabled the researcher to check more closely for coherence and potential misinterpretation of the questions posed in the questionnaire.

Open-ended questions were utilised in this questionnaire, enabling the respondents to insert their own views and ideas about the question posed, which as Cohen, et al. (2001) identify as being “the hallmarks of qualitative data” (p.255). Although there are, as Hinds (2000) claims, both advantages and disadvantages of incorporating closed or open-ended questions in questionnaires. One of the advantages, of using closed questions, is that they are able to pre-coded, thus reducing the amount of time taken to collate and interpret the data. Analysing open-ended questions, is a more complex and time consuming process (Cohen, et al. 2001; Krueger & Casey, 2000; McLachlan, 2005).

Nonetheless, as this questionnaire was specifically designed to ascertain the perspectives and views of these teachers, thus encouraging the respondents to answer in their own words, using open-ended questions was paramount in order to achieve this (Anderson, 2001). The questions were written to elicit more thoughtful and through responses rather than yes or no answers, although this format may have been more time consuming for the respondents to complete. This questionnaire contained fourteen questions, which took approximately thirty minutes to complete.

The questionnaire was circulated to the participants and analysed prior to the focus group meetings, in order for the researcher to gain some initial understanding of the range of ICT resources utilised, and the ways in which ICT was currently being implemented. The findings from the questionnaires were also useful to consider as possible prompts or catalysts within the subsequent focus group discussions, providing a valuable platform or framework for the researcher to work from. Respondents were then invited to indicate their willingness (or not) to be further involved by attending one of two focus group discussion sessions.

### ***Focus Groups***

The use of focus groups as a data collection method have, in recent times gathered in momentum and are considered by qualitative researchers to be a particularly effective and valuable method for social research purposes (McLachlan, 2005). Early childhood research is also beginning to be well represented within this momentum.

Focus groups are proposed by McLachlan (2005) as being “quintessential qualitative research” (p.115) as they enable the researcher to engage more closely with the participants, gaining a deeper understanding as to their perspectives and ideas in relation to a specific issue or topic. Although, this gaining in popularity should not infer that focus groups per se was an entirely new and innovative technique. Focus groups were used for many years as a data collection method, predominantly for the purpose of market research (Anderson, 1998; Bryman, 2008; McLachlan, 2005). This method of collecting data continues to be seen as an effective means to gain a range of viewpoints from groups of potential consumers or clients.

Additionally, the evolution of the focus group technique was in part a response to the criticism of interviews where it was deemed that these were dominated by the questioner or interviewer, potentially limiting the interviewee’s voices (Anderson, 2001). More recently, however, focus groups are being increasingly utilised within educational contexts (Bryman, 2008; Cardno, 2003; Cohen et al., 2001) and particularly within the context of early childhood education (Aitken, 2004; Hampton, 2000; Hedges, 2002; Kolt, Schofield & McLachlan et al., 2006; McLachlan, 2005; Sigley, 2006). Nevertheless, Cohen et al. (2001) assert that focus groups still have some way to go in establishing themselves in educational contexts to the same extent in which they have in the marketing arena.

A focus group, therefore, is a group of people who are brought together for the specific purpose of exploring and discussing a particular topic or issue of which

they have had some experience. Consequently, when considering the participants for this study, teachers who worked in early childhood education centres and who held some experience with working with ICT within these contexts were approached.

One of the key advantages of using focus groups is the way in which the group can create a synergy which motivates and stimulates in-depth discussion. Engaging in discussion potentially enables the participants to challenge and question one another's perspectives (Bryman, 2008). These perspectives, however, may not necessarily be explored to the same extent when using other research techniques, such as an individual interview. The group situation also presents opportunities for the participants to individually and collectively refine, and redefine, their ideas through the overall input of the group. On the other hand, Thackeray and Neiger (2004) argue, that focus group opinions do not always necessarily reflect individual views.

### ***The role of the researcher***

The researchers' role within focus groups is usually less intrusive, acting more as a guide or moderator in order to encourage the group to delve more deeply into the topic under discussion and also ensuring that everyone has had the opportunity to participate. McLachlan (2006) comments though that this is sometimes difficult to maintain and identifies a limitation of focus groups where participants are not "equally and fully participating" (p.116).

As a consequence, focus groups can be criticised for reflecting more of a group perspective, particularly when some participants voice their views more strongly than other group members. On the other hand, utilising questionnaires alongside these focus groups, contributed to providing a balance for these views to be relayed as the participants were able to express their individual views through the questionnaire. Although the respondents to the questionnaire were not necessarily the same participants who attended the focus group sessions, as

their responses to the focus group invitation were opened by the research administrator.

The researcher's role in these two focus groups involved a delicate balancing act, between keeping the discussion moving within the general direction of the topic whilst not restricting the possibilities of insightful data being revealed. At times the conversations went into side issues that were not always directly connected to the main topic under discussion, hence it was important to ask probing questions or prompts to keep the dialogue flowing. The key purpose of a focus group is on the data, which may be engendered through the group interactions, rather than on the interaction between the group and the interviewer (Cohen et al. 2001).

The intent, therefore, is for the participants to interact with each other rather than the facilitator taking a central role, thus keeping the focus on the participant's perspectives rather than on the researcher. As Cohen et al. (2001) note, "the interaction within the group leads to data and outcomes" (p.288). Thus, it is crucial that the researcher ensures that the systems implemented for the capturing and collection of this rich data is full-proof. These interactions can not be replayed or retrieved if not recorded adequately at the time.

### ***Capturing the data***

The focus group discussions for this study were recorded using a digital audio recording device, alongside field notes taken by the research administrator and the researcher. Using this particular device to capture the discussions proved to be very effective, as it was both unobtrusive and contained a very good sound quality, making the conversations easier to transcribe. Additionally, the note taking provided a valuable record to complement the audio data, noting the responses unheard or unseen on the audio recording device (for example body language and positioning of the respondents).

A copy of the transcriptions were subsequently sent to each of the participants to review as previously promised in the initial permission letter. No requests were received for changes to be made, however, this does not necessarily mean that the respondents totally concurred with these findings, as recalling their exact contributions several weeks after an event could be problematic. Nevertheless, these processes, alongside the transcriptions, contributed to the rigour of the study being upheld and ensured the clarity of the data was captured.

### ***Focus group strategies***

There is, however, potential challenges that focus groups can present. Bryman (2008) describes one of the pitfalls of focus groups when a particular member dominates the discussion. This domination can mean that not all of the participant's views are necessarily expressed. Therefore, the challenge comes down to the pivotal role of the researcher to sensitively encourage all participants to feel comfortable about expressing their views without feeling intimidated by more articulate or dominant participants.

These potential challenges were attempted to be addressed in this present study, by both outlining an overview of the purpose and process of focus groups and by allocating time prior to beginning the groups to introduce the topic. Collectively agreed upon ground rules were also discussed. Several of the points which were covered are outlined in the following.

- Introductions of the participants, researcher and research administrator
- Reiterating confidentiality of both the participants and the name of their centre
- Participants choosing a pseudonym of their choice
- Outlining the process for the checking of transcripts
- Clarifying the purpose and use of data (for thesis/articles in future)
- Encouraging responses to others comments to elicit other views and perspectives
- Encouraging dynamic conversation rather than taking turns

- All contributions are welcome-no right or wrong response
- Clarifying importance of different views being expressed alongside examples if possible
- Stressing importance that everyone has the opportunity to respond.

### ***Focus groups as a feminist research method***

The popularity of using focus groups as a research method by feminist researchers has also increased more recently. Bryman (2008) presented several reasons for this growth. Power relationships between the researcher and participant are considered to be greatly reduced within focus groups as the researcher is keen to draw out as much as possible the respondents' position or stance related to the issue under the spotlight. Secondly, as focus groups are focused upon the group in relation to the context from which they are drawn rather than decontextualising these responses. Lastly, as focus groups emphasise group interaction, they are considered to provide a less artificial method than other methods.

However, perhaps the most important attribute of focus groups that find favor with feminist researchers is the way in which this method offers valuable opportunities for marginalised groups (often women) to have a stronger voice. All of the participants in this research project were women, although this was not by deliberate choice. There were no men who worked in these particular kindergartens during the time of data collection. Men are also significantly less represented in the early childhood profession overall.

### ***Focus group sessions***

For the purpose of this study, two focus group sessions were held using the same focus group schedule although the different dynamics of the two groups resulted in different directions inevitably being taken at times. Each of the sessions ran for approximately one and half hours. This time frame proved to be sufficient for these participants to express and share their views. The researcher

was also aware that these teachers have many other professional and personal commitments and was keen to keep closely to the allotted time slot without compromising their valuable contributions.

Having two focus group sessions at different times and on different days, enabled the participants to attend a session at their convenience. The first focus group had five attendees and the second seven attendees. All of the participants, who indicated their willingness to be involved from the outset, were able to attend a session of their choice. The setting where these sessions took place was chosen due to the familiar and convenient location, which also offered easy access to parking. Participants were also provided with food and refreshments, which was warmly received as many had come directly from their place of work at the end of a busy working day.

The outline of the focus group questions (Appendix 5) followed a pattern as suggested by Krueger and Casey (2000). The flow of questions began, once the introductions and ground rules had been ascertained, with opening and introductory questions leading into the transition questions, key questions and finishing with the ending questions. These questions or probes were formulated from the responses to the questionnaire and in relation to the initial research questions for this study. Several of these probes were endeavoring to expand upon ideas touched upon in the questionnaires and to explore other aspects of the topic under scrutiny.

Despite the inherent challenges of this method of research, the use of focus groups for this study engendered a rich array of valuable data that might not have otherwise been revealed by other research techniques. Focus groups are an effective means of gathering diverse understandings of complex topics in an efficient and collaborative way. As McLachlan (2005) claims, “the focus group is a powerful method which is consistent with the early childhood focus on communication and collaboration with our communities” (p. 121).

Furthermore, the combination of using both focus groups and questionnaires as data collection tools provided a more extensive range of data, and added to addressing issues of rigour. Using two different methods also contributed to triangulation of the data Hughes (2001). Triangulation is defined by Bryman (2008) as being “the use of more than one method or source of data in the study of a social phenomenon so that the findings may be cross-checked” (p.700).

### **Validity and Reliability or Rigour?**

Attention to the concepts of validity and reliability are considered to provide a framework for researchers as a means to check the quality of their work (Mills, 2000). Validity, as defined by Mills (2000) is “how we know that the data we collect accurately gauge what we are trying to measure” (p.72). Measuring data against a *gauge* however, is problematic within a qualitative research methodology. Reliability is defined (Mills, 2000) “as the consistency that our data measures what we are attempting to measure over time” (p. 83). This means, is the data able to be repeated or collected by using the same methods with other groups?

While there may well be some crossovers and similarities with other studies, the unique interpretations and responses from this research would not be expected to be replicated. Furthermore, there has been considerable debate as to whether qualitative research can be measured for validity and reliability in the same ways as quantitative research. Meade (2000) ascertains that “in many cases it is not possible [nor necessarily appropriate] to measure qualitative research by the traditional tests of validity and reliability” (p.25).

On the other hand, the principle of rigour as suggested by Eisner (1998) provides a valuable framework to contribute towards addressing these issues. Rigour in qualitative research should be visible and infused throughout the research

design. Meade (2000) created a useful raft of criteria which identified how rigour can be addressed when undertaking qualitative research. These criteria included,

- The philosophical position of the researcher is clearly stated;
- The theoretical constructs and units of analysis being worked with are identified;
- The nature and extent of the sample is described and justified;
- The arguments are based on data and are logical;
- There is sufficient evidence gathered, e.g. from triangulation where the sample is small;
- The standards of judgment are vigorously assessed by others involved in the study and generalisations to populations beyond those in the study are not attempted;
- The findings are published. (p.35)

These criteria provided a valuable guide for this researcher to recognise and address issues of rigour throughout the current study. Similarly, several other writers (Cohen, et al., 2001; Mills, 2000) have also identified relevant criteria, through which these issues of quality assurance can be addressed within qualitative research. Maxwell (1992) cited by Mills (2000) for example, suggests that *understanding* is a more appropriate or relevant term to adopt rather than *validity*.

## **Data Analysis**

This study utilised both questionnaires and focus groups as the data collection methods. Analysing the data proved to be a continuous process, with Siraj-Blatchford and Siraj-Blatchford, (2001) claiming, that data analysis often starts before collecting the actual data by, for example, the initial choice of questions and what is included or not included in the questionnaire. The data from the questionnaires was analysed in relation to the questions and the data from the two focus groups was transcribed, analysed and summarised. The findings were then synthesised to present patterns, themes and categories.

### ***Questionnaires***

The first stage of the data analysis involved the responses from the questionnaires. The questionnaires were circulated to 30 individual teachers from eleven different kindergartens in the central/west location of Auckland. Thirteen people completed the questionnaire, equating the response rate to 43%. A follow up letter was sent to encourage a greater response. This resulted in one other person completing the questionnaire. The questionnaires were opened by the research administrator to ensure the anonymity of the respondents. Respondents also indicated their willingness to be part of a focus group session, by completing a signed response on the consent letter. Although this process meant that the researcher was unaware as to whether the respondents to the questionnaire were the same as the focus group participants, it is highly likely that they were one and the same.

To ensure all of the responses to the questionnaires were viewed, they were colour coded and collated electronically onto a table, in relation to each of the fourteen questions. This visual organisation enabled the researcher to see more clearly the similarities and differences of the responses and the predominant categories. Collating the data from the questionnaire as the first step in this process signaled the emergence of any potential issues or challenges, which could be investigated further during the focus group sessions.

Although, as previously noted, these issues were not necessarily the same as raised by the teachers attending focus groups. However, several areas that were identified in the questionnaires were subsequently expanded upon in the focus groups. These included the role of the teacher; how they learnt about ICT; the cautionary aspects related to ICT; equity issues and the promotion of ICT for future learning. This process enabled a more thorough exploration of the topic to be undertaken.

### ***Focus groups***

Twelve teachers in total indicated their willingness to attend one of two focus group discussions, as signaled on their consent letter. Five teachers attended the first focus group discussion and seven attended the second. As these sessions were scheduled on two different days and weeks, they were able to choose the session most convenient to them. The response rate for the focus group involvement was 40%, as the number of teachers initially approached totaled thirty. In addition, the presence of a research administrator proved to be of enormous value as it allowed the researcher to focus on the dialogue in hand rather than being side tracked with the practical arrangements.

The data was transcribed by the research administrator, with the researcher reading and checking the transcripts for meaning making throughout the data analysis process, as often the terminology used reflected the early childhood discourse. The transcriber did though have some knowledge and familiarity of this terminology from her work as an administrator in the tertiary early childhood sector. Furthermore, to ensure a more immediate recall, the transcribing was carried out relatively quickly and the common themes *cut and pasted* accordingly and filed in such a way as to ensure the data was stored in a manageable and retrievable way.

Krueger and Casey (2000) outline the “long –table approach” (p.132) as a useful and tangible way of identifying and categorising data into manageable chunks. This approach entailed creating a series of large pieces of paper with the focus group question at the top and attaching excerpts from the transcript which responded to the particular question. When collating the data this same process was utilised electronically and provided a practical way to categorise data into patterns and themes. Each of the focus group findings were analysed separately in relation to the responses to the prompts, summarised and then synthesised under several common categories.

The recalling and re-visiting of the data, alongside the reviewing of literature, assisted the researcher to make connections and to identify more clearly the themes that were being elicited. The research questions provided the overall framework when beginning the focus group analysis, in order to avoid as Krueger and Casey (2000) caution, the sense of approaching a “maze” (p.127). As one of the challenges of focus groups is the amount of data which they create, maintaining the intent of this study enabled the researcher to more effectively find a way through the maze and eventually come out the other end.

Additionally, within the following month or so, the participants were all provided with the transcripts from their particular focus group session inviting them to verify the information, and to make changes or withdraw comments to ensure that the transcriptions accurately reflected their views. None of the respondents, however, choose to make any changes. This process was integral to this research, as the researcher acknowledged their considerable interest and experience in the topic under investigation and this interest could potentially influence what the researcher chose to highlight or not. To counteract this Siraj-Blatchford and Siraj-Blatchford,(2001) suggest, involving a colleague in the process of analysis to provide a “critical community” approach (p.139). Whilst this process was not utilised by the researcher in this particular study, it could prove invaluable for future research endeavours.

## **Ethical Issues**

### ***Researcher's interest***

The researcher's interests in the problem under scrutiny can create potential bias. The researcher's prior interest in this topic, ICT in ECE, stemmed initially from her recent role as a Head Teacher in a multi-cultural kindergarten in Auckland. The teaching team, with whom the researcher previously worked, explored the many uses of ICT and integrated a range of ICT resources within the learning and teaching environment.

Throughout this exploration and integration the researcher began to discover ways in which ICT could potentially provide a useful tool to make children's learning visible for children, their families and communities (Gould & Pohio, 2006; Lee, et al., 2002; Ministry of Education, 2004; Ministry of Education, 2009; Ramsey, et al., 2006; Wilson, et al., 2003). Additionally, the researcher's prior experience as a professional development facilitator with the Educational Leadership Project (ELP), provided insights into the varied ways that teachers viewed the use of ICT in ECE and how these differing views and perspectives influenced and shaped their subsequent implementation or resistance to ICT within their teaching and learning contexts. As a result, this interest determined and drove the focus of this current study, and although the researcher was mindful that this interest didn't override or sway the participants' perspectives, as in any research enterprise the issues or presence of power relationships cannot be ignored.

Nonetheless, the presence of potential power relationships can not be totally negated as they exist simply due to the nature of the roles of *researcher* and *participant*. The ultimate aim, however, was that these relationships were recognised and acknowledged and attempts made to ensure that the voices and perspectives of the participants remained central, rather than allowing the voice of the researcher to potentially dominate and distort the findings. Tuawhai Smith (1999) sends a strong cautionary message to researchers by stating "we [as researchers] have the power to distort, to make visible, to overlook, to exaggerate and to draw conclusions, based not on factual data, but on assumptions, hidden value judgments, and often downright misunderstandings" (p.176). Therefore, it is crucial that throughout the research process, this caution is remembered.

Furthermore, the field of ECE is relatively small and there was no doubt that some of the participants will have had some professional contact with the researcher, in the past in her role as a teacher, a professional development

facilitator and more currently as a lecturer in the teacher education context. The current role held by the researcher however, has impacted to some extent on the rationale behind the selection of centres.

At the time the research project was undertaken the researcher was working in a field based tertiary teacher education institution, where many of the student teachers worked as unqualified teachers in care and education centres. As a result, the early childhood contexts drawn from were kindergartens, where all teachers employed are fully qualified and where current students undertaking their field based qualification were not part of this study.

Therefore, the researcher does not claim to be removed from or detached from this topic nor does the researcher purport to be totally objective (Wellington, 2000). The researchers' underlying values, beliefs and preferences both specifically related to ICT and more broadly in relation to the theoretical perspectives of teaching and learning, may have explicitly and implicitly impacted on and to some extent shaped the research focus.

Hedges (2002) claims that "research has indicated that in relation to teachers' professional knowledge, teacher's beliefs mediate between thinking and practice" (p. 103). This realisation and awareness enabled the researcher to endeavor to ensure that the data was not distorted, or overlooked in light of the researcher's own interests, being mindful that we inadvertently filter information through the lenses of who we are and our own experiences and we may unintentionally discard or retain information accordingly. Collecting the data from a range of sources (questionnaires and focus groups), and applying rigorous analytical processes to this data, contributed to the verification of this process.

### ***Ethical Considerations***

Fundamental to addressing ethical considerations when undertaking research is gaining voluntary and informed consent from the participants. Informed consent

explicitly implies that when permission is sought and subsequently gained from participants, information pertaining to the purpose and potential implications of the research was clearly and succinctly presented (Coady, 2001). For this project, a letter which explicitly outlined the purpose and nature of the research, was circulated to all potential participants, enabling them to make an informed decision about whether or not they wished to be involved.

This letter also stated that the names of the participants and the names of their centres would remain anonymous and the data would only be viewed by the researcher, the research assistant and the researcher's supervisors. In addition, a separate consent form was sent to the participants, inviting their further participation by attending a focus group. The participants were assured that their participation was entirely voluntary (Cardno, 2003) and that they had the right to withdraw from the research study by a specified date.

### ***Ethical approval***

Prior to embarking upon this research project, ethical approval was sought from the Unitec Research Ethics Committee (UREC). The process also provided a valuable opportunity to clarify and rationalise the purpose and direction of this study (Coady, 2001). Jenkins (2005) describes this process as "turn[ing] a vague conceptual proposal into a more solidly and carefully crafted proposal with a clear timeline for the research" (p.103). In addition, application was sought from the employing body of these teachers.

This organisation, the Auckland Kindergarten Association (AKA) required a copy of the UREC ethical application approval to be forwarded as part of their application process, in order for them to be assured of the nature of the research and the commitment required from teachers that a project such as this would entail. The AKA has its own ethics committee, the *Research Access and Ethics Committee* (REAC) through which this proposal was considered and subsequently approved. REAC was established to monitor more closely

researchers' access to the sites under their jurisdiction and to ensure that the rights of the teachers, children and families were protected.

Therefore, the proposal for this particular research project was tightly scrutinised through these two filters (UREC and REAC). Nevertheless, ethical commitments and responsibilities did not end there. From the outset a commitment was made to circulate the transcriptions of the focus group discussions to every participant, inviting their feedback and comment. This commitment was followed through, although as noted earlier, no requests for changes were received.

As previously stated, the forming and maintaining of respectful and professional relationships with the participants was paramount when embarking upon and continuing through this particular research process. As Mills (2000) asserts, "researchers should have an ethical perspective that is very close to their personal ethical position" (p.86). Therefore, researchers must ask themselves how they would wish to be treated if they were participants in a research project. Does this match with what they themselves are proposing? This premise was kept centrally throughout the process undertaken by this researcher.

### ***Description of the Participants***

All of the participants in this study were qualified early childhood teachers who worked for the Auckland Kindergarten Association (AKA). The association only employs qualified teachers. Therefore, all of these participants held a minimum qualification of either a Diploma of Teaching (ECE) or a Bachelor of Education (Teaching) ECE. The participants were a combination of Head Teachers and Teachers from ten kindergartens in Central and West Auckland.

Several of the participants who attended were from the same teaching team, whereas others were there on their own. Furthermore, these teachers mainly worked in three teacher teams, although there were some participants who worked in two teacher teams. Moreover, the participants worked in sessional

kindergarten contexts with group sizes ranging from 30-45 children in each session.

Within the focus group discussions there was an even representation of both Head Teachers and Teachers, although this information was not specifically identified on the questionnaire. However, within the focus group introductions the participants identified the position that they held. For the purposes of this particular research, it was not the researcher's intention to differentiate between these roles (Head Teacher and Teacher) as in these contexts using or not using ICT is not necessarily connected with the specific position held. However, this information could prove useful in other settings or indeed in future research endeavours. Additionally, as most teachers employed by the Auckland Kindergarten Association have some degree of experience with ICT regardless of their position, there did not appear to be a need to make a specific choice or differentiate between these participants.

On the other hand, this may possibly be different in other early childhood education contexts and could be an aspect to take into consideration in further investigations. These particular participants were also all women, although not by deliberate design or choice by the researcher. The researcher acknowledges that the inclusion of male participants may well have presented other perspectives, not represented by this current group of respondents.

### ***Participant's teaching experience***

Each of the teachers in this particular group of participants held between approximately four and twenty-five years plus of teaching experience. Therefore, there were teachers who had considerable experience in the field of early childhood education and those who had less so. Their experiences and knowledge related to ICT were also varied, ranging from experienced to relatively limited (at their own admission).

The range in experience may have also been indicative somewhat of the era in which they undertook their teacher qualification and their general exposure to ICT, although while this was not a specific focus in this research, the responses in the questionnaire alluded to this notion. Furthermore, the experiences and responses of student teachers in relation to ICT in ECE, undertaking their qualification is another key area where further investigation could be undertaken. This possibility is explored in the concluding chapter of this thesis.

### ***Geographical location***

The participants were selected from clusters of kindergartens which were listed according to their geographical location. Kindergartens from the West and Central areas were considered due to their location in relation to Unitech where the focus group sessions were held. The centrality of this site enabled these teachers to attend the focus group, in a place that was easily accessible and relatively familiar for most of the participants at the end of a busy teaching day. Several of these participants may have also attended other meetings at this same venue in the past.

The physical surroundings and settings are seen to have some impact on how the participants may respond within the sessions, and indeed may even influence if they choose to attend focus group sessions at all (Hinds, 2000). Therefore, some thought and consideration was given to the location and overall accessibility to the choice of site for the focus group discussions.

## CHAPTER FOUR

### FINDINGS AND ANALYSIS

Within this chapter the findings of the research study are presented. Initial scoping of the data from both the questionnaires and focus groups seemed to indicate a number of predominant themes. This process involved the constant sifting through the data to find commonalities and connections, resulting in several broad categories being identified. The focus of this chapter was to present the data under each of these broad themes, with the data from collection method one, the questionnaire, and data collection method two, the focus groups, presented separately. Each section concluded with an overall summary of the findings.

As indicated in the methodology chapter, the benefits of utilising focus groups were that probe questions could elicit more information, whilst the questionnaires were valuable to gather a preliminary understanding of the respondent's views of ICT in ECE. At times these two methods engendered different quantities of information within these themes. The focus group discussions tended to be more wide ranging whereas in the questionnaire the focus of the questions was much more specific. On the whole the combination of these two methods elicited the following predominant themes,

- The place of ICT in the early childhood teaching and learning environment
- The role of the teacher
- The impact of ICT on children's learning
- The benefits and challenges of ICT within the early childhood context
- Sharing of expertise.

## **The place of ICT in the early childhood teaching and learning environment**

### ***Questionnaire responses***

The views teachers hold as to the role ICT plays in early childhood contexts implicitly and explicitly influences the ways in which ICT is subsequently utilised and implemented. The notion of ICT being seen as a tool came through strongly in the responses to the questionnaire. The majority of these participants suggested that ICT should be seen as another tool, which can be utilised alongside an array of other equally important resources within the teaching and learning environment. They also saw ICT as providing a valuable way to support and enhance the work they were already undertaking with children, as described in these next quotes,

*ICT is another tool for children to explore the environment (Questionnaire).*

*I consider the role of ICT in ECE as being able to enhance what we are doing with the children. Having information readily accessible is great, we can get answers to questions very quickly. I feel that if ICT is used safely & wisely in ECE, it is a very useful and valuable tool to use alongside everything else we do (Questionnaire).*

*I see ICT in ECE as just another tool, like a paint brush or a ruler but with a bigger range of tasks that it can manage. We incorporate ICT into our everyday programme but not to the detriment of other things we do but to enhance what we do through children's emergent interest (Questionnaire).*

*ICT gives early childhood teachers and children a range of tools to support and enhance curriculum topics and children's interests (Questionnaire).*

Other responses, however, reflected a stronger stance being taken due to these teachers recognition of the very different technological worlds children are participating in, in the present times. These teachers considered that ICT has a

pivotal role to play in early childhood settings due to these changing times, as reflected in this particular comment,

*I feel ICT is essential in ECE as it is such a part of our world now. It must be embedded in our practice and the curriculum. It enhances our documentation processes such as learning stories for children's portfolios. It enables administration tasks to be undertaken and saved more effectively (Questionnaire).*

It was also apparent that these teachers considered that ICT in ECE was about children being engaged with and having access to ICT rather than just as something that the teachers did or used. The specific examples of children's active interaction with ICT that these teachers offered illustrated this idea. Their examples included the following,

*The children at kindergarten enjoy taking photographs to document their learning-taking ownership of events and celebrations, by gaining skills and knowledge using ICT the children develop an interest in communication, for example fax, email, telephone and post (Questionnaire).*

*Supporting children to document their own learning (Questionnaire).*

Whilst the majority of responses to the questionnaire indicated a relatively positive reaction to the presence of ICT within their early childhood contexts, there were also several respondents who tempered their replies by voicing a sense of disquiet over what they perceived as the potential domination of ICT within some centres. They were keen to see ICT being viewed as part of the everyday teaching and learning environment; that is, as part of the norm, rather than being seen as the central focus and driver. Their main focus, whilst acknowledging the potential value of ICT, was centred on profiling the children's thinking and learning rather than on the novelty value of ICT. Their views were reflected in these statements,

*ICT is exciting but can dominate EC centres rather than supporting action packed learning and thinking. I see it as an asset for children to acknowledge their learning and share this with families. It's not the ICT that's clever, but the thinking of the children in mastering their world (Questionnaire).*

*I don't feel that ICT is the "be all and end all" (Questionnaire).*

*ICT gives ECE teachers and children a range of tools to support and enhance curriculum topics and children's interests. I'm pleased that children are able to access ICT tools as just another resource in the centre ICT is the norm, it's not the answer to everything or the enemy in an ECE setting and children accept and use ICT alongside all of the more traditional resources (Questionnaire).*

In addition, several respondents declared that because ICT has such a presence in children's everyday worlds, it is a facet that should not be ignored because, in their view, access to these technologies provides children with life-long learning opportunities. These views infer that some responsibility sits with teachers in early childhood settings to ensure that young children have had some experience with these resources, particularly where there could be limited availability or access to ICT in the home context. Conversely, these respondents also commented on the need for teachers to recognise and expand upon the prior knowledge and experiences of ICT that young children may bring to the early childhood context. Their perspective is reflected in this response,

*Children are growing up in a world where information and communication technology is an evolving factor, and where children have access to the information and machines to access the information they need. I feel that children having access to these tools can be a stepping stone to their learning and how these tools can benefit their education and life-long learning (Questionnaire).*

Others saw ICT as providing a way of advocacy for early childhood education generally and for children and their family's rights. Visible documentation in the

form of video, photographs, learning stories for example, was considered to create valuable and tangible pathways for this advocacy. The use of ICT has, in their view, enabled this visibility to become more prominent and accessible as explained by these participants,

*[ICT provides ways to] document[ing] children's learning and sharing them with children, families/whanau and the wider community (Questionnaire).*

*[ICT can act as a form of] advocacy for ECE, and children's and family's rights (Questionnaire).*

This visibility was also seen as a concrete way of showing the value of the early childhood profession as a whole, particularly through the documentation of children's learning as this is often shared by children and families within the local and wider community by, for example, sending DVD's to grandparents overseas and sharing portfolios with the local schools.

### ***Focus group findings***

The findings from the focus group sessions in this section relate to how these teachers saw the place of ICT in ECE. There appeared to be a consensus as to the holistic approach to incorporating ICT alongside other resources in the teaching and learning environment, to support the learning that is already occurring, rather than allowing ICT to dictate what can happen. Several of the teacher's views are depicted in these excerpts,

*I really think it is because I don't use ICT as a separate thing and I don't see it as the learning. I only see it as supporting the learning. I don't use it as 'special' I don't drive what we are doing so I can use ICT. (Focus group 1).*

*It's a tool like when we were growing up, we've got pencils, pens, rubbers, rulers and for these children it's [ICT] it's another tool F. (Focus group 2).*

*I think that technology needs to follow us rather than us following technology S. (Focus group 1).*

*So it's kind of an integral part of it (of what we do) rather than being the main thing that we do S. (Focus group 2).*

These responses indicate that these teachers viewed ICT as being infused within everyday events and that they tried to keep ICT usage in balance. One particular teacher, however, considered that there was a sense of obligation for teachers to incorporate resources such as computers in the early childhood environment, as they are already such an integral component of young children's lives,

*But I thought if you don't incorporate computers into the environment that the children are learning in, then it's not a real reflection of life, is it? L. (Focus group 2).*

Some participants also considered that it was important for children to have access to these resources as they provided opportunities to know how to manoeuvre, for example, a mouse and the keyboard and could be useful for learning, not only now but in the future,

*In a society a child needs to learn how to use a mouse and how it works. When they go to primary school, they're going to need it and also how to use the keyboard N. (Focus group 2).*

Although this futuristic view was questioned by other participants, one of whom thought that children in the early childhood sector sometimes had rather more access to ICT than in the primary sector, so the notion of the primary sector expanding upon these possibilities was possibly less realistic. Another participant used the analogy of learning to drive a car to illustrate her view of *teaching for the future*,

*But aren't we talking about children being able to transfer knowledge to a new learning situation rather than having the actual skills? They don't start learning to drive a car until they are 15, but we don't start teaching them at five so they are better at it when they are 15 C. (Focus group 1).*

The public nature of using ICT was considered to increase the awareness of the possibilities for learning, attending an early childhood centre could offer. This notion is described in the following passage,

*I use it as a tool to support and increase the visibility of learning that's happening. When you see something written down and you see the photos in the portfolios, parents read it and they think, "Oh that's what's happening here" and you build an increased awareness for the families as to the learning that's happening for their children that they may not otherwise have seen J. (Focus group1).*

*I guess that's one of the things that ICT has done is justify our existence. It shows what we as early childhood professionals do for children in terms of their learning J. (Focus group 1).*

There was also some discussion as to the initial resistance or reluctance displayed by many teachers when the presence and expectation of ICT usage became more predominant. This resistance, however, appeared to be more related to an initial lack of confidence of the user rather than resisting ICT itself. This highlights the importance of supporting teachers with, for example, relevant and purposeful professional development opportunities when new innovations are promoted. One teacher described her struggle in the following way,

*When I first came in there was a lot of resistance and people were given free cameras and things to try. And that's only because we as teachers didn't really know what we were doing. There was new equipment and we didn't have any training and it just sat there. I didn't know what to do with it or how to use it and then when you start using it you get all of these problems L. (Focus group 2).*

### **Summary**

The overall response to the place ICT should play in ECE as demonstrated by these participants was generally positive, however, they also expressed cautionary aspects within their descriptions. These cautions included, viewing the presence of ICT in ECE in a balanced manner that is in ways in their view that did not privilege ICT over other equally important experiences and resources.

These respondents were also consistent in their understanding of the definition of ICT and the types of resources they encompassed. They mainly saw ICT as providing one of many tools or resources to utilise within the early childhood teaching and learning environment. There was general agreement that ICT was particularly useful to document children's learning, enabling the sharing of this in a visible way with children, their families and the community. These teachers saw that a significant benefit of this process resulted in strengthening and enhancing relationships with the teaching and learning community.

Furthermore, ICT was considered as an effective vehicle to support and enhance children's learning opportunities and through this created an increased awareness of the purpose and value of early childhood education. It was also suggested that children needed to be purposefully engaged with the resources in order for these experiences to be most effective. One example of this was children photographing aspects of their own learning experiences that they considered important. Additionally, the notion that children were sometimes more proficient than the teachers with particular aspects of technology was acknowledged by several participants, although there was some variation in perspectives as to whether children needed to be armed with specific technical information about how to use these tools in order to participate successfully in the compulsory school sector.

## **The role of the early childhood teacher**

### ***Questionnaire responses***

These respondents drew upon an array of terminology to describe their role in relation to the incorporation of ICT. These terms included: building expertise, facilitator, supporter, guide, scaffolder, role-model, a source of information, learning alongside children, exploring and researching new ways of learning. The following quotes illustrate the varied role of the teacher in more detail,

*The teacher is there to support and guide the child to gain access to information required and to use ICT successfully in a safe environment (Questionnaire).*

*[The role of the teacher is] to allow children to explore the equipment, to teach them to respect the equipment. Also the teacher needs to continue to learn about equipment (Questionnaire).*

*[The role of the teacher is] to build[ing] expertise, learning alongside children, exploring and researching new ways of learning, providing an environment where using this technology is safe and for a purpose (Questionnaire).*

The above quotes also demonstrate how these teachers considered the need to engage in on going learning about ICT, in order to understand how to utilise ICT in meaningful and purposeful ways. Furthermore, it appears that these same participants saw themselves acting in a co-constructive manner, rather than in a traditional teacher- learner relationship; with others also stating how they as teachers could learn from the children, reflecting the notion of *Ako*. The following excerpt describes this notion,

*[As teachers we] can also learn from the children as they have some skills and knowledge that may be greater than the teacher (Questionnaire).*

The findings indicated that learning from and with the children, did not though negate the responsibility of teachers to continue to build their own expertise and continue to learn about utilising ICT equipment in creative and innovative ways. In fact, it appeared that the challenges these teachers were at times confronted with served to motivate them to find out more and to extend their own learning. In addition, the role of the teacher was highlighted by one participant as being more complex than initially identified. This comment illustrates this point,

*Be knowledgeable, provide a challenging environment that includes ICT rather than hold it up as more important than critical thinking, problem solving, etc. (Questionnaire).*

### ***Focus group responses***

It was evident that these teachers were beginning to more critically reflect upon their role when interacting with ICT within the early childhood context. Their

responses indicated how they were reviewing more closely their practice and subsequent responses to children, particularly in relation to the use of the computer. This reflection is illustrated in the following explanation,

*I must say with the computer, I don't find that I spend a lot of time there. I'll help them get it set up. I'll make sure that they are clicking on the right space. And then once it's up and running, I leave them to it. I don't actually often sit there and get really involved in it. Maybe that's because I'm a digital immigrant, I don't know. Whereas if they were drawing on a piece of paper, I would maybe sit beside them and ask can you tell me about what are you doing? On Kidpix, I don't do that S. (Focus group 2).*

This teacher described herself as being a *digital immigrant* to explain how, in her view, she is a relative newcomer to the technological world. She questioned whether she would have responded to this situation differently if the child had been engaged with drawing, using traditional tools such as pencils and paper. Another participant recounted how she changed her initial view of young children accessing the computer in early childhood settings, after reading literature which described the potential harmful physical effects of sustained computer usage. This reaction was, however, more related to the prolonged use of computer games rather than using the computer to, for example, download photographs. Her view is explained as follows,

*(As a result of my reading) I watched children when they played computer games and realised how haphazard what they were learning was. I don't think that children need to be hooking into the computer for this purpose C. (Focus group 1).*

While it is clearly evident that most of these teachers understood the broader definition of ICT, and endeavored to integrate the array of resources included within these definitions, there were some different approaches expressed in the responses, specifically related to the use and general accessibility of computers for children within the teaching and learning environment. There were varied perspectives as to whether teachers had an obligation to increase the provision

of these resources in response to requests from families, and how there were different expectations and reactions from parents in different communities, specifically related to the presence or absence of computers. These reactions ranged from reluctance to keenness. Several participants noted that parents commented how they were pleased that computers did not feature for children in the early childhood environment,

*[I'm] so glad you don't have a computer here, it's hard enough to get them off it at home C. (Focus group1).*

Another teacher recounted how,

*At our centre, in all of the twelve years I've been here, I never ever had a parent ask for a computer, it was never even mentioned at a committee meeting. They are not interested in that. We've had a mother who was an IT person who said that she didn't want her child focusing on the computer at the centre P. (Focus group1).*

The reaction of one community, (where there had previously been limited ICT resources) to the introduction of ICT was relayed by a teacher, who described the adverse response,

*When I first went there the parents were fearful that I introduced computers as part of the teaching and learning environment. I didn't even consider that people would find it offensive in any way L. (Focus group.2).*

This same teacher also described how the use of the recently introduced ECE ICT Framework, *Foundations for Discovery* (Ministry of Education, 2005) was a very useful document to refer to as a discussion resource, to engage with the community when introducing ICT. Her experience, however, was not the same for all participants as previously described. One participant described how her community expressed a desire for computers to be available for the children in the early childhood centre, due to the lack of access in the home environment. These parents saw computer experience as being important for their child's

learning, both in the early childhood and school settings. The parent's perspective is outlined by this teacher,

*We would probably have the opposite. We would have parents who would absolutely love us to have a computer for the children because they don't have one at home and they see it as an integral part of their learning. They look forward to their children having some experience with computers in the school setting J. (Focus group1).*

Another participant questioned this view, by offering yet another dimension. Her thoughts are expressed in this comment,

*Do we have to think about exposing four year olds to areas which they may need to know about in the future? Or do we need to consider the types of dispositions (for example finding an interest and persevering with difficulty) children exhibit which could encourage their positive approach to leaning overall? S. (Focus group1).*

The teachers, in this study, articulated their understandings of pedagogy in relation to their role in the implementation and integration of ICT. They reflected upon their approach to teaching and learning and described how, in their view, they integrated and interacted with ICT in a holistic way, reflecting the principles of the early childhood curriculum. This is illustrated by the following statement,

*My pedagogy is the same, you respect children and show how that is reflected throughout your interactions with children and so when utilising for example the digital camera, I ask the children if it is okay for me to take a photo of them and when they are documenting their learning I encourage them to do the same, by asking their peers S. (Focus group 1).*

### **Summary**

The responses to the questionnaire and the focus groups indicate that while these teachers identified their role in a variety of different ways, they were also aware of engaging in critical reflection about the implications of these roles, both for their own practice and for children's learning. Their own research and investigation appeared to have some impact on how they both viewed their role

and the presence of ICT resources. They also considered that the way in which they interacted with ICT reflected their overall pedagogical approach to teaching and learning, although one participant recognised that this may not always be the case, after recounting and reflecting upon her experiences.

In addition, these teachers indicated that at times they considered themselves less technologically able and knowledgeable than the children they were working with, recognising that they were learners too. They also described how they needed to embark upon on going learning as being a *digital immigrant*, in their view, meant that they were often encountering new and unfamiliar situations. It seemed, however, that due to the collaborative nature of working in ECE enabled these teachers to more successfully overcome these hurdles with the support of their colleagues, and combined with on going professional development opportunities. On the whole these responses reflected teachers who persisted with difficulty and who were determined to confront the challenges working with ICT may engender.

## **The impact of ICT on children's learning**

### ***Questionnaire responses***

The teachers who participated in this study predominantly viewed ICT as providing a pathway to enhance and add value to children's learning. They specifically noted the way in which ICT presented opportunities to record exemplars of children's learning, encouraging children themselves to more effectively participate in and access the learning opportunities, particularly through the visual features (photography, for example). These features also opened up possibilities for visual literacy to be promoted. They also considered that ICT could contribute to encouraging and enhancing the notion of the child as a researcher and problem solver. Several respondents described this in the following excerpts,

*ICT is great for recording learning and visual representation of their [the children's] experiences that they can access (Questionnaire).*

*I feel that using ICT, particularly in the documentation of learning, adds value to the learning occurring for children, parents/whanau and the teaching team. It builds research capabilities in children, building knowledge for their future learning (Questionnaire).*

*I feel that using ICT, particularly in the documentation of learning, adds value to the learning occurring for children, parents/whanau and the teaching team. It builds research capabilities in children and building knowledge for their future learning (Questionnaire).*

*It shows how we value learning, it [ICT] records learning; it often shows the many strengths and interests a child has (Questionnaire).*

Encouraging children to more critically reflect upon their use of ICT was another area which several teachers identified as an example of how ICT could enhance children's learning. The opportunities ICT created for children to review and reflect upon their work by using, for example, the digital camera, was also emphasised in these quotes,

*The availability of a camera encourages children to document their learning so that they can revisit it. The children are confident using the computer for Kidpix and peer tutor each other. Using the laptop to research information with teachers makes it faster to arrive (Questionnaire).*

*Children are able to assess and reflect on their own learning. (Questionnaire).*

*[The use of ICT] allows reflection of prior learning by children and allows children to have a wider audience (Questionnaire).*

This wider audience included peers, families and local and wider communities, reflecting a socio-cultural approach to learning and teaching, creating a sense of a learning community. It was also noted how the image of the child can be made

more visible through the use of ICT. The notion of the competent child is articulated by this teacher,

*Children are viewed as powerful competent learners (Questionnaire).*

Others commented how, in their experience, utilising ICT can encourage children to become more actively involved in events within the centre, creating an increased sense of ownership and belonging. One teacher explained her view in the following comment,

*The children at kindergarten enjoy taking photographs to document their learning; taking ownership of events and celebrations. ICT is another tool for the children to explore the environment. By gaining skills and knowledge using ICT, the children develop an interest in communication e.g. by fax, email, telephone and post (Questionnaire).*

The opportunity for children to acquire technical skills and understandings whilst engaging with ICT in purposeful ways, was also mentioned by another respondent,

*It enhances children's learning to become more knowledgeable about ICT equipment, for example mouse skills, clicking on icons, moving through and between programmes, printing, saving, editing etc. The internet also opens up the world for learning (under supervision) (Questionnaire).*

### ***Focus group responses***

Several participants in the focus groups described how they actively encouraged children to utilise the equipment more critically, which contributed to enhancing their learning. The following example illustrates this approach,

*Today this child was so excited that he had tied his own knot on his shoelace. Now I didn't know that another teacher had already done it twice but this time he continued to persevere and tied it himself in the end. So I took two photos for him because I thought he might like to be in it and as I showed him the photo he looked and waited and he said, "No, you haven't shown the knot properly." I promptly gave him the camera and he took the shot of the actual knot. This reminded me once again about how powerful and competent children are and how we must keep this image central in our minds P. (Focus group 1).*

Another teacher noted how access to ICT resources had encouraged children to become increasingly aware of the technicalities of using equipment, such as the digital camera. These experiences resulted in children developing, for example, a greater awareness of the necessary conditions for taking photos. The next passage illustrates this process,

*Sometimes they look more closely at the shots they have taken and often say "I can't see it properly I need to move in into the light". The children then take another photo so that they can see which lighting is best J. (Focus group1).*

Using the laminator was another example of how, in this teacher's experience, children were learning about various ITC resources for a specific function. Through this they were able to know what resources were the best option or most useful to utilise when encountering a specific problem. The following experience illustrated this approach as described by this teacher,

*One day a child asked to use the laminator to laminate their kite because it kept ripping where the string was attached. They noted that if they used the laminator it would strengthen the kite C. (Focus group 1).*

Overall, most of these teachers in this study focused upon the ways in which ICT created opportunities for young children to take an active and collaborative role in documenting their own learning, rather than always being the one documented. This realisation increased these teachers' awareness of issues of children's

rights and notions of privacy, as articulated by one teacher who noted how she felt about publicly displaying personal information about her own interests. Including a profile of the teacher, within the children's portfolios, is an area that is increasing in popularity as a way to relay the *teacher's voice* and to create a stronger sense of collaboration between the children, their families and the teachers. Her response is depicted as follows,

*We really want to have a page (in the children's portfolios) where we talk about the teachers in the form of our interests and for some reason I feel quite private about it. It has made me more sensitive to children and what we document about them and how critical it is to enable them to be active participants in their own learning P. (Focus group1).*

Another participant, believed that children have a right to have access to information and communication technologies due to their interest, just as teachers provide other possibilities related to children's interests throughout the curriculum,

*Just seeing them as legitimate citizens of society at the age they are now, then they should (have access to ICT), if they see something that interests them, then they have a right really because that information is there L. (Focus group 2).*

### **Summary**

The findings related to this theme indicated that these teachers saw ICT as offering further possibilities to enhance children's learning, when utilised in ways that have meaning and are purposeful for young children. They also considered that children should be agents in their own learning, actively participating in and contributing to the teaching and community in which they are part of. Ensuring that the ICT resources, such as the laminator and digital camera, were available for the children to use alongside the array of other materials within the environment increased the opportunities for this to happen. Furthermore, these teachers considered that this use could support children to more critically discover learning opportunities as they arose, with skills and understandings of the technical processes involved being infused within these discoveries.

## **The benefits and challenges of ICT in the early childhood context**

### **Benefits**

#### ***Questionnaire responses***

The majority of the respondents articulated a raft of benefits, which they believed the use of ICT in ECE offered. These benefits ranged from the acquisition of literacy experiences; understanding the actual processes involved when using resources, for example, how to turn the camera on and which button to press to take the photo, and the ways in which the written and visual information displayed enabled children to be more active participants in their own learning, reflecting and reviewing their ideas. These thoughts are explained in the following excerpts,

*I think mastering the use of different ICT tools aids children's belief in their own competency, as well as more obvious learning such as letter and number recognition and fine motor development (Questionnaire).*

*[ICT is] exciting in the recording of learning supporting children revisiting and extending on this. Understanding the sequencing required to use these resources (Questionnaire).*

*Hopefully ICT will support children to be more creative thinkers who can solve problems innovatively (Questionnaire).*

*ICT use supports effective learning for children. Visual documentation is meaningful for children. Children can monitor and reflect on their own learning. I am fully convinced about the effectiveness of ICT in ECE (Questionnaire).*

#### ***Focus group responses***

Other benefits these teachers identified included the way ICT encouraged children to work collaboratively, solving problems and offering their ideas when working together with these resources. The following extract illustrates this,

*[When using ICT] They actively engage with each other and they often pair up S. (Focus group 2).*

Another teacher described how children can work together collaboratively and challenge each other whilst exploring ICT, provoking conversation and discussion, as reflected in the next excerpt,

*The other children might say, have you tried this, have you tried that? L. (Focus group 2).*

Further benefits, articulated by these teachers, related to how ICT in their view has the ability to increase the visibility of children's learning through for example their portfolios. The way in which this information was presented, by the inclusion of digital photographs, learning stories, exemplars of children's visual art works, for example, was considered to provide more accessibility to parents. This was seen to thus contribute towards strengthening relationships between the children, their families and teachers. This perspective is illustrated in the following quote,

*It increases the visibility of learning that's happening. When the parents see something written down and see those photos in the children's portfolios, they think "Oh that's what's happening here". You build their awareness of the learning possibilities happening for children J (Focus group 1).*

Similarly, another teacher described how, in her view, ITC has had a strong impact on the assessment focus of children by opening up avenues for children themselves to notice and recognise opportunities for their own learning and respond to these possibilities by taking photographs, for example. Her experience is described as follows,

*The camera has made such an impact on the assessment of children. This child was so excited that he had tied his own shoelace (after several attempts). I took two photographs of this event and when I showed the child the photographs, he said "no you haven't shown the knot properly" and took his own photographs to depict his view of what was important P (Focus group 1).*

Other teachers also described how utilising ICT enabled the children to,

*Document their own learning so that it can be revisited; confidently utilise the computer to access information; and peer tutor each other when trying out new resources such as kidpix (Questionnaire).*

Enhancing communication with families and communities was seen to be a pivotal benefit of ICT as explained by this teacher,

*[In the early childhood centre we] send faxes with the children to other kindergartens and family members overseas. We email family members who are overseas and communicate via fax and email. We also research information with the children (Questionnaire).*

## **Challenges**

### **Questionnaire responses**

The challenges expressed by the respondents to the questionnaire were mainly centred upon practical and contextual considerations, such as teacher child ratios, as explained by this teacher,

*The implementation of ICT can be difficult because of the ratios, but worthwhile. Sometimes the kindergarten community can't support an ICT programme well and it can be difficult to maintain (Questionnaire).*

The issue of funding the purchasing of equipment was also highlighted as a significant challenge by one teacher,

*Most ICT equipment is funded through telecom talking points, which is sadly being taken away next year (Questionnaire).*

The actual costs related to the purchase of big-ticket items, such as computers and digital cameras, created a significant financial hurdle for some centres. In the past a system of collating 'telecom talking points' from the toll accounts of families and friends in their community, provided a valuable source of funding for purchasing ICT resources. As of 2007 however, this funding option was discontinued leaving some centres searching for other avenues for the purchasing of equipment.

### ***Focus group responses***

Similar to the questionnaire respondents, several of the participants in the focus groups faced challenges of some description related to ICT within their teaching and learning contexts. These ranged from the ongoing issue of limited funding and updating equipment, combined with the costs related to the day to day running and operation of these resources, such as purchasing photo quality paper for the printers. One teacher described the on going issues related to *having to make do* with older equipment and the problems this sometimes presented,

*The original computer we got and the printer were absolutely terrible. We had to clean the heads every three or four times after we've printed something! We weren't able to access grants at the time to replace the equipment but then the Kindergarten Association provided us with a beautiful, new Apple computer with a big, flat screen. It's lovely and they paid for that, but as I've said, we've been using our own digital cameras because we just didn't have the finances to purchase ones for the kindergarten M. (Focus group 2).*

She also recounted how they had to resort to using their own equipment at times, due to the financial constraints at the kindergarten. Other challenges encountered by several respondents included the time taken to carry out administrative requirements electronically. While some centres had administrative support to fulfill these requirements, these teachers preferred that this time was spent supporting the kindergarten in other ways. One teacher expressed her dissatisfaction in the following excerpt,

*For all the ease of ICT for administrative purposes, the amount of time I spend thrusting another piece of paper for parents to sign is embarrassing. It's almost belittling our service C. (Focus group 1).*

Other less explicit challenges were alluded to by several other teachers. One of these related to issues of equity, particularly where there were communities who had limited access to technology in their homes. One teacher described her dilemma in this way,

*You are thinking about life long learning and in our situation are we doing the children a disservice by not offering them the opportunity to have some experience with technology, as we have limited resources within our kindergarten J. (Focus group 1).*

### **Summary**

The responses of these teachers included an array of both benefits and challenges related to the implementation of ICT in ECE. Whilst overall the benefits appeared to outweigh the challenges this did not mean, however, that these teachers remained complacent about this increasing presence. Addressing issues of funding equipment remained an on going challenge, along with the increasing administrative demands experienced by some teachers. Nevertheless, these teachers appeared to have a commitment to ensuring that ICT had some presence within the early childhood environment and, despite the challenges this could present, saw the benefits over shadowing these issues.

## **Teacher's understandings and expertise of ICT**

### ***Questionnaire responses***

The participants in this study appeared to have a clear appreciation of what ICT is comprised of with several emphasising, in particular, the *communication* function of the array of tools referred to. These teacher's understandings are described in the following excerpts,

*ICT is any equipment/technology that we use to share information, communicate with others, and record / document information e.g. computers, telephones, fax machines, I pods etc (Questionnaire).*

*ICT refers to a range of technologies used for gathering, sorting, processing, analysing and transmitting information. It provides access to the pool of global information. Hopefully it enhances creativity! (Questionnaire).*

*[ICT] is the use of multi resources to make children's and teachers learning visible. Knowledge is accessible over a wider resource base; children become independent using cameras, laminators, computers etc, with guidance (Questionnaire).*

The following participant expressed within her definition the need (from her perspective) for early childhood education to promote ICT due to its escalating presence in young children's lives. This definition also indicated that teachers not only needed to promote ICT but to be aware of the possible provision,

*ICT is the way we operate now in the modern world-in ECE we need to be aware, to provide and promote ICT for children (to a degree!) (Questionnaire).*

The views and definitions expressed by these teachers clearly indicated an understanding of ICT beyond previously held views, which mainly identified computers as being the key ICT resource.

Furthermore, it has been suggested that unless teachers have some prior understanding and experience with ICT, they may not be able to, or so inclined to, access the array of possibilities and potential, which these tools may offer when working in the early childhood sector. The responses from the teachers participating in this study indicated a wide scope of prior experience with ICT, ranging from limited to extensive usage, with several respondents noting that,

*My prior experience of ICT initially began with writing assignments, and developed into inputting data at kindergarten; using the Kidpix programme with the children and googling questions with the children (Questionnaire).*

*We learnt typing and computer skills at school and some other technologies such as videoing (Questionnaire).*

*I had no experience-not even with typing until approximately 2000 when I was given the use of a computer at home (Questionnaire).*

It also appeared, however, that this experience, or lack of experience did not always inhibit their usage of ICT resources as demonstrated by one respondent, who described the way in which they had learnt on the job by being motivated to utilise the equipment for specific purposes,

*I use a laptop to write my learning stories. During the session I use a digital camera to photograph the children and sometimes use the laptop with the children (Questionnaire).*

In addition these teachers commented on their ability to,

*Work things out for [themselves] myself (Questionnaire).*

*I learnt on the job from colleagues and associate teachers (Questionnaire).*

### **Focus group responses**

It seemed from the focus group findings that a certain degree of risk taking, perseverance and motivation was required for these early childhood teachers to navigate their way through the raft of technological processes and applications, which these resources presented. Therefore, having more experienced colleagues to work alongside and learn from appeared to be advantageous and useful when grappling with ICT implementation. Working collaboratively and as part of a team is a fundamental core component and expectation within the early childhood sector. This collaborative approach to teaching and learning seemed to have been particularly beneficial for these teachers to increase their knowledge and understanding of working with ICT. Working in a team appeared to increase their confidence and motivated them *to give things a go*, as described in the next extracts,

*I've found my biggest support so far as being my colleagues, because when I first started teaching, we had a PC and I could do the basics but I had to learn how to insert photos etc. I had a colleague who was very good at it, so I would ask her and she would come over to give me a hand. By the time I'd done it a few times, I would be all right with it. Then I came to*

*this kindergarten where it's all Apple so again I've been able to ask a more experienced colleague who has been very willing to help me-so eventually I do get it done S. (Focus group 2).*

*It's like everyone supporting each other and going to courses and coming back and sharing information about the courses, giving things a go S. (Focus group 2).*

*Learn by making mistakes S. (Focus group 1).*

While overall it was apparent that several of these teachers had some degree of experience and ability with ICT, for others their access and knowledge of ICT was in their view somewhat restricted, with an element of anxiety (towards ICT) expressed by one participant,

*Well, it's the fear of the unknown, isn't it? For me, I haven't had any access to ICT. I have never typed, I've have never done anything like that. And I can remember the first time I used a computer, I found it really difficult to manoeuvre the mouse- I didn't know what I was doing, it's just practice and working at it M. (Focus group 2).*

Several participants also mentioned how the provision of professional development support from employers and participation in professional development contracts such as the *Educational Leadership Project (ELP)*, contributed to enhancing their knowledge and utilisation of ICT. On going opportunities to attend these courses to sustain and extend their learning and application, was also emphasised. Their experiences were expressed in the subsequent comments,

*The Auckland Kindergarten Association does offer quite a bit of ICT professional development and ELP (Educational Leadership Project) does also. If there's an area you are not familiar with you can do a course, for example Kidpix, but unless you use the programme consistently, you forget how to do it J. (Focus group 2.)*

*There are a lot of courses to choose to go on and I've chosen to attend a lot of courses simply because I*

*started from the basics two years ago. I knew how to write assignments on a computer but I didn't really know much else. It's really enhanced my knowledge and I've been eager to continue attending a variety of courses to learn more. Sometimes it doesn't really always sink in straight away and I've got to write it all down again in my own words, but eventually it gets there. I've actually started to really enjoy it. If there's another course offered, I've always put my name down for it, to go a little bit further F. (Focus group 2).*

### **Summary**

It appeared that the lack of prior experience indicated by some teachers did not always inhibit their subsequent use of ICT in these contexts. Their use, however, was often provoked by a desire to carry out specific tasks that they considered important, such as writing learning stories, downloading and inserting photos and making videos or DVD's of events and experiences. Therefore, being persistent and resilient appeared to be worthwhile attributes or dispositions for teachers to develop and strengthen, if they were to fully engage with the potential for learning, ICT may offer. Having a sense of purpose and value for using ICT also appeared to be important. Additionally, the experiences of these teachers highlighted the value of working collaboratively in a team, where the more expert colleague often supported those less experienced, until a time where they were able to confidently carry out the processes themselves. The relevance of these findings and the relationship to ideas in existing literature will be discussed in the following chapter.

## CHAPTER FIVE

### DISCUSSION

The positioning and perception of ICT in ECE has undergone a considerable shift over recent times, reflecting somewhat the rapid technological changes in the 21<sup>st</sup> century. This has resulted in ICT becoming increasingly commonplace in the early years environment (Lindsay, 2006). Within this context the shift has, in part been coupled with a socio-cultural approach to teaching and learning as indicated in the literature (Cowie & Carr, 2004; Fleer, Anning & Cullen, 2004; Nuttall, 2003). The increased profile of ICT in ECE has also come about through the release of *Foundations for Discovery*, a relatively new framework aimed at promoting the use of ICT as a tool to strengthen the education of young children (Ministry of Education, 2005). The framework clearly signals the commitment of governmental policy to support the use of ICT in ECE in Aotearoa/New Zealand alongside the recent initiative of an ICT professional development contract, *Information and Communication Technologies (ICT) Professional Learning (PL) programme for Early Childhood Education (ECE)* (Ministry of Education, 2006). The aim of this programme is to provide quality support and guidance to ECE services in relation to their use of ICT.

Nevertheless, up until fairly recently the implementation of ICT in early childhood appeared to be left up to individual teachers or centres to decide how, and indeed if, they incorporated digital technology within their teaching and learning environments. This decision making was set amid a competing array of views and literature about the possible benefits or drawbacks related to the presence of ICT in ECE. Very often there was relatively little support or information provided for teachers to explore the place of ICT, other than the skills and knowledge that they may have already acquired or picked up through other experiences. Although this appears to be changing somewhat as the current initiative, ITC PL

ECE pilot programme Ministry of Education (2006) suggests. Furthermore, there appears to be increased demands being placed upon teachers to be skilled and competent ICT users (Siraj-Blatchford & Whitebread, 2003).

The current study is, therefore, timely to gain a better understanding as to how teachers are responding to this more explicit expectation to integrate the use of ICT within everyday teaching and learning experiences.

This study has examined the implementation and integration of Information and Communication Technologies (ICT) in Early Childhood Education (ECE) from the perspective of a small group of early childhood teachers. The research questions that informed the basis of this study are as follows.

- How do teachers understand their role in implementing and integrating ICT in ECE?
- How does a teacher's understanding of his or her role influence the implementation and integration of ICT in ECE?
- From a teacher's perspective what role does ICT play in the teaching and learning environments in ECE?

## **Key Themes**

The data collated for this project enabled these questions to be answered and also served to bring to light several other issues. This section discusses how each theme has contributed to an enhanced understanding of the questions and leads into a consideration in the concluding chapter of what this may mean for practice in ECE and for further research directions.

The findings from the data revealed several key themes as depicted in the preceding chapter. While filtering through these five main themes several sub themes were also highlighted. This chapter discusses these findings in relation to the literature and to the initial research questions. The themes and sub themes are encapsulated in the following statements.

The role of ICT in the teaching and learning environment.

- Supporting teaching and learning
- Reflecting *Te Whāriki*

The role of the teacher

- Critical awareness

The impact of ICT on children's learning.

- Making learning visible
- The child's voice

The benefits and challenges of ICT within the early childhood context.

- Strengthening relationships with families and community
- Issues of equity, funding and resourcing

Sharing understandings and expertise of ICT.

- Variation of expertise
- Professional development provision

### ***The role of ICT in the early childhood teaching and learning environment***

- ***Supporting teaching and learning***

The teachers in this study expressed an overall positive picture of the role ICT could play in ECE, amid a climate of continuing controversy about the degree to which ICT is appropriate for young children to engage with (Siraj-Blatchford & Whitebread, 2003). Nevertheless, these teachers were quite clear about the place ICT could hold within the early childhood environment. They unanimously articulated the notion of ICT integration, rather than viewing ICT as a separate or isolated set of tools *to be taught*. As Siraj-Blatchford and Whitebread (2003) state "if children are to understand ICT they need to see it used in a meaningful context, and for real purposes" (p. 9).

They also considered because children are living in increasingly technological worlds that they, as teachers, have a real responsibility to ensure that these

children are provided with meaningful experiences to explore technological resources, enabling them to participate fully in the current climate. As Siraj-Blatchford and Whitebread (2003) purport in the early childhood context, “this begins with children learning about the new technology that is being applied around them and becoming more aware of the critical technological choices that are being made by the adults that are significant to them” (p.2). Similarly, Stephen and Plowman (2003b) suggest that there is a “wide spread belief among educators and parents that children will require technological competencies to succeed in the workplace” (p.224). This stance is articulated in the following quote,

*I feel ICT is essential in ECE as it is such a part of our world now. It must be embedded in our practice and the curriculum (Questionnaire).*

This view was countered, however, by others who considered that it was more important to encourage children to be critical thinkers and researchers, as due to the rapid changes in technology the actual technological knowledge acquired by children at this stage, will have altered dramatically in the future. This perspective is described in the following extract,

*I think it's about fostering the learning disposition to preserve and problem solve, and being a risk taker that is more important P. (Focus group 1).*

The perspectives of the teachers in this study resonate with the literature. For example, Anderson, Rooney and Vincent (2007) claim that used appropriately, ICT offers early childhood teachers and children a number of key advantages. One of these advantages is to “enhance[ing] communication, socialisation and learning experiences for the children, and facilitate[ing] children’s emerging ICT literacy” (p.15). The participants in my study concurred with this claim as expressed in this quotation,

*Documenting children's learning and sharing them with children, families/whanau and the wider community; Supporting children's learning through access to global information; Supporting children to document their own learning (Questionnaire).*

This same view is reiterated by the Ministry of Education (2005) ICT ECE Strategy, where it states "used effectively, ICT can encourage purposeful and exploratory play. It can encourage discussion, creativity; problem-solving, risk-taking and flexible thinking and this can all be achieved in a play-centred and responsive environment" (p.10). What's more, as Gandini (2005), asserts, "documentation nourishes our own research" (p.143).

This research study found that a teaching approach that utilises ICT resources within a socio-cultural framework, embedding associated knowledge and technical processes of ICT within the actual experiences, was preferred to the drill and practice approach to ICT, which as described by Stephen and Plowman (2003b) tended to use ICT to teach children specific technical skills. The approach to teaching and learning that the teachers in my study described, recognised the technological era in which the children in their centres were part of, by broadening the means by which they documented children's expression.

These same teachers strongly promoted the view that ICT should support learning possibilities, rather than driving the learning, with some expressing their resistance to ICT domination as illustrated in the following extract,

*ICT is exciting, and I see it as an asset for children to acknowledge their learning and share with families, but it can dominate early childhood centres, rather than supporting action packed learning and thinking (Questionnaire).*

One the other hand, Brown (2007) suggests, that whilst teachers should be the ones setting the agenda and direction for technology innovation and integration, the use of technology itself can also lead to changes in teaching practices.

Furthermore, as Brown (2007) claims, “there is a place for technology helping to challenge and transform traditional forms of schooling [early childhood education]” (p. 3). This position is echoed by Ramsey et al. (2006) who claim that, “adding more technology-cameras and laptops in particular-on its own made this work possible *but not probable*” [my emphasis] (p.ii). Stephen and Plowman (2003b) concur with this perspective, noting that at times “first ‘hardware based enthusiasm, then pedagogical reflection’ is a recurrent pattern in the adoption of new technologies in education” (p. 225).

Therefore, there is a clear implication for teachers, and those involved in the purchasing of equipment, that the provision of ICT equipment alone does not automatically create an enriching teaching and learning environment for young children. Rather, it is when there is a synchronicity across people, places and things that the potential for children’s learning can be enhanced through the thoughtful and meaningful integration of ICT (Cowie & Carr, 2004; Ramsey et al. 2006).

- ***Reflecting Te Whāriki***

The ICT ECE strategy *Foundations for Discovery* (Ministry of Education, 2005) posits *Te Whāriki* as the underlying framework which informed the strategy. The principles of *Te Whāriki* (Ministry of Education, 1996) provided a visible foundation upon which ICT implementation should be applied. ICT should be utilised with the view of empowerment for children; in collaboration and participation with families, whanau and community; reflect a holistic view of curriculum and promote responsive and reciprocal relationships with people, places and things (Ministry of Education, 2005).

Specific reference to ICT within *Te Whāriki* (Ministry of Education, 1996) is couched within *Communication, Goal 4* where it provides an example of experiences, which help to meet these outcomes as stated in the following,

“children experience a wide variety of the materials and technology used in the creative and expressive arts, such as...cassette players, calculators, computers...” (p.81). Other less explicit references, are also in, for example, *Exploration, Goal 4* (Ministry of Education, 1996) where it states “children have the opportunity to use two dimensional materials such as diagrams and photographs” (p.91). Thus inferring that ICT can provide one way for children to express and communicate their experiences.

The teachers in this study appeared to draw upon, and apply, these principles and goals when considering the underlying purpose and place of ICT in the early childhood environment. This same approach, is promoted by Ramsey et al. (2006) who suggest that, “without *Te Whāriki* (Ministry of Education, 1996) the purpose of introducing ICTs might be as early technical skills of a technological ‘subject’ that will only be useful in the real world later, or as a means to acquiring print literacy” (p.1). The holistic approach to learning endorsed by *Te Whāriki* was evident within this participant’s response.

*Documenting children’s learning and sharing this with children, families, whānau and the wider community; supporting children’s learning through access to global information; supporting children to document their own learning; communicating globally with colleagues across the world and advocating for ECE and children and family rights (Questionnaire).*

The teachers in this study have responded to the increased expectation of ICT in ECE by integrating ICT within everyday teaching and learning experiences, although this response was accompanied somewhat by a hint of skepticism. This skepticism was questioning, in their view, the increased domination or fore fronting of ICT evident in some centres, and also how the computer-generated documentation could sometimes present a cloned look, rather than a more personalised look. They questioned what messages this could relay to children and families.

Whilst the expectation of ICT is not a mandatory requirement for early childhood settings, it is implicitly promoted through a variety of ways (Ministry of Education, 2005; Ministry of Education, 2009) and through the publication and profiling of articles featuring innovative ways of ICT utilisation in ECE (Erb, 2008; Ministry of Education, 2009). Research shows that in order for these technologies to be effectively utilised, understood and applied, teachers need to be able to integrate ICT, rather than teach ICT separately (Siraj-Blatchford & Siraj-Blatchford, 2006). This application, however, is dependent upon the role the early childhood teacher undertakes, as described in the next section.

### ***The role of the early childhood teacher***

- ***Teachers' Attitudes and Beliefs***

The participants in this study held generally positive attitudes towards ICT in ECE despite, for some of the participants, having limited ICT skills and knowledge. The role we see ICT playing in the teaching and learning environment is dependent upon the attitudes and beliefs held by teachers towards ICT. The attitudes and beliefs towards ICT and its place in ECE displayed by the teachers in my research, regardless of their own experiences of using ICT in their daily lives, implicitly and explicitly influenced whether or not these resources were recognised as appropriate opportunities for learning, and indeed their place in early childhood settings.

Even though several of the teachers, in this study, professed to have low levels of expertise, they appeared to display positive attitudes towards ICT and found ways to implement ICT resources to the best of their ability. This view is also supported by O'Hara (2004), who proposed that "a practitioner who remains unconvinced about the appropriateness of ICT in early years education or who is unhappy about her/his capability could produce a significant mismatch between the official policy and the actual experiences of young children" (p.15).

The positivity expressed towards ICT, by the teachers in this current study appears to be predominantly due to the way in which these teachers have seen ICT as providing a helpful way to further enhance and strengthen relationships with children, families and communities. These teachers perceived their role in relation to ICT no differently than their overall teaching role within the early childhood context. They saw themselves as supporting and guiding children's learning, through the provision of a purposeful and innovative teaching and learning context as expressed in the next excerpt,

*Building expertise, learning alongside the children, exploring and researching new ways of learning, providing an environment where using this technology is safe and for a purpose (Questionnaire).*

However, one participant when describing her encounter with a child using the computer reflected upon her response, indicating that it is not until these practices are closely examined that different approaches may well be identified. As Ward, et al. (2005) argue "to increase such use [of ICT] requires a better understanding of how teachers construct their practice and the place of ICT in that practice" (p.23). Whilst the Ward, et al. (2005) study was carried out within the secondary school sector, there were some similarities to the experiences of the teachers in my study.

Although it appears that teachers within the early childhood sector are more able to take an active role in the decision making process, and are therefore more likely to implement ICT in a holistic and integrated way, reflecting what the research shows is more effective learning possibilities for children. This view is emphasised by Brooker (2003) cited in Bolstad (2004) who stated that "there is increasing evidence that some of the most exciting and appropriate uses of ICT are to be found in early years settings where there is less pressure to meet strict targets and more opportunities to experiment with child-centred practice" (p.3).

However, Williams, et al. (2000) study of primary and secondary teachers found that although the teachers in these contexts showed a great deal of interest and motivation related to ICT, their actual frequency of use in the classroom was low. Their study also found a direct correlation between levels of use and teachers' attitudes, that is, those who identified a positive approach tended to use ICT more often than those who saw the use of ICT as being difficult or problematic.

Although Laffey (2004) found that even if teachers had prior experience and knowledge related to ICT, if they considered that ICT was not appropriate for using in early childhood settings, then they were less likely to incorporate ICT within the teaching and learning experiences, regardless of their expertise. Madden, et al. (2007) argued, that our "perceptions of a technology are affected by the age at which we encounter it" (p.234). As noted previously, many of the teachers who participated in this study had not grown up in a technologically saturated environment and this could account for their initial limited expertise, although for some this did not prevent their subsequent exploration.

Furthermore, Zevenbergen (2007) urges teachers in early childhood settings to recognise the distinctly differing social conditions that young learners have experienced, from those that they themselves had experienced,; potentially creating different approaches and understandings of teaching and learning. Zevenbergen (2007) claims that teachers need to "reconceptualise pedagogy and learning opportunities for the new generation of learners" (p. 19).

- ***Critical awareness***

It was evident that several of the participants in this current study had become more discerning about how they perceived ICT and what role they saw themselves playing as teachers in relation to how ICT was utilised and managed. These same teachers argued that using ICT required critical analysis rather than simply accepting ICT as a fait accompli. Their claims were echoed by the literature, for example, Brown and Murray (2006) who strongly urged teachers to

examine more critically the underlying values and ideology, which drives ICT. Brown and Murray (2006) likened this process to teachers being “crap detectors” or “garbage sifters” (p.43).

The increase in awareness expressed by these teachers encouraged them to engage more deeply in the on going discourse surrounding ICT and its place within early childhood education. Similarly, Lindsay (2006) challenged teachers within the early childhood sector to “[be] critical educators armed with deeper knowledge of the purpose of education and the way that ICT can advance the goals of early childhood” (p.40). Siraj-Blatchford and Siraj-Blatchford (2006) offer a further challenge, by arguing for early teachers and children to be more closely engaged with hardware and software designers if the “full potential of ICT in early childhood education is to be realised” (p. 53).

Furthermore, it was apparent that the teachers in my study were developing an awareness of the non neutrality and political nature of the push behind initiatives such as *Foundations for Discovery* (Ministry of Education, 2005), and several teachers were questioning the privileging of ICT that they perceived within some settings. This participant expressed her understanding in this extract,

*So everything that is coming through [policy], is filtering through from the business round table, and is for the long-term economic growth of the country*  
L. (Focus group 2).

Another participant had begun to review more closely her use of ICT and the implicit messages the way in which this documentation was presented could be relayed to children and families. She gave the example of the computer generated documentation in children’s portfolios and questioned whether a personalised style was being lost through the more generic appearance created by using word documents.

Moreover, this increased and more critical awareness, as proposed by several writers (Brown & Murray, 2006; Gibbons, 2006; Lindsay, 2006), is an aspect that

requires more examination overall in order for teachers to critically engage with, as Gibbons (2006) urges “the nature and purpose of education and technology” (p.8). The participants in my study had begun to contribute to this increased examination, by not only taking a closer look at the resources and how they were used, but also at their own responses and dispositions.

In addition, as Brown and Murray (2006) propose that the focus should be on what, and how not, whether ICT has a place in ECE, “the important question is what kind of place should ICT have and how should it be used by children and teachers to promote the goals of the curriculum”? (p. 44). The *what* and *how* approach reflected the stance of many of the teachers in this research project. The following excerpt from my study particularly illustrates this notion.

*My pedagogical approach [when utilising ICT] is just the same, as I consider learning to be holistic, and regardless of what resources you are using the underlying framework is that you respect children S. (Focus group 1).*

Yet whilst the findings of this study indicated that these particular participants engaged with and viewed ICT in an enthusiastic way, these same findings also showed that these teachers reflected some awareness of the need to resist the complacency of *doing* ICT, by continuing to critically engage with and question the place of ICT in ECE.

### ***The impact of ICT on young children’s learning***

- ***Making learning visible***

The desire to make children’s learning visible through documentation in the form of learning stories, photographs, and other exemplars of children’s learning, for example, appeared to be the predominant driver for many early childhood teachers to enthusiastically engage with ICT (Oldridge, 2007; Ramsey, et al., 2006). This has been underpinned by an aspiration to build and strengthen responsive and reciprocal relationships with the children, families and communities with whom they work (Ministry of Education, 1996).

Several studies recently undertaken exemplify this approach (Anderson, et al., 2007; Erb, 2008; Hong & Trepanier-Street, 2004; Ramsey, et al., 2006). The teachers in this current study were actively aware of the increased possibilities for learning, when the teaching and learning community were able to participate more fully. The following quote illustrates this notion.

*When you see something written down, and you see the photos in the portfolio and when the parents read it they think, "Oh, so that's what's happening here"; you increase the awareness of the possibilities of learning happening through the photographic documentation J. (Focus group 2).*

Furthermore, the notion of making children's learning visible has been stimulated somewhat by the Reggio Emilia approach to teaching and learning, (Edwards, Gandini & Forman, 1998; Hong & Trepanier-Street, 2004), combined with an deepening understanding and realisation of socio-cultural theory (Cowie & Carr, 2004).

The Reggio Emilia approach is founded upon a very powerful credit based image of children, where they are seen as competent and confident. But as Thornton and Brunton (2007) caution, "this powerful image of the child needs adults who listen to children and trust them to make responsible decisions" (p.11). These realisations, along with the vision statement in *Te Whāriki* (Ministry of Education, 1996), have revealed new directions for practice and have contributed to changing perceptions about children's competence and abilities, which has seen a significant impact in the early childhood education Aotearoa New Zealand context.

Additionally, by being more acutely aware of the mediums chosen, and the potential bias and interpretations this documentation may portray, the public nature of these traces of teaching and learning encouraged teachers to engage in discussion and analysis of both their own and the children's learning. Rinaldi (1998) illustrates this notion in the following way.

The slides and the videos become occasions for intense daily communication and reflections. They [documentation] support the memory and the interactions for children, teachers, and parents-true mirrors of our own knowledge in which we see our own ideas and images reflected (p.121).

The increased visibility of children's learning, however, can create potential risks if not monitored appropriately as suggested by the participants in this study. One participant told of her increased awareness of the implications of this visibility, when it was suggested that they as teachers document aspects of their own experiences to share with the children and their families. This caused this participant to critically reflect upon the ways in which they involved children in the documentation of their own learning. As Clark and Moss (2001) purport, "the visible child" may be more easily controlled than before (p.61). Although it appeared that the majority of participants in this study used ICT to support increasing the visibility of the learning that is happening for the children in the centre, as depicted in this quote:

*ICT use supports effective learning for children. Visual documentation is meaningful for children and children can monitor and reflect on their own learning (Questionnaire).*

- ***The voice of the child***

The competent and confident image of the child underpinned by *Te Whāriki* (Ministry of Education, 1996) and expressed within the Reggio Emilia approach (Hong & Trepanier-Street, 2004; Thornton & Brunton, 2007) shaped how these teachers interacted with the children in their settings. Furthermore, Canella (1997) challenges teachers to find ways to hear the voices of the children we teach. These teachers attempted to do this by encouraging the children to actively participate in the utilisation of ICT. One example of this was the children using the digital cameras themselves to document their own learning rather than always being seen as the subject of the camera. Boardman's (2007) study concurred with this view, contending that the use of the digital camera not only

promoted children's reflective thinking but also, "facilitated reflective practices in the educator" (p.61).

By offering children these opportunities enabled them to become active agents in documenting their own perspectives of what is deemed as important, providing a way for children to visibly express and share their understandings of their experiences, rather than the adults making the decisions (Clark, 2005a). As the United Nations Convention on the Rights of the Child (Article 12) states, children have "the right to have a voice and be listened to and respected" (Carr, Jones & Lee, 2005: p. 142). ICT is considered to have the potential to provide purposeful ways for the sometimes invisible or unvoiced perspectives of children to be seen and heard (Boardman, 2007).

This notion was illustrated by a participant in my study, when describing how when a child took their own photograph of an event, they were able to capture more closely the learning episode under focus from the child's own perspective (in this particular case tying their own shoelaces), rather than what the teacher involved may have considered valuable. Photography has been described as an important tool for listening to children, particularly those who may be denied a voice where written or oral responses may be favoured (Clark, 2005).

Additionally, using a digital camera was considered to promote children's reflective thinking, whereby their prior experiences can be reviewed and replayed, enabling the children to reflect and revisit these experiences further (Boardman, 2007). The use of visuals is not intended, however, to exclude verbal communication, but rather to create increased opportunities for engagement and as a valuable site for multiple listening between children, peers, families and teachers, offering a visual language for children to read and interpret (Fasoli, 2003).

Moreover, according to Clark (2005a), "children's photographs can bring the important details of the context of their everyday lives into the classroom [early

childhood context] and provide a visible platform for creating and exchanging meanings” (p.28). By children themselves making the decisions as to what to photograph or not, and setting their own goals, lessens the possibility of privileging the adults agenda, thus shifting the balance of power more in favor of children (Carr, et al., 2005).

It is crucial, therefore, that children and adults engage within these events to provide a context and interpretation of these images (Fasoli, 2003). By offering opportunities for young children to interact more closely with technology enabled them to develop a more critical understanding of using technology and the possibilities that these mediums can present. As one respondent explained, by engaging with children with these resources, encouraged children to become more informed and critical users. What's more as Siraj-Blatchford and Whitebread (2003) strongly assert, “for citizens (of any age) to make informed technological choices they must gain some understanding of the technologies that are available” (p.2).

## ***The benefits and challenges of ICT in ECE***

### ***Benefits***

- ***Strengthening relationships with families and community***

Involving the community was a critical component that was clearly valued by the teachers in this study by the way in which they acknowledged the expertise brought into the centre by children and their families (Carr, et al., 2005). They recounted how they offered parents the opportunity to share resources such as cameras to use at home for special occasions, in order to foster and facilitate collaborative relationships between home and centre. This approach is evident in the array of case studies emerging from the 2005 Ministry of Education funded initiative, *Foundations for Discovery* and also through *the Centre of Innovation* (COI) projects, which were introduced in 2003.

Moreover, the teachers in this study considered that ICT created increased opportunities for children, their families and teachers to interact more deeply through different digital media. The oral, visual and written nature of these interactions invited diverse pathways for the community to participate and engage with the early childhood centre (Boardman, 2007; Hong & Trepanier-Street, 2004). The development of children's portfolios, containing a raft of documentation, was seen to contribute towards cementing and strengthening relationships (Hatherly, 2006). As Jordan (2006) suggests, that "continuity between settings, home, centre and community, centre and school, is facilitated when all parties are aware of this potential" (p. 23).

The forming and development of responsive and reciprocal relationships is a fundamental feature of the early childhood teaching and learning context. Relationships-Nga Hononga and Family and Community-Whanau Tangata are two cornerstones of *Te Whāriki* (Ministry of Education, 1996). These principles firmly place establishing strong connections with family and community at the heart of early childhood education.

What's more, utilising ICT for documenting children's learning can invite participation with centre families. Gould and Pohio (2006) claim, that "real participation will only be achieved when it sits within a context that has strong, positive and reciprocal relationships with families" (p. 85). Ultimately, the responsibility lies with teachers to find ways to build these relationships, with ICT considered to provide one useful way for this to happen.

- **Challenges**

The teachers in this study encountered many challenges related to the use of ICT. The challenges included: becoming more ICT literate; resourcing; encouraging a more critical analysis of the ways in which the resources were utilised from both the perspective of the teachers and the children, but also an awareness of *the more you do the more there is to do* as the utilisation of ICT

opens up many other possibilities, which may not have been otherwise considered.

It also appeared, however, that due to the commitment and enthusiasm demonstrated by these teachers, these challenges did not appear insurmountable. Nevertheless, the challenge remains for teachers to navigate their way through the array of software programmes and resources to ensure a holistic, yet critical, approach is infused when utilising ICT materials within the early childhood setting.

Despite these hurdles, it appears that early childhood is on the way to establishing a reputation, which has contributed to increasing the predominantly positive profile of ICT, particularly within Aotearoa/ New Zealand. This reputation is probably due to the proliferation of credit based documentation of children's learning, for example (Carr, 2001; Ministry of Education, 2004), which has been shared both nationally and internationally, combined with the non mandatory expectation of ICT in ECE.

### ***Early childhood teachers sharing understandings and expertise of ICT***

- ***Variation of expertise***

It was not surprising to find that the teachers in this study held a varying assortment of expertise and knowledge of ICT, which ranged from limited to extensive. This variation may have also been reflective somewhat of the era in which these many of these teachers undertook their teacher education qualification. Thus, not all of the teachers in this study came armed with prior knowledge related to incorporating ICT within early childhood education settings when they commenced their teaching career. Each of the teachers in this particular group of participants had between four and twenty-five plus years of teaching experience.

Consequently, when they were confronted with an increasing expectation to amalgamate ICT within their teaching and learning environments (Ministry of Education, 2005), particularly over the latter part of the last decade, these teachers described how they drew upon a number of strategies which they employed in order to respond, and for some, to find ways to resist these challenges.

While for some of the teachers in this study the thought of incorporating ICT was at times problematic due in part to their limited knowledge and lack of confidence (by their own admission), this did not seem to deter their overarching resolve to engage with these resources. The varied range of experiences, as described by the teachers in this study and how this knowledge or lack of seemed to not deter their subsequent use of ICT's, presented a perspective contrary to the literature. Laffey, (2004) asserted, that unless teachers have some prior knowledge and confidence with using ICT, it was less likely that they would be inclined to implement ICT resources within the teaching and learning contexts of early childhood settings.

Conversely, this same study (Laffey, 2004) also revealed that even if teachers had prior experience in the form of, for example, writing assignments, emailing and accessing the internet themselves to acquire information, they did not necessarily transfer this knowledge to the early childhood setting. This was mainly due to their belief that, "[while] computers would be nice to have, they do not believe that computers are essential to ECE" (p.370). Shaw (2004) also describes how the perceptions and attitudes primary student teachers held towards ICT often outweighed their proficiency.

It, therefore, seems highly likely that their subsequent implementation of ICT may be more dependent upon the support and practices present within their place of employment, regardless of their initial knowledge and expertise. This was similar to the findings of the data collated for this study. Moreover, while it appeared that

their perception of ICT was mainly centred on the use of computers, which could explain their resistance, the case studies carried out by Laffey (2004) indicated that the most critical influence on these teachers were their experiences and observations of the way in which ICT was utilised within their field or practicum placements, whilst undertaking their teaching qualification.

- ***Professional development provision***

The provision of professional development opportunities was an aspect greatly valued by these teachers. They noted how these opportunities enabled them to explore more effectively the possibilities that ICT could offer. Engaging in further research and reading enabled these teachers to delve more deeply into their pedagogical approach to teaching and learning more generally, and more specifically related to ICT. The experiences of one teacher in particular exemplified this. Reading research carried out by Healy (1998), whilst undertaking further study, caused this teacher to rethink her position related to the unsupervised use of computers by the children and she subsequently monitored and restricted children's access to working on computers,

*So that would be the only area where I'm really wary of-a computer that's freely available for children to access, she (Healy) said that no child should sit in front of a computer for more than 10 minutes because its so bad for their vision C. (Focus group 1).*

In spite of this particular expression of concern, it was apparent that because these teachers predominantly saw using the computer as a medium to document children's learning and for administrative purposes, rather than as a resource for children to independently explore, the adverse effects posed by Healy (1998) were not seen to be so applicable or relevant in these particular contexts. Although the issue of ergonomics, for example, raised by Healy (1998) were seriously considered and applied when positioning resources in the early childhood teaching and learning environment.

Conversely, other studies (Lee & O'Rourke, 2006) considered that using computers in early childhood settings created valuable opportunities for learning,

particularly in relation to enhancing children's oral language, social interaction and problem solving abilities. These opportunities for learning were specifically fostered and encouraged, however, by providing a bench seat at the computer, for example, thus inviting more than one child to interact with this medium.

In addition, Ward, et al. (2005) propose that "teachers who had a wider view of teaching and learning, and who were more reflective about their practice, were more likely to use ICT (p.28). This perspective concurred with the findings in my study, in the way in which these teachers considered the how and why of utilising ICT resources, and whether this use aligned with their pedagogy of teaching and learning.

The strategies that these teachers employed in order to use ICT within the early childhood setting reflected the early childhood curriculum *Te Whāriki* (Ministry of Education, 1996), where it "encourages adults working with children to debate what they are doing and why they are doing it" (p.45). These teachers described a number of ways to illustrate this. These included how they learnt from each other, with the more confident user often supporting and guiding colleagues who were less experienced, until they were able to confidently carry out the processes themselves. Furthermore, attending professional development sessions offered by their employer and other facilitators provided useful support alongside finding out by,

*Making mistakes* S. (Focus group 1)

*Working things out for themselves* (Questionnaire).

Working collaboratively in these early childhood settings was an integral aspect of being a teacher. The sharing of expertise, enabled these teachers to all contribute, albeit in different ways, to the main purpose of implementing and utilising ICT, which from their perspective, was about making children's learning visible, ultimately increasing the possibilities for family and community participation.

Nevertheless, because the teachers in this study held predominantly positive views towards the integration of ICT in ECE, regardless of their proficiency, this commitment enabled them to on the whole address challenges, such as insufficient resources, grappling with technological functions and personal lack of experience. On the other hand, this commitment did not necessarily overshadow their ability to cautiously consider what kind of place ICT should have within these settings.

O'Hara (2004) notes, however, that rather than creating a negative and deficit view of teachers and their perceived inability to incorporate ICT, there is a need to consider other contributing factors. These factors include: limited ICT experience within their private and professional lives combined with restricted or inadequate professional development opportunities; lack of sufficient funding to purchase or supply adequate ICT resources; absence of ICT technical support and limited opportunities to explore how ICT could be integrated and interwoven within the curriculum. Therefore, it appears that there are many causative and complex facets, which may impact on how and if ICT is deemed as important or utilised within ECE. Several of these facets were alluded to by some of the participants in this study.

Likewise, Edwards (2005) found in a survey of early childhood teachers in Melbourne, the provision of ICT equipment on its own is not enough, particularly if teachers have had limited prior experience with ICT. This study found, for example, that teachers' lack of experience can sometimes lead to the equipment (for example, computers) being made available for children to use without guidance, which could suggest a developmental approach to teaching and learning.

Whereas it is suggested that teachers who have experienced in practice the tenets of socio-cultural theory, and value the co-constructions of understandings, are more likely to apply this approach to these new technologies (Ministry of

Education, 2009). Whilst it seemed that the participants in this study were less likely to allow the computer to be used without adult guidance, one participant openly questioned her differing approach with children, when they were working on the computer.

*I must say with the computer, I don't find that I spend a lot of time there. I'll help them get it set up. I'll make sure that they are clicking on the right space. And then once it's up and running, I leave them to it. I don't actually often sit there and get really involved in it. And maybe that's because I'm a digital immigrant, I don't know. Whereas if they were drawing on a piece of paper, I would maybe sit beside them and maybe ask can you tell me about what are you doing? On Kidpix for example, I don't do that S. (Focus group 2).*

The sharing of their understandings and expertise of ICT, by the group of teachers involved in the fore mentioned Ministry projects, has highlighted the strategies, which they drew upon to integrate ICT within the early childhood teaching and learning environment. While each of the particular teachers in this study displayed varying levels of proficiency ranging from very little to extensive, this level did not necessarily appear to detract from their desire to embed ICT resources within their everyday practice.

While the initial questions posed for this study were able to be answered, the findings also raised several other questions, which could provide useful catalysts for future research investigation as discussed in the concluding chapter. These included,

- Investigating the perspectives of children and families in relation to ICT in ECE
- Exploring the actual implementation of ICT by early childhood teachers through in depth case studies;
- Examining early childhood teacher education students' perspectives of ICT in ECE.

## CHAPTER SIX

# CONCLUSION AND RECOMMENDATIONS

### Implications of the study

There are several implications that can be drawn from the experiences of the early childhood teachers who participated in this present study. These have particular significance for those involved in early childhood education, albeit from differing angles depending upon the role undertaken. These include researchers, policy makers, funding providers, management, professional development providers, teacher education sites, teachers, families and, most importantly, the children themselves.

The first implication identified in this study is the role early childhood teachers undertake in relation to ICT. The respondents in this study illustrated how the attitudes and perspectives they held towards ICT explicitly and implicitly shaped and influenced how ICT was subsequently implemented (or not). These same respondents indicated their increasing awareness of how the different theories of teaching and learning more generally impacted on their practice which, in turn, shaped how they utilised ICT. Although, whilst Ward, et al. (2005) assert that “teachers are often unaware of why they practice as they do” (p. 24), it appears that some teachers in the early childhood sector are gradually developing a more acute sense of awareness of what influences and shapes their practice, as illustrated by the participants in this study.

However, continuing to create increasing opportunities for teachers to actively engage in dialogue to explore and articulate their pedagogical approach to ICT in ECE is vital. This engagement may also cause those involved in the resourcing of ICT to more critically consider the impact and influence of these resources on teachers’ practice and children’s experiences, rather than simply layering ICT

resources on top of teaching and learning, and expecting things to change (Visser, 2001). Furthermore, these engagements may subsequently increase opportunities for the views and perspectives of teachers to be acknowledged and understood when creating policies and procedures related to ICT in ECE.

Secondly, the way in which teachers interpret their role and the views they hold towards the presence of ICT in ECE influences their subsequent application (or non application) of ICT as described by the teachers in this study. These views invariably impact on what happens for children in the early childhood setting. Children in the current climate are living in dramatically different technological worlds than what teachers themselves experienced as young children. They are participating in an ever increasing visual world, being exposed from all directions with visual texts through a variety of multimodal mediums including television, video, DVD, advertising, computer games, clothing icons and images to name but a few. The escalation of this visual world is particularly targeted towards this young audience, capturing and engaging their attention (Jones Diaz, Beecher, & Arthur, 2007).

As the teachers in this present study imply, the early childhood sector can (and some assert should) play an important role in guiding and supporting young children in their awareness of the implicit and explicit messages these technological mediums relay. It is crucial, therefore, that this audience, are able to make informed and knowledgeable decisions about these images and the underlying messages that they may portray.

This role, however, is two fold. Firstly there is need for teachers themselves to actively increase their own awareness of the overt and covert influence of the visual texts in their own and in children's lives, and secondly by offering young children in their care meaningful opportunities to deconstruct and decipher the messages conveyed through the multiplicity of visual images, which are part and parcel of their everyday experiences. This could occur by, for example, as

several participants alluded to, children actively participating in creating their own videos/DVDs, movies or slide shows and being involved in the design, production and editing process. These experiences can create essential opportunities for young children to consider and review the content and intent of the visual stories being told through this medium, thereby increasing their ability to navigate their way through the myriad of resources and visual texts targeted towards them, in a more perceptive and astute way. The teachers in this current study described the beginnings of this awareness, and further focus on this could significantly increase the recognition and potential of these experiences.

The final implication for this study, and as the findings of this research suggest, ICT is beginning to establish a secure base, (and some might say has already) within many early childhood settings. Furthermore, the raft of publications (for example Erb, 2008); and ICT strategies (Ministry of Education, 2005) emerging more recently, is presenting a predominantly credit based view of the perceived benefits of ICT in ECE. This present study, however, has suggested the views and perspectives of the teachers involved in implementing these resources are pivotal in ensuring that these are instigated purposefully, and must be taken into account when promoting ICT. Therefore, it is imperative that teachers are provided with opportunities to be actively involved in the decision making surrounding the purchasing and application of ICT, rather than being randomly supplied with resources to use.

More importantly though, as the teachers in my study began to describe, is providing opportunities for teachers to acutely engage with the nature of technology itself. The teachers in the present study demonstrated how, when they questioned and reflected upon the presence of ICT within their own sites and engaged in dialogue with their colleagues to refine their understandings, their awareness of the role ICT currently played, or could play, within these settings increased. Therefore, there is a need for this use to be continually reviewed and critically examined by teachers and others to ensure that the

presence of ICT is well synchronized with the pedagogical approaches of teaching and learning highlighted within *Te Whāriki* (Ministry of Education, 1996) and not are taken for granted.

Moreover, as Nuttall and Edwards (2004), claim, “early childhood teachers engage in acts of professional discrimination when making decisions about curriculum in relation to particular curriculum approaches” (p.17). Professional discrimination is the process of selection teachers inadvertently go through when interpreting and understanding theories of teaching and learning in relation to their practice (Nuttall & Edwards, 2004). Therefore, encouraging teachers to engage in dialogue to critique their values and beliefs surrounding ICT is deemed of value.

Brown and Murray (2006) sent an even stronger message to teachers in the early childhood sector, along with teachers in the primary and secondary sector urging them to be “hi-tech’ educators capable of sifting through the garbage” (p.43) in their quest to develop and extend a deeper and more thorough understanding of the role and purpose of ICT within educational contexts.

So rather than teachers being caught up in the surge of blindly implementing ICT, there is a need for teachers to recognise the values and ideology, which can sit behind the introduction of strategies such as *Foundation for Discovery* (Ministry of Education, 2005). This more rigorous examination could enable teachers to be more conversant and informed with policies such as these, and to be more critically aware of the non neutrality of educational policy more broadly. As Brown and Murray (2006) allege, “teachers have a critical role in mediating the hidden and taken-for-granted messages conveyed and promoted through new digital technology” (p.47).

## **Conclusions**

In this study, teachers' views and perspectives of Information and Communication Technologies (ICT) in Early Childhood Education (ECE) have been examined. The findings of this study indicated that the teachers involved in this research study considered that ICT in ECE offered valuable opportunities to make children's learning visible and contributed to developing and enhancing relationships with children, families and teachers, when integrated in meaningful and purposeful ways within the early childhood teaching and learning community. The overarching positive approach to ICT, expressed by these particular respondents, did not mean, however, that this place remained uncontested. Several critical issues, as previously noted, were signaled by several of these teachers.

The first key issue surrounds the significant difference in exposure to ICT the children or as Zevenbergen (2007) describes "digital natives" (p.27) may come with, when entering early childhood services, compared with what the teachers themselves are likely to be familiar or confident with. Therefore, how do early childhood teachers respond to the knowledge and experiences these often technologically confident learners bring with them to the early childhood setting? Conversely, what provision is made for children who have limited access to and experience with ICT in the home environment?

A second key issue relates to the resourcing of ICT, as it appears that there is a variation in equity and access between different early childhood centres depending upon their economic status. Writers such as Zevenbergen (2007) suggest that the early childhood context has the potential to address these differences.

A third issue that arose is related to the increased visibility of children through the use of ICT. Whilst ICT was seen to offer opportunities for children's learning to be profiled through digital photography, learning stories, video, and DVD recordings,

for example, this visible and rising public nature may be seen to create a mode of increased control and surveillance.

The current study, has attempted to contribute to the increasing body of literature related to ICT in ECE. While ICT in itself is not a total newcomer to the early childhood scene, as items such as audio tape recorders, television and fax machines have been utilised for many years, the current use of computers, digital cameras, interactive whiteboards and video recorders, for example, used to document and share children's learning experiences, has served to significantly increase and highlight this profile. As noted previously, the main focus of past research was centred upon whether or not the presence of computers could be beneficial or harmful to young children's learning (Edwards, 2005; Elkind, 1996; Haugland, 2000; Stephen & Plowman, 2003a; Stephen & Plowman, 2003b).

Now that these understandings appear to have changed to some extent, with a broader meaning of ICT being realised, the focus of the literature has shifted to the *how* and *why*, rather than *if* (Brown and Murray, 2006). The expanding publication of case studies, which outline the ways in which ICT has contributed to enhancing children's learning, have added yet another dimension and expectation in the ICT in ECE discourse (for example, Cowie & Carr, 2004; Hong & Trepanier-Street, 2004; Ramsey et al., 2006; Zevenbergen, 2007) .

Nevertheless, it must be noted as the teachers in this study emphasised that ICT on its own will not create or instigate optimum teaching and learning environments, or enhance relationships. ICT should be seen as a tangible and visible way to create possibilities and avenues through which children, their families and teachers can collaboratively engage and interpret teaching and learning experiences. Furthermore, the visual and written opportunities offered by utilising ICT resources invite, as proposed by Rinaldi (2005) "those who document and those who read [both visually and in the written form] an opportunity for reflection and learning" (p.25).

It is imperative, therefore, that the voices and perspectives of teachers be examined and not remain silent in these projects, as possibilities and potential for learning and teaching with young children are presented through the filter of teachers' enactment and views of their teaching and learning pedagogy (Edwards, 2005). Moreover, as Hattie (2003) cited by Smith (2008) asserts, "Educators still make most of their practice decisions on the basis of personal belief and personal experience" (p.68), it is critical that teachers are provided with on going opportunities to reflect and examine this notion further. Consequently, it is important that teachers' personal beliefs and experiences are considered, if changes and shifts are to be made to foster and optimise opportunities for young children's learning.

The initial questions posed for this current study were focused on exploring early childhood teachers' understandings of their role related to ICT in ECE, and how this understanding influenced and shaped the ways in which they implemented and integrated ICT. Questions were also asked as to what role they considered ICT played within their early childhood teaching and learning environments. Whilst their responses signaled an overwhelming acknowledgement of the potential that they believed ICT has in enhancing the early childhood teaching and learning communities with whom they work, this enthusiasm was also, however, tinged with caution, as highlighted earlier in the findings.

This study has contributed to making visible the views and perspectives of a small group of early childhood teachers to the on going discussion about the benefits and challenges of ICT in ECE. Their voices have added valuable insights into the issues surrounding this highly debated topic and may serve to provoke others to look more acutely at the ways in which they view and subsequently implement ICT in their teaching and learning contexts. Thus, ideally creating *hi tech* educators, who are also capable of encouraging young children to develop the ability to sift through the array of ICT mediums, that they are

presented as part of their daily encounters with as Ministry of Education (1996) describe “people, places and things”. (p. 11).

Teachers cannot ignore the influence of digital technology in their own and young children’s lives, and the implications for practice this can present, if they are to acknowledge and embrace the very different social conditions that the children who attend these early childhood settings have experienced. It is suggested, therefore, that teachers in early childhood education have more than a passing obligation to gain a deeper understanding of these influences and explore how they can interact with young children more effectively, taking into account the diverse range of children’s prior knowledge, experiences and access to these digital mediums (Zevenbergen, 2007).

## **Limitations**

This study was designed as a modest scale research project that set out to investigate how a small group of early childhood teachers viewed the presence of ICT in ECE. The strength of this current study was that it provided a snapshot into the practice and perspectives of a group of kindergarten teachers related to ICT. Whilst, the relatively limited number of participants meant that this study was not generalisable, mirroring a qualitative approach, this was not the main intention of this researcher. The underlying focus was to elicit in depth views and perspectives of a small sample of early childhood teachers in the field. Nevertheless, including the perspectives of children and parents from the early childhood centres would have added yet another valuable and rich dimension to this study. Details outlining how this could be a feature in further research are included in the conclusion of this chapter.

The particular participants in the current study were kindergarten teachers (both head teachers and teachers), all of whom had some experience of working with ICT within early childhood settings, although as previously discussed this experience varied somewhat. Nonetheless, research undertaken by others

(Laffey, 2004) indicates that the experiences described by the respondents in this study, may have some connection with the findings of similar studies. Consequently, the considered and thoughtful views and perspectives reflected in these findings may well parallel or have some resonance with the experiences of others.

On the other hand, because the teachers in this research study were drawn from kindergarten contexts only, there may have been different responses from early childhood teachers in care and education settings. As a result, these findings may not be so relevant or applicable to all early childhood contexts. Nevertheless, these research findings could be seen as a pebble creating ripples causing or provoking others in the field to consider more critically the *how* and *why* of incorporating ICT, rather than simply going through the motion of *doing* ICT.

Furthermore, the responses of the teachers in this present study are not presented as exemplary practice, or as what should happen. Rather, their responses should be viewed as a way to provoke and open up further dialogue and discussion, engendering reflection and critical analysis of pedagogical practice, causing teachers to question what is often taken for granted. Moss and Petrie (2002) explain this notion in the following way,

Examples are best seen and used as provocations. They should surprise us, make us think, ask critical questions, appreciate the peculiarity of what we have taken for granted, illuminate understandings and values, make narratives stutter, open us to new possibilities (p.148).

Whilst undertaking this study it also became apparent that several other unanswered questions arose from the findings. These questions will be illuminated in the subsequent section under recommendations for further research. In addition, recommendations for improving practice will be explicated.

## **Recommendations for further research**

While, as outlined earlier, the findings of this research project enabled the research questions to be addressed, these same findings also brought to light several areas of investigation for future research. These investigations are summarised under the following headings.

- Investigating ICT in ECE from the perspectives of children and families;
- Exploring how early childhood teachers notice, recognise and respond to the impact of ICT on young children, through a series of case studies
- Examining early childhood teacher education students' perspectives of ICT in ECE.

### ***The perspectives of children and families in relation to ICT in ECE***

The first, area for further inquiry could focus on ICT in early childhood education, from the perspective of children and families. This study could investigate how children and their families perceive the place of ICT in ECE and what value they consider ICT plays in this context. There is some evidence pertaining to the way ICT can increase connections between home and centres, and further investigations into this relationship would be useful. Furthermore, several studies indicate that there can be a miss match between what young children know and experience in relation to ICT in the home, compared to what is recognised in the early childhood setting (Downes, 2002; Zevenbergen, 2007). Undertaking, research pertaining to these aspects would contribute to increasing teachers' understandings of these experiences and enable them to provide more effective and meaningful teaching and learning environments.

As Brooker (2002), cited in Clark (2005) urges, "unless adults [teachers] are alert to children's own ways of seeing and understanding and representing the world to themselves, it is unlikely that children will ever manage to identify with the school's [early childhood's] and teacher's ways of seeing" (p. 47). Therefore, an investigation such as this could create a place where teachers are more in tune with how young children see and understand their worlds.

***Exploring how early childhood teachers' notice, recognise and respond to the impact of ICT on young children, through a series of case studies***

Further research into the specificities of how ICT is utilised would be useful, particularly to explore how teachers understand and recognise the impact of these technologies on young children's lives. By increasing teachers' understandings in relation to children's visual literacy, for example, may enable the possibilities for learning that are presented within the early childhood setting to be noticed more clearly.

The potential of new technologies is considered by some authors (for example, Hill, 2007) to be significantly unrecognised and underestimated by teachers, particularly in relation to the notion of multi literacies. Hill (2007) suggests that, teachers need to recognise these new forms of literacies (visual), moving beyond the traditionally considered forms of literacy (written and oral), in order to engage more effectively with children's visual worlds. ICT is considered to offer many valuable opportunities for this to occur. An inquiry such as this may also enable teachers to be more aware of the ways in which young children interpret, translate and are influenced by the imagery presented through this medium.

These insights can encourage young children to become more critical and discerning users of the array of technological resources that they are increasingly confronted with. Therefore, a case study project, which focused more explicitly on the actual application of these resources within the early childhood context, could provide useful data for professional development facilitators, for example, and more importantly for the teachers themselves to draw upon and consider more closely, when confronted with these resources within their teaching and learning environments.

### ***Examining early childhood teacher education students' perspectives of ICT in ECE***

A final area for future research is from the perspective of student teachers undertaking their early childhood qualification in teacher education contexts, with the Aotearoa New Zealand context. Whilst my study was centred on teachers in the field (whose teaching experiences ranged from a period of four to twenty five years plus), all of these teachers held a teaching qualification gained from a teacher education site. Due to the era in which this teaching qualification was gained, probably meant that the degree to which ICT was promoted (and how this was presented) within these teacher education settings, may well have varied over the past one or two decades. Research undertaken by Laffey (2004), described how student teachers understandings of ICT were highly influenced by their experiences whilst undertaking their practicum placements, therefore, it is crucial that research is undertaken to examine their understandings further.

Furthermore, with the recent and rapid expansion of technology into the worlds of young people it is important to ascertain what attitudes and views student teachers hold towards ICT in ECE, and how their attitudes facilitate or hinder their subsequent application of ICT in early childhood education settings when they are qualified teachers. It would also be valuable to explore what position teacher education sites take in relation to ICT in ECE, and how they see their role in the preparation or guidance of student teachers for working in technological early childhood teaching and learning environments. A research project such as this could contribute to gaining a deeper understanding of these issues and provide useful data for both the teacher education and the early childhood education contexts to consider.

## Recommendations for improving practice

This study presents several recommendations for consideration which may contribute to challenging and increasing early childhood teachers' understandings and practice of ICT further. The following points outline these suggestions,

- Increase opportunities for teachers to actively engage in dialogue to explore and articulate their pedagogical approach to ICT in ECE ;
- Create opportunities for young children to deconstruct and decipher the messages conveyed through the multiplicity of visual images, which are part of their everyday experiences;
- Ensure that teachers are actively involved in the decision making surrounding the purchasing and application of ICT, rather than being randomly supplied with resources to use.
- Encourage teachers to be hi-tech educators capable of *sifting through the garbage* (Brown & Murray, 2006) in order to develop and extend a deeper and more thorough understanding of the role of ICT in education.

There is no doubt that a great deal of controversy and contention still surrounds the place of ICT and young children. This study has highlighted some of the different positions taken in relation to this debate, both in past and present times. Rather than suppressing and ignoring the discussions arising from this controversy, the recognition and acknowledgement of these issues will hopefully keep alive the why and how of ICT in early childhood education, as the teachers in this present study begun to reveal. Thus, keeping the central purpose of this use closely to what Gandini (2005) describes, as “the most important discovery for teachers and *atelieristi* is still the complex relationships among materials, tools, and above all the thoughts of children” (p.143).

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PO BOX 69-146  
GLENDENE  
WAITAKERE CITY 1230

30 August 2007

Tena Koutou

I hope everything is going well for you and your kindergarten so far this year. I really appreciate having the opportunity to invite you to participate in an exciting research project.

I am currently enrolled in the *Master of Education* degree in the School of Education at Unitec New Zealand. Part of this study involves undertaking a research project entitled: ***The Implementation and Integration of Information and Communication Technologies (ICT) in Early Childhood Education (ECE): Teachers' Perspectives.***

The purpose of this project is to gather the views and perspectives of early childhood teachers in relation to the use of ICT within the early childhood context.

Please read the attached participant information (**Appendix 2**). If you choose to be involved please complete the enclosed **questionnaire** and if you also choose to be involved in a focus group discussion, please sign the **yellow 'Consent to Participate in Focus Group Form'** (**Appendix 3**) and return them both in the self addressed envelope by the **14<sup>th</sup> September 2007**.

Thank you for taking the time to consider this invitation. I hope that you will agree to take part and that you will find your involvement interesting and informative.

Please do not hesitate to contact me or my supervisor for further clarification and information.

**My name and contact details are:**

Lesley Pohio: Work phone number: 6238899 Ext: 48461

Email address: l.pohio@auckland.ac.nz

**My supervisor's name and contact details are:**

Dr Mary Panko: Work phone number: 815 4321

Email address: mpanko@unitec.ac.nz

Yours sincerely

Lesley Pohio

**UREC REGISTRATION NUMBER: 2007.738**

This study has been approved by the Unitec Research Ethics Committee from August 2007 to April 2008. 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 7248). Any issues you may raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

## PARTICIPANT INFORMATION

The following information is designed to provide you with details about the nature of my research. This information will also enable you to make an informed decision about your possible participation in this study. Your participation would be in the form of completing the enclosed questionnaire and attending a focus group.

### RESEARCH TITLE:

*The Implementation and Integration of Information and Communication Technologies (ICT) in Early Childhood Education (ECE): Teachers' Perspectives.*

### BACKGROUND INFORMATION:

There is an increasing expectation that ICT is integrated within ECE. While there has been some research as to the potential benefits or harm for children's learning that ICT may engender, there has been relatively limited literature in relation to implementing and integrating ICT from the perspective of teachers.

### RESEARCH AIMS:

The aim of this research is to explore teachers' perspectives of their role in relation to implementing and integrating ICT within the early childhood education context.

### RESEARCH QUESTIONS:

The following questions form the basis of this study:

- How do teachers understand their role in implementing and integrating ICT in ECE?
- How does a teacher's understanding of her/his role influence the implementation and integration of ICT in ECE?
- From a teacher's perspective what role does ICT play in the learning and teaching environments in ECE?

### PARTICIPANT INVOLVEMENT:

If you are willing to participate, your involvement in this research would be in the following ways:

- **Questionnaire:** Please complete the enclosed questionnaire and return it by the **14<sup>th</sup> of September 2007** using the self addressed postage paid envelope.
- **Focus Groups:** If you choose to participate in a focus group discussion (date to be advised), please complete the **enclosed yellow 'Consent to Participate in Focus Group Form'** and return with the questionnaire by the **14<sup>th</sup> of September 2007**.

**In order to retain the anonymity of your questionnaire, a research administrator will open and sort the returned questionnaires and pass them on to the researcher with coded names.**

**CONFIDENTIALITY AND ANONYMITY:**

The details of the questionnaires and the focus group discussions will remain confidential. A group contract will be designed in collaboration with the participants to ensure the information discussed within the focus groups remains confidential. Within the report the names of neither the participants nor the centres will be disclosed, and where appropriate pseudonyms will be utilised.

**USE OF FINDINGS:**

The predominant use of the data collated will be for the purpose of meeting the requirements of a Masters in Education Thesis. In addition these findings may also be used in future articles and publications.

If you wish to withdraw from the study notification of your intent must be received by the end of October 2007.

Please do not hesitate to contact me or my supervisor for further clarification and information.

**My name and contact details are:**

Lesley Pohio

Work phone number: 6238899 Ext: 48461

Email address: [l.pohio@auckland.ac.nz](mailto:l.pohio@auckland.ac.nz)

**My Supervisor's name and contact details are:**

Dr. Mary Panko

Work phone number: 815 4321

Email address: [mpanko@unitec.ac.nz](mailto:mpanko@unitec.ac.nz)

Yours sincerely

Lesley Pohio

**UREC REGISTRATION NUMBER: 2007.738**

This study has been approved by the Unitec Research Ethics Committee from August 2007 to April 2008. 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 7248). Any issues you may raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

## CONSENT TO PARTICIPATE IN FOCUS GROUP FORM

Research Title: *The Implementation and Integration of Information and Communication Technologies (ICT) in Early Childhood Education (ECE): Teachers' Perspectives.*

Please read the following information carefully. Should you wish to participate in a focus group please clearly record your name, signature, date and contact details and return with the questionnaire in the enclosed self addressed envelope to Lesley Pohio.

***The focus group discussion will involve approximately two hours of your time. It will take place in October at Unitec in Mt Albert. Specific details of time and date will follow.***

- I have read the information sheet and am clear about the purpose of this research
- I have had the opportunity to ask questions and clarify the extent and nature of my involvement by the provision of an information letter and the inclusion of contact details of the researcher and researcher's supervisor.
- I understand that the information gained through this study is for the purpose of meeting the requirements of a Master of Education qualification and may also be used in future publications.
- I have been assured of the confidentiality of the data and understand that neither my name nor my centre will be disclosed (*The questionnaires will be opened and sorted by a research administrator to ensure their anonymity*).
- I may withdraw from this study by the end of October 2007 and withdraw data at any time.
- My participation in this research project is voluntary.

**NAME:** \_\_\_\_\_  
(Please print clearly)

**SIGNATURE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

**TELEPHONE:**  
(Daytime): \_\_\_\_\_

(Evening): \_\_\_\_\_

***Please return this form by the 14<sup>th</sup> September 2007 in the enclosed self addressed envelope along with your questionnaire.***

## QUESTIONNAIRE

The purpose of this questionnaire, is to gather data in relation to the role of the teacher when integrating ICT in ECE. Please answer with as much detail as you can. Thank you for taking the time to complete the questionnaire.

<b>1.</b>	<b>How do you define Information and Communication Technologies (ICT)?</b>
<b>Comment:</b>	
<b>2.</b>	<b>What prior experience do you have in relation to ICT?</b>
<b>Comment:</b>	
<b>3.</b>	<b>Have you had any professional development related to ICT? If so what was the purpose and content of these sessions?</b>
<b>Comment:</b>	
<b>4.</b>	<b>What do you consider is the role of ICT in early childhood education? How do you feel about the presence of ICT in ECE?</b>
<b>Comment:</b>	
<b>5.</b>	<b>What do you consider is the role of the teacher in relation to ICT?</b>
<b>Comment:</b>	

6.	<b>How is ICT currently implemented within the kindergarten?</b>
Comment:	
7.	<b>What impact do you consider the use of ICT has on children's learning?</b>
Comment:	
8.	<b>What range of ICT resources does your kindergarten currently have? Please list (indicating the number and type of resource):</b>
Comment:	
9.	<b>Who initiates the choice and purchase of these resources?</b>
Comment:	
10.	<b>Where are these resources positioned within the learning and teaching environment?</b>
Comment:	
11.	<b>Are they accessible for children? If yes, then how?</b>
Comment:	

<b>12.</b>	<b>Are they accessible for parents? If yes, then how?</b>
<b>Comment:</b>	
<b>13.</b>	<b>Do all of the teaching team utilise these resources regularly?</b>
<b>Comment:</b>	
<b>14.</b>	<b>Does your team have a shared philosophy in relation to ICT? Please briefly explain</b>
<b>Comment:</b>	

**Please add any additional comments:**

**Please place in the self addressed envelope and return by 14<sup>th</sup> September 2007**

I hope this study will contribute to the ongoing dialogue related to ICT in ECE.  
 Thank you again for taking the time to complete this questionnaire. Many thanks, Lesley Pohio ☺

**UREC REGISTRATION NUMBER: 2007.738**  
 This study has been approved by the Unitec Research Ethics Committee from August 2007 to April 2008. 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 7248). Any issues you may raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

## FOCUS GROUP SESSIONS

- Welcome, refreshments and participant introductions
- Overview of the research and focus group framework (confidentiality, choosing of pseudonyms, engaging in discussion)

### **Key Questions:**

1. ***The role of the teacher*** (Prompts)
  - Does this role reflect a similar/different pedagogical approach when working with children in other areas?
  - Are you offered adequate professional development to support your role as the teacher in this field?
2. ***What are your views about the increased presence of ICT in ECE?*** (Prompts)
  - What kind of place do you think ICT should have in ECE? What are the positives, benefits/challenges?
  - Should ICT be increasingly part of or permeate the teaching and learning environment?
  - How has this use being 'managed'? Has it been strategically planned or has it just happened?
  - Do you feel supported/prepared able to rise to the challenge?
  - Do you think that other things/opportunities fall by the wayside with this increased focus?
  - Do you feel under pressure/comfortable/confident to incorporate ICT?
3. ***Implementation of ICT in ECE.*** (Prompts)
  - The term 'digital native' has been used to describe the current generation of children who are more familiar and confident users of technology than many adults (digital immigrants).
  - Are children able to explore and build upon their prior knowledge and understanding of ICT?
  - Do you feel that you are able to 'keep up' with the digitally competent young child?
  - What are the implications for your practice?
  - How do you encourage children to be critical technological consumers?
  - Is this exploration accessible and available to all children?
4. ***What are your views in relation to the notion that children must learn how to use ICT in order to be prepared for their future lives?***
  - What are your responses to this comment?
  - Do you share similar/differing views?
  - What do you think is the reason behind the move towards encouraging ICT in ECE?
  - What overarching principles do you think should inform and shape the use of ICT?
5. ***Any final or additional comments?***
  - As we are coming to a close of this focus group I would like you to take a minute and consider if there is anything else that you would like to add?
  - Is there anything we should have covered but haven't?
6. ***Summary and thanks***

Thank you for your input, I really appreciate you taking the time to come to this focus group and hope that you have found the discussion to be informative and of interest.

Once the transcripts have been transcribed they will be sent out for you to check.

### **UREC REGISTRATION NUMBER: 2007.738**

This study has been approved by the Unitec Research Ethics Committee from August 2007 to April 2008. 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 7248). Any issues you may raise will be treated in confidence and investigated fully, and you will be informed of the outcome