
The Perceptions of Teachers Surrounding the Potential of iPads in Early Childhood Education (ECE)

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Table of Contents

An abstract of the thesis.....	7
Acknowledgements	8
Chapter 1: Introduction	9
Background to the study	9
Theoretical framework	11
Statement of the Problem	12
Significance of the study.....	12
Research design.....	13
Outline of the study.....	14
Chapter two: Literature review	16
Introduction	16
The background to the use of iPad as educational tool.....	17
iPad use in early childhood education.....	19
iPad in music.....	34
Computer use in early childhood education	36
Chapter Three: Methodology	40
Introduction.....	40
Theoretical underpinning	40
Research questions.....	45
Research design.....	45
Target Population	46
Research Process	47
Ethical consideration	47
Research Sample	48
Data Analysis.....	48
Structure of the interview	49
Chapter Four: Findings	52
Introduction.....	52

Outline of the findings.....	54
• The benefits of iPads in early childhood education (ECE)	54
• The challenges of iPad as an educational tool	62
Summary.....	65
Chapter 5: Discussion	66
Introduction.....	66
The theoretical perspective.....	66
The practical perspective.....	68
Using iPad as an instructional tool	69
iPad supports teaching practices.....	69
iPad supports multilingual children’s learning	69
The iPad support formative assessment	70
Using the iPad as a learning tool	70
First group of disposition.....	71
Second group of disposition	73
The challenges of using iPads	75
Implications for teachers.....	79
iPad management.....	79
Chapter 6: The Conclusion.....	83
Introduction.....	83
Statement of the research.....	83
Research questions.....	84
Background to the study	84
Significance of the study.....	85
Limitation of the study	85
Empirical findings	86
Empirical implications for teachers	86
Early childhood teachers’ professional training	86
Appropriateness of iPad pedagogy.....	87
Recommendations for future research	87
A wider sample of participants.....	87
Future follow- up studies.....	88
Variation of methods of collecting data	88
Doing action research in the early childhood setting.....	88

The missing / the gap between this research and other research..... 88

The theoretical framework..... 89

Conclusion 89

Appendix 98

Appendix 1 98

Appendix 2 99

Appendix 3 101

Appendix 4 104

Appendix 5 105

An abstract of the thesis

Qualitative case study is chosen as a method for this research to examine the potential of iPad use in early childhood education from the teachers' perspectives. The researcher utilized a convenience sample of four registered early childhood teachers who agreed to participate in the study. They were using iPads in their classrooms at an early childhood center within a suburb in the Auckland region in New Zealand. The researcher collected the qualitative data via semi-structured interviews by interviewing the four teachers who participated in the study on an individual basis. The interviews included open-ended questions and lasted for less than 60 minutes, depending on the teachers' available time. Inductive analysis was used to analyse the qualitative data gathered in this research.

The findings showed that the early childhood teachers' had clear perceptions about the potential of using the iPad in the early childhood setting. In addition, they had clear perceptions about the benefits of using iPads in an early childhood setting. Their perceptions identified that iPads could be used as an instructional tool, as well as a learning tool, to support both the teachers' practices as well as the children's learning.

The findings also indicated that, according to the teachers, the use of the iPad in the classroom was somewhat challenging. The teachers perceived there are certain issues involved in using the iPad in an early childhood setting. These challenges are mainly related to iPad use and management in the centre.

Nevertheless, they agreed that using the iPad is helpful as it provides the opportunity for more independence and democracy in learning. Moreover, the findings indicate that early childhood teachers should re-examine the way children learn and the way in which the early childhood education (ECE) workforce organises their learning environments to include digital devices in a meaningful way.

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Chapter 1: Introduction

Background to the study

This chapter provides an introduction to my research into early childhood teachers' perceptions regarding the use of the iPad.

The chapter is composed of six sections and provides general information about the significance of the research topic. The first section introduces the background to the study. The second section presents the theoretical background that underpins the study. The third section describes a statement of the problem. The fourth section identifies the importance of the study and examines the limitations. The fifth section explains the research design and the sixth section provides a guide to the outline of the research.

I decided to study early childhood teachers' perceptions about the use of the iPad in early childhood education and throughout the research I have played three roles, as a mother, a teacher, and as a researcher. I used the iPad in an early childhood centre since I am a teacher. As a mum, my children have used the iPad since they were preschoolers. While they use the iPad I supervise them and I have noticed that they acquired various skills and showed their creativity. They were more excited to use the iPad than other available tools, such as, for example, a laptop and an iPhone because of the wide touch screen. I used the iPad for other reasons, such as, to contact my family overseas via Skype, to search for helpful articles that support my research, and for email. As a researcher, even though I have noticed an increase in integrating the iPad in early childhood education, it was not used as an educational tool to enhance teachers' practices and teaching and learning experiences. Thus, I was motivated to explore teachers' perceptions about using an iPad and whether it possibly could be used as an educational tool. For these reasons, I chose this topic for my thesis.

The definition of the iPad

The iPad is defined as a tablet computer that uses a touch-sensitive screen, allowing users to control the device with their finger(s). The iPad has a 9.7 inch (diagonal) screen

that displays 1024-by-768-pixel resolution at 132 pixels per inch with a data capacity of 16GB, 32GB and 64GB (Ireland & Woollerton, 2010).

Recently the early childhood education sector has introduced the use of iPads (Henderson & Yeow, 2012). The introduction of iPads has influenced greatly teachers' methods and strategies and has had an impact on learning. This includes having an impact on teachers' expectations regarding that which is an appropriate teaching method in early childhood education (ECE) (Henderson & Yeow, 2012).

In order to form a basis for the background to the study, I started to browse the New Zealand Ministry of Education (MOE) website to contextualize the topic of the study. I found that there was little information about the use of iPads in early childhood education except in two areas as follows: using an iPad with disabled children and another on a free downloaded app for schools (Ministry of Education, 2016; Apple Inc., 2016). However, it is important to mention that the New Zealand early childhood education curriculum document, *Te whāriki He whāriki matauranga mō ngā mokopuna o Aotearoa* stresses implementing technological tools such as computers into children's curriculum to improve children's learning and develop their skills (Ministry of Education, 1996). It stated that "Children use a variety of technologies for different purposes as they explore their world" (Ministry of Education, 1996, p.98).:

"ICT is already part of children's lives: New Zealand children interact with ICT every day. A growing role of the whole education system is to support children's understanding of the nature of the technologies they encounter and to support learners to maximize the benefits they can provide. We can support our children to use ICT in healthy and safe ways that enhance their learning" (Ministry of Education: Information Communication Technology (ICT) *Ngā Rau Tangotango*, 2016, p.1).

The whāriki concept also recognizes the diversity of New Zealand children.

I read an online-article; from a New Zealand news website Stuff.co.nz, about iPad use in the school sector. It stated that in 2012 a survey held by the Ministry of Education found that 25 per cent of schools applied a "bring your own device" (BYOD) policy or were advising their students to bring a device, and that in other schools it is compulsory for all students to bring a device (Dudding, 2014). The BYOD policy was also mentioned via a published article in the Herald newspaper (Jones, 2011). The Ministry of Education allocated budgeting to establish the introduction of the iPad and using it in schools. For example, since 2011 the Ministry of Education has spent \$35 million on training teachers in integrating digitals in schools. Most of the schools were supported by the \$1.25 billion

ultrafast broadband network, which was supposed to be ready for use by 2016. MOE has also spent \$165 million on upgrading the networks and \$211m more on getting schools connected to the "Network for Learning" (Dudding, 2014). However, no mention was made about iPad use in early childhood education.

The iPad was first released in April 2010 and gained a high level of popularity in the world. For example, it was once estimated that in the first two months of availability two million iPads were sold (Ireland & Woollerton, 2010). Beschoner and Hutchison (2013) suggested that the iPad could be used as an instructional tool in early childhood education. Indeed an iPad is thought to be an instructional tool that supports children's learning. This tool helps children to be independent and capable learners (Curry, 2013). Thus, recently, the level of teachers' awareness about iPads as instructional tools has increased (Ruggles & Dawson, 2012).

In New Zealand, Falloon (2013) explained that there are two points of views on iPad use in education. The first claim was that iPad integration would possibly fail due to a lack of pedagogical models related to using the iPad. In spite of what is often reported about the benefits of iPad use in early childhood centres, Falloon has only offered some practices of iPad in New Zealand schools and universities. The benefits of iPads in the education sector, especially early childhood education, have been shown to reflect teachers' limited usage and practices of iPad and highlight the need for sustainable long-term professional learning on iPad use as an educational tool (Falloon, 2013). The other claim was that as schools continue the integration of new technologies, such as, iPads into their classrooms, the demand for these technologies may increase because of the learning opportunities the iPad may bring. In addition, Colbert (2012) a kindergarten teacher from New Zealand, noted that there were different uses for iPads in the centres that she visited.

In Australia, Yelland and Gilbert (2013) in their report advocated that teachers should be aware of the wider range of uses of tablets.

Theoretical framework

Vygotsky's socio-cultural theory insists on the importance of social interaction between children and their social context. This interaction is believed to support children's learning and guide their development. Those social interactions construct the meaning of the environment around children and it is important to formulate many concepts in learning (Vygotsky, 1987). Vygotsky also emphasizes the importance of providing a child with a variety of cultural tools to enhance their thinking and creativity. The iPad can be seen as a cultural tool (Vygotsky, 1987). Children are viewed, by Vygotsky, as constructivist as they are constantly constructing meaning from experience (Smidt, 2006). Children have the

opportunity to construct meaning through experiencing iPad use. I think when they choose and use a variety of iPad apps, they are able to experience learning opportunities by themselves. Thus, children present their own understanding through a chosen app, such as painting or drawing.

The iPad is becoming integrated into early childhood education, and is becoming a part of the educational environment. The iPad has the potential to be used as a pedagogical tool. This educational tool provides literacy and numeracy for learning, teaching and assessment, and supports language acquisition. That's obvious, Vygotsky regarded language development as vital for children's learning and for thinking (Smidt, 2008). The social interaction and experiences in the environment of the early childhood context provides children with a variety of educational tools for improving children's learning and skills. An example is interacting with the iPad as part of the educational context, and as a pedagogical tool that improves language and social interaction (Smidt, 2008). Thus, children's interaction with the environment includes the iPad as a pedagogical tool to support their learning, as explained in Vygotsky's Socio-cultural theory.

Statement of the Problem

This research aims to investigate the potential of iPad use in early childhood education. It examines the perceptions of early childhood teachers while teaching children using the iPad. It aims to explore beneficial and challenging perceptions, such as, iPad benefits to children, iPad benefits for teachers, iPad challenges for both teachers and children. This research explores what teachers think about using such highly developed technology and examines any potential teaching difficulties or challenges related to the use of iPad. Understanding the perceptions, experiences, and the pedagogy that accompanies the use of iPad will give insights into the benefits and challenges for both teachers and learners. The four teachers who chose to participate in this study were interviewed. The data from all the interviews was analysed and organised thematically. The teachers themselves brought up several other topics in the context of the semi-structured interview, and these topics were also explored.

Significance of the study

This research examines early childhood teachers' perceptions about the use of iPads in early childhood education. A major strength of the research is that a range of perspectives was sought from the teachers, as each of the teachers has had a role to play in influencing the use of the iPad in early childhood education. Importantly, a major emphasis was placed on capturing the teachers' voices, as they play a key role in providing and enabling the use of the iPad with the young children. Therefore, the study attempts to gather teacher' opinions and perceptions of the potential benefits afforded to their children through the use of the iPad. The aim of this study is to discover new insights and an understanding of the way in which teachers' perceptions about the use of iPad technologies in Early Childhood Education (ECE) influence the surrounding practice in the New Zealand Early Childhood Education. Little research has been conducted in early childhood education related to using the iPad. Thus, the exploration around the teachers' perceptions about iPad use in early childhood education is necessary, and provides a valuable contribution to the research on the use of the iPad in education, in general.

This study focused on early childhood teachers' perceptions toward the use of iPads in their centre. This study may be limited due to the small scale of the sample and time constraints, and data collection method .This study examines one early childhood centre, by interviewing registered teachers' perceptions about iPads after they used them in their teaching . The time for conducting the study was only one year. In addition, the data collection use in this study only consists of semi-structured interviews, which may limit the use of the data. Therefore, the findings of the study are only representative of the perceptions of this specific sample of teachers.

Research design

This research aims to answer the following main research question that is addressed during this study:

- What are early childhood teachers' perceptions about the potential use of iPads in early childhood settings?

This question represents the central issue at the core of the research study. However, it should be clear that there were other additional sub-questions to help the researcher elaborate on the main research question. In addition, other open-ended questions were

asked during the semi-structured interview process to allow the teachers themselves to express deeply and freely their perceptions on using the iPad in the early childhood centre.

In addition, to answering the main research question, these sub-questions were included in the interviews:

- What are early childhood teachers' perceptions about the benefits of using iPads in early childhood settings?
- What are the early childhood teachers' perceptions about the challenges in using iPads in early childhood settings?

A qualitative case study method was chosen as the method for this research. This method facilitates the exploration of a phenomenon within its context. It allows the researcher to explore and describe the phenomenon using a variety of data resources (Yin, 2003). This method provides an in-depth understanding of the situation (Merriam, 1998). The case study explores the case in detail by setting boundaries (Stake, 2005). The boundaries in this case study are that the data was collected in only one centre and I believe this method was appropriately used in this research because it provides a valuable contribution to an area where little research has been undertaken. The research aimed to study the use of iPad and its effect. Thus, investigations around the teachers' perceptions about iPad use in early childhood education were undertaken.

Outline of the study

The thesis is divided into six chapters. After this introduction and problem formulation, Chapter 2 introduces the literature on iPad use in different education sectors, and the integration of other technologies in the education sector. In Chapter 3, I have outlined the methodology that I used in order to achieve the goal of exploring teachers' perception about the benefits of the iPad and their perceptions about the challenges associated with it. In general, chapter three addresses the methodology of the research as well as the research design and process.

In Chapter 4 I analysed the teachers' responses to the interviews in order to determine the findings. Thus, my focus was on studying the main research question and the sub-question and how to relate the findings to those questions. I studied the teachers' perceptions in conjunction with the benefits and challenges of iPad use in early childhood education. This led me to propose the two main findings that answer the research questions. They are as follows: the iPad as a pedagogical tool has benefits in early childhood education as well as challenges. The benefits were summarized as that the iPad can be used as an instructional tool to support teachers' daily practices and formative assessment of children's learning, and can be used as a learning tool to also support children's learning and help the children develop their learning and skills. The challenges involved with using the iPad in the early childhood centre were addressed by early childhood teachers who faced difficulties in iPad management in their classrooms mainly due to the shortage of professional development and training on iPad use in their context. Chapter 5 concentrates on a discussion of the research findings in light of the studied literature in chapter 2 and the researcher's reflection on the teachers' original responses to the interview questions. In Chapter 6 I reformulated the main findings of the thesis, and I suggested recommendations for future research.

Chapter two: Literature review

Introduction

This chapter provides an overview of the literature that informed my research topic of the early childhood teachers' perception on the potential of iPad use in early childhood education. Whilst the literature that has been reviewed is related to the area of early childhood education, where no relevant literature was found, the search was expanded to include literature from elsewhere in the education field. The literature shows that the use of the iPad in early childhood education and the intervention of recent technologies has greatly influenced teachers' methods and strategies and has had a positive impact on learning for children (Almekhlafi & Almeqdadi, 2010; Brand, Kinash, Mathew & Koryban, 2011; Bryne 2015; Karsenti & Fievez, 2013; Ireland & Woollerton, 2010; Jones, 2015; Kucirkova, 2014; Ostashewski & Reid, 2010; Prensky, 2010). This includes having an impact on educators' expectations regarding what comprises an appropriate teaching-method that includes iPads in early childhood education. While assessing the appropriateness of using iPads in early childhood education, it is beneficial to involve children in order to ensure the children are aware of iPads in an educational context. It must be emphasised that it is only recently that there has been any experience at all with iPads in early childhood education.

This literature review establishes a contextual framework for this study by incorporating the relevant research that is fundamental for understanding the different issues related to this study. Specifically, it includes the following sections: the background in regard to the use of iPads; iPad practices in early childhood; iPad practices in the primary school sector; iPad practices in the secondary school sector; iPads in the tertiary sector; and iPads in curriculum areas.

At the time of writing this thesis, although there was little research that had been completed in the context of early childhood education (ECE) in New Zealand on this topic, there were on-line comments posted by teachers about their experiences and opinions regarding the use of the iPad in early childhood education. These comments provide a critical review about the way iPads are being used in early childhood education.

Some research claimed that the integration of iPad is still in development (Byrne, 2015). Byrne conducted a small collection of studies of iPad use in schools because he felt he did not have enough information on this topic. He mentioned several studies as examples and evidence from around the world about iPad use and interestingly mentioned that the results varied. One example provided by Byrne was, from the Department of Education and Early Childhood Development for Victoria, Australia, which studied the use of iPads in nine schools. The department reported that iPad use was more successful at primary and special schools than in secondary schools.

Another example by Byrne, from England, is a study based on iPad use at Long Field Academy, entitled “the iPad as a Tool for Education”. In this example, the academy students and teachers were surveyed and the results revealed that there were differences in students’ and teachers’ perception about the impact of iPad use on their achievements. Byrne (2015) in a study named “Reading with iPads – The Difference Makes a Difference” explored the impact of iPads on the reading skills of boys aged 11 to 13. The reading skills (reading comprehension, knowledge of content, and analysis) were examined in the light of iPad use. An example of a study on distance learning in the tertiary sector was also provided in the Byrne (2015) collection. Another example in the tertiary section was presented by Byrne entitled “Promoting Student Engagement by Integrating New Technology into Tertiary Education: The Role of the iPad” examined teachers’ and students’ use of iPads in two learning environments. The results were that students were able to benefit from their use of iPads. The last study provided by Byrne is entitled, “The Impact of the iPad and iPhone on Education”. In general, Byrne indicated that there was a shortage of research on this topic.

The background to the use of iPad as educational tool

The iPad, first released in April 2010 (Ireland & Woollerton, 2010), was the newest member of the second most popular mobile operating system in the world by sales, after Android. It was created and developed by Apple Inc. The (iOS) family of devices that includes the iPod Touch and iPhone has gained a high level of popularity in the world (Apple Inc., 2016). For example, it was once estimated that in the first two months of availability from 3 April to 31 May 2010, two million iPads were sold. Besides the iPad itself, iOS devices seem to be popular given the evidence that as of 1 September 2010, 120 million iOS devices have been sold worldwide and 230,000 new devices were being sold for each of those days. By definition an iPad is defined as a tablet computer which

uses a touch-sensitive screen, allowing users to control the device with their finger(s) (Ireland & Woollerton, 2010). Physically, the iPad has a 9.7 inch (diagonal) screen that displays 1024-by-768-pixel resolution at 132 pixels per inch with a data capacity of 16GB, 32GB and 64GB. The iPad is used by older students in a variety of ways including as a discovery tool and for note taking, organizational tasks, research, presentations, homework, sharing and reading. Complicating app development even more is the arrival of touchscreen tablets. Since the iPad was introduced in 2010, it has been a phenomenal success for Apple. iPad sales have far exceeded most expectations and eclipsed sales of earlier tablet computers, which never caught on except in narrow niche markets. Whilst apps developed for the iPhone will also run on the iOS-based iPad, to take advantage of the larger screen they need to be modified, which may entail a revamping of the user interface. One of the first commercial language learning apps, the heavily marketed hello-hello app, was designed especially for the iPad. This app is helpful for learning several different languages. Meanwhile tablets from other manufacturers are becoming available, many using the Android system. The Android tablets vary in size. Thus, since mobile devices have become even more powerful and versatile, we are likely to see more users make them their primary, and perhaps even their sole computing device. It is a trend that all educators cannot ignore (Jones, 2011).

According to Johnson (2011) one of the unique features of the iPad is the mobility feature the iPad's wireless telephone connection capability provides which allows unlimited access to the Internet from different places. The students were always interested in finding information, as they had access to documents and data. However, since iPads do not have USB ports, disk drives or CD-ROM/DVD capability, methods for sharing data with other computers and devices over the Internet or "cloud" have been developed. Dropbox.com allows students to set up a personal account in which they are able to store iPad-created documents, photos and field notes. They were able to access their documents from any other computer or Internet-capable device. Evernote helped the students to keep track of their notes and Mandalay organised their research documents and let them connect to their document wherever they happened to be. Project Gothenburg allowed the students to download many books to be read on the reader apps that were available. With HMMH Fuse app, students had at their fingertips the entire Houghton-Mifflin Algebra with exercises and tools for learning algebra. The teachers, moving around the classroom and interacting with students, were able to control students' computers from their iPad with the Remote Mouse app. The teachers used a simple cable connected to their iPads to present their unique and creative Prezi presentation made on

their computer using the iPad application called Prezi Player. The teacher controlled the document by simply pinching, twisting and sliding their fingers across the face of the iPad.

The results of survey data by Ireland & Woollerton (2010) showed that approximately 72.7 percent of older students currently have an iPod touch or iPhone compared to owning an iPad. Moreover, 45.6 percent aspired to iPad ownership and 70.9 percent of all students surveyed by Ireland and Woollerton responded that they thought the iPad could be a useful device to use for studying. These results illustrate that there is the future of iOS devices, including employing the iPad in educational contexts, such as, in early childhood centres. It has therefore been claimed by Ireland and Woollerton that the iPad has the potential to revolutionize the world of learning and teaching in the coming years. This is mainly because in addition to its convenient size, the process for creating digital versions of books and magazines is much simpler with an iPad than if institutions were required to stock these resources.

IPad use in early childhood education

Many preschool programs are also beginning to purchase iPads. For example, Beschoner and Hutchison (2013) described the use of iPads in two preschool classrooms of four and five year-old children. They considered how iPads, as a literacy teaching tool in early childhood, can be used in a developmentally appropriate manner with young children. Indeed, for many reasons, the iPad is slowly replacing computers in school. These reasons include certain benefits and advantages the iPad offers for use in education including price, ease of use, size and portability, touch screen and applications. Ostashewski and Reid (2010) studied the specific application of the iPad in the classroom. They found that teaching strategies which utilised the iPad as a teaching tool benefited from several key advantages over previous generations including, for example, ease of interaction (touch screen), increased screen size, controllable multimedia playback, effective volume, and various data collection capabilities.

An iPad is also considered to be an instructional tool that supports children's learning. This tool helps children to be independent and capable learners (Curry, 2013). Curry's action research (2013), implemented in the city of Salem in the state of Oregon in the United States, confirmed that iPads do increase academic gains in Kindergarten and create and support enthusiasm for children in terms of their learning. The conclusions drawn from Curry's research strongly support the idea that iPads allow students more

independence in their learning. This simply indicates that iPads have the capacity to reshape the ways that teachers think about traditional education. For example, in Curry's research, students were quick to identify their favourite app and they were eager to show why they liked to use the app. This confidence and ability to express their choice is clearly related to the independence in their learning that they exhibited.

In Norway, Sandvik, Smerdal and Osterud (2012), observed that while an iPad was used the children's smooth turn-taking in controlling the tablet is strengthened by the device's portability and shared display. It was also easy for them to cooperate, easy to participate and easy to share. Moreover, the children were able to transfer their experiences from the educational or home setting in a digital context (Sandvik, Smerdal & Osterud, 2012).

The iPad's app features and app content can influence the extent to which children's engagement is of educational value. The app supports easily accessible open-ended accomplishments and because of this open-ended learning it is more likely to have a positive educational impact. A study from Madrid, Spain by Kucirkova and his colleagues (2014) investigates the effect of a story-making app called Our Story and a selection of other educational apps signed to support the learning of children of 4-5 years of age. Both quantitative and qualitative indices of the children's engagement were considered. Kucirkova Messer, Sheely and Panaderp (2013) advocated that the overall findings suggested that in terms of the Bangert–Downs and Pyke taxonomy, the quality of children's individual engagement was higher with the iOs apps in contrast to their engagement with the software from other apps. The frequency of children's use of exploratory talk was similar with the iOs and colouring and drawing apps, and a detailed qualitative analysis of the interaction transcripts revealed several instances of the iOs and drawing apps supporting joint problem-solving and collaborative engagement. In addition, this study indicated that children generally prefer using a technology-mediated method of learning using an iPad more than a traditional method. This is an important message for educational professionals.

Beschorner and Hutchison (2013) suggested that in terms of the iPad, in particular, it is one tool that young children can navigate and use independently. They indicated that children can develop emerging knowledge about print in digital contexts using an iPad, or similar tablet, and that it offers unique ways to employ reading, writing, listening and speaking within one context. Specifically, children use environmental print to navigate within and between apps and can use the iPad to read, write, and talk about print.

Whilst iPad apps have caused transformation in teaching and learning, it has been suggested that the iPad is the tool that can transform classroom practice (Johnson, 2011). The iPad has a number of unique features that provide interesting possibilities in teaching and learning. According to Johnson (2011), kinaesthetic learners benefit by using iPads. The motion sensor of the iPad has a number of important applications for kinaesthetic learners. The iPad motion sensor allows students to use their hands in guiding the iPad thus they are using their balance and control skills. Students used a variety of apps that supported their learning. Johnson provided several examples on iPad apps that were effectively used by students. For example, the Clinometer app was used for measuring, and the iPad camera allowed documentation photos to be taken. In addition, an app called Field Notes LT was used for taking copious notes of the observations showing time and place. Students attached videos and voice recordings to their field notes. The Dragon Dictation app and the Assemblée app and web collaboration were used by students to share information. The iPad GPS and Map app were useful in the math class. GPS established the locale in profound ways. Map app was helpful to calculate the distances, routes, and speeds of the trip planning and decision-making utilised actual real-time photographs. The Google Earth app and Big Blue Marble HD supported trip planning and actual real-time photographs, maps and weather data. By using the app Tour Wrist with the use of DerManDar, the students were able to take their own 360 degree pictures of places they visited (Johnson, 2011).

For iPads to be developmentally appropriate in early childhood education, their use should be responsive to the children's backgrounds (NAEYC & the Fred Rogers Center, 2012). It is the teacher's responsibility to make appropriate choices about using iPads with children. For example, the statement on the use of technology and interactive media as tools in early childhood programs serving children from birth through age eight years (NAEYC & the Fred Rogers Center, 2012) provides general guidance for teachers on developing appropriate practices for using technology and interactive media. According to this statement, iPad use should be appropriate to the ages and developmental levels of the children and responsive to their individual needs and interests and their social and cultural contexts. Thus, teachers should use professional judgement in evaluating and using an iPad, just as they would with any other learning tools or experiences. This is critically important since teachers need to include affordable and accessible technology and media in their learning programmes (NAEYC & the Fred Rogers Center, 2012).

However, iPads should not replace other beneficial educational activities (NAEYC & the Fred Rogers Center, 2009). Teachers should provide a balance of activities in their programs for young children. For example, iPads should not replace activities, such as, creative play, outdoor experiences, and social interactions with peers and adults in early childhood settings. The iPad should also be recognized as an educational tool that is valuable while used intentionally with children to extend and support creative and authentic learning.

Shifflet, Toledo and Mattoon (2012) illustrated how to incorporate iPads in early childhood education using best practices. Shifflet and his colleagues selected “Cassandra’s preschool classroom” as a natural environment for them to test their ideas on how to incorporate iPads using best practices. As Cassandra introduced the iPads into her classroom, she encountered four surprises. The first was cooperation. In other words, the children were sharing ideas, helping each other find apps and asking each other questions. Many apps encouraged creativity, for example, the drawing apps that were popular with the children. While using the drawing apps, Cassandra discovered the second surprise, namely, collaboration. She found that the children collaborated to design their pictures and create art. The third surprise supported the NAEYC statement about finding a balance between educational activities. Cassandra found that the children naturally moved to engage in other hands-on activities in the classroom. And finally, the fourth surprise was a connection to the real world. The iPad helped reinforce real-life experiences within developmentally appropriate practice. For example, the technology helped reinforce cookie-making steps and reinforced the children’s vocabulary.

Teachers need to use iPads wisely to support children’s practice while considering ways to integrate iPads into their classrooms (Colbert, 2012). Colbert, a kindergarten teacher from New Zealand, noted that there were different uses for iPads in the centres that she visited. Some early childhood centres only used iPads rather than other tablets. In addition, she noted that iPads were used in a variety of ways within the centres. Some were used in ways that supported teaching and learning, whilst in other centres iPads were left very much up to the children to navigate and engage with. Additionally, children often chose to just switch between apps instead of engaging in real deep learning while they are introduced to many apps within ECE. Thus, she believed that the practice of “less is more” is applicable while selecting from the well-known apps, such as, Safari, photo booth, mail and using the camera. Additionally, online programs could be used to

enhance collaboration and communication between children and private blogs could also be used to upload stories. However, Colbert believes that teachers need to maintain learning and teaching as their priority while they are in the process of considering and selecting an app for gaming on the iPad.

Yelland and Gilbert, writing in Australia, completed two reports on the use of iPads with young children. The first one titled *iPlay, iLearn, iGrow-ipads for learning*, was written in 2012 and the second that is titled *Smart Start: Creating new contexts for learning in the 21st century* was completed in 2013. Yelland and Gilbert (2013) in their report advocated that teachers should be aware of the wider range of uses of tablets. These uses enable learners to become creators and innovators and support them in their reflections about whatever they encounter in learning or in the real world. In the first study, they stated that the project was designed to build on the successful IBM project Kid Smart Early learning program by exploring the potential of tablet technology for knowledge building, meaning making and learning.

The second phase of their project was designed to explore the ways in which tablet technologies can be used to extend learning in early childhood settings. This resonates with the demand for students to be fluent in 21st century skills. This project was designed to build new relationships between pre-service teachers and practicing teachers. It was also designed to create a partnership between schools and universities to promote 21st century learning. Their findings show that teachers work collaboratively to incorporate tablets into their pedagogical repertoires, and multimodal learning is facilitated while iPads are used in early childhood contexts. Hence Yelland and Gilbert believe that opportunities for learning with iPads were transformative. Professional learning contexts were designed by these researchers to share exemplary practices. Nevertheless, it was also apparent that it was difficult for preservice teachers to incorporate the use of iPads without specific educational assistance.

A study by Michael Cohen Group LLC from United States in 2011 studied the Touch screen technology, which has introduced a first generation of tools that afford remarkable access and potential for creativity. This study focused on 60 children who were from two to eight years of age. Children participated in one-on-one in-depth interviews and observations were made on how the children used the technology.

The apps currently designed for children include three general types that include gaming apps, creating apps and e-books. Creating apps provides a set of tools for drawing and building. The findings of the study showed that children prefer creating apps and gaming

apps specifically. They prefer gaming apps because they afford ready access and provide interactive games that are easy to learn and exciting to master. Additionally, the study findings show that engaging with creative apps often shifts the child's focus away from the subjective experiences of winning or losing to a personal-best competition. Thus, children progress quickly from novice to mastery while in the process of using a well-designed app.

Children's initial reactions to the iPad are shaped by their developmental level, prior experiences with technology and the design of the app interface and game (Michael Cohen Group LLC, 2011). The access children have to the iPad is a result of the child's expertise in terms of how the fit between the app content matches the child's developmental level. According to this study the child's experience is characterized by learning by doing, building on their existing skills and by being motivated by their own interests. Ideally, the use of digital tracking and analytics identifies the child's level of mastery and provides feedback in the area of extending learning. At best, the iPad offers a mode of interactive experience that mirrors the child's natural constructivist learning. Therefore, there are several types of learning that occur during app play. These include the tacit learning of the game and how it works, the mastering of explicit learning tasks, the matching and counting embedded in the game narrative, and the use of the skills and models learned and applied to other types of games and levels of play (Michael Cohen Group LLC, 2011).

Recently, the level of teachers' awareness about iPads as instructional tools has increased (Ruggles & Dawson, 2012). Ruggles and Dawson (2012) examined teachers' perceptions in regard to using iPads with kindergarten through third-grade students participating in a not for profit after-school tutoring program. Their study involved 77 pre-service teachers enrolled in a technology integration course at a university in Florida in the United States. Ruggles and Dawson suggested that the opportunity to use the iPad with the students helped the teachers to value the use of the iPad in teaching.

There is a need to construct new pedagogy while using the iPad in the classroom. Because some teachers resist change, the implementation of the iPad in their classroom could be inappropriate (O'Mara & Laidlaw, 2011). O'Mara and Laidlaw as teachers, authors and mothers conducted personal experiments in a unique study that involved their children as iPad users outside the classroom in order to reflect on the use of the iPad, in general. They documented their observations of their own young children's usage of technology in their homes. The study by O'Mara and Laidlaw is an international research study based on Canadian and Australian curriculum documents. It showed the need to

develop pedagogical approaches to educational practices using the iPad. In addition, they insisted on the inclusion of iPads as a dominant tool in facing 21st century challenges (O'Mara & Laidlaw, 2011). They also provided examples linking to media news stories in both countries, addressing the use of touch-screen technologies in schooling and examining how these practices were very different from the practices they observed in their homes, where the children had relative openness and freedom in their iPad usage. O'Mara and Laidlaw demonstrated the ways in which their own children began to use iPads where they used the features of texts and created new sorts of narratives that open possibilities for literacies in multiple ways. The authors argued that, once translated into classroom practices, iPads tended to be governed by some specific classroom practices that resisted the new transformative process and which created challenges and issues for teachers' and students' engagement and practice. Regarding the seeming resistance to integrating iPads as new technologies at the early childhood level of instruction, O'Mara and Laidlaw made suggestions for creating opportunities for transformative technology use in education. It was suggested that perhaps it was not the technologies that were problematic; rather it was the methods that were being used to implement them in classrooms, where exploration and children's freedom to investigate were highly valued. That is to say, innovative early childhood educators might take up iPads and use them in new ways. Thus, it was believed that classroom use of interactive iPads should incorporate some of the innovative pedagogy that the children experienced with iPads in their homes.

Since the first appearance of iPads in 2010, they have been heralded for their potential to revolutionise the education of young children (Kucirkova , 2014). Since iPads are multi-modal, they allow users to use texts, pictures and sound. In comparison with other technologies, iPads have three unique features that comprise an educational tool with the potential to make a positive difference to early childhood education (Kucirkova, 2014). First, iPads are light-weight, unlike netbooks and laptops. Second, with the iPad, there is no need for separate input devices requiring certain levels of dexterity, such as, a mouse and keyboard. Third, they have a variety of beneficial apps, many of which have a child-friendly intuitive design. With several of these apps, iPads provide opportunities for children to create their own content and participate in rich and dynamic learning contexts. Kucirkova (2014) studied the research that has been conducted on the use of iPads by children from 5 to 8 years of age. The iPad research describes many educational benefits which are yet to be realised and formally evaluated. Consequently, this learning potential of iPads is directly related to the teachers' ability to use the pedagogy which contextualizes

the iPad use to make a difference to children's learning, and creatively link them to the curriculum. Thus, where there is a shortage of qualified and effective teachers, iPads can be a cost-effective means to enhance the learning process (Kucirkova , 2014).

IPad practices in the primary school sector

There are many promising opportunities for iPad use by teachers and students in the school sector (Chou, Block, & Jesness, 2012). These opportunities include positively enhancing instructional activities, such as, the implementation of student-centred activities, and providing teachers with updated information as needed. The case study of Chou and his friends reported findings from a four-month pilot project concerning one-to-one learning with iPads in a 9th grade geography classroom in a large K-12 school district in the United States. It showed that iPad integration has a positive impact on student learning, seen in improved active engagement, increased time for projects that students worked collaboratively on and the provision of digital information. Whereas the challenge for student learning was mainly the distraction caused by the multitude of irrelevant apps and websites, the challenges for teachers' practice included a lack of teacher-selected apps and the necessity for more time to prepare their lessons. Thus, teachers need to attain and conduct a training program on iPad use (Chou, Block, & Jesness, 2012).

Primary school teachers' perceptions towards the iPads as an instructional and assessment tool that supports their teaching were studied by Beauchamp and Hillier (2014). This report evaluated the implementation of iPads in six primary schools with varied catchment areas across Cardiff, Wales. The authors explored the introduction and implementation of the iPads and assessed the impact the iPads had on the attitudes and motivations of teachers, parents and pupils. The data was collected via surveys and interviews. Online surveys were completed by 52 parents from four schools and 70 teachers from five schools. In addition, small group interviews were conducted with 120 pupils from years 1, 3, 5 and 6 and 23 teachers from all six schools. The teachers had positive perceptions about iPad use in the classroom and perceived that the iPad helped them teach, as well as assess the progress of the students.

The results showed that iPads had the potential to motivate both pupils and teachers. Their use in school, along with other technology, was valued by parents and seen as beneficial for the students' futures. In general, all of the teachers reacted positively to the pupils assisting them with the iPads and in many cases encouraged them to support

other pupils in the class as well. The iPads increased the levels of teacher, pupil and parent enthusiasm and motivation and enhanced pupil independence. Positive features included the ease of use, and how the iPad supported the various methods of assessment. It is interesting to note that the small sample of parents in this study was confident about using technology and keen to learn how it could be used in education.

This change in the role of the teacher to the learner gives greater pupil autonomy. The role of teacher as facilitator is different from other models of classroom technology, such as, the interactive whiteboard, where the teacher acquires a level of competence (and indeed confidence) with the device before using it with pupils. While the dominant students' use of iPads reported by teachers was in conducting research, it was also used as a device to support learning in a range of areas of learning subjects by using both Apps and other multimodal tools on the iPad. Teachers also reported using the iPad as an assessment tool and described the various ways in which the features of the iPad (including sound and video recording) can be used in both summative and formative assessment, by both teachers and pupils. Teachers reported that evidence of learning and assessments can be easily shared within the classroom (for example, with Apple TV) and beyond (for example, emailing files, storing on the school network or Cloud-based systems, such as, Dropbox). This should become easier with recent advances in the speed and availability of Wi-Fi networks (Beauchamp & Hillier, 2014). Teachers were confident that iPads were reliable and did not worry that they would be damaged in use. However, since not all schools use the iPads sufficiently and as the iPad is merely a tool it is how pupils and teachers use it that matters. However, the importance of both the informal and formal methods of iPad training was emphasised and teachers reported that although initial formal training on the basics of operation can be useful, the iPad was intuitive to use and easy to learn.

Accordingly iPads have the potential in elementary schools to enhance both teaching and learning (Gasparini & Cule'n, 2011). Gasparini and his colleagues discussed the integration of iPad use in elementary classes, specifically with fourth grade students. These researchers observed, as well as interviewed, the families and teachers of the fourth grade students. The researchers reported that children's learning practices have changed and that iPads have influenced students' learning, play and even more, the students themselves were independent and able to influence the curriculum. For example, students improved in their reading and creative activities, including searching for information and 3D viewing. Through this experience, they were able to practice learning tasks on the iPad. The students expressed their gratitude to their teachers. For example,

one student said that the iPad was one of the best things they had ever had at school. The practice of using iPads brought the students closer to each another. However, iPad practices needed to be reviewed over an extended period to see what would happen with how the students used the iPads. A problem arose with the fourth grade students while they were using iPads in the mathematics classroom, as the iPad did not support the flash that was required for the digital content (Gasparini & Cule'n, 2011). Another obstacle to fuller use of iPads is the language since not all of the children were native English speakers.

The iPad is becoming the preferred digital device for educating students (Prensky, 2010). The iPad features (full operating system, multiple apps and touch screen) make it the preferred device, not in terms of actual usage, rather in terms of utility. In addition to this, the combination of all the great features of iPhone and itouch, such as, the size of the iPad, add to the iPad features. Prensky (2010) stated that teachers and students were likely to prefer the size of the iPad and find it more appropriate than the iPhone and itouch. However, there are other issues relating to the size of the iPad in that it does not fit in the student's pocket, unlike the iPhone or itouch. Thus, a well-designed iPad case, that was easy to carry and stylish was necessary for students.

In a further study in the United States, Karsenti and Fievez (2013) studied the benefits, as well as the challenges, of iPad use in primary school, or grade school. They carried out a large-scale survey of 6,057 students from Grades 6 to 10 and 302 teachers and other education stakeholders. The participants responded to a questionnaire and interviews were held with some participants. In addition, the authors supplemented these methods of collecting data with 18 videotaped classroom observations. The results presented in their report stated there were many benefits, as well as challenges, that were highlighted by both students and teachers. The following were the main benefits encountered. The iPad was found to be an instructional tool that increased student motivation and it provided greater access to information. The iPad was portable and made it easier for making notes, especially on PDF documents. The iPad also eased work organization, improved the quality of students' presentations and the quality of teachers' presentations was also improved. The iPad enhanced collaboration among students and between students and teachers as well as supported more creativity. The iPad contained a variety of resources that could be used, such as, images, videos and applications and, at the same time it allowed the opportunity for students to work at their own pace. The iPad encouraged the development of the computer skills of the students as well as the computer skills of the

teachers, the iPad improved reading experience and helped teachers cut down on paper. In regard to challenges, the following were the nine main challenges encountered. The teachers felt that the greatest challenge for them was that iPad provided a kind of distraction for their students. The students and teachers faced problems with writing lengthy texts on the iPad. They thought that the iPad did not make learning to write an easier process. Students and teachers worried that some of the textbooks were inappropriate for working with touchpads. Teachers faced certain problems related to course planning and iPads presented challenges for teachers in organising the students' work. Teachers found it very difficult to find available resources for the iPad. Teachers stated that eBooks were rarely used in an efficient way and teachers and students found the function of the touchpad challenging. Teachers stated that as a result of the distraction mainly from the touchpad, the academic performance of the students suffered. Therefore, for successful integration of the iPad and its apps into daily classroom learning, it is necessary to provide teachers with a professional training program.

In the United Arab Emirates, teachers trust their abilities and competencies to integrate technology successfully into their teaching (Almekhlafi & Almeqdadi 2010). This study investigated technology integration at United Arab Emirates (UAE) model schools utilising a mixed method of data collection consisting of focus group interviews and a questionnaire. The study sample consisted of 40 female and 60 male teachers from two schools in the Al-Ain Educational Zone in Abu Dhabi. The study results showed that teachers at both schools were integrating technology into the activities of their classes. The teachers used a variety of technologies to promote student learning. However, the methods of integration by male teachers differed compared to their female colleagues. The results showed that both male and female teachers at UAE Model Schools had a high self-perception of their abilities and competencies to integrate technology successfully into their teaching. In addition, the results revealed that teachers integrated technologies by using different strategies according to the classroom and the challenges that they faced. Technical problems, the large number of students, a lack of professional development training, lack of motivation and financial support, and negative teacher and parent attitudes toward the impact of technology on teaching and learning affected the use of digital technology in the classroom.

Similar to early childhood education, iPads have the potential in both elementary schools and secondary schools to enhance both teaching and learning. As an instructional and learning tool, this section seeks to provide practices that early childhood teachers may possibly be able to benefit from using the appropriate strategies to integrate the use of the iPad.

The New Zealand Herald newspaper, reported that the decision to make iPads compulsory in the Auckland secondary school caused controversy when it was announced in 2011, but now iPads are a compulsory instructional tool in the majority of Auckland secondary schools (Jones, 2015). It was reported that nearly four out of five Auckland secondary schools ask students to bring a device, such as, an iPad. A Herald survey of 81 secondary schools in Auckland demonstrated how accepted the practice of bringing a device into the classroom is, and secondary schools are adding expensive electronics to stationery lists. The results showed that 78% of schools required students to bring a device to use in class. Interestingly, the survey showed that most low-decile schools allowed any device to be brought to class; for example, at Papatoetoe High School, where the majority of students brought a device, it was normally a smartphone.

IPad practices in tertiary sector

In the tertiary sector, a correlation between mobile learning and iPads has been studied (Brand, Kinash, Mathew & Koryban, 2011). The undergraduate students surveyed were positive about mobile learning. For example, empirical research conducted by Brand, Kinash, Mathew and Koryban (2011) tested the efficacy of mobile learning with iPads. To do this, they used textbook, blackboards, and applications connected with a learning management system. They studied about 135 undergraduate students enrolled across two semesters. They used the Apple iPad, and were asked whether the iPad was considered a tool which supported their mobile learning and whether it added to their existing tool of technologies. The results suggested that the students reflected an enthusiastic and positive attitude toward the emerging mobile learning platform of the iPad, and as it added something to their performance, so they gained higher marks. In fact, students who borrowed iPads twice gained higher marks than others. However, the students expressed the view that they were unconvinced that the iPad itself made a difference to their learning and the iPad should be integrated fully with the curriculum design and ensure student engagement in order to be effective. These researchers added that these findings were preliminary and should be treated with caution, as higher marks may not only be because of the use of iPad itself. In terms of those who borrowed

the iPads and the fact that they had better grades was perhaps indicative of the motivations of the students and their eagerness to learn, their eagerness to use technology, and their eagerness for innovation and engagement in the classroom. Certainly the results indicated that the ability to use internet-connected technologies during class is important to students, particularly in a class on digital media and society.

A qualitative study conducted by Wakefield and Smith (2012) suggested that the iPad supported a collaborative learning environment. After the iPad was issued to the undergraduate and postgraduate students in August 2011, the authors conducted research where the students were selected randomly, in a face to face course in Multicultural Education. The students were engaged in finding, evaluating and using information, critical thinking and problem-solving activities as necessary skills that were practiced in the course. It is important to mention that the students were also encouraged to use the iPads in all of their courses throughout the fall and spring semesters. The results showed that the iPad was successfully implemented into a university level course. It was a paperless course that achieved the major iPad implementation goal which was to shift from the traditional teacher-centred environment to a student-centred collaboration mode for learning. Consequently, the students responded positively to the collaborative environment that was created. They acknowledged this course as meaningful, engaging and challenging and they were comfortable using the iPads in their university learning.

Additionally it was found that iPads contribute positively to students learning (Rossing, Miller, Cecil, & Stamper, 2011). The growing use of iPads heavily features in the learning activities of the present and future, such as, in research and with student – faculty communication. For example, the survey and open-ended responses of 30,000 students (conducted by a team from Purdue University in Indiana) explored the impact the iPad has on student learning. Overall, students' responses indicated that iPad use contributed positively to the learning experience and resulted in better student learning and engagement. It also enhanced attention and engagement in learning activities and promoted a collaborative classroom environment. This is because iPads offer benefits, such as, access to information and advantages for collaborative learning. And although, iPads may also distract learners and cause frustration in the classroom, if they are incorporated wisely into the classroom activities, teachers can maximise their potential to enhance learning.

Use of iPad in curriculum areas

iPad in mathematics

Using iPads is of great benefit in preschool settings, especially when more children became familiar with the technology and teachers used it more often. The iPad apps support students' learning in mathematics, for children at 4 to 5 years of age in an inclusive mixed ability classroom (Aronin & Floyd, 2013). One of the several science, technology, and mathematics (STEM) classroom apps available is called Monkey Math. According to Aronin and Floyd, this app provided the students with reinforcement and motivation in their learning, so students, especially those with poor fine motor skills, were more likely to stick with their activity. Therefore, iPads were found to be efficient in teaching STEM concepts in the inclusive preschool environment and improving children's learning academically in STEM concepts, and was helpful for students with specific areas of need in this age group. However, the authors mentioned that iPad use also presents challenges and concerns as well as beneficial aspects. The authors suggested that teacher-led learning stations with a small group of three or four students of mixed-ability levels is the appropriate strategy for introducing the iPad at first. After that, as the students' confidence and independence improves while using the iPad, the opportunity should be taken to lead discussions and expand the learning from the apps to the classroom environment, specifically in the STEM learning concepts. Two of the strongest challenges relating to inappropriate iPad use in terms of how the students interact with the iPads were mentioned by Aronin and Floyd (2013) as follows. The first challenge was that some students faced problems with applying the correct pressure required to manipulate the touch screen. They suggested a possible solution for this issue would be to have the students interact with the iPads using a stylus rather than their fingertip. However, using the correct amount of continued pressure can assist students with their fine motor development and, for some students, the motivation to use the technology may keep them playing long after they would normally have stopped. The second challenge was that, when the iPads are laid flat on the desk, some students may have difficulty looking down at the screen. Consequently, they considered that propping the iPads up with a slant board or large binder or purchasing a cover would help with this feature. Also, if necessary, a ruler could be placed over an edge of the iPad to help

support the arm of a student who was having trouble applying pressure to the screen in multiple places at a time. They added that, for students who have a palm grasp, a stylus could be placed in a tennis ball for additional support and manoeuvrability.

In another context, the iPad is an effective instructional tool to use in academic situations with students with disabilities (O'Malley, Jenkins, Wesley, Donehower, Rabuuek & Lewis, 2013). This research was conducted by O'Malley and his colleagues in a study with 10 students enrolled in a special education school. It examined the effect of the use of a basic maths skill application on an iPad to increase basic maths fluency. The results revealed that teachers perceived that the iPads had a positive impact on students' engagement and interest in the content. However, professional training was required so that teachers could integrate iPads into their daily practices.

In the relatively recent past, early childhood education in New Zealand has implemented the use of iPads. The view is that "smaller devices are better able to facilitate social collaboration than PCs which users must use singly, and the rise of more social application software enables much better opportunities for collaboration than was possible in the past" (Henderson & Yew, 2012, p.79). Henderson and Yew's research revealed that there were great benefits from the easy access to information and the supportive collaboration that occurred while children were provided with iPads in the classroom.

Moreover, iPads have had an impact on maths teachers' professional development (Kearney & Maher, 2013). Kearney and Maher conducted a research study in Sydney, Australia to explore the influence of the iPad on maths teachers. Kearney and Maher's project explored how mobile learning approaches can enhance pre-service teachers' professional learning. The maths teachers used iPads to note and capture implications for their teaching. There were signs of collaboration, such as, conversations and data-sharing through social media, and the student teachers valued the role of the iPad in facilitating conversations about learning activities. Other findings included the use of iPads to enhance the pre-service primary teachers' ability to capture evidence of their professional learning. They used the iPads to take notes, observe lessons and create multi-model reflections. They also used a range of iPad-supported math techniques in K-6 settings, and e-portfolio development. In this way, maths teachers developed their knowledge in terms of using technology to support maths teaching. The iPad facilitated an enhanced awareness of maths in an everyday context, and this knowledge was then used to develop rich, contextualized ideas for the teachers' own tasks.

In terms of the utilization of iPads for teaching and learning, the idea has been controversial and many studies have tested the validity of claims about the usefulness of various iPad applications. In many respects the iPad has been at the cutting edge of both hardware and software innovations ranging from multi-touch interfaces and energy consumption to distribution models for software (Murray & Olcese, 2011). Nevertheless, the study by these authors suggests that these advances are underused in teaching and learning applications.

It is very important to manage the iPad use in the classroom (Gentile, 2012). While incorporating iPads into the curriculum brings new educational opportunities, teachers experienced a new set of problems, for example, management and content delivery. The applications to meet these challenges are still in development. Increased demands for new apps and other content to enrich the classroom experience will be inevitable as the technology evolves. There are security policies, content management and access control issues relating to the iPad that should be taken into account before students use the iPads. As schools continue to integrate iPads as a new technology into their curriculum, a strong mobile device management solution is compulsory to support these requirements. Additionally, the budget should be reviewed and revised to include costs for mobile device management before such tablets are purchased. Teachers have used iPads to distribute specific documents, including media, videos, and applications. For example, a teacher could select specific documents/textbooks, applications, videos, and curriculum related to a subject, such as, algebra and target content to the specific tablets used by the students enrolled in the classroom. In this way, teachers could select appropriate content for their students.

IPad in music

According to Riley (2013), the usefulness of the iPad for educational purposes is endless. In the music education field the iPad has been implemented for a variety of activities. For example, it was used for creating music, listening to course-related music, and facilitated immediate access to information about music. The music teachers reflected on the use of iPads. They mentioned utilising the iPad enhanced their musicianship, their preparation, and it helped them while they were working with their students. According to the Riley study, in terms of the categories of iPad usefulness in the music education field in the school included the ability of the iPad to be helpful with

performance assistance, creating music, teaching instruments, providing virtual instruments, audio/video recording, listening resources and organisational support.

IPads in English as a foreign language (EFL) area

The iPad has demonstrated potential in EFL secondary classrooms. Morgana (2015) investigated the students' and teachers' perceptions of iPads in the EFL classroom. Based on the results of this study, the school decided to implement iPads. The participants of the study were two experienced teachers and 43 students. This action research implemented the following methods of collecting data: interviews with two teachers and eight students; an online survey; and four observations of classroom lessons. The teachers' and students' perceptions of the effectiveness of the iPad apps for English as foreign language learning (EFL) and the four required skills comprising listening, speaking, reading and writing were explored. The research showed that most of the students were enthusiastic about the use of iPads for learning English. More than 80% of the students were expecting to create materials and presentations with the use of the iPad. The teachers noticed improvement in the students' work and creativity with the iPads. Through iPad use, the students were more independent and it helped them increase their engagement with assignments. Teachers also stated that many teaching strategies were supported by the iPad apps, such as, voice recording, and 75% of the students felt confident about using the iPad. The iPads improved students' language learning skills, especially their listening skills inside and outside the classroom. The students themselves acknowledged the impact of the iPad on their learning, such as, pronunciation. There was a clear change of practice for both teachers and students. However, it was felt that effective activities and materials for language learning are greatly needed if the next step is to improve iPad use in the classroom (Morgana, 2015).

IPad integration in New Zealand curriculum

In the New Zealand context, Falloon (2013) stated that the iPad has been described by some people as a 'game changer', and stated that the use of the iPad as a tool required educational reform. He explained that iPad integration would possibly fail in the New Zealand educational context due to a lack of pedagogical models considering the potential of iPads. However, he mentioned that others may argue that claim is unrealistic. He

mentioned that schools continue the integration of new technologies, such as iPads, into their classrooms and the demand for these technologies has increased because of the learning opportunities the iPad may bring. The study explored student interaction with iPad apps, and attempted to discover the factors that affect students' learning. It focused on iPad app design features. The apps were selected by an experienced teacher to enhance literacy, numeracy and the problem-solving capabilities of her 5-year-old students. The results of the study showed that interrelated factors interacted with each other in the learning context. These factors included the impact of pedagogical factors, such as, modelling, reflection time, corrective and formative feedback, text-to-speech functionality, imposed interaction, and conversely, impediments to learning, such as, web links, advertisements, buying content. The author provided arguments for researchers, teachers and developers to work together and adopt pedagogical approaches, and to gather data to improve the design of multiple apps. The author also recommended that stakeholders should pay extra attention to the design and content of the apps. Consequently, if teachers are motivated to use iPads effectively, their practices would be transformed into thoughtful engagement and a productive learning environment. Falloon (2012) stated importance of apps, the five benefits include the fact that apps help with communicating, learning objectives in ways young students can access and understand, apps provide smooth and distraction-free pathways towards achieving goals, apps include accessible and understandable instructions and teaching elements and finally, apps incorporate formative, corrective feedback that combine an appropriate blend of game, practice and learning components.

Literature from other areas of ICT use in the education sector:

After reviewing the related literature, I found that there was a lack of literature on iPad use with young children. Thus, to further inform my research, I decided to review related literature about using other educational technology, such as, computers (ICT) and iPods in early childhood education (ECE).

Computer use in early childhood education

In a study from the United States, it has been shown that computers influenced children's learning and their skills (McMains & Gunnewig, 2012). McMains and Gunnewig discussed the use of educational technology in the following three areas: developmental

appropriateness; supporting implementation; and classroom and curriculum integration. These areas together can strengthen the potential for technology to facilitate meaningful learning for children. McMains and Gunnewig (2012) gave a good example from a teacher's experience (Mrs Robin). Mrs Robin was using technology with children and she advocated that computers had the potential to help in children's learning. She also mentioned that computer use supported children's skills in the following categories: social, cognitive, language, literacy, writing and mathematical realms. Thus, children could share and help one another, ask for and provide information and explanations and collaborate to solve problems (McMains & Gunnewig, 2012).

However, McMains and Gunnewig (2012) suggested that teacher's guidance for children while they are using computers is recommended to support their skills. They added that this guidance is associated with an increased improvement in abstract reasoning, planning behaviour, visual-motor coordination and visual memory. McMains and Gunnewig concluded that the children who were working with technology in teacher-led activities or in peer groups were experiencing a powerful type of learning, particularly in terms of additional language and social skills development. In addition, McMains and Gunnewig (2012) discussed teachers' perceptions towards integrating technology into early childhood education. Half of the teachers surveyed by two studies sponsored by the Public Broadcasting Service (PBS) believed that the content in fee-based technology resources, such as, games or activities from videos or the internet, is not appropriate for the ages and abilities of the children they teach. While both K-12 and preschool teachers agreed that digital media and resources were more effective when integrated into the curriculum, it was found that preschool teachers were more likely to use these resources in very limited ways.

Information and communication technology (ICT) is acknowledged as representing a significant part of many children's lives (Archard, 2013). It forms the backdrop to their learning and influences child-initiated and/or teacher/child collaborative learning. Archard suggested that teaching children requires the use of relational and collaborative pedagogical practices. He found examples in his research that involved teachers and children using ICT together in learning. Thus, ICT can support such sustained learning activity in ways which are democratic. These include supporting the child's participation, their investigation of topics and subjects that are of interest to them, and their sharing, and even extending, their thinking and curiosity with others.

Use of digital technology in early childhood education

Early childhood teachers should re-examine the way children learn and the way in which the ECE workforce organise their learning environments (Palaiologu, 2014). According to Palaiologu, children have access to all kinds of digital technologies and are spending time during the day with them. Palaiologu's project aimed to investigate the types of digital technologies that children younger than five years of age used at home, and to assess the possible implications for ECE pedagogy and parental attitudes towards the use of these technologies. One of the findings showed that parents felt that their definition of an illiterate person no longer corresponded to the traditional view of someone who cannot read and write; rather it was a person who could not learn, unlearn, relearn and use digital technologies as part of their everyday life. Therefore, there should be a re-conceptualisation of children's engagement with digital technologies in playing and learning at home, and how this can have an impact on children's learning in the early childhood education context (Palaiologu, 2014).

iPod use in early childhood education

In addition to the potential use of ICT, iPod use also supports and increases children's skills (Banister, Miller & Herman, 2009). iPod touch is the perfect way to carry your music collection in your pocket. With the iTunes Store it is possible to load up your iPod touch with your favourite songs (Apple Inc. 2016). The iPod applications apps allow children to play and discover as they engage with them. They also encourage children to understand and interact with web apps, such as, Ppp\ vccnm, Preschool Adventures, At the Zoo, ABC Letters, and iDoodle. The apps allow children to explore concepts, such as, colours, shapes, sounds and body parts and web apps for the iPod touch provide many ways for students to practice and explore mathematics. Other application, such as, blank-a vocabulary building application supports language awareness and the development of social studies. Similarly, there are a number of different scientific web apps.

Banister, Miller and Herman (2009) delineated a variety of possible uses for iPod touch technologies for K-12 teachers and students. Most of these uses are still at the visionary stage. In other words, these are untested possibilities that will require energy and time to explore in real classroom situations.

iPhone use with language learning

The iPad and other devices with enhanced capabilities have led to tremendous interest among educators, including language educators. Jones explored the state of language learning apps, the devices (iPod/iPhone/iPad) they run on, and how they are developed (Jones, 2011), and stated that a variety of iPad apps support language learning. Interestingly the column mentioned iPod use. iPods and other mp3 players have led to enhanced use of audio-based learning, such as, language podcasts with integrated transcripts. Picture taking, text messaging, and dual language dictionaries proved to be very useful. However, while the main purpose of the phones was for the students to write travel diaries, this proved to be problematic as the text input system was too slow and error-prone for writing longer texts efficiently.

Summary

As a review of the literature revealed, there was a variety of viewpoints among teachers about the perceptions about iPad use in teaching and learning. The findings of previous research also indicated the increasing trend of iPad integration in the classroom in the past few years in the primary and tertiary education sectors. This rising trend of iPad integration throughout all education was not as high as expected. Researchers proposed different challenges that could have an effect on the positive use of the iPad in the classroom. Little research could be found on the use of the iPad in the early childhood sector, and the research that was found had a focus on iPad use with pre-school age children. At the time this research was conducted, I noticed that no research was available on the use of iPad with infants and toddlers, however, now there may be a few studies that have been undertaken. In addition, this study examines specifically how early childhood teachers used the iPad in their teaching to provide more insights into questions or issues that previous research did not include. The next chapter will outline the methodology and research design that has been employed in this research.

Chapter Three: Methodology

Introduction

This research examined early childhood teachers' perceptions and practices surrounding the use of iPads in early childhood education. A major strength of the research design was that a range of perspectives were sought from teachers, as each have a role to play in influencing the use of the iPad in early childhood education. Importantly, a major emphasis was placed on capturing the teachers' voices, as they play a key role in providing and enabling the use of iPad for young children. Therefore, the study attempts to gather teachers' opinions and perceptions of the potential benefits afforded to their children through the use of iPad. The aim of this study was to discover new insights and understandings of how teachers' perceptions of the use of iPad technologies in Early Childhood Education (ECE) influence the surrounding practice in the New Zealand Early Childhood Education.

Methodological underpinning

The specific methodology chosen within this research is a qualitative case study methodology. As the chosen research methodology, it focuses on providing an in – depth understanding of the situation and the meaning for those involved (Merriam, 1998). A number of basic features of a case study make it an appropriate methodology for this research.

Case study begins with defining of the case (Stake, 2005) by setting boundaries. The boundaries of this case are the early childhood teachers, and the early childhood setting within a suburb in the Auckland region. Case study can make a valuable contribution to areas where little research has been undertaken (Stake, 2005). Until now, most of the research on iPads has tended to focus on the debates regarding the use of the iPad with children and its effect, for example, on children's behaviour and interaction around the

use of iPads. An investigation around the teachers' attitudes to iPads needs to be undertaken. Little research has been conducted in the area of early childhood teachers' perceptions and teaching practices surrounding the use of iPads in early childhood settings and there remains a great many variables relevant to the concepts of this phenomenon yet to be identified. An early childhood centre within the Auckland region which includes the use of iPads in the teaching and learning programme was invited and accepted an invitation to participate in the research.

As stated above, the first issue is defining the case study method. Berg (2001) stated that case study is a methodology that employs a range of data-gathering techniques and it is not a data gathering technique on its own. Yin (2003) linked the notion of a study to its researchable question. He viewed the case study as a strategy for dealing mainly with "how" and "why" questions, particularly when the phenomenon that is being studied is not readily distinguishable from its real-life context. Yin (2003) suggested that there are three distinct types of case study; exploratory, explanatory and descriptive. According to Yin, if the research question starts with "what", it has different interpretations. This research which focuses mainly on "what" questions, so according to the interpretation of Yin types of "what" questions it is an exploratory study. Thus, an exploratory case study is used in this research.

The other issue within the methodology literature is the notion of producing generalizations from the collected data. Berg (2001) believed that for some, in-depth investigation of an individual or groups or events is useful enough in itself. However if the case study is undertaken properly then it should also provide general understandings about similar individuals, groups or events. Berg suggested that few human behaviors are unique, so generalization can be made from case study results. As this case study investigates the teachers' perceptions about iPad use in the early childhood context, it would be imagined that many other teachers outside of the sample would have same perceptions, in the same or similar ways.

Stake (2005) broke generalizations down into two further categories 'petite' and 'grand' generalizations. The petite generalizations are those which help to continually refine understanding, grand generalizations help to increase reader confidence in the generalizations they have already made. I think in this case study; the petite generalization is relevant because it helps to continually refine understanding about the potential of iPad use in the early childhood context. Bassy (1999) viewed generalizations as fitting three

categories; scientific, statistical and fuzzy generalizations. The scientific generalizations stem from classical physics, one of the key factors was that if an exception was found then the generalization was rejected. This is too far rigid a method to be using in the education sector. Statistical generalizations came from sampling; if the results can be replicated through a similar study then statistical generalizations can be made. Fuzzy generalizations can be seen as predications that arise from empirical enquiry. This case study will also conclude with some fuzzy generalizations or propositions of how the findings might apply to the wider educational community

Hamel (1993) advocated the benefit of the case study to study the individual interactions, common patterns of behavior and social structures and highlights of features of social life. Case study also enjoys a natural advantage in research of an exploratory nature (Scolaz, 2002). Gomm (2000) promotes the idea of a case study for an in-depth examination of one or a few instances of some phenomenon. This research investigation proposes to use the qualitative research approach of exploratory case study (Berg, 2001). The research investigation exploring the early childhood teachers' perceptions of potential of iPad use in the early childhood context in the design of only one year of data gathering to find out what happens (what perceptions are) rather than focusing on causes, reasons and relationships, or rather than a hypothesis (Bouma, 2000). In order to explore the research question further, two sub questions were used. These questions are measurable and adequately reflect the concept of the main question, when this occurs validity is given to the research (Bouma, 2000)

Yin (2003) referred to the reliability of the case study and its availability to other researchers. The case study research aims to uncover the manifest interaction of significant factors and characteristics of phenomenon. In addition, the case study is able to capture various nuances, patterns, and more latent elements that other research approaches might overlook. (Berg, 2000) .Yin (2003) advocated that the case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life situation. Stake (2005) also supported this view where the case study is useful to explore a situation over which the investigator has little or no control (Yin, 2003). The case study is also defined as intensive study of a single unit with an aim to generalize across a larger set of units (Gerring, 2004). However, lack of rigor links to the issue of bias, and for this reason, the subjectivity of the researcher and participants is often challenged (Berg, 2001).

Time and money are factors of the case study; and the methods of collecting data need to be triangulated (Merriam, 1998). In this study, triangulation took the form of interviewing four teachers, not just one, in order to collect the data. Another issue was the lack of representativeness that affects generalizing findings (Hamel, 1993). The limitations of generalizing case study findings are often argued as a reason for not pursuing case study as a form of research (Hamel, 1993). In this study, this limitation is recognized and only petite generalizations are made.

Berg (2001) advocated that exploratory case studies have the potential to pre-empt larger qualitative research and act as a 'pilot study' to further research. Outcomes for this study may warrant further large scale research. He also proposes that expert case studies include subject matter of importance, contemplation of options, adequate data; they are created engagingly and include an entire explanation. Case study needs carefully planned research designs that need time and effort (Platt, 1992). In- depth study needs accurate data collection (Berg, 2001). According to Berg (2001), much of the data gathered in case study is subjective and can be quantified as easily as in qualitative research. The rich data that is uncovered can provide for more depth and insight than some research provides, and demonstrates the need for triangulation of data in case study, as well as careful content analysis.

Theoretical underpinning

The theory that underpins this research is Vygotsky's sociocultural theory. This theory is appropriate to the study. Vygotsky's sociocultural theory concerns the child's cognitive development, and learning through social interaction. Vygotsky believed that social interaction is a key element in a child's development. To improve their cognitive abilities, children should be introduced to a variety of cultural tools and the way to interact with these tools should be learned. Social interaction encourages children's thinking and creativity, and so improves their cognitive abilities (Vygotsky, 1987; Vygotsky, 1930; Lock & Strong, 2010).

The iPad has begun to be integrated into early childhood education, and has started to become a part of the educational environment. The iPad is used as a pedagogical tool. This educational tool provides both literacy and numeracy, and can be used for learning,

teaching and assessment, as well as language acquisition, as Vygotsky stated. The social interaction with the environment of the early childhood context provides children with a variety of educational tools for improving children's learning and skills. Nowadays children are interacting with the iPad as part of the educational context, and as a pedagogical tool that improves language and social interaction. Thus, I think the children's interaction with the environment that contains iPad as a pedagogical tool is supported by Vygotsky theory.

Vygotsky (1930) claimed that the purpose of education is to introduce children to the full range of cultural tools that are developed and preserved in culture. He believed that the cultural tools are used to extend children's abilities. The introduction of these tools includes presenting the proper way of using them, in order to lead children to a successful learning experience. If the cultural tools are integrated properly in learning contexts that surround children as a culture, a child can handle or use this tool appropriately to maximize benefits and improve their abilities.

Examples were provided by Vygotsky on these cultural tools, including mainly language, and play. Vygotsky's main work was in the language field. He claimed that language is a symbolic system that includes signs and symbols which are used to communicate, construct meaning and analyse reality. According to Vygotsky, the language that is used by children supports and reshapes their thinking. Vygotsky interpreted this idea by referring to the zone of proximal development (ZPD). That is, the linguistic ability of the child to a great extent determines the development of thought. He also insisted on the interrelationship between language and play. Vygotsky claimed that when a child is playing, he/ she often use basic structures of spoken language, so these become the structure to his/ her inner thoughts.

In early childhood education, cultural tools are developed and preserved within the early childhood culture. Vygotsky believed that the purpose of early childhood education is to introduce children to the full range of cultural tools. Not only presenting these tools to children, but also explaining how to use them. Providing children with effective and useful cultural tools in the early childhood culture is vital, because it is facilitating the development of a child's independent socio-cultural experience. The socio- cultural experience enhances the development of children's abilities. From these experiences, a child will be able to construct his own skills such as problem solving, effective communication, and creativity. Socio-cultural interaction is also seen to be an effective learning strategy that successfully supports children's independency in learning, and thereby sharpen their personalities to be more confident in expressing their own thoughts,

communicating their opinions and share their thinking with others in the surrounding culture and context.

For example, the effective communication between teacher/ children or children/children, facilitates the development of children's linguistic abilities to a great extent that sharpens their thought. Therefore, to offer a full range of cultural tools in the early childhood environment enables children to develop their abilities and skills successfully.

Vygotsky believed early childhood teachers play a key role in developing children's abilities and skills. Therefore, teachers have a crucial role to guide children's skills, abilities and actions towards a high level of performance. While teachers' support is highly needed to push up children's abilities to a maximum level, it is obvious that this support should be aligned with paying extra attention and maximum care to their own limited abilities and capacities so as not to bring any harm to children. As an example, this suggests that the teachers in my study should extend their own skills and abilities in the use of iPad so as to competently guide the children. With such guidance, teachers support children's development to a great extent and success.

Research questions

This research aims to answer the main research question:

What are early childhood teachers' perceptions about the potential use of iPads in early childhood settings?

In addition, these sub-questions were included in the research:

- What are early childhood teachers' perceptions about the benefits of using iPads in early childhood settings?
- What are the early childhood teachers' perceptions about the challenges in using iPads in early childhood settings?

Research design

This research aimed to describe insights surrounding a particular phenomenon, which is iPad use in early childhood education. It examines the early childhood teachers' perceptions about iPad use in early childhood education for a comprehensive descriptive

research study. The actual teachers' language itself was utilized to transcribe the data (Patton, 2002). The spoken words used by the participants were used as data and were then interpreted and analyzed. Inductive analysis was used to analyze the collected qualitative data. The conclusions were shaped by the themes that emerged from the data analysis. Thus, the findings were also shaped by conclusions made by the researcher (Patton, 2002). In order to maintain credibility and trustworthiness within this qualitative case study, the researcher triangulated the data by interviewing four teachers. The teachers' perceptions assisted me as the researcher to view the phenomenon from different perspectives to give greater credibility to the research (Patton, 2002).

Target Population

Despite the fact that there has been a rise of teachers using technologies, there is little evidence of research to examine the potential of and experience of early childhood teachers who use iPad with children from the population of teachers who use the technology in general. Thus, early childhood teachers who use iPads are the chosen target population for this study, as other teachers, educators and researchers in New Zealand or nationwide may also benefit from this research. For this study on the perceptions of teachers using iPads in early childhood education, the target population is early childhood teachers who are using iPad on a daily basis. More specifically, the teachers involved in this study use iPads in one early childhood centre in the Auckland region. This centre provides educational facilities for children from birth to five years old (babies, toddlers, and preschoolers). The teachers in this study are fully qualified teachers in early childhood teaching, are different ages, came from a variety of ethnic backgrounds and represent the diversity of bicultural and multicultural people that call New Zealand home (Phillips, 2015). This early childhood centre is a good example of diversity as the teachers are New Zealand citizens from England, Pakistan, China, and India. The total of teachers at the center is around 20, and the children are around seventy. The teachers also have experience and have completed the requirements for and have graduated with their early childhood education qualifications. Their ages range between 25 and 35 years of age. Teacher N has dual roles as a teacher and as an administrator. In addition, the teachers are considered digital immigrants since they have not been using technology since birth (Vanslyke, 2003). The centre provides inside and outside activities. The use of the iPad within the learning programme depends on ages of the children.

Research Process

Once ethical approval had been gained, I sent out an invitation to a suitable early childhood centre to participate in the research study. I applied for research ethics because I was conducting interviews with early childhood teachers. The centre where the research was conducted was chosen purposefully because it promoted the use of iPads in the learning and teaching programme, and because it was accessible to the researcher. When the centre accepted the invitation, the research commenced.

Once the centre had accepted the invitation and ethical approval had been given, participants were given information about the research and the researcher obtained informed consent from all participants. The participants completed a consent form sent as part of phase one of the study. Each selected teacher was then interviewed individually. The in-depth interview lasted for less than 60 minutes, depending on the teachers' available time, and included open-ended questions to allow the participants to give detailed answers and the researcher to gain more details and information.

In conclusion, an early childhood centre within the Auckland region which includes the use of iPads in the teaching and learning programme was invited to participate in the research. The purposeful sample for this study included a maximum number of four teachers in one centre. Teachers were selected who teach children attending the early childhood centre, and whose use an iPad and who agreed to participate in this study.

Ethical consideration

As the research involved human participation, ethical approval was needed (Glesne, 1999). The researcher had ethical consent for all the participants. Each teacher was interviewed for around 60 minutes depending on their available time. The participants were unlikely to experience embarrassment or experience discomfort as a result of cultural, employment or financial pressure and were not at risk in this research. This case study is dependent on interviews and data provided by the participants. The questions were not intended to be controversial, so it was not believed that responding to them would bring harm upon the participants or their centre. The data obtained from the participants were treated as absolutely confidential throughout the research process. Participants were assured of anonymity for both the centre and the teachers. The

participants did not experience any risks or discomfort as a result of cultural, employment, financial or similar pressures. The research was not designed to have negative psychological impact or harm for the participants. The pursuance and provision of all proper ethical considerations ensured that this research had no potential harm to the researcher. Participants and the participating centre are not named in the final written report, but the researcher was able to identify the respondents in each single interview. In other words, even though the researcher knew the participants, their identities were not disclosed in the written report as the researcher used pseudonyms. The participants also had the right to decline to participate or to withdraw without penalty and it was made clear that this withdrawal from the research study could happen at any stage up until data analysis. The ethical consideration was done via the information sheet, as this stated clearly that completion and return of the form was considered to be the participant's consent to participate in further research, including participating in a taped in-depth interview.

Research Sample

As has been explained, the teachers who were selected as participants for this study are qualified teachers who use iPad technology. Teachers, who do not use iPad, such as in the baby room, were excluded from this study. The selected number of participants, approximately four, was used to gain a full and thorough description of the experience of teachers who use iPads. The semi-structured interview allowed for each person to be interviewed in-depth and then for the data to be reviewed in detail. The sample here was purposeful as the teachers were a meaningful representative for this case study on the benefits and challenges of iPad to teachers and children (Seidman, 2005).

A sample of approximately four teachers was proposed with the ideal number being for this case study, to suit the limited time of the research of approximately one year. However a limitation of the study is that this number of participants, four, was not enough for the final data to provide a representative study of the target population of teachers who use the iPad (Seidman, 2005).

Data Analysis

Inductive analysis was used for analysing the qualitative data gathered in this research (Patton, 2002; Thomas, 2006). Inductive coding was implemented by starting with close readings of text to consider the multiple meanings that emerged. I then identified text

segments that had significant meaning. After that, a label was assigned for a new category into which the text segment was positioned. I then added additional text segments to the category where they were relevant. In addition, the writing of a memo about the category was used to develop an initial description of the meaning of each category such as associations, links and implications (Seidman, 2005).

Structure of the interview

Interviewing to collect data needs practicing, and needs a huge amount of work from the researcher to establish credibility and earn people's trust (Gillham, 2000). Investigating teachers' perceptions are a sensitive topic to be studied and teachers' time is limited (Gillham, 2000). According to Gillham (2000), the interview technique is the richest single source of data that can be used when interviewing a small number of people, (as they are accessible, they are 'key' and the interviewer cannot afford to lose any participants) and when the interview questions are mainly 'open' that require extended responses with prompts and probes to clarify the answers, and when the material is sensitive so that trust is involved. In this study, face-to-face mode, individual interviews, with open ended questions interview were used.

The semi-structured interview format is the most appropriate technique for this research in that it allows for the entirety of the experiences of the teachers who use iPad to be explored, as well as certain specific questions to be answered (Seidman, 2006). According to Patton (2002), the semi-structured interviews progress through a framework of three stages; before, during and after conducting the interview.

Before the interview

A framework emerged from the literature review on how to conduct the semi-structured interview. This helped me, as a researcher, to conduct the interviews in a professional manner (Patton, 2002). Before conducting the interviews, the manager was given a letter asking permission to conduct research in the centre, and to approach the participants. A discussion between the manager and the researcher, and the researcher and the participants took place. This discussion included an explanation of the nature of the study, the target population, and a general summary of the research questions. Then a copy of the consent form was also given to each of the participants who signed it later. The participants who were interested in the research would be provided a copy of the research once it was completed.

During the interview

During the interview process, familiarization with participants was necessary, as well as familiarization with the place where the interviews took place. This was needed to establish a comfortable environment with the participants. I introduced myself first to the participants and then asked the participants if they had any questions or concerns. The participants were given the space to talk while I actively listened to the participants' perceptions about iPad use. I also tried to ignore the participants' questions about my own opinions as a researcher. I avoided the participants' reactions to anything that was not related to the topic or when they asked if their answers were correct. By explaining that there was no one correct answer and it is the participants' own opinion that is important for the research, I allowed the participant to continue with their response to the interview without interruption. The interviews were recorded via digital recorder and an iPhone recording app.

After the interview:

After the interviews were conducted, I showed my appreciation for the participants' involvement. The teachers asked for a copy of the research and showed their interest in the research findings. Finally, I gave the teachers a Koha of twenty dollars.

Data Analysis

I analyzed the data in a confidential environment (Thomas, 2006). The transcripts of the interview were saved in a secure place. An inductive analysis process was mainly used for analyzing the collected data of this research (Patton, 2002). The raw data that emerged from the participant's transcripts was utilized to analyze the interview data. By doing this, a cluster of patterns was found by rereading the texts and then the themes that had arisen throughout the interview transcripts emerged. These transcripts were kept in a secure place to maintain confidentiality, as well as to avoid losing the data. Specifically, this process happened throughout four stages. In the first stage, the familiarization with the interview transcripts was vital. The familiarization was completed by reading the interviews several times, reviewing each response related to an interview question individually, and highlighting the meaningful text that were related to the research question. Then the identification of certain codes that represented the text and were relevant to the study was carried out. The irrelevant data (that is unrelated to the research question) of these

transcripts was excluded and eliminated. The relevant data was used to describe the codes and to inform the whole coding system. In this stage, the identification of themes and categories was accomplished.

The second stage was about grouping and clustering the data. In this stage, the grouping and clustering process of the collected data depends on the meaning of the text. Each category or group identified to contain meaningful units was approached. Then labels for each category were used. The participants' language was utilized throughout the analysis stages.

In the third stage, the patterns combined into themes. Each phrase corresponded to a specific group. Each group of patterns constructs a theme that a meaningful theme was found within descriptive related patterns. This process was repeated till many meaningful themes emerged from four transcripts.

Summary

This chapter outlined the methodological approach and the research design that was used to gather the data for this research. The descriptive data collected in the interviews that specifically addressed iPad usage and the respondent summaries describing teacher experiences with iPad in their early childhood centre will be examined in Chapter 4. In chapter 4 the teachers' general perceptions about the use of the newest technology tool, the iPad, will be explained.

Chapter Four: Findings

Introduction

The previous chapter explained the methodology underpinning the research and the method of collecting the data. This chapter provides an explanation about the strategy undertaken to gather the data and obtain the findings. In addition, in terms of the way the data was analysed, an outline is provided. In this strategy the three steps that were followed in order to fully identify the findings from the interviews include: listening, transcribing and analysing. Each of these steps is discussed in detail below.

In order to ensure that the interviews were safe and would not be lost, they were recorded on two devices, the iPhone 4 and a digital recorder. Using two recorders enabled the researcher to listen to the different versions of the recordings. The digital recorder was easy to insert into the computer and type while listening and the smartphone was easy to listen to and carry to the interviews.

The stage of listening took place after I finished conducting all of the interviews. The first step in the analysis happened before transcribing the data. I listened to the recordings to get familiar with the interview content. After conducting each interview, I immediately wrote notes about the interviews. I listened to the interviews twice in a sequence from first to last.

The second step involved transcribing the data. At first, I listened to a response and while the digital recorder was playing I typed at the same time. I realised this was difficult to do because it was hard to stay focused on listening while writing at the same time, so then I changed this strategy. I used a large notebook entitled “interview questions” to manually write down the responses the teachers gave to the questions as I heard them. This method was easier and faster and it kept me focused. The notebook was stored in a secure place. If I did not hear the responses properly, it was simple to recheck as I could

play it several times. I repeated the entire process until all the responses for all the interviews were recorded. It took two notebooks, around 100 pages, and over three weeks, and another week to recheck if something was missed. Transferring the data from the spoken word to the written form was challenging since it required extreme accuracy, so as not to lose any words. The extreme care required to check and recheck the transcripts by matching what was said in the records and written transcripts was undertaken to ensure trustworthiness, and confidentiality (Patton, 2002).

The third step occurred after the data had been transcribed while I rechecked the first draft of the transcript to get the final transcripts and then organised the data.

To gain a more in-depth understanding of the analysis process, I firstly analyzed the first and second drafts of the teachers' responses to the interview questions to gain codes from the main highlighted ideas of the responses (Patton, 2002).

A similar process was followed for all of the responses, from one to eight. Eight codes emerged from the responses as follows: iPad and technology, iPad and literacy, iPad and learning, iPad and teaching, iPad content, iPad policy, iPad benefits and iPad challenges.

This allowed me to compare the interviews to gain an understanding of the responses more rapidly. This process involved a matter of planning, thinking and re-thinking, reading and re-reading rather than rushing into writing drafts.

Then I stopped after analysing the first response, by teacher V, because I found that it was not a straightforward process at all since extra time to plan and assess, think and re-think about the coding was necessary and it was even necessary to think about getting the right process of coding. Thus, to be able to do this process, I learned that it was better to compare the first response from the first teacher to other teachers on the first code, rather than continuing to analyse the responses from the same teacher.

Even so, I thought this process was taking too long, and I was unsure if I was analysing the data properly. I thought it was really important to relate the teachers' responses or first draft findings to the main research question and the sub-questions. So I stopped and revised what I was doing once again and began to analyse the responses to the questions. I was trying to identify the teachers' attitudes towards the benefits and challenges of iPad use in early childhood education (ECE). Therefore, I had to look for the benefits and challenges of iPads rather than everything in the teachers' responses. So I decided to write up the findings separately for each question. Afterwards, the relevant parts of the findings in the responses were easily gathered to make the complete story.

To analyse the data, I selected an inductive approach, rather than a deductive approach (Patton, 2002). I analysed the first responses from all the teachers and discovered that the codes from teacher V applied to all of the interviews. Then I related the responses to the research questions and compared them to each another. Then I decided to use the response from teacher V as the “introduction” or first general indicator of the teachers’ perceptions, except it was not enough because the details from the remaining seven codes were necessary.

I then looked for the main ideas and answers to the questions in the responses again and I deleted the “ah, uh” ... exclamation expressions. I was analysing the data to determine the main codes. Reading through the remaining transcripts and comparing and relating them to the research question was much harder than with the first response. So I shifted my focus to the research question, rather than the interview question. The main focus of the research questions is basically about the challenges and benefits of iPad in early childhood education. I typed the transcripts on the Microsoft Word and then I highlighted the benefits in green color and the challenges in a red color to simplify the classifying process, and as I went back to the first response to apply the same process I felt that it was very hard to analyze the first response in the interview since the first response gave the background regarding the teachers’ perceptions about iPads. So then a coding tree, then general coding, then general tree coding were designed for each teacher and ‘mind-mapping’ and at that stage the themes emerged.

In addition, I had the first copy of the teachers’ responses to the interview questions, and another copy that included a description and an explanation about their responses written using their words only. The third copy was built on the first copy and related to the research questions for the findings.

Outline of the findings

The findings are outlined below that answer the research question. The research question was further divided into two sub-questions as follows: What are early childhood teachers’ perceptions about the benefits of using iPads in early childhood settings? And, what are early childhood teachers’ perceptions about the challenges of using iPads in early childhood settings?

- **The benefits of iPads in early childhood education (ECE)**

This finding answers the following sub-question of the research:

What are early childhood teachers' perceptions about the benefits of using iPads in early childhood settings?

The early childhood teachers, who were interviewed, had clear perceptions about the benefits of using iPads in an early childhood setting. Their perceptions identified that iPads could be used as an instructional tool as well as a learning tool to support both teachers' practices as well as children's learning.

- **The identification of iPads as an educational tool**

The teachers showed a clear perception that the iPad is a technology with helpful applications/apps and features that support teachers practices and children's learning in the early childhood context.

- **IPad applications (apps)**

According to the teachers, iPads have applications/ apps that can support and benefit teachers and students. As teacher V, interview 1, reported: "we use the iPad as a camera ... we can record like dance and play... and we can take photos and videos... and we search some YouTube videos". The teachers use the iPad for educational purposes in their daily teaching practices. For example, they used the camera app on the iPad as a camera for taking the children's photos and for videos. They used it to take photos and also to take photos for inclusion in each child's portfolio, either in an electronic or printed out format. These photos became the basis for the formative assessment of children's learning. The iPad was used as a recorder to capture children's activities at the early childhood centre, such as, their dance and play, and it was either shown later to their parents or posted on the wall of the centre or posted online on the center website. The iPad was also connected to a wide screen by wireless and videos were switched on using a remote control. In addition, the teachers used the Safari app to search for videos for the children, such as, on YouTube. For example, teachers searched for teaching-related topics using the Safari app because an iPad can connect to the Internet Wi-Fi. In addition, the music app was frequently used for educational purposes and children's physical development, especially in the toddler room, as teacher E commented: "... iPads are cool, they have apps music and internet Wi-Fi ... Safari research and the best application for teachers is to use it to research ... It is cool, I like it"

Interview 2: T. E. Early childhood centre

- **IPad's features**

IPads have features that support learning, such as, they are easy to carry (mobility) and easy to use. As teacher E, from interview 3, commented "iPad is a technology ... move around ... you can take it to different places... you can take it around". The ease of using the iPad supports children's learning. It facilitates teaching and benefits both teachers and children. In regard to this specific aspect, teachers stated that the iPad is sometimes better than a laptop, because it is easier for children to use. For example, teachers mentioned that an iPad is easier for children because it enables them to scroll down the screen.

- **The practices of iPads as instructional tools**

The practices of iPad as instructional tools were seen and acknowledged by the teachers as the iPad supports teaching and formative assessment

- **Teaching literacy**

Teaching practices include teaching literacy, numeracy and to support language learning for multilingual children. Teachers viewed the iPad as an educational tool for children's learning. The teachers viewed the potential to enhance literacy learning with iPads as important to be introduced in the early childhood centre. They defined iPad literacy as gaining knowledge through the symbols, similar to the literacy learning that comes from recognizing signs, such as road markings when teachers teach children about cars and trucks. Teachers summarised iPad literacy as all about learning and education in the centre. The teachers benefit from iPads because the iPads facilitate teaching the children about the surrounding environment outside the centre. The teachers use iPads as an educational tool for the purpose of teaching such subjects as writing and counting. Children can learn the alphabet and they can form numbers while looking at the iPad. Since the iPad has a touch screen, the children can use their fingers to write on the screen. The teachers used the iPad apps for learning activities and the children themselves were doing lots of activities and viewing many items on the iPad. For example, the children like to watch dinosaurs, and with the use of the iPad they knew a lot about dinosaurs, such as, the different kinds of dinosaurs, information related to dinosaurs, what dinosaurs looked like, and the times they lived in. For reasons such as this, the teachers viewed the iPad as an educational resource to show videos and documentaries. Another

example of iPad use, mentioned by teacher K, which supports literacy, is the games that help children with letter recognition, such as, becoming aware of alphabet lower case and upper case. Learning for letter recognition included matching letters with pictures or letters with sounds. There is a drawing pen that can be used with the iPad to support children's literacy.

- **Teaching multilingual children**

The iPad also supports English language teaching for multilingual children in the centre, as there were children who spoke multiple-languages. It is vital that teaching those children English language in order to succeed in the educational system (Smidt, 2008). In addition they can learn other languages using iPad apps. Multi-language use is an issue for children and also for their teachers. Where English is the main spoken language, teachers sometimes need to translate some words for children who do not speak English. Another example of their usefulness is that iPads were also seen as being easier to use for translation than laptops. As one teacher stated the "iPad has multi apps that were used for multi-language children in the centre, especially for children whose mother tongue is not English". Another teacher stated that "in the centre, there were Kiwi children and also children from different cultures" and then she gave an example of how she used the iPad. The teacher introduced topics from another culture, such as, the celebration of Eid. Some children had no idea about this celebration, so the teacher used the iPad to show the children the aspects of Eid celebration, such as, the colored decorations and different food. The centre is a shared multi-cultural area, so the iPad is a great tool for exchanging knowledge about the children's cultures between the children themselves and their teachers.

From the perspective of the teachers in the pre-school room, the preschoolers and teachers really enjoyed the use of action songs for the purpose of learning about different cultures. One teacher explained the following: "Now that the iPad is part of their life, they can learn issues in life, such as, cultural issues... Children may benefit from iPad in learning specific issues in life".

- **Formative assessment**

Teachers used the iPad to take photos to include them as records for each child's portfolio, either in electronic or in a printed out format. These photos or portfolios

became the basis for formative assessment of children's learning. The iPad was used as a recorder to capture children's activities at the early childhood centre, such as their dance and play, and it was either shown later to their parents or posted on the wall of the centre or posted online on the center website.

- **The practices of iPad as a learning tool**

The early childhood teachers have a clear perception that the iPad could be used as a learning tool in the early childhood centre. The iPad as a learning tool supports children's learning through the following points.

- **IPad supports Children's Physical development**

The iPad supports children's physical development, including both gross and fine motor skills. The children do lots of physical activities, such as dancing, while watching the iPad. This is a unique aspect of iPads, which contrasts with other technologies such as a CD player. The iPad provides audio as well as video factors for children. With the iPad, the children are able to move, play or dance, or even do actions while watching the iPad or listening to it, all at the same time. This specific aspect made teachers and children prefer iPads to CD players. Before the iPad was available at this centre, the teachers used the CD player. While using the CD player, the children were only able to hear the song. Only the audio aspect was provided. However, the iPad enables endless watching as the material, content or videos played on the iPad can be repeated many times. As teacher V mentioned: "By the iPad ... children can watch and watch ...They love it...For the young... for the children ... by watching the videos, they can see the movement on the screen, and they also can hear the songs and music ..." Another teacher mentioned since "The iPad has a touch screen, the children use their fingers to write on the screen". This quote could be interpreted that the iPad enabled the children to use their fingers to scroll on the screen and this supports their fine motor skills. Practicing pressing on the iPad interface or even drawing also supports fine motor skills.

- **IPads enhance children's learning dispositions**

Early childhood teachers have the responsibility to guide children's learning dispositions in ways that support their development (Ros-Voseles & Fowler-Haughey, 2007). iPad supports children's learning dispositions. Learning dispositions include aspects, such as building connections with parents, iPad supports learning pathways, enthusiasm and

independence, connection to real life and creativity. iPad enhances a collaborative, cooperative learning environment.

- **IPad allows learning pathways**

The teachers read about the topic that the children were interested in before introducing or presenting the material on the iPad. In this way, the children learn about the topics that interest them, thus iPad supports their enthusiasm for learning. In general, while the children spend a lot of time on learning activities not necessarily on the iPad, the iPad supplemented this learning and was viewed as a useful instructional tool while connected to a wide screen. The iPad allows different learning pathways to be formed by supporting children's learning in several different ways. Previously in the centre, learning was supported separately either through audial, visual, or in a kinesthetic way. Now iPads combine all these learning pathways at one time. This also gives children choices in how they learn which supports independence in learning. Teacher K, from interview 4, mentioned "...the iPad is a good resource for teachers to teach children in different ways... in different areas ... I feel like that the iPad is...a good thing to have in the centre as well".

As the teachers explained, the iPad also gives the children more opportunity to learn. It gives them the opportunity to see children acting in different ways, because the iPad provides examples of what things look like, different in different situations. The iPad provided something more than the pen-paper way of learning, and the children seemed more interested in using the iPad. iPads are also helpful when used to learn life-related situations. For example, the teachers showed the children the images of road marks, signs and lights. Teacher N mentioned "The iPad as a tool gives the children an opportunity to see and discover the related items needed to construct the big picture of life beyond the centre, such as the road". The teachers care about the learning disposition through taking children's interests into account besides planning what and how to use the iPad. As one teacher discussed "It seems the use of the iPad depends on how many children use it, what they use it for, how much they are willing to understand a specific topic of learning, and what the teachers plan to use the iPad for... As every child in the centre has his/ her own different interest... it is good to draw on the children's interests when using the iPad". The early childhood teachers explained the topics that draw from the children's interests including learning about dinosaurs, learning numbers, and dancing, specifically multi-cultural dances. In addition, the teachers used the iPad to introduce a topic of children's interests. For example, the teachers reported, one day the toddlers, except for one boy,

were interested in talking about space. So the teachers looked on the iPad and searched for some information related to space. They looked up some photos about space, and then they read some documents about it. And finally they were able to discuss it with the child so he could be involved with the others. From the teachers' experience, the iPad use supported the teachers' practices and they were used for many learning activities in the preschool room. The iPad was used to get the preschoolers involved in action songs, as well as for storytelling on the mat. At mat time, the preschoolers sat down with their teachers who used the iPad to introduce a topic for discussion and build from the children's interests and for educational purposes, for example, learning about the parts of the face. The teachers and the children talk about a topic, so the children got involved in a discussion about a topic. Some teachers stated that activities, such as, action songs are available on the iPad screen that make the iPad attractive to use and they also feel that the children really like that as well.

- **IPad supports a collaborative, cooperative learning**

In addition to the action songs the teachers did other activities with the iPad. They used the iPad as a technology to enable teachers to take photos with the children and then show them their photos on the iPads. That encouraged children to revisit their memories of learning. The teachers sometimes allowed the preschoolers to use the iPad by themselves. The teachers used the iPad as a technological tool and it has many different digital materials and videos some of which are not suitable for the children and do not support their interactive learning. Thus, it should be used under a teachers' supervision. With the teachers' expertise, the iPad is a tool that opens the children's minds. If the children only play in the centre alone, or with others, the children just play in their own way. However using the iPad they can see how other children act in other countries. Children who start to learn about other countries act in different ways. If teachers played YouTube videos for children and searched for examples about Chinese children in day care, then the children showed interest and excitement and they were even surprised to see the other children. As the teacher's explained, the iPad also gives the children more opportunity to learn. Because the iPad provides examples about what things look like in different situations, it gives the children the opportunity to learn in different ways. It gives them the opportunity to see what things are like in life in other contexts, not only in New Zealand.

Since the iPad provided something more than the pen-paper way of learning, as the children seemed more interested in iPad use. The children demonstrated more engagement when activities were provided via the iPad. This is a strong indicator that the

iPad provides more motivation, collaboration, cooperation and engagement through iPad apps. The drawing app and games were examples given by teachers to strengthen their claim and support their perception about iPad use. For example, if the teacher asked the children to draw on paper and to use a pen, they might not be happy about that and they might not be interested. On the other hand, if the teacher provided an iPad activity, they would be happy, excited and say “oh!”

In addition, the children were highly motivated to use apps to join in with an activity, such as watching a video or drawing a picture. The apps help children collaborate and co-operate as they are interested to learn, because the teachers noticed the iPad is not only a paper-and-pen learning strategy which the children do not seem interested in. For example, Draw app provides drawing assistance by which the children can use their fingers to draw a shape, such as, a circle, as well as using their fingers to be able to draw other shapes and drawings that the teachers do not recognize. It's all about using the app for fun, and because the toddlers at two to three years of age use their fingers more, they use Draw App. The children use their fingers to draw, even if they just scratch and do not really draw.

Indeed the teachers look at the iPad as a game. The iPad provides games that help learning. If children are not really good at iPad games, some iPad games really help children's learning, for example, if the teacher asks questions about the quantity of objects shown on the iPad learning activity, they first say “oh” as they think about it, then they say “yeah” as they need time to think - the iPad gives them time to think about the answer while the teacher waits, so the iPad supports these child-centered activities. This action shapes the children's experience, as the expressions such as “yeah” and “oh” show there is more excitement towards cooperation and team-work in solving a problem. “The children join in by using iPad, this is the way they learn” a teacher said. The teachers don't play games with the children who are two to three years old but they have some examples of the teacher asking questions, such as, how many [items] are there? They “say oh, two or three” and the iPad supports dispositions, such as communication.

The iPad forms communication among parents, teachers, and children. Thus, it connects parents with the early childhood setting. The children's activities in the early childhood setting were captured by their teacher, recorded and then used in a specific programme. This programme is called Story Park and it is helpful to upload digital recordings of the children's profiles. These records are called Learning Stories and are formative assessments of each child's learning. Parents can see their child's learning stories immediately online so with the use of the iPad a stronger connection between the centre and the child's family is formed.

- **The challenges of iPad as an educational tool**

This finding answers the second sub question of the research as follows.

What are early childhood teachers' perceptions about the challenges of using iPads in early childhood settings?

The iPad has lots of benefits for teachers and children. However, it has challenges that the teachers perceive as issues involved in using the iPad in an early childhood setting. The early childhood teachers have a clear perception that the iPad is a learning tool and a teaching tool, and at the same time, it has certain challenges in the early childhood context. This challenge is mainly regarding iPad use and management in the centre.

- **The management of iPad use**

The management of iPad use in the early childhood centre focuses on how to find the balance between resources (material and technological resources that are held in or outside the room) and the management of the time involved in using the iPad in the classroom.

The number of children in the toddler room and the preschooler room is around 25 children and there is only one iPad in the room. Therefore, the iPad, as a resource in early childhood education, should be used for a short specific time each day to avoid overusing it. Children have to take advantage of the other resources that are available for them. Teacher K reported that "In this centre, the iPad is not allowed to go outside when the children go and experience nature, for example feeling the air, or looking at plants, as it was felt by the teachers that with iPad they will not be able to play or look". However, every child is different and learns differently. Some parents want their children to play all the time and do not want their children to only sit and watch the iPad. Some children themselves cannot stay for a long time watching an iPad so it is the teacher's role to keep the balance between the inside and outside activities. As one teacher reported the "iPad is like any other technology and it should not be used too much... Children should be experiencing other things more than an iPad". This quote is an example of the necessity to use the iPad for a restricted time and to let the children use other instructional tools. This is a challenge for both the children and the teachers. An iPad is not suitable for all areas of learning and teachers have the responsibility to keep the balance between the learning resources. For example, one teacher mentioned " if children see a bug outside the room,

and they then come inside the teachers search for bugs on the iPad, they can extend their learning in a meaningful way”. “So that I have the responsibility to keep the balance ... I wouldn’t say against ... but keeping the balance ...” (T.K. interview 4). Teacher V added “the iPad works if we use it properly”. “In general the iPad has good tools, if it is used in meaningful ways” teacher E said.

- **Developmental background of the children**

In terms of the management use of the iPad, it must consider the children’s developmental age or background in regard to the time of iPad use (NAEYC & the Fred Rogers Center, 2012). The iPad is used in each of the rooms in the centre for half an hour. In addition, as teacher E, K, and V mentioned the “iPad should be used under supervision, and teacher N mentioned also the “iPad should not be used without supervision”. The iPad should be used under supervision with the children since the teachers must view the videos first as many of the videos are not suitable for children to view. One teacher reported: “I think the teacher, a parent, or other people in the centre, can seat the children while watching iPad”. Another teacher added “For children to learn a teacher must be with them, because an iPad is like a computer and they may touch it and view something that is inappropriate for them”. In summary, the iPad should not be used without supervision. Teacher N reported that “iPad should be supervised and used for an educational purpose, not only for playing YouTube videos of cartoons, such as, Thomas the Tank Engine and Dora the Explorer all the time”. Teachers also mentioned that for an iPad to be effective for children’s learning, it must be used in the right context and in the right way. Teacher K stated:

“IPads are great for children ... if they are used for the right time and right purpose... if they are used for general education and as a full experience resource”. She mentioned that “... I think their interest is as a tool, something to support their learning... if you look for something to do...you have to search for it... and you go for it. As I say songs and stuff like that that dramatically helps, like stories.”

- **Other challenges**

- **Effect on vision**

In addition to the findings that answered the main research questions, the research uncovered other findings that were related to both the children and the teachers. These findings were the teachers concerns or issues about the use of the iPad with little children and that it had an effect on their vision.

“.... Similar to other technologies such as television or computer technologies, it has a side effect on children’s vision” T.V. interview 1, in an early childhood center

- **Typing lengthy text**

Other concerns for the teachers include that the iPad is not suitable to type lengthy text or long documents. I read this in the Apple iPad website “While it’s true that there currently isn’t a native Microsoft Office suite for the iPad”. And teacher N reported *“I think the iPad is good but for my personal usage, I prefer the laptop, because I can type and do other things more than with the iPad, so I personally prefer laptop”*

- **The addiction to iPad use**

The addiction to iPad use is another issue that concerns the teachers. One teacher mentioned that “children prefer iPads more than computers because they can see heaps of videos and apps”. Lots of children join the activities that involve an iPad. They join in activities, such as, dancing and singing when teachers play the iPad. The children found these activities fun and interesting to do, but the problem is that when the teacher stopped using the iPad, the children protest and want to use it more than the limited time assigned by the teacher. In addition, some parents who allow their children to use iPads at home ask the teacher to give their children iPads all the time at the centre. For example, a teacher reported one boy comes every morning with his mother. After his mother leaves, he just starts to cry and wants the iPad. Before leaving, the mother says: “go to your teacher and ask her for the iPad”. It seems that some of the parents use it to help the children to settle, but teacher V said since this is not centre policy, the teacher refused to use the iPad as a tool to settle the children. She believed that “... if the iPad is given to children every morning, some children will stay glued to the iPad the whole day, and most parents would not be happy to see that”. The teachers stated that centre is the place to play and learn and it is not the place to watch iPads all day. The teachers do not want the children to become addicted to iPads.

“in certain cases... some kids like to keep close, really close, to the iPad ... yeah ... like ... young children, they like to keep close to the iPad, they always say my... my, my and stay very close and say it’s my one...” T.V. interview 1, in an early childhood centre.

Summary

In summary, the main points that were revealed in the findings included the Benefits of iPad in early childhood education (ECE). The teachers have a clear perception of the iPad as an educational tool that has unique applications and special features that support the iPad to be used in early childhood education. Moreover, the iPad practices as instructional tool include: teaching literacy, teaching multilingual children, and formative assessment. The practices of iPad as a learning tool supports children's physical development and enhances children's learning disposition as it allows learning pathways, and collaborative learning. On the other hand, the teachers have challenges associated with the iPad use including the management of the iPad and the background of the children. Other challenges that were also presented are the iPad's effect on vision, typing, and the potential addiction to the iPad. This chapter outlined the findings of this research, and the next chapter will discuss these findings in light of the literature.

Chapter 5: Discussion

Introduction

The aim of this research was to explore the perceptions of early childhood teachers regarding their perceptions about the potential use of the iPad in their classes in early childhood education. This chapter provides a discussion of the implications regarding the findings related to this overarching research question. In general, from a review of the related literature that was studied, it supported the idea that the iPad can be used as a learning tool as well as an instructional tool. These issues were researched and studied, emerged from a review of the related literature and then the researcher reflected on the issues. An interpretation of the perspective related to the practices of the teachers has been based on the transcripts from the interviews with the teachers. This chapter provides a discussion of the issues and their inter-relationship with the findings, as mentioned in chapter four. This chapter also includes a further discussion as it relates to the research question, namely, what are early childhood teachers' perceptions about the potential of iPad use in early childhood settings?

The two sub-questions are also discussed. The two questions are as follows:

What are early childhood teachers' perceptions about the *benefits* of using iPads in early childhood settings? And, what are early childhood teachers' perceptions about the *challenges* of using iPads in early childhood settings?

The chapter will discuss the findings from the point of view of those two perspectives including the theoretical and the practical perspective. In addition, the implications of the findings will be presented.

The theoretical perspective

This section presents a reflection of the teachers' understanding of the iPad as an educational tool and includes the main findings of the study.

The findings of this study show that the teachers have a clear perception regarding the iPad, in that it can be used as an educational tool. Teachers view the unique features and apps that the iPad offers so that it can be used for educational purposes both as an instructional tool as well as a learning tool. These features and applications support children's learning as well as the teachers' practices in the early childhood context (Almekhlafi & Almeqdadi 2010; Brand, Kinash, Mathew & Koryban, 2011; Bryne 2015; Ireland & Woollerton 2010; Jones, 2015; Karsenti & Fievez 2013; Kucirkova 2014; Ostashewski & Reid, 2010; Prensky 2010).

The early childhood teachers mentioned that the features of iPads include that the iPad is easy to carry, it is easy to use, and it has a touch screen. Ireland and Wollerton (2010) also mentioned the positive features of iPads in regard to the fact that it is mobile and easy to carry. Other authors (Ireland and Woollerton 2010; Prensky 2010; Ostashewski & Reid 2010) mentioned the touch screen as a unique feature of the iPad. The availability of Wi-Fi networks was mentioned by Beauchamp and Hillier (2012) as viewed in the Safari app. The use of Wi-Fi networks was also discussed by Kearney and Maher (2013). Teachers did not mention other features, such as the size of the iPad. However some researchers (Ireland & Woollerton 2010; Kucirkova , 2014; Ostashewski & Reid 2010; Prensky 2010) noted that the size of the iPad and the size of the screen make it convenient to use, although this was not mentioned directly by the teachers in this present study. Regarding the size of the iPad since it does not fit in the student's pocket, unlike the iPhone or itouch, a well-designed iPad pocket is necessary (Prensky 2010). Karsenti and Fievez (2013) mentioned the variety of iPad resources, such as, images, videos and so on.

There are other features mentioned in the literature. Beschorner and Hutchison (2013) mentioned that iPads have advantages over computers for use in education, such as price, ease of use, size and portability, touch screen and applications. The teachers in my research study agreed with these points. They stated that iPads have started to replace computers and CD drivers. The teachers also mentioned that the iPad was easy to carry and they indicated that both the light weight of the iPad and the mobility together, along with the ease of use, also carries many implications. All of these factors result in helping the teachers with their work. In both cases, I think the ease of use is, in general, a shared feature found in the literature and in the study findings although the teachers did not directly mention the specific examples by using the phrase "ease of usefulness". The iPad has other applicable features that the teachers mentioned that make it convenient to use, such as, the ability of the iPad to connect to other devices, for example, to a wide screen,

such as, Apple TV. This point is supported by Beauchamp and Hillier (2012). The teachers also mentioned other reasons for the fact that the iPad is slowly replacing computers in schools. These reasons include the advantages of the iPad compared to PC computers for use in education. The advantages include price, ease of use, size and portability, touch screen and applications. The teachers in my research study stated that iPads have started to replace computers and CD drives in the centre where they work.

The findings identified that the apps that the teachers use include the Camera app, Drawing app, Safari app (Wi-Fi), and the Music app. The use of pictures and sounds of iPad is a feature, as mentioned by Kucirkova (2014) and is thought to be comparable to the use of Camera app. Riley (2013) mentioned the Music app. Toledo and Mattoon (2012) mentioned the Drawing apps that were used by children for educational purposes.

However, the teachers were limited to specific apps. Their use of apps was limited to Camera, Draw, Safari and Music apps. There are many more apps mentioned in the literature. For example, Kucirkova, Messer, Sheely and Panaderp (2013) mentioned that the iPad apps support children's learning, and they provided two examples. The first example was that the Story app had a positive impact on children's learning, engagement and interaction. The second example was that the Colouring and Drawing app also supports children's learning. The iPad in the center supported the use of audio-based learning and picture taking (Jones, 2011). Ireland and Woollerton (2010) explained that iPad apps could be used in order to support the process for creating digital versions of books and magazines, which is much simpler with the iPad than with other resources. This contrasts with the findings since the teachers did not mention that they, that is, the teachers or the children, created any kind of digital content. They accessed YouTube videos and videos that already existed that others had produced. The literature provided many other examples of iPad applications in education that were not mentioned by the early childhood teachers. These included specific pedagogical applications and intervention justifications, such as, literacy, numeracy and problem-solving apps (Banister, Miller & Herman, 2009; Johns, 2015; Johnson, 2011; Jones, 2011; Kucirkova, 2011; Michael Cohen Group LLC., 2011; Ostashewski & Reid, 2010).

The practical perspective

This section includes the perceptions of the teachers in terms of the technical or empirical issues related to the iPad, including their perceptions about how iPads could be used as an instructional tool and their perceptions of the challenges involved with using the iPad as

an instructional tool. The teachers showed a clear perception about the iPad as an instructional tool by stating that the iPad supported their daily teaching practices in teaching and formative assessment.

Using iPad as an instructional tool

The teachers reported that the iPad could be used as an instructional tool that supported their daily practices. The literature also supports this finding in the ways that are discussed below (Banister, Miller & Herman, 2009; Beauchamp & Hillier, 2012; Chou, Block, & Jesness, 2012; Gasparini & Cule'n, 2011; Kearney & Maher, 2013; O'Malley, Jenkins, Wesley, Donehower, Rebuke & Lewis, 2013; Riely, 2013). The iPad supports teaching practices that includes supporting teaching literacy, supporting multilingual children's learning, and supporting formative assessment

IPad supports teaching practices

The daily practices mentioned by teachers included the teaching of literacy, numeracy and cultural aspects in terms of English speaking and multilingual children and formative assessment.

The teaching practices that were mentioned by the teachers included the literacy, numeracy and cultural aspects. The iPad could be used to enhance literacy teaching. Ruggles and Dawson (2012) claim that teachers perceive the iPad as a valuable instructional tool in teaching and since the iPad supports literacy and numeracy it can help to build vocabulary and language and it helps to make the cultural aspects of learning accessible. In addition, Beschorner and Hutchison (2013) reported that an iPad is a literacy teaching tool in early childhood which can be used in a developmentally appropriate manner with children. Jones(2011) and Karsenti & Fievez,(2013) mentioned other practices that benefit teachers, such as, the ease of making notes and the ease of organising work. The iPad improved reading experience (Karsenti & Fievez, 2013). Aronin and Floyd (2013) claimed that the iPad supports children's numeracy skills. In the context of technology, McMains and Gunnewig (2012) also mentioned that computer use supports children's skills in social, cognitive, language, literacy, writing and mathematics realms.

IPad supports multilingual children's learning

The teachers in this study also reported that the iPad supports multi-lingual children's language learning, especially the English language (Banister, Miller & Herman, 2009). Blank app -a vocabulary building application - supports language awareness and the development of social studies. Jones (2011) explored the state of language learning iPad apps. These apps provide dual language dictionaries and proved to be very useful. One of the first commercial language learning apps designed especially for the iPad was the heavily marketed hello-hello app, available for several different languages. Morgana (2014) discussed the use of various iPad apps that teachers and pupils were using, for example, voice recording, including their perceptions of the effectiveness of the iPad for learning in terms of listening, speaking, and writing skills, finding that the iPad could help them improve their listening skills both inside and outside the classroom. The students themselves acknowledged the impact of the iPad on their learning, such as, help with pronunciation.

The iPad support formative assessment

The iPad was viewed by the teachers in my study as providing help with the formative assessment of children's learning since the iPads were used for writing learning stories, a form of formative assessment. Beauchamp and Hillier (2012) stated the teachers' perceptions towards iPads were that they were an instructional and assessment tool that supports their teaching, highlighting that early childhood teachers have positive attitudes towards iPads (Kearney & Maher, 2013). Teachers in this study also reported using the iPad as an assessment tool and described the ways in which the features of the iPad (such as sound and video recording) can be used in both summative and formative assessment, by both teachers and pupils.

Using the iPad as a learning tool

The findings showed that the iPad can be used as a learning tool. The literature supports this finding (Aronin & Floyd, 2013; Curry, 2013; Gasparini & Cule'n, 2011; McMains & Gunnewig, 2012; O'Malley, Jenkins, Wesley, Donehower, Rebuke & Lewis, 2013; Wakefield and Smith, 2012). The early childhood teachers claimed that it is a learning tool because it supports children's learning disposition in areas, such as motivation, cooperation and collaboration, connection to the real world, communication and independence. The iPad also supports children's physical development (Johnson, 2011; Aronin & Floyd, 2013; Ireland & Woollerton, 2010; Riley, 2013; Jones, 2011), as explained

below. It was also used as a device to support learning in a range of subjects through the use of apps and other multimodal tools (Kearney & Maher, 2013). These will be discussed below.

The iPad supports children's physical development of both gross and fine motor skills

The teachers claimed that using the iPad supports children's physical development. According to Johnson (2011), teachers and children can control a document by simply pinching, twisting and sliding their fingers across the face of the iPad. Aronin and Floyd (2013) mentioned the touch screen provided motivation, so students, especially those lacking fine motor skills, were more likely to stick with the activity, and so were able to improve their fine motor skills. Ireland and Woollerton (2010) also support this finding, by stating that iPad is a tablet computer which uses a touch-sensitive screen, allowing children to control the iPad with their fingers. In my study, iPads were used for music, especially in the toddler room where the iPad supported the physical activities through the use of the music app. This is totally agreed by Riley (2013). I think the 'Kinesthetic' term mentioned by Riely refers to physical activity. He stated that many students today would be classified as bodily-kinesthetic learners, and the motion sensor on the iPad helps students to use their hands in guiding the iPad to equilibrium, balancing skills, or remote control of real or virtual robotics, hovercraft, or other vehicles. I considered his claim as supportive as to this finding. The iPad in the center supported the use of audio-based and picture-taking ways of teaching. This finding is supported by Jones (2011).

Learning dispositions

The following discussion on learning dispositions is separated into two sections. The first section discusses the dispositions mentioned directly by teachers and the second section discusses the learning dispositions that are indirectly affected and produced by the first set of dispositions. The first group of dispositions discusses motivation, enthusiasm, and learning strategies. The second group of dispositions includes collaboration and cooperation relating the topic to life and independence.

First group of disposition

The first group of dispositions includes motivation, enthusiasm, and learning pathways. The findings in this study support the notion that iPads motivate the children. Karsenti and Fievez (2013) stated that iPads have the potential to motivate students and teachers because students can work at their own pace. Beauchamp and Hillier's (2012) study also showed that iPads have the potential to motivate pupils and encourage them to support other pupils in the class as well. In addition, iPads increased the levels of teacher, pupil and parent enthusiasm and motivation since iPads were easy to use, enhanced pupil independence and supported various methods of assessment (Brand, Kinash, Mathew & Koryban, 2011). The students feel the iPad motivates them to learn and perform better. According to Aronin and Floyd (2013), the apps provided the students with reinforcement and motivation for their practices.

Moreover, iPads support motivation which directly leads to engagement. The teachers stated that children get more involved and motivated by using an iPad. The features and app content of the iPad also influence children's engagement (Kucirkova, Messer, Sheely & Panader, 2013; Morgana, 2014). Engagement means that the app supports easily accessible accomplishments and learning has a positive impact. Engagement with the Story app has also had a positive impact in terms of learning and the interactions of the children. Another example is the Colouring and Drawing app, also mentioned by teachers, as it supports children's engagement. Kucirkova, Messer, Sheely and Panaderp (2013) stated that these apps support joint problem-solving and collaborative engagement. In addition, children often prefer using iPads more than traditional methods of learning. This is important for teachers to know, and the teachers say that children preferred using iPads more than using paper and pencils. Consequently, iPads contributed positively to students' learning (Rossing, Miller, Cecil, & Stamper, 2011). Overall, students' responses indicated that iPad use contributed positively to the learning experience and resulted in better student learning and engagement. It also enhanced attention and engagement in learning activities and promoted a collaborative classroom environment. The iPads had a positive impact on students' engagement and interest (O'Malley, Jenkins, Wesley, Donehower, Rebuke & Lewis, 2013). The iPad created high levels of engagement (Ruggles & Dawson, 2012).

In this study, iPads support enthusiasm when the learning content is built on the interests of the students. This finding is supported by Brand, Kinash, Mathew & Koryban (2011) who explained that the iPad provided the students with a stimulus to have an enthusiastic and positive attitude toward the emerging mobile learning platform the iPads provide.

Another result is that iPads allow learning pathways to be built using children's choices, including the visionary, kinesthetic and auditory methods. For example, Karsenti and Fievez (2013) and Kucirkova (2014) discussed a variety of iPad resources (images, videos, applications, pictures, and sounds). Johnson (2011) stated that in some ways iPads would be the tool that really transforms classroom practice. Jones (2011) also stated that iPads support different ways of learning. For kinesthetic learners, the iPad has a number of unique features that provide for interesting possibilities in teaching and learning, for example, the motion sensor of the iPad has a number of intriguing applications in terms of learning.

Second group of disposition

In addition, a variety of other learning dispositions are available. According to many authors, iPads support collaboration with other learning dispositions and they support independence.

The iPad is also viewed as a tool that encourages collaboration. For example, a study by Karsenti and Fievez (2013) showed that iPads support greater collaboration among students and between students and teachers. Another example by Beauchamp and Hillier (2012) is where the student teachers valued the role of the iPad in facilitating conversations about learning activities. Ostashewski and Reid (2010) found that teaching strategies which utilised the iPad featured the ease of interaction. In addition, iPads are becoming the preferred device for educating students, just as the iPhone and itouch are popular (Prensky, 2010).

However, the literature added more value to my findings by mentioning the other benefits the iPad offers in regard to learning dispositions. It found that the benefits of iPads include cooperation, creativity, collaboration and connection to the real world. The findings show the iPad supports a collaborative learning environment and iPads support cooperative and collaborative learning (Archard, 2013; Henderson & Yew, 2012; McMains & Gunnewig, 2012; Miller & Herman, 2009; Rossing, Miller, Cecil & Stamper, 2011; Shifflet, Toledo & Mattoon, 2012). It is my belief that these dispositions are indirectly linked and are affected by the dispositions that were mentioned by the early childhood teachers who participated in the study and this is the reason I mention them here.

According to the literature, the iPad is thought to be supportive of children's independence in learning. This tool helps children to be independent and capable learners. The iPad can

be seen to support students' independence as a variety of apps are used for this purpose (Curry, 2013; Gasparini & Cule'n, 2011; Morgana, 2014).

In the early childhood centre that participated in this research, the children only viewed what the teacher put on from YouTube videos. Some planned lessons, such as, learning about the solar system made use of an iPad. The children did not choose to search topics independently or complete activities by themselves on their own. Due to the fact that the research findings are based on one centre and since data gathering took place over a relatively short period of time, this could be an area for further research.

Curry (2013) indicated that iPads have the capacity to reshape the ways that teachers think about traditional education. The teachers who took part in this study wholeheartedly agreed with this, and it matches their perceptions because they said that iPads can change attitudes to using certain items, such as, pencils and paper and CDs. My study finding and Curry's research finding agreed that the children were not only quick to identify their favorite app, they were eager to show why they liked to use the app. The confidence they had to show their ability to express their choice is clearly related to the independence that they felt.

Reports about the children from the teachers who participated in Curry's study, indicated that the children did not have the ability to choose the app they wanted. In the centre, the children did not take turns choosing. The teachers played YouTube videos or songs for the children. Sandvik, Smerdal and Osterud (2012) observed that while an iPad was used, the children's smooth turn-taking in controlling the tablet was strengthened by the device's portability and shared display. Sandvik, Smerdal and Osterud (2012) mentioned also that iPads made it easy for children to both cooperate and participate. This was demonstrated in this study, when the teachers mentioned that the children danced and participated during mat time or story time.

The Story Park use of iPad allowed the teachers to transfer the children's activities and experiences in the centre to the digital content in stories that their parents or caregivers could view, so the iPad in this way provides cooperation and participation. Beschorner and Hutchison (2013) suggested that iPads are tools that children can use independently. However, this was not the case in this study. Although the children only listened or watched, there was sharing and cooperation. Beschorner and Hutchison (2013) mentioned that the iPad offers unique ways to employ reading, writing, listening and speaking while using the one device. In this centre, the children participated in physical activities, such as, dancing, watching, drawing or listening, and writing on paper or using an iPad. As the

teachers mentioned, the children also cooperate in this centre while using an iPad to read, write or learn about a topic of interest. For example, in the toddler room the children and their teachers talked about dinosaurs or about planets. In the preschool room, the children learned cooperatively and collaboratively. Beschorner and Hutchison (2013) mentioned that the children use iPads to read, write and talk about the pictures. The iPad practices brought these students closer to each other (Gasparini & Cule'n, 2011).

As mentioned, iPads support children's independency in learning. As stated, Curry (2013) indicated also that iPads have the capacity to reshape the ways that teachers think about traditional education. The teachers only seemed to use the iPad in limited ways because they had not participated in any professional development related to iPad use. The teachers at the center completely agreed with this and it matched their perceptions. They reiterated that iPads change pen and paper learning and the use of CDs. The children in Curry's research were not only quick to identify their favorite app, they were eager to show why they liked to use the app. This confidence to show ability to express their choice is clearly related to the independence that they feel, which as mentioned, was missing for children of this study who had no ability to choose the app they wanted and instead only received drill activities. In other words, they did what they were asked to do in terms of using the iPad. In the centre, there were no turns to be taken by the children as only teachers played YouTube or songs for the children. The study by Sandvik, Smerdal and Osterud (2012) observed that children were taking turns to use iPads, and controlling the tablet was strengthened by the device's portability and shared display. The taking of turns did not happen at all for the children of the centre where this research took place. Sandvik, Smerdal and Osterud (2012) also mentioned that iPads make it easy for children to cooperate and make it easy to participate. This is true for the children who cooperated in dancing, mat time and stories (Sandvik, Smerdal and Osterud, 2012). Moreover, the children were able to transfer their experiences from an educational or home setting to a digital context. This did not really happen in the centre as the transfer of experience from the educational or home setting did not occur, except possibly for Story Park, since teachers transferred the children's activities and experiences in the centre to the digital content in Story Park so that their parents or caregivers could view them.

The challenges of using iPads

The findings reported that there were challenges associated with iPad use. According to the teachers these challenges were associated with managing the use of the iPad. iPads

tended to be governed by some specific classroom practices that resisted the new transformative process and which created challenges and issues for teachers' and students' engagement and practice. Managing the use of iPads in early childhood education takes four issues into account as reported by the teachers. The issues the teachers mentioned are as follows. First, children's use of iPads should be responsive to their backgrounds. Second, iPads should not replace other beneficial educational activities. Third, the use of iPads should be incorporated wisely and four the use of iPads should be supervised by the teacher.

The first issue is that for iPads to be developmentally appropriate in early childhood education it should be responsive to their backgrounds. It is the teacher's responsibility to make appropriate choices about using iPads with the children. For example, the statement on the use of technology and interactive media as tools in early childhood programs serving children from birth through eight years of age (NAEYC & the Fred Rogers Center, 2012) provides general guidance for teachers on developmentally appropriate practices for using technology and interactive media. According to this statement, iPad use should be appropriate to the ages and developmental levels of the children and responsive to their individual needs and interests and their social and cultural contexts. Thus, teachers should use professional judgment in evaluating and using iPads, just as they would with any other learning tools or experiences. This is critically important, because teachers need affordable and accessible technology and media (NAEYC & the Fred Rogers Center, 2012). Children's initial reactions are shaped by their developmental level, prior experience with technology and the design of the app interface and game/play (Michael Cohen Group LLC., 2011). Moreover, iPad access and use are relative to the design of the app interface game experience and the fit between the app content and the child's developmental level. Additionally, the child's experience is characterized in terms of learning by doing, by building on their existing skills and by being motivated by their own interests. Ideally, the use of digital tracking and analytics identifies the child's level of mastery and provides feedback in the service of extending learning. At best, the iPad offers a mode of interactive experience that mirrors the child's natural constructivist learning. Therefore, several types of learning occur during app play. These include the tacit learning of the game and how it works, the mastering of explicit learning tasks, the matching and counting that is embedded in the game narrative, and the use of skills and models learned and applied to other types of games and levels of play.

The second issue is that iPads should not replace other beneficial educational activities. Teachers should provide a balance of activities in their programs for young children. For example, iPads should not replace activities, such as creative play, outdoor experiences, and social interactions with peers and adults in early childhood settings. The iPad should also be recognized as an educational tool that is valuable while used intentionally with children to extend and support creative and authentic learning (NAEYC & Fred Rogers Center, 2012; Shifflet, Toledo & Mattoon, 2012). Shifflet, Toledo and Mattoon (2012) supported the NAEYC and the Fred Rogers center statement about finding a balance between educational activities. Their study findings show that the children naturally moved to engage in other hands-on activities in the classroom.

The third issue is to incorporate iPads wisely. In other words, because iPads can also distract learners and cause frustration in the classroom, if they are incorporated wisely into the classroom activities, teachers can maximize their potential to enhance learning (Rossing, Miller, Cecil, & Stamper, 2011).

The fourth issue is that iPads should be used under supervision. McMains and Gunnewig (2012) suggested that teacher's guidance for children while using computers is recommended to support the skills of the children. They added that this guidance is associated with increases in abstract reasoning, planning behavior, visual motor coordination, and visual memory. McMains and Gunnewig concluded that the children who were working with technology in teacher-led activities or in peer groups were experiencing a powerful type of learning, particularly in additional language and social skills development. However, from a review of the literature, there are more challenges regarding iPad use. Karsenti and Fievez (2013) encountered additional challenges than those that were mentioned in the findings, such as, the greatest challenge for the teachers that iPads provided a distraction for the students and the iPads did not make learning easier.

In regard to the four issues, results of Almekhlafi and Almeqdadi (2010) revealed that teachers integrate technology in their classes with different degrees of effectiveness in spite of the barriers that hinder such integration (for example, technical problems, large number of students, lack of professional development training, lack of motivation and financial support, and negative teacher and parent attitudes toward the impact of technology on teaching and learning) (Almekhlafi & Almeqdadi 2010). However, the methods of integration by male teachers differed in some cases compared to their female

colleagues. The implications for technology integration in the United Arab Emirates (UAE) context are discussed. The study results show that both male and female teachers at UAE Model Schools have a high self-perception of their abilities and competencies to integrate iPads. Extending this research to study the impact of gender differences in New Zealand and elsewhere in terms of the use of iPad in teaching and learning could be an area for further research.

Surprising realities from my research

In contrast to the findings of my research study, there are three surprising realities that were found in the previous literature. The first surprise was that the literature mentioned that teachers often showed resistance to iPad integration. In contrast to the literature, in the centre, the teachers seemed supportive in regard to the use of the iPad. O'Mara and Laidlaw (2011) presented an example of a teacher's (Linda's) resistance. While Linda was remarking to a teacher colleague about the seeming resistance to "new technologies" at the early childhood level of instruction, her colleague suggested that perhaps it was not the technologies that were as problematic as the methods that were being used to implement them in classrooms where exploration and children's freedom to investigate were highly valued. The authors then added that they were hopeful that perhaps innovative early childhood educators might take up new tools, such as the iPad, and use them in new ways as technology is a growing part of any society today.

The second point that I believe is important is that education and learning will take place without the use of an iPad. According to a study by Wakefield and Smith (2012), students expressed that they were unconvinced that the iPad itself made a difference to their learning and the iPad was not independent from curriculum design and student engagement. The authors added that these findings were preliminary and should be treated with caution because the good performance might be a result of the students' motivation and not only the use of the iPad itself (Wakefield & Smith, 2012).

The third point that is important to consider is that using iPads can present technical problems that limit their use. Johnson (2011) explained that iPads do not have USB ports, disk drives or CDROM/DVD capability, methods for sharing data with other computers and devices over the Internet. It was claimed, based on the study by Aronin and Floyd (2013) that the iPad has two technical problems. The first one was that some students will be faced with applying the correct pressure required for manipulating the

touch screen. The other is that while the iPad is laid flat on the desk, some students may have difficulty looking down at the screen. According to Gasparini and Cule'n (2011) there was a problem that the iPad did not support the flash which was required for the digital content.

The other findings of this research is that iPad does not support longer text efficiently which was also mentioned by teachers when they said that the iPad does not support typing (Jones, 2011). Many students and teachers stressed that they had problems writing lengthy texts with the iPad (Karsenti & Fievez, 2013).

Implications for teachers

IPad management

It is my belief that teachers require professional development to be introduced on an in-depth basis to the features of the iPad in order to support their teaching practice with children. This could include professional development on how to manage the iPad as an educational tool and appropriate pedagogical use of the iPad.

Beauchamp and Hillier (2012) reported that although initial formal training in terms of the basics involved with using an iPad can be useful, the iPad was intuitive to use and easy to learn. Teachers need to use iPads wisely to support children's learning and while considering ways of integrating iPads into their classrooms, teachers need to think wisely about how to best support the children's learning experiences (Colbert, 2012). Colbert noted that in terms of the use of iPads in centres that she visited, the teachers used the iPads in different ways. Some early childhood centres used only iPads and no other tablets. Furthermore, she noted that iPads were used in a variety of ways within the centres. Some were used in ways that supported teaching and learning, while in other centres iPads were left very much up to the children to navigate and engage with. Additionally, children choose to just switch between apps instead of doing any real deep learning when they are introduced to many apps within ECE. Thus, Colbert believed that the practice of "less is more" is applicable when selecting from the well-known apps, such as, safari, photo booth, mail and using the camera. Additionally, online programs could be used to enhance collaboration and communication with the children and private blogs could also be used to upload stories. However, teachers need to keep learning and

teaching as their priority while they are in the process of selecting an app for gaming on the iPad. In addition, Yelland and Gilbert (2013) point out that learners should be encouraged to become creators and innovators and teachers should support them in their reflections about whatever they encounter, whereas the challenges for teachers' practice included the lack of teacher-selected apps and the need for more time to prepare and conduct training for teacher development (Chou, Block, & Jesness, 2012). Therefore, the key to successful integration of the touchpad in the classroom, and arguably for all newly introduced technologies, is to provide teachers with adequate training (Karsenti & Fievez, 2013)

In terms of the learning process, the teachers and the literature both agreed that the iPad should probably be used to give more independence and democracy. Early childhood teachers should re-examine the way children learn and the way in which the ECE workforce organizes their learning environments (Palaiologu, 2012). According to Palaiologu, children have access to all kinds of digital technologies and are spending time during the day with them. In Palaiologu's project, the aim was to investigate the types of digital technologies the children less than five years of age used at home, and to assess the possible implications for ECE pedagogy and parental attitudes towards the use of these technologies. One of the Palaiologu's research findings was that parents felt that their definition of an illiterate person no longer corresponded to the traditional view of someone who cannot read and write; rather it included a person who could not learn, unlearn, relearn and use digital technologies as a part of their everyday life. Therefore, there should be a re-conceptualisation of children's engagement with digital technologies in playing and learning at home and this cannot be overseen only by early childhood education (Palaiologu, 2012).

Kucirkova (2014) stated there is a need to use the iPad as pedagogy within a context. It is the pedagogy that contextualizes the use of iPads rather than the device *per se* that makes a difference to children's learning. Thus, this shows that in contexts where there is a shortage of qualified and effective teachers, iPads can be a cost-effective means of delivering individualized, up-to-date learning content which is in alignment with innovative teaching practices. Johnson (2011) stated that while in some ways there has been a transformation, the basics of teaching and learning have remained unchanged. Perhaps, the iPad will be the tool that really does transform classroom practice. Falloon (2013) stated that teachers' methods of teaching should be appropriate to iPad integration. Professional training is much needed so that teachers can integrate iPads into their daily practices (O'Malley, Jenkins, Wesley, Donehower, Rebuke & Lewis, 2013). Moreover,

effective activities and materials for language learning are necessary as a next step to improve iPad use in the classroom (Morgana, 2015).

IPad pedagogy

Some of the teachers selected YouTube videos to be used as the digital content of the iPad for children's learning. In general, it seems in this centre as if an organised process for selecting educational material for learning is not present. It is not appropriate for the teacher to randomly select whatever the teacher notices first in terms of YouTube videos and just present it to the children as instructional material. As such it is recommended that some teachers require a professional learning programme in order to use the iPad more professionally. Therefore, to design appropriate digital content to be used in the early childhood sector it may be necessary for the curriculum designers to coordinate with the early childhood teachers and also get help from the children themselves, as well as the parents.

Summary

In summary, the iPad is a useful device for use in early childhood education, as it has the potential to change both the teaching practice and children's learning. The iPad has been shown to be useful for both teachers and children. The rules and educational policies in both the centre and the wider field of early childhood education support technology without stating how best to use it or the appropriate pedagogy to base teaching practice on. This chapter introduced both the theoretical perspective and the practical perspective in which the research is viewed and it also reflected on the findings in light of the literature in conjunction with the research questions. It started with the theoretical perspective, where I think the teachers of this study deeply expressed their perceptions in terms of using the iPad in the early childhood setting or context theoretically. They did this by stating or defining the main features and applications of the iPad used in the Centre. Thus it reflected their comprehension in terms of the major conceptual framing of the iPad as an educational tool. The other section, from my point of view, represents the teachers' perceptions of their daily practices related to iPad use in the center. Their practices include teaching numeracy, literacy, and other curriculum areas, as well as to complete formative assessment. Due to the fact that both the Kiwi children and the

multilingual children proved the iPad could be used as a learning tool, teachers demonstrated through their reflections on the iPad as a helpful tool that supports children's learning and development. The teachers showed strong and clear perceptions that the iPad is a helpful pedagogical tool that could be used to support teaching and learning in early childhood education. They also explained that there are certain challenges related to the use and management of the iPad in this context. The teachers faced difficulties in finding the balance between different educational resources, including the iPad as an educational tool, and other challenges related to the appropriate use of the iPad in the centre. Finally, applications for teachers were mentioned that were for the purpose of supporting their use of the iPad. Thus, guidance and supportive ideas need to be carried out to improve the professional development of the teachers related to iPad management in early childhood education, especially in using the variety of apps as well as to let the children take turns and have more experience while using the iPad in this context.

Chapter 6: The Conclusion

Introduction

There are three sections in this chapter. The introduction includes a statement of the research, the research questions, the background, and the framework of the study. It also explains the significance as well as the limitations. The main results of this case study are also included. Recommendations for future research are provided. Finally, the conclusion is presented in terms of concluding the main significant points of this chapter.

Statement of the research

This case study aimed to investigate teachers' perceptions about the potential of iPad use in their early childhood centre. It set out to explore the perceptions of early childhood teachers while teaching using iPad. The potential of iPad use in the early childhood centre was the objective in terms of the benefits and challenges in regard to the use of the iPad in this context, in the early childhood centre. The study sought to determine the benefits of the iPad for children, and for teachers, and the challenges of the iPad for both teachers and children.

Research questions

The study sought to answer the main research question:

- What are early childhood teachers' perceptions about the potential use of iPads in early childhood settings?

In addition, the study sought to answer these two sub-questions of the research:

- What are early childhood teachers' perceptions about the benefits of using iPads in early childhood settings?
- What are the early childhood teachers' perceptions about the challenges involved in using iPads in early childhood settings?

The qualitative case study approach was chosen as the method for this study. This enabled the researcher to collect and gather qualitative data in order to accomplish the aim of this study. This method was used to ensure an in-depth understanding of a studied topic (Stake, 2005). The case study was appropriate to be used in this research to conduct an in-depth exploration regarding the teachers' perceptions about the potential of iPad use in the centre. In addition, this method enhances the investigation into a phenomenon within its context (Yin, 2003). In other words, the case study supported the exploration of teachers' perceptions, as a phenomenon, regarding how iPads were utilised in the early childhood setting. Semi-structured interview was chosen as a method to collect the qualitative data. The closed ended questions were used at the beginning of the interview to let the teachers introduce themselves and break the ice. Then open ended questions were used to allow the teachers to explain their perceptions in-depth and for the researcher to explore their perceptions in-depth. The interview lasted no more than 60 minutes depending on the teachers' available time. The interviews were held in an early childhood centre in the Auckland region. The four teachers who were interviewed were all fully qualified, had full teacher registration and they had chosen to participate in this study. The data from all the interviews was analysed and organized thematically.

Background to the study

The literature studied in chapter 2 presented the theoretical background in terms of the literature on this subject, and specifically in the context of experiences, and the pedagogy that accompanies the use of iPad that reflected the insights into the benefits and challenges for both teachers and learners. This literature included these main sections: the background in regard to the use of iPads, iPad practices in early childhood education, iPad practices in the primary school sector, iPad practices in the secondary school sector, iPads in the tertiary sector, and iPads in curriculum areas. A review of the literature suggests that the use of the iPad in early childhood education and the intervention of recent technologies has greatly influenced teachers' methods and strategies and has had a positive impact on learning for children (Almekhlafi & Almeqdadi, 2010; Brand, Kinash, Mathew & Koryban, 2011; Bryne 2015; Jones, 2015; Ireland & Woollerton, 2010; Karsenti & Fievez, 2013; Kucirkova, 2014; Ostashewski & Reid, 2010 ; Prensky, 2010). This includes having an impact on educators' expectations regarding what comprises an appropriate teaching-method that includes iPads in early childhood education. While assessing the appropriateness of using iPads in early childhood education, it is beneficial to involve children in order to ensure the children are aware of iPads in an educational context. However, there is little research that had been completed in New Zealand on the way iPads are used in early childhood education.

Significance of the study

The significance of this study is to investigate early childhood teachers' perceptions of the potential of the iPad in Early Childhood Education. Little research has been conducted in the area of iPad use in early childhood education. Thus, the exploration around the teachers' perceptions about iPad use in early childhood education makes a valuable contribution to research related to the use of iPad in education.

Limitation of the study

This is a valuable study that makes a contribution to the research on this topic. However, this study was limited to a small sample, which included four teachers and a specific population - that of early childhood education. The second limitation is regarding the time for conducting the study, which is one year. The third limitation is that, this research utilised only one data collection method, the interview. Therefore, based on these three limitations the researcher could not over generalize the results to encompass a wider population of teachers. However, it is felt that this small-scale research study provides a basis for future research.

Empirical findings

The findings answered the research question about the benefits of iPads in early childhood education (ECE). The teachers showed a clear perception that the iPad is a technology with helpful applications/apps and features that supports teachers' practices and children's learning in the early childhood context. According to the teachers, iPads have applications/ apps that can support and benefit teachers and students. iPads have features that support learning, for example, iPads are easy to carry (mobility) and they are easy to use. The practices of iPad as instructional tools were seen and acknowledged by the teachers as the iPad supports teaching and formative assessment. Teaching practices include teaching literacy, numeracy and to support language learning for multilingual children. The iPad also supports English language teaching for multilingual children in the centre, as there were children who spoke multiple-languages. To assist formative assessment, the teachers used the iPad to take photos. These photos or portfolios became the basis for the formative assessment of children's learning. In regard to the practices of iPad as a learning tool, the early childhood teachers have a clear perception that the iPad could be used as a learning tool in the early childhood centre. Moreover, the iPad supports children's physical development. The children do lots of physical activities, such as dancing, while watching the iPad. In addition, iPads enhance children's learning dispositions, such as building connections with parents, since the iPad supports learning pathways, enthusiasm and independence, and connects to real life and creativity. Furthermore, the iPad enhances a collaborative, cooperative learning environment. However, it has challenges that the teachers perceive as issues involved in using the iPad in an early childhood setting. The management of iPad use in the early childhood centre focuses on how to find the balance between resources (material and technological resources that are held in or outside the room) and the management of the time involved in using the iPad in the classroom.

Empirical implications for teachers

The teachers' applications about iPad use in the early childhood centre need to be revised in order to improve their professionalism in using the iPad as a pedagogical tool.

Early childhood teachers' professional training

One of the findings showed that early childhood teachers did not integrate the iPad effectively into their teaching. The teachers' lack of professional training on how to use the iPad effectively is highlighted. It is more important to integrate the iPad carefully with consideration into early childhood education, rather than only utilizing it without preparation. Providing professional training for teachers to learn how to integrate iPads into their teaching should include professional development opportunities to support teachers to learn not only more about the iPad, but also for them to learn how to use it professionally in the setting of the early childhood centre. As one of the findings in this study showed, effective professional training is necessary.

Appropriateness of iPad pedagogy

The findings showed that teachers used the iPad as an instructional tool, both academically and physically. The iPad apps motivate children to learn effectively and to collaborate and cooperate. This result suggests early childhood teachers take into account how they utilise the appropriate pedagogy of the iPad into their teaching. Interviews with participating teachers also revealed that there are more benefits in using iPads with various apps, as well as the wireless aspect that simply enables the device to be connected with other tools such as connecting with a wide screen.

Recommendations for future research

A wider sample of participants

The collecting data method for this study consisted of semi-structured interviews with four registered teachers at one early childhood centre, in the Auckland region.

The teachers in this case study were identified as technology migrants in the proposed early childhood centre. A recommendation for future research is that teachers who were digital natives will be interviewed to see if there is a difference.

In future studies, it will be helpful to study more than the perceptions of the teachers. Including a study on the perceptions of other stakeholders is necessary to assess the potential of iPad use. For example, the children's parents and even the children themselves are also necessary parties to study in future research studies. Including a study that involves other stakeholders, for example, early childhood managers and other educators may also add a valuable dimension to future studies.

Future follow- up studies

Future studies may be worthwhile after the iPad had been used in the early childhood centre for a longer period of time. This is since the teachers' practices, opinions and attitudes toward the use of the iPad after participating in this study may evolve and change. Therefore, future research may be helpful to understand early childhood teachers' changing perceptions about the potential of the use of the iPad in the early childhood centre and determine the impact on the children's learning.

Variation of methods of collecting data

In regard to collecting the data, face-to-face, semi-structured interviews were conducted to complete this research. The interviews were often rushed to ensure that everything outlined in the interview protocol was discussed. Future studies may select more methods in addition to the interview to collect the data. Other methods to collect the data, for example, observations, surveys and a questionnaire could be used in the future research to ensure the quality of the findings, as well as to increase the credibility and reliability of the studies.

Doing action research in the early childhood setting

From my perspective, I believe conducting action research in the early childhood context is beneficial. Therefore, I am recommending future action research be carried out and as such this is a recommendation. The action research could include professional learning on iPad use. In regard to this idea, I learned about it from reading and reviewing the previous research, and I was inspired by Curry's action research (2013). It could be carried out to assess children gains or iPad usefulness after iPad use to check on the iPad potential in early childhood education. So action research is highly required and it is recommended that teachers conduct action research. However, I believe they first need some kind of training in regard to how to do action research on iPad use.

The missing / the gap between this research and other research

Little research has been conducted in the area of iPad use in early childhood education, especially, in regard to teachers' perceptions about iPad use in early childhood education. Thus exploration around the teachers' perceptions about iPad use in early childhood education was undertaken. Chapter 2 provides an overview of the literature

that informed my research topic of the early childhood teachers' perception on the potential of iPad use in early childhood education. Whilst the literature that has been reviewed is related to the area of early childhood education, where no relevant literature was found, the search was expanded to include literature from elsewhere in the education field.

By interviewing early childhood teachers and reflecting on their perceptions in conjunction with the literature, I feel this research makes a valuable contribution to the research on using the iPad in the education sector.

The theoretical framework

The research theoretical framework is Vygotsky's sociocultural theory. The main focus is on the importance of the social interaction between the children in their social context. In the research context I studied the way the iPad has been integrated into early childhood education, and how it has become a part of the educational environment. The iPad is used as a pedagogical tool. This educational tool supports learning, teaching and assessment, in the social interaction with the environment of the early childhood context and it provides the children with a variety of educational tools to improve the children's learning and skills (Vygotsky, 1987). Thus, the iPad is important in providing a child with a variety of cultural tools that enhance thinking and creativity more than acquiring knowledge in the learning context (Vygotsky, 1987). In addition, Vygotsky insists on the importance of using a variety of cultural tools to improve the children's development and learning (Vygotsky, 1987). I believe recently the iPad is considered theoretically as one of those cultural tools. Therefore, if it is integrated properly in the early childhood centre, it will greatly enhance the teachers' practices and the children's skills and learning.

Conclusion

In this conclusion chapter, I reflected on the findings, as well as the implications and recommendations for future studies and research. This case study focused on the teachers' perceptions for the potential of iPad use in an early childhood centre. The results showed several implications for early childhood teachers about the benefits and challenges associated with the use of the iPad. In addition, recommendations for future research in regard to using the iPad in early childhood education were presented. This research on the benefits of iPads in the education sector, especially early childhood

education, have shown that teachers only engage in limited usage and practices in relation to the use of the iPad and require further professional learning to enable sustainable long-term utilization of the iPad as an educational tool.

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Appendix

Appendix 1

Information Consent Letter for Interview – Qualitative Research 24/06/2015

To the Manager,

This letter is an invitation to participate in a research I am conducting for a thesis of Master of Philosophy (MPhil) at AUT University. The supervisor for this research is Dr. Anne Grey from the Faculty of Culture and Society at AUT University. I would like to provide you with more information about this research and what your involvement would entail if you decide to take part.

The major emphasis of the research is placed on capturing the teachers' voices, as they play a key role in offering the use of iPads to the young children. Therefore, the research will help me to gather teachers' opinions and perceptions of the potential benefits afforded to the children through the use of iPads.

I would like to ask your permission to interview four teachers from your early childhood centre on their views on the use of iPads with children. Participation in this research is voluntary. It will involve an interview of approximately 60 minutes in length to take place in a mutually agreed upon location and time. The teachers may decline to answer any of the interview questions if they so wish. Further, they may decide to withdraw from this research at any time by advising the researcher. With your permission, the interviews will be tape recorded to facilitate collection of information, and later transcribed for analysis. All information the teachers provide is considered completely confidential. The name of the centre, the teachers' names, or any other personal identifying information will not appear in the thesis resulting from this research; however, with permission anonymous quotations may be used. Notes and/or tapes collected during this research will be retained for six months in a secure location and then destroyed. Even though I may present the research findings to the university board, only the supervisor and I will have access to the data. There are no known or anticipated risks to you as a participant in this research.

If you have any questions regarding this research, or would like additional information to assist you in reaching a decision about participation, please contact me by e-mail at asfoyass@yahoo.com. You can also contact my supervisor, Dr. Anne Grey at +64 9 921 9999 ext. 7231 or anne.grey@aut.ac.nz.

I would like to assure you that the proposal for this research has been approved by the Research Ethics Review Board of AUT University. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this research, please contact me at 096200039.

I very much look forward to speaking with you and thank you in advance for your assistance in this research.

Approved by the Auckland University of Technology Ethics Committee on 24/06/2015 AUTEC Reference number 152/12

Sincerely,

Yasmeen Almashaileh

MPhil student

Dr. Anne Grey

Supervisor/ Faculty of society and culture

Appendix 2

Consent form

Consent Form

For use when interviews are involved.



Project title: *The Perceptions of Teachers Surrounding the Potential of iPads in Early Childhood Education (ECE)*

Project Supervisor: *Dr. Anne Grey*

Researcher: *Yasmeen Almashaileh*

- ☐ I have read and understood the information provided about this research project in the Information Sheet dated 24/ 06/ 2015.
- ☐ I have had an opportunity to ask questions and to have them answered.
- ☐ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ☐ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.

- ☐ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- ☐ I agree to take part in this research.
- ☐ I wish to receive a copy of the report from the research (please tick one): Yes ☐ No ☐

Participant's signature:

Participant's name:

Participant's Contact Details (if appropriate):

.....

.....

.....

.....

Date:

**Approved by the Auckland University of Technology Ethics Committee on 24/06/2015 AUTEC
Reference number [152/12](#)**

Note: The Participant should retain a copy of this form.

Appendix 3

Participant information sheet

Participant Information Sheet



Date Information Sheet Produced:

22 June 2015

Project Title:

The perceptions of teachers surrounding the potential of iPads in Early Childhood Education (ECE)

An Invitation

My name is Yasmeen Almashaileh. I am completing a Masters of Philosophy at AUT University. As part of this qualification I would like to interview four early childhood teachers on how they use iPads to teach young children.

What is the purpose of this research? How was I identified and why am I being invited to participate in this research?

The purpose of this research is to complete a Master's thesis. I may also use the research to present at a conference and write a journal article. You were identified as a possible research participant because you are an early childhood teacher who uses the iPad with young children.

What will happen in this research?

The project involves interviewing four early childhood teachers for approximately one hour. I will ask you questions about the iPad, and your answers will be audio recorded. The interviews will then be transcribed and returned to each person interviewed for verification. Your participation is voluntary and you may withdraw from the research at any time without giving reasons and with no adverse consequences to yourself.

You will not be asked to participate in any other roles.

What are the discomforts and risks?

It is not expected that there will be any risks or discomforts. However, if you do experience discomfort you may stop the interview at any time.

How will these discomforts and risks be alleviated?

You may stop the interview at any time. Confidentiality will be maintained as neither you nor your place of work will be identified. You may request that parts or all of the tapes be erased.

What are the benefits?

Whilst there will be no direct benefit to you as a participant, the research may be useful in allowing you to reflect on your teaching practice and the use of iPads with young children.

This research will help to the completion of thesis for Masters of Education for myself.

What compensation is available for injury or negligence?

If this section does not apply to your research, delete it. If you are involved in health research or some other research that may result in the need for compensation, then the following standard phrase must be used:

In the unlikely event of a physical injury as a result of your participation in this study, rehabilitation and compensation for injury by accident may be available from the Accident Compensation Corporation, providing the incident details satisfy the requirements of the law and the Corporation's regulations.

How will my privacy be protected?

No names or places of work will be used in the research report. All participants will be identified by pseudonyms.

What are the costs of participating in this research?

The only cost will be one or two hours of your time. What opportunity do I have to consider this invitation?

How do I agree to participate in this research?

You will agree by filling out the consent form. Filling out the consent form will be considered as an acceptance to participate in the research. I will then make contact with you to arrange a time and a place for the interview to take place.

Will I receive feedback on the results of this research?

A copy of the research report will be sent to each of the participants.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, *Dr Anne Grey*, e-mail: anne.grey@aut.ac.nz, phone: 09-921-9999 ext. 7231

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTECH, Kate O'Connor, ethics@aut.ac.nz, 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher Contact Details:

Yasmeen Almashaileh: e-mail: asfoyass@yahoo.com

Project Supervisor Contact Details:

Dr Anne Grey, e-mail: anne.grey@aut.ac.nz, phone: 09-921-9999 ext. 7231

Approved by the Auckland University of Technology Ethics Committee on *type the date final ethics approval was granted*,
AUTEC Reference number *type the reference number*.

Appendix 4

List of interview questions

How would you explain iPad technology?

How do you use the iPad to support children's learning?

What do you understand by iPad literacy?

What digital content on iPad do you use in the centre?

How has your teaching changed through using iPad with the children in the programme?

How do you think the use of iPad changes children's thinking?

What policies have you formed in the centre concerning the use of iPad?

What concerns do you have concerning the use of iPad?

And, what do you perceive as the benefits to children's learning?

Appendix 5



AUTEC
SECRETARIAT

24 June 2015

Anne Grey
Faculty of Culture and Society

Dear Anne

Re Ethics Application: **15/212 The perceptions of teachers surrounding the potential of iPads in Early Childhood Education (ECE)**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Subcommittee (AUTEC).

Your ethics application has been approved for three years until 24 June 2018.

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

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 24 June 2018;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 24 June 2018 or on completion of the project.

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

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this.

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

All the very best with your research,

A handwritten signature in black ink, appearing to read 'K O'Connor', written in a cursive style.

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Yasmeen Almashaileh asfoyass@yahoo.com

Appendix 5:

**Te Whāriki: He Whāriki Matauranga mō ngā Mokopuna o Aotearoa / Early
Childhood Curriculum /Ministry of Education**

<http://www.education.govt.nz/assets/Documents/Early-Childhood/te-whariki.pdf>

Appendix 6:

Play idea: Information communication technology (ICT) - Ngā rau tangotango

<http://www.education.govt.nz/assets/Documents/Early-Childhood/Play-ideas/ICT.pdf>

(Ministry of Education, 2015)

Retrieved from:

<http://www.education.govt.nz/early-childhood/teaching-and-learning/learning-tools-and-resources/play-ideas/ict/>

