School of Education

Digital Technology Use in Western Australian Early Years Centres: The Role of Directors, Educators And Parents in Guiding Young Children's Engagement with Digital Technologies

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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature:

Date: 25th July 2023

Abstract

Digital technologies are increasingly being used to advance children's knowledge acquisition and learning in fun and age-appropriate ways and have become an undeniable central part of children's lives (Kaye, 2017). This includes digital devices such as computers and tablets, tools such as cameras, calculators and digital toys, systems such as software and apps, augmented and virtual reality, and less tangible forms of technology such as the internet (Johnston et al., 2022). Though digital technologies are pervasive and used by, with and for very young children, not enough is known about adult attitudes towards digital technology management. There can be tension between traditional views of young children's digital technology use and the reality of their home and educational experiences. Furthermore, most existing research has focused on children engaged with digital technologies in schools, not at the ages beforehand.

This study investigated the digital technologies being used by, with and for children at three and four years of age in their education and home contexts. It also sought to understand the mediation strategies employed by educators and parents to manage children's technology use, facilitate active and constructive engagement, and protect them from unwanted inappropriate or harmful online interactions. The primary qualitative data came from a multiple case study design approach of four diverse Western Australian early years centres as the units of analysis. Within each of early years centre, one director, two educators and three families participated in interviews, and observations were carried out across multiple classrooms. Additionally, to enrich the data, a desktop audit of centres public content, memos, and digital technology policy documentation were collected and analysed. The qualitative analysis was multifaceted; the audit content, interview data, observation data and the memo notes required separate methods of qualitative analysis. All were analysed for common themes in seeking to find answers to the research questions guiding the study. This included an exploration of the opportunities and risks related to children's engagement with digital technologies, specifically at three and four years of age.

Results found some evidence of the participating early years centres using digital technologies at both an operational level, and at the level of individual children engaging with digital technologies for learning and in creative ways, as illustrated by a Digital Technology Activity Framework (Wilson et al., 2023). Furthermore, the study found that educators and parents desired age-appropriate and constructive guidance as to how to use digital technologies with young children. This study revealed effective strategies used by

educators and parents which have the potential inform governments and policymakers and enable them to create relevant and impactful policies for early years centres, as well as provide valuable and informed advice guidelines to educators and parents. Based on the findings, this study recommends firstly that children be allowed to exercise greater agency when interacting with digital technologies in a safe environment, and secondly that early years centres develop context specific, clear, and useable digital technology policies to guide digital technology use in centres and with children.

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Table of Contents

List of Tables

List of Figures

List of Appendices

1 Chapter 1 – Introduction to the study

1.1 Introduction

Digital technologies are used differently in the education and home contexts by, with and for young children. The attitudes and digital capabilities of the surrounding adults arguably determine what digital technologies children access and how they interact with digital content. Furthermore, many children display remarkably advanced digital skills from the ages of three and four that allow them to navigate our digital world, and often to learn from digital content in their everyday lives. When conceptualising this thesis, it was evident that previous literature had largely neglected the experiences of young children (below five years of age) and their immersion in digital play and enhanced environments. With the ever-changing digital landscape, the increased interaction with digital technologies by young children, and both practical and research experience with children, I aimed to contribute to this limited knowledge. I am passionate about education improvement initiatives and the research skills necessary for creating new knowledge and improved outcomes, especially for young children.

My previous research experience included investigating parenting and teaching styles, and social behaviour in younger primary school children. As time progresses, social behaviours are more influenced by immersive digital interactions. Therefore, I was drawn to investigate this more deeply, to understand how guiding children's agency and access to digital experiences affected their learning and play spaces. Previously I had worked with a longitudinal study and developed a strong socio-cultural understanding and approach to research. This was further developed through my international experience in both New Zealand and Mauritian kindergarten and primary schools. Additionally, I have been a participant in a longitudinal study since pre-birth which further revealed the advantages of practical research. Overall, my preliminary research and experience gave substance to this study into digital technology use in Western Australian (WA) early years centres, and the role of directors, educators, and parents in guiding young children's engagement with digital technologies.

This chapter provides both context and reasons for the study. It includes the following sections: 1) background, 2) problem statement, 3) research aims and objectives, 4) research questions, 5) research overview, 6) significance of the research, 7) thesis structure and 8) a chapter summary. Each will be elaborated in the subsequent thesis chapters.

1.2 Background

Digital technologies are increasingly utilised to advance children's knowledge acquisition and learning in fun and age-appropriate ways (Early Childhood Australia [ECA], 2018). This is true when content protects children's privacy and children access content based on its age appropriateness. This, for example, may include a registration process that prevents users from accessing services not targeted at their age range (Office of the eSafety Commissioner, 2018a). There is potential for tension between traditional, and even popular views of young children's digital technology use and the reality of their educational and home experiences. Children often begin their early years education experience able to use digital technologies, having grown up with digital technologies as a central part of their lives (Kaye, 2017). This includes digital devices such as computers and tablets, tools such as cameras, calculators and digital toys, systems such as software and apps, augmented and virtual reality, and less tangible forms of technology such as the internet (Johnston et al., 2022). In a prominent European Union study of young children's internet use, Holloway et al., (2013) found that children were going online at increasingly younger ages. More recently, The Office of the eSafety Commissioner shared that 81% of parents with preschoolers reported their children having some level of access to the internet (Office of the eSafety Commissioner, 2018b). With the prevalence of online accessible devices, there is a need to investigate current attitudes, beliefs, practices, learning benefits and potential risks surrounding children's use of technologies in both the early years and home contexts. Moreover, early years educators are expected to integrate digital technologies into children's learning environments more than ever. This expectation is outlined in both the Early Years Learning Framework (EYLF) (Australian Government Department of Education [AGDE], 2022) and National Quality Framework (NQF) (Australian Children's Education & Care Quality Authority [ACECQA], 2012).

Educator and parent mediation strategies are key to fostering positive and safe digital interactions and experiences for young children. However, the literature often presumes that the significant adult in the child's life has the time and digital literacy to participate in, and monitor children's digital activities (Bronfenbrenner, 1989). Berson et al., (2021) referred to digital literacy practices as the use of digital technologies to access information, investigate ideas, connect with others, and create innovative solutions. The American Academy of Pediatrics Council on Communication and Media (2016) encourages parents to be aware of their child's digital interactions and explain to children how their online experiences relate to

the world around them. A review of the literature also reveals that more studies (Livingstone et al., 2017; Zaman et al., 2016; Plowman & Hancock, 2014; Given et al., 2014; McPake et al., 2013) focus on children's personal engagement with digital technology in the home environment, and fewer (AGDE, 2022; Schriever, 2021; Murcia et al., 2020; Palaiologou, 2016b; Nikolopoulou & Gialamas, 2015; Danby, 2013) explore children's digital experiences in early years centres. Therefore, this research has sought to build upon the literature relating to digital technology use in early years centres and their connection with practices in the home.

Finally, there is a growing call for early years program leaders to develop and make available to educators, parents, and children where possible, policies which guide and supports children's health, wellbeing and learning with digital technologies (AGDE, 2022). For early years centres to effectively integrate digital technologies into their contexts, centre directors and educators would benefit from guiding principles and policies and resources, for the integration of digital technologies into daily programmes and children's play. These principles must ensure the child is placed the centre and are given agency when interacting with digital technologies. Essentially, the healthy cognitive, social, emotional, and physical development of the whole child is as important as ever in the digital age (ECA, 2018).

1.3   Problem statement

There has been limited research within the context of early years centres into young children's (aged three and four years old) experiences with digital technologies. The ramifications of pervasive digital technology presence and use is not fully understood for young children in the early childhood context. Furthermore, educators and parents are grappling with societal expectations for appropriate and effective digital technology use with young children. This may be due to young children having more advanced digital competency than those of adults, which is well established by primary school age (International Society for Technology in Education [ISTE], 2007). Furthermore, it can be challenging to ascertain how educator and parent attitudes, as well as their digital competence, influence how digital technologies are used by, with and for young children (Tondeur et al., 2020). These aspects often determined the mediation strategies and digital technology guidelines chosen, which in turn influence the encouragement and fostering of agency in children's digital interactions. Therefore, this research has sought to identify the relationships that exist between each of these aspects, both in the education and home

contexts. The research also sought to identify where the knowledge gap existed, especially in reference to digital technology policy implementation in early years centres.

1.4 Research aims and objectives

This study set out to investigate what digital technologies are being used by, with and for children at three and four years of age in their education and home contexts. The aims were to:

- add to existing literature of how digital technologies might be beneficial to young children, their families, and early years education, when fostered and managed in appropriate ways,
- understand the strategies employed by educators and parents to guide children's technology use, facilitate active and constructive engagement, and protect them from unwanted inappropriate or harmful online interactions,
- demonstrate how early years centres use digital technologies for operational efficiencies, as well as to enhance children's learning and play by providing opportunities for digital experiences, and
- make recommendations for the development of digital technology policies in young children's early years education contexts.

Specifically, the study has focused on how children, educators and families manage and prioritised digital interaction. This has included an investigation of how digital technologies are managed in educational and family settings. Ultimately, this research seeks to inform both educators and parents on how to guide young children's use of digital technologies to ensure safe and meaningful digital interactions.

1.5 Research questions

Based on the research aims and objectives, this research asked the following research questions. A qualitative study approach framed both the question and three sub-questions.

How are digital technologies used by, with and for young children in early years centres and in the home?

- What positive and negative aspects associated with young children using digital technologies are reported by children, early years educators and parents?

- What main mediation strategies are employed by early years educators and parents to ensure safe and positive digital interactions for young children?
- What recommendations would be made for developing digital technology policies in early years centres?

1.6   Research overview

To answer the research questions this study employed a constructivist informed approach to explore educator and parent beliefs about digital technologies in early childhood. Within the constructivist paradigm, a subjectivist epistemology was used to understand the relationship between children's digital behaviour and their environment. A subjectivist epistemology assumes that reality can be expressed in a range of systems, and that individuals impose meaning on the world and interpret it in a way that makes sense (Moon & Blackman, 2017). The methodological approach employed was a case study research design with multiple case studies. The context for the research were WA early years centres, and the cases comprised four diverse metropolitan centres. Within each of the four early years centres; one director, two educators and three families participated in interviews, and observations were carried out across multiple classrooms.

Specifically, this study utilised a desktop audit of each centre's online public profile, interviews, observations, memos, and digital technology policy reviews to gain insight into the digital technologies young children in WA engage with, and the opportunities and risks associated with their use. The desktop audit was carried out prior to observations in the centres and was conducted to determine how each centre theoretically incorporated digital technologies and whether they referenced a digital technology policy. Individual, semi-structured, and confidential interviews were undertaken with each child, their parent, their educator, and the centre director. Classroom visits were undertaken to document their perspective of classroom practice and children's interactions with digital technologies. Memos were recorded (in both the interviews and observations) to note any key repetitive themes and interactions. Finally, the study sought to gain access to the current digital technology policy in each centre to determine how digital technologies were managed in the education context.

Analysis was multifaceted and required the audit content, interview data, observation data and the memo notes to have separate methods of qualitative analysis. Importantly, there were no digital technology policy documents evident across all centres. Thematic analysis

was selected as the most appropriate method as it allowed flexibility in interpreting large data sets by sorting them into broad themes. The combination of the language used, images captured and interpretations by all participants formed the data sets and allowed for a detailed account of children's digital technology experiences and environments.

1.7   Significance of the research

This study is significant because it provides a rich description of digital technology practices within WA early years centres, both operationally and with children. Ongoing attention needs to be given to research into children's digital technologies usage to ensure mediation strategies employed by educators and parents are effective in maximising opportunities for children's digital learning and play. The opportunities afforded by digital technologies were multiple, including allowing for creative and active learning and play that engaged children's specific interests, and digital experiences that aligned with children's developmental stages. This research into specific strategies utilised by educators and parents of children has the potential to inform governments and policy makers and enable them to keep policy up-to-date and relevant. The findings also offer advice and guidance into how digital technologies can be best utilised and managed in education and home contexts to maximise children's learning whilst ensuring children's safety online.

1.8   Thesis structure

The next chapter, Chapter 2, presents the literature relating to the role of educators and parents managing young children's engagement and safety online, including 1) the digital environment of young children, 2) the types of digital technologies young children engage with and why, 3) young children's digital skills, 4) the positive and negative aspects associated with young children's digital technology usage, 5) the main mediation strategies employed by early years educators and parents, 7) digital technology policies in early years centres and 8) the conceptual framework that informed this research. Chapter 3 then presents the research overview, theoretical framework, and the methodological approach underpinning the study, and includes details on the context, participants, data collection and analysis, as well as the ethical considerations and limitations of the study. Chapter 4 presents the results from the four participating early years centres and is the lengthiest because it presents each case in detail, inclusive of the centres participants, the results of the desktop audit and digital technology policy review, as well as the observation and interview findings. Each centre's findings include photographic evidence and participant quotes to illustrate the prevalence and

value of key themes. This is the nature of case study research which allows for a greater depth of understanding and reflection of participant voices. Chapter 5 begins with a cross-case analysis in which key themes from all centres are compared for similarities and points of difference. It then presents a detailed account of each key theme pertaining to the research questions. This includes 1) digital technologies, 2) attitudes, 3) mediation strategies, 4) digital technology policies in early years centres and 5) recommendations from the research. Chapter 6 concludes by reflecting on the research questions and summarising the key findings before providing the implications for practice and policy, and recommendations for future research.

1.9   Chapter summary

This study has addressed the role of educators and parents in guiding young children's engagement with digital technologies, as well as investigated what children themselves think about digital technologies in both education and home contexts. The research was primarily based in early years centres in WA, with interviews and observations being carried out in classrooms of three and four-year-old children. Additionally, parents and children provided details of how digital technologies were used in home contexts. By examining the role of educators and parents in managing young children's engagement with digital technologies, this study has sought to explore the current digital state of play in both contexts. Specifically, the cross-case analysis of four early years centres has provided a snapshot into digital technology usage and revealed not only quality practices, but also what should be included in digital technology policies and procedures in early years contexts. Ultimately, this has helped generate a framework applicable to contexts outside of the participating centres in this research.

In conclusion, this research is timely and warranted as it has identified and documented both educator and parent practices in fostering children's online experiences and described the nature of children's actual online experiences. It has the potential to inform educational digital technology practices in early years centres and highlights opportunities for centre-based digital technology policy development. Finally, it advocates for government investment in early childhood digital technology policies and regulatory systems for supporting quality digital technology practices with young children.

2 Chapter 2 - Literature Review

2.1 Introduction

Chapter 1 presented an overview of the research, including the aims and objectives, and the questions that framed this study. This chapter now reviews the relevant literature pertaining and informing the key areas of focus within the study. This includes the digital environment of young children, and the types of digital technologies young children engage with and why; examination and analysis of the literature that framed the understanding of the digital skills that young children acquire as they navigate their digitally influenced world. Emerging from the literature include previously identified positive and negative aspects associated with young children's digital technology usage and the primary engagement and mediation strategies employed by educators and parents. This is followed by an overview of digital technology policies mandated or advocated for in early years centres. The chapter then concludes with a presentation of the conceptual framework that emerged and framed this study.

2.1.1 Context

Crucially, this research took place during the Covid-19 pandemic and therefore children's context was drastically different from their normal routines and activities. Parents, educators, and children learnt to utilise new technologies and artefacts (Luo et al., 2022). As the pandemic progressed, some children were forced to attend school online, and parents were provided with resources from schools on how to continue their children's schooling. This bought multiple challenges including issues surrounding stable internet connection, a lack of adequate devices in homes to enable children to connect virtually with their peers and educators, and inadequate guidance for parents and children on how to operate digitally amongst such uncertainty.

The pandemic influenced early years centres in similar ways. Early years educators had to create digital content that would keep children cognitively, socially, and physically active. For example, research by Luo et al., (2023) showed that educators largely relied on pre-recorded lessons as their primary instructional strategy. This allowed educators to pre-empt parent and children questions, eliminated out-of-sync internet issues, and allowed children to rewatch videos multiple times. Some educators even used digital technologies to augment their voices to toy characters or apply face filters to create engaging digital content (Luo et al., 2023). This protected their privacy while curating content according to the curriculum.

While these were the benefits, challenges associated with swapping to solely digital content became event during the pandemic. Some educators had not yet harnessed their digital skills and struggled with the expectation of creating digital content that would be permanently shared with parents. Each of these factors impacted children's engagement in the on-line learning environment, as generally younger children were more disengaged that older children (Luo et al., 2023). Further, it is difficult to predict what the educational landscape will look like after the full impact of the pandemic passes (Blackley et al., 2021). Equal access and opportunities to take advantage of digital technologies for young children was discussed during the Covid-19 pandemic (Flack et al., 2020). While the research of Flack et al., (2020) focused primarily on primary-aged children, the same ramifications reach down into early years education contexts.

2.2   The digital environment of young children

It is important to understand the context surrounding young children in relation to the digital elements they interact within their play and learning environments. Children's development and appropriation of digital capabilities are affected by social relationships and the world around them. Bronfenbrenner (1979) acknowledged multiple social systems at various distances that impact an individual's life, including a microsystem (e.g., family), mesosystem (e.g., school), exosystem (e.g., school community) and macrosystem (e.g., dominant ideologies). Bronfenbrenner (1989) also added that children's interactions with their environment influenced their development.

Many factors affect the presence of digital technologies in the home, and how parents manage their children's digital interactions. As Bronfenbrenner (1989) suggested, children are at the centre of their contexts, with their family, education context and communities contributing to their everyday experiences. The home environment is the first context where children access and interact digital technologies (Ozturk & Ohi, 2019; Kervin et al., 2018), and family circumstances and socioeconomic status influence the digital technologies present in the home (Plowman et al., 2014). For example, children may have bedtime stories delivered by their parent using a tablet as a book (Danby, 2013), or may be given a parent's phone to watch an animation while waiting at the doctor's surgery. After the family home, the education context is usually the next digital environment for young children (Wilson et al., 2023; Preradovic et al., 2016; Danby et al., 2013; Yelland, 2011).

This study was informed by two influential international positions on digital technology use in young children's education contexts: the United Nations (UN) Convention

on the Rights of the Child [UNCRC], General Comment Number 25 (2021) and the U.S. Department of Education's guiding principles (2016). The UNCRC, General Comment Number 25 (2021), in relation to the digital environment, reiterated that children developing independent ideas and having a right to be involved in decisions that affect them should be at the forefront of decisions made around their opportunities and wellbeing. Comment 25 provides guidance on legislative and policy measures to ensure compliance with the Convention, and to ensure children's rights are met within the digital environment (UNCRC, 2021). Additionally, the principles state that when used appropriately, digital technologies can be a tool for learning and should be used to increase access to learning opportunities for all children (U.S. Department of Education, 2016, p.7). The guiding principles state:

1. Technology, when used appropriately can be a tool for learning.
2. Technology should be used to increase access to learning opportunities for all children.
3. Technology may be used to strengthen relationships among parents, families, early educators, and young children.
4. Technology is more effective for learning when adults and peers interact or co-view with young children.

Elements of these principles were also evident in a range of Australian early years sector governing frameworks (National Laws and Regulations, EYLF and NQF). The National Laws and Regulations include the Education and Care Services National Law (WA) Act 2012 (Government of Western Australia, 2012) and the Education and Care Services National Regulations. Both the laws and regulations guide the NQF. Both the EYLF and the NQF highlight the expectation for educators to integrate digital technologies into children's learning environments. The EYLF, a national framework created to ensure quality and consistency in early childhood programs across Australia, acknowledge the importance of building digital capacity among young children through Outcomes 4.4 and 5.5 (AGDE, 2022). This was first introduced in 2009 and updated in 2022. Learning Outcomes 4.4 and 5.5 discuss digital technologies and the way in which educators are required to guide children's engagement with digital technologies, support children to navigate their ideas, and represent their thinking in a digital manner (AGDE, 2022). Both outcomes promote digital technologies in encouraging new and creative ways of thinking. Specifically, Outcome 4.4 states *"children*

resource their own learning through connecting with people, place, technologies, and natural and processed materials" (p. 51). This, as stated, is evident when,

> *"…children explore the purpose and function of a range of tools, media, sounds and graphics, experiment with different technologies, use digital technologies and media to investigate and problem solve, express, and respond to ideas and feelings using a range of creative media including photography and digital technologies and more"* (p. 56).

Furthermore, the outcome states that educators should *"select and introduce appropriate tools, technologies and media and provide the skills and develop their skills and knowledge with digital technologies and media in their curriculum to use them confidently with children"* (p. 56). Outcome 5.5 states that *"children should use digital technologies and media to access information, investigate ideas and represent their thinking"* (p. 63). This, as stated is evident when children,

> *"…identify technologies and their use in everyday life, incorporate real or imaginary technologies as features of their play, use digital technologies to access images and information, explore diverse perspectives and make sense of their world, develop simple skills to operate digital devices, such as turning on and taking a photo with a tablet, use digital technologies and media for creative expression (e.g. designing, drawing, composing), engage with technologies and media for fun and social connection, identify basic icons and keys (e.g. delete button) and use them to support their navigation (e.g. click, swipe, home, scroll) and understand these terms and adopt collaborative approaches"* (p. 63).

Again, the expectation is that educators provide access to a variety of technologies and teach the necessary skills and techniques to engage with the available resources (AGDE, 2022). The introduction of the NQF in 2012 presents a regulatory framework designed to oversee early childhood sector standards and reinforce the expectation of digital technologies being used for and with children, through Quality Areas 3, 4 and 7. Quality Area 3 focuses on the physical environment and references the use of technologies. Element 3.2.2 states that *"educators introduce appropriate technologies to enhance children's learning"*, and *"children engage with technologies for experimentation"* (ACECQA, 2012). Quality Area 4 focuses on staffing and states that services with fewer than 25 children can engage with an early childhood teacher exclusively online using information technology. Quality Area 7 focuses on governance and leadership and references the availability of information technology for administration, planning, evaluation, and communication. This includes

enrolment information, children's health information, and other data pertinent to the child. The EYLF and NQF digital technologies requirements encourage educators to increase their digital literacy to co-construct knowledge with children (Mantilla & Edwards, 2019), and effective preservice training and ongoing professional development is essential to providing educators with the digital capabilities to select, use, integrate, and evaluate appropriate digital technologies in the educational environment (Wilson et al., 2023; Nikolopoulou, 2021; Donohue & Schomburg, 2017).

In addition, both EYLF Principle 2 (partnerships) and NQF Element 6.2.1 require educators to utilise digital technologies to communicate with parents (Wilson et al., 2023). Digital platforms such as Storypark, Seesaw and Xplor are available for documenting children's experiences, routines and facilitating parent communication (White et al., 2021; Stratigos & Fenech, 2021). While privacy policies vary slightly between the platforms, each has its own policy on data ownership. For example, a parent is the administrator of a child's Storypark portfolio but does not 'own' a child's portfolio (other than the content they have created themselves). Rather, the content is owned by the educator, and therefore usually the educator's employer. However, under Storypark's Terms of Use (Storypark, 2021), parents are granted a lifetime license to administer and use on behalf of the child as part of all parties agreeing to the Terms of Use.

Parents ultimately control their children's digital footprint and have the right to remove their children's information off the internet, but not necessarily from a centre's records. Arguably, educators who are digitally capable should be able to seamlessly integrate the demands of updating the digital platforms during their workday with the children. Social media, such as Facebook and online messaging, can also be used for communication between centres and home, and policies should therefore guide digital communication in this manner. This should include who posts and maintains the social media platform, and who accesses and replies to messages. While social media might be an efficient means of communication, many centres opt to instead utilise digital platforms.

Both the EYLF and NQF affirm the need to develop independence and foster agency in young children's digital interactions and experiences and are informed by social constructivist calls for greater independence and agency to build young children's digital skills and capacities (Tay, 2021; Kewalramani & Veresov, 2021; Mantilla & Edwards, 2019; Heikkila & Mannila, 2018; Rogoff, 2003). For children in early years centres in WA, these expectations influence the presence and use of digital technologies in their daily context.

Additionally, both documents represent an important call for educators provide quality digital experiences and consistency in early childhood programs across Australia.

2.3   Types of digital technologies young children are engaging with and why

Digital technologies include a range of devices and learning tools that may be internet accessible and can be either screen-based (Edwards et al., 2018; Major & Watson, 2018; Axford et al., 2018) or non-screen-based (Aranda et al., 2022; Berson et al., 2019). Digital devices include game consoles, music and video players, televisions, tablets, mobile phones and desktop or laptop computers (Australian Bureau of Statistics [ABS], 2016a). ECA (2018) states that digital technologies should allow people to share, communicate, store, retrieve and manipulate digital data for education, entertainment, recreational, organisational, and work purposes. Johnston et al., (2022) also recognised that children are interacting not only with devices such as personal computers, tablets, cameras, calculators, and digital toys, but with systems such as software and apps, augmented and virtual reality, and less tangible forms of technology such as the internet. In summary, the digital experiences of young children in both education and home contexts vary considerably (Parette & Blum, 2014; Gutnick et al., 2011).

Literature referring to the digital technologies utilised in family homes is readily accessible. Parents have reported that their children have access to YouTube and YouTube Kids, streaming services for television shows or movies (e.g., Netflix or STAN), single player games, multiplayer games, Reading Eggs, Mathseeds, and social media (Office of the eSafety Commissioner, 2018b). Furthermore, children engage with a wide variety of digital technologies for educational, entertainment and creative purposes (Murcia et al., 2022; Rideout & Robb, 2020; Konca & Koksalan, 2017; Chaudron et al., 2015; Duffy & Bruns, 2006). For example, Davidson et al. (2014) reiterated the benefits of YouTube as a teaching tool for specific topics. Each child had a unique context in which they were permitted access to digital technologies, making it important to identify all possible digital devices used to access digital content. Numerous researchers have documented young children's use of digital technologies across many different countries (Rideout & Robb, 2020; Konca & Koksalan, 2017; Chaudron et al., 2015). In Australia, one exploratory research study looked at 15 preschool children (three to five-year olds) and their use of different technologies in their individual homes (Given et al., 2014). The researchers found that of the 15 participating households, seven had tablets and six had smartphones available for children's use. Many children (45% of the participants) engaged independently with digital technologies and were able to complete activities without adult intervention (Given et al., 2014). Even children in

economically challenged households use newer interactive and mobile media daily (Council on Communications and Media, 2016). With one third of Australian children owning their own tablet or smartphone (ACMA, 2020), both Mantilla and Edwards (2019), and Zabatiero et al., (2018) report that children aged birth to two years spend an average of 14 hours and children aged three to five spend an average of 26 hours per week engaging with digital technologies.

Digital devices with internet accessibility pose more of a management challenge for parents but can provide a range of opportunities and new skills. Across Australia, parents have reported that their young children use the internet for a range of purposes including: 1) entertainment, 2) new skill development, 3) to keep them occupied, 4) education, 5) creative activities, 6) to unwind or calm down and, 6) to prepare them for school (Office of the eSafety Commissioner, 2018b). When a range of devices is available to young children, they learn a range of skills that contribute to their development. For example, creative purposes can include looking at novel ideas playfully, freedom of choice, making connections and comparing ideas (Murcia et al., 2020; Hannaway & Steyn, 2017). Each learned skill contributes to the overall healthy child.

Early years education should recognise children's digital experiences, given how much they interact with digital technologies in the family home (McPake, et al., 2013). There is a growing body of research into effective pedagogy, especially in the early years setting (Aranda et al., 2022; Murcia et al., 2022; Murcia & Cross, 2022; Chaudron et al., 2015). The types of digital technologies present in early years centres may differ from family homes, and the purpose of their use in the classroom is usually curriculum related or for communication with parents. For example, researchers report many early years centres utilise digital platforms to communicate with parents, and many families appreciated receiving regular updates via these platforms (Reynolds & Duff, 2016). Platforms, such as Storypark and Xplor, combine photographs, videoclips, text, and audio files, and have widely replaced paper-based documentation (White et al., 2021). Sometimes, digital technologies are used for entertainment purposes, which positively effect children's overall wellbeing (Johnston, 2021; Bohnert & Gracia, 2021). Stratigos and Fenech (2021) state that early years education is immersed in the app generation, whereby digital platforms are used for digital documentation, assessment for learning and parent communication. Papadakis et al., (2017) acknowledged that educators should be able to assess apps for their effectiveness in educational practice. Each type of digital technology serves a purpose within the learning

environment, with some serving multiple purposes. For example, some technologies have multiple functions such as a tablet being a camera, an audio recorder, and a digital canvas (Fielding & Murcia, 2022).

According to Houen and Danby (2022), digital technologies need to be authentically integrated into early years education. This integration is in alignment with a genuine need to use digital technologies (mandatory in Australia). The benefits include being connected with people, information and memories as well as responding and reacting to what the children are interested in within their classroom at the time. They draw on evidence from two research studies funded by the Australian Research Council (Investigating Mobile Technologies in Young Children's Everyday Worlds and Interacting with Knowledge, Interacting with People: Web Searching in Early Childhood) (Houen & Danby, 2022). The mobile technologies included YouTube, web searching for information and images, online shopping, email, and maps. Digital technologies were used: 1) to encourage cultural and everyday experiences of home, school, and community, 2) for information seeking, investigating and problem solving, 3) to support home and school relationships, 4) to move from technology into play-based activities, and 5) to support communication and connect globally (Houen & Danby, 2022; Danby et al., 2013; Danby, 2013). For example, platforms such as Skype or Zoom were used in classrooms to connect with others around the globe (Morgan, 2013). Each example utilised different digital skills and varied across education contexts.

Another purpose of digital technologies in early years centres included educators using tablets, SMART boards, or Bluetooth speakers to facilitate digital story times with children (Preradovic et al., 2016). Digital stories often made lessons enjoyable, and encouraged the improvement of language skills, interest, attitudes, attention, and motivation in positive ways (Girmen & Kaya, 2018). Additionally, varied digital technology usage across centres and in the home led to children learning how to operate devices and engage with digital content. Importantly children's digital skills and capabilities are best encouraged when guided in intentional ways (Fielding & Murcia, 2022; Murcia & Tang, 2019).

2.4   Young children's digital skills and capabilities

The International Society for Technology in Education (ISTE) has highlighted many foundational digital technology core competencies and skills which can be established by age five (ISTE, 2007). Additionally, both Bers et al., (2019) and Elkin et al., (2016) have demonstrated that three-year-olds can master skills and demonstrate problem solving abilities

when interacting with digital technologies. Dong (2018) reported that many early childhood educators believed that digital technologies benefitted young children's language, creative, literacy and problem-solving skills in addition to building their digital skills and capabilities. The terms digital skills and digital literacy are referred to throughout the literature with similar intent. Digital skills include how children operate digital technologies. Both educators and parents play crucial roles in both the adoption of digital technologies and children's development of digital skills (Livingstone, 2007). The acquisition of digital skills is influenced by the child's age and access to digital technologies, their digital use, attitudes of the adults closest to them, and by both online and offline capacities and activities (Helsper & Eynon, 2010). By contrast, Twinkl (2023) defines digital literacy as an ability and skill to find, evaluate, utilise, share, and create digital content. Additionally, Twinkl adds that digital literacy includes skills such as uploading YouTube content and sharing on Facebook (Twinkl, 2023). Digital literacies therefore refer to practices across technologies and media involving reading, writing and multimodal communication and meaning-making, advanced by digital play or other playful and creative activities (Fleer & Rai, 2023; Fleer, 2018; Arnott, 2016; Marsh, 2016).

Research has shown that digital technologies can enhance creative expression and foster creativity in children (Fielding & Murcia, 2022; Murcia et al., 2022; Murcia, 2021; Murcia et al., 2020; Kucirkova & Sakr, 2015). These researchers align creativity with an ability to generate original ideas appropriate to the task at hand (Murcia, 2021). However, there has been little research focused on young children, digital technologies, and the development of creativity (Fielding & Murcia, 2022). Murcia et al., (2020) suggest that appropriately designed technologies can in fact foster creativity through the integration of Beebots or iPads into the learning environment. This requires children to have a basic understanding of these devices, and an element of skill when interacting with them.

Today, young children have the capacity to manage many aspects of their online experiences. Campbell and Speldewinde (2022) state that agency comes with competence, and agency facilitates the opportunity to act on behalf of oneself or others. Developers of digital content and applications aim to connect with the range of digital skills young children possess when creating interactive content and activities. For example, young children may not yet possess the fine motor skills or literacy required to use a mouse and keyboard (Office of the eSafety Commissioner, 2020a). Therefore, developers create applications that are simpler and fit for younger ages, and there is increased uptake by younger children. Children

are learning earlier in life to control and install a wide range of applications and they can search the internet leading to more advanced online competencies. The U.S. Department of Education (2016) has argued that integrated digital tools may empower young children by providing them with a voice. Papadakis and Kalogiannakis (2017) state that because tablets and touchscreen devices only require the use of a finger, they can be attractive for young children to engage with as touchscreen technologies require only the capacity to point, touch and drag items on the screen. Axford et al., (2018) added that touchscreen technologies provide opportunities for children to employ motor skills such as pinching, dragging and pointing. Importantly, children's capabilities are limited by their levels of cognitive development so educators and parents need to be thoughtful when selecting the types of digital technologies for integration into children's learning environments.

According to Plowman (2015), digital technologies also support social interaction. In classrooms, young children can use digital technologies as opportunities for social interaction which requires educators to model collaborative learning and turn taking (ECA, 2018). Although not specifically a digital skill, the overall skills encouraged by digital technologies are manifold. Overall, children quickly master the basics of operating iPads, tablets, and smartphones, and soon understand most versions of age-appropriate web-based activities and applications (Falbe, 2015). Given children's engagement with increasingly complex online technologies, a considered and comprehensive look at associated positive and negative aspects is required, to gain an understanding of both opportunities as well as risks.

2.5   Positive and negatives associated with young children using digital technologies

Educators and parents offer a range of attitudes towards young children and digital technologies. Inan and Lowther (2010) researched the effects of educators' characteristics and perceptions of contextual factors influencing digital technology integration and found that educators beliefs about technology strongly influenced the use and inclusion of digital technologies in their classrooms. Tondeur et al., (2020) suggested that educators' attitudes and digital competence were two crucial influencing factors upon how digital technologies were used by, with and for young children. Multiple researchers (Kalogiannakis & Papadakis, 2019; Hatzigianni & Kalaitzidis, 2018; Palaiologou, 2016a; Sharkins et al., 2016; Aldhafeeri, et al., 2016; Blackwell et al., 2014; Teichert & Anderson, 2014) have investigated educator attitudes towards digital technologies with young children, as well as how digital technologies could be successfully integrated into early years contexts. Despite this, there is still the need to develop a deeper understanding of the process of engaging digital

technologies in play and learning activities in early years centres (Gjelaj et al., 2020). It is also well documented that parental perceptions and attitudes play a crucial role in children's digital technology engagement and the development of their digital literacy (Marsh, 2016: Dias et al., 2016; Nikken & Jansz, 2014) with Lauricella et al., (2015) noting that parental attitude was key in the amount of young children's screen time. Furthermore, parents own digital literacy affected their confidence to protect children from online risks (Durak & Kaygin, 2020).

There are several reported positive and negative aspects associated with young children using digital devices to access the internet. Primarily, most adults seek to guide children to use digital technologies in a wise and balanced manner (Plowman, 2015; Ernest et al., 2014). Online digital devices present many opportunities to learn, connect and create (Office of the eSafety Commissioner, 2020a) while Blum-Ross and Livingstone (2016) state that online time can facilitate learning in literacy and numeracy, general academic achievement, and both hard and soft skills, including creativity and personal expression. Digital technologies can also encourage connection with others in the physical world. For example, research by Arnott (2016) analysed how social clusters emerged in children's (three to five-year-olds) digital play time at two preschools. A nine-month observation revealed that children exercised considerable agency in shaping their own digital play, demonstrating that children can effectively navigate their social interactions within the domain of education technologies by using different methods of communication, teamwork, and leadership (Arnott, 2016). However, Zabatiero et al., (2018) has cautioned that digital technologies should not entirely replace opportunities for physical activities or movement.

Importantly, digital technologies can generate dialogue and encourage social interactions that may not otherwise happen regularly (Gillen et al., 2018). A further positive reported aspect is that many children are able to utilise online technologies before they can read and write. They subsequently learn lessons earlier, and therefore more school ready. Age-appropriate design features, such as voiceover support to guide children through content allows children to not only utilise digital technologies, but to gain self-regulatory capabilities and acquire knowledge as they do so (Day et al., 2019; Falbe, 2015). According to Segal-Drori and Shabat (2021), there is increasing evidence that well designed and age-appropriate digital technologies can effectively support children's development. Finally, digital technologies can promote effective communication and meaningful interactions with others (Hsin et al., 2014).

By contrast, there are numerous concerns reported with young children's digital technology usage. Many studies have reported educator and parent concerns over the physical effects on the child, such as the long term effects on their eyes, attention span, levels of discipline, social skills, language development, playfulness, poor posture, repetitive movements, or sedentary activities (Straker et al., 2018; Makransky & Lilleholt, 2018; Livingstone et al., 2017; Tremblay et al., 2017; Department of Health, 2017; American Academy of Pediatrics Council on Communications and Media, 2016; Haughton et al., 2015; Freina & Ott, 2015; Livingstone & Helsper, 2008). Others have reported cognitive, emotional, and social concerns. Cognitive concerns include limited learning opportunities, shortened attention spans and fewer verbal interactions (Luckin, 2018; Ferranti, 2016), while emotional concerns include addiction, depression, and access to inappropriate content (Office of the eSafety Commissioner, 2018a; Kostyrka-Allchorne et al., 2017). Wider societal concerns that inappropriate digital technologies negatively impact children's development have been reported by Erinfolami (2021), the Council on Communications and Media (2016) and Zabatiero et al., (2018). Social concerns revolve around isolation, distraction from outdoor play with peers, learning how to behave in appropriate ways and cyber-bullying (Schriever, 2021; Office of the eSafety Commissioner, 2020a; Office of the eSafety Commissioner, 2018b; Haughton et al., 2015; Chaudron et al., 2015; Plowman & Hancock, 2014). Finally, other concerns include the overall level of usefulness, the ease of use of the technologies and the financial costs associated with digital devices (Makransky & Lilleholt, 2018), along with parent and educator anxiety around their own lack of digital skills. Further research is necessary to unpack the most prominent concerns.

Specifically, in their systematic review of educators' attitudes towards digital technology utilisation, Luo et al., (2021) stated that 28% of their articles revealed positive attitudes, while 15% revealed negative or uncertain attitudes among teachers. Educators concerns generally mirrored those of parents, and they largely dictated how digital technologies were embedded and used by children in their classrooms. Similarly, McArthur et al., (2022) defined screen time as television, computer, or video games. Ebbeck et al., (2016) reported that some educators referred to time spent with digital technologies as screen time, and their concern was that screens inhibited development in other fields. In general, early years educators report hesitance in using digital technologies with young children (Pila et al., 2022). Educators cite lack of confidence (Sheehan & Rothschild, 2020; Gillen et al., 2018; Blackwell et al., 2014), lack of knowledge (Pendergast et al., 2017), lack of training

(Nikolopoulou, 2021) and workload issues (Stratigos & Fenech, 2021) as reasons for reluctance in using digital technologies. In response, ECA (2018) notes that if educators are concerned about children's high home-based digital technology use, they can view their classroom as an opportunity to either restrict use in or model positive use. However, educators do not always fully understand the scope of children's digital activities and therefore may not value digital technologies as a means for advancing children's competencies in the early years setting (Wood et al., 2019).

Parents appear to approach their children's digital technology interactions with great caution and most parents report being uncertain about the harms associated with digital technologies resulting from excessive screen time and the nature of some digital content (Plowman & Hancock, 2014). Research by Papadakis and colleagues (2019), however, revealed most parents held positive attitudes towards their children's use of smart mobile technologies both at home and in their education context. Blum-Ross and Livingstone (2016) evaluated interview data from 65 families about their digital media practices and reported that parents held concerns around: 1) conduct risks, such as 'sexting' or misuse of personal information, 2) content risks, such as pornographic or misleading content, 3) contact risks, such as stalking or impersonation; and 4) commercial risks such as advertising, excessive or hidden marketing, in-app purchases, or scams. The most commonly reported parental negative aspects include exposure to harmful, inappropriate, or unsettling content. Children were more exposed to inappropriate content on YouTube, and through search engines due to the autocomplete features and prompts (Holloway et al., 2013). In Australia in 2016 - 2017, 14% of parents in connected households with children aged 5-14 revealed that a child had been exposed to inappropriate material and in 5% of these, a child aged 5-14 had been subject to cyberbullying (ABS, 2016a). Although the ABS data derives from older children than participants in this study, it still highlights the vulnerability of young people, the potentially long-lasting and harmful impact of internet misuse and, therefore, why educators and parents must exercise caution around children's online accessibility. Digital technologies provide access to endless sources of information and social resources (Dias et al., 2016), and therefore present risks for all children who are particularly vulnerable (Holloway et al., 2013).

In a report by the Office of the eSafety Commissioner (2018a) involving 710 Australian parents of preschool children two to five years old, parents reported several concerns around their child being online. The top five concerns included: 1) accessing or being exposed to

inappropriate content other than pornography (39%), 2) online addiction (34%), 3) accessing or being exposed to pornography addiction (30%), 4) accessing, or being exposed to violent content (30%) and 5) contact with strangers or inappropriate invitations to meet offline (24%). While Mourlam et al., (2019) recognise that early education should be responsive to the needs of the learner, the increased use of digital technologies by young children pressures educators to take advantage of these technologies to improve learning opportunities. With the expectation of a seamless integration of technology into their existing pedagogies, educators can justifiably hold reservations for the safety and effectiveness of children's engagement with potentially unfamiliar technologies. This therefore becomes a focus in this study in an effort to further evaluate and understand the positive and negative aspects of young children using digital technologies in early years centres, as well as understanding parent concerns. Importantly, research highlighting concerns (Erinfolami, 2022; Palaiologou, 2016b; Jago et al., 2012) now leads to a necessary discussion on mediation strategies employed by both educators and parents.

2.6   Mediation strategies employed by educators and parents

Both educators and parents, intentionally and unintentionally, model digital behaviours while managing children's engagement with digital technologies and the fostering of safe environments. However, it is becoming increasingly difficult for educators and parents to manage children's use of devices that have increasing access to content, growing technological complexity, constant updates, and adaptations to new versions, which are often personalised and portable (Haddon & Vincent, 2014; Mascheroni & Ólafsson, 2014). Accordingly, an understanding of mediation strategies in both the education and home environments compliment research on the opportunities and challenges associated with children's digital use. There are a wide variety of mediation strategies documented throughout the literature including time and location limitations, certain site restriction (by verbal instruction), limiting permissions, parental controls, control on tasks to be completed first, limited access to devices (take it away), filters and use of technologies as reward systems to mediate how and what children access (Livingstone et al., 2017; Livingstone & Helsper, 2008). Each mediation strategy shapes the development of children's digital skills and is influenced by parent and educator beliefs (Mertala, 2019).

In the education context, mediation of digital technologies can be somewhat varied and haphazard. Some centres may have policies that determined how and for what purpose digital technologies are used, but there is little research into specific mediation strategies. For

young children in early years centres, educators are important influencers of digital children's engagement and consequently their online safety (Sharkins et al., 2016). The mediation or management strategies employed by educators are usually linked to centre leadership or overarching centre vision statements, as there are rarely formal policies regarding digital technology integration into classrooms.

In the home context, digital technology time is monitored in various ways, and the focus of recent research has been to take a proactive stance, embracing the opportunities that children encounter when engaging with digital technologies (Livingstone et al., 2017; Office of the eSafety Commissioner, 2018a; Zaman et al., 2016). Some mediation strategies are primarily reactionary to children's behaviours (Hiniker et al., 2016). At minimum, some harmful content is illegal (according to the Australian Government regulations) or managed by the Code of Conduct and guidelines adhered to by platforms used for children's activities or applications. Educators and parents then chose to further enforce safety measures beyond those safeguards; they should never be fully trusting of automatic child protection safeguards. Blum-Ross and Livingstone (2016) further acknowledged that parental roles should include more than simply policing their child's access. Instead, they can be key players in ensuring children capture the unique benefits offered by the digital age. Overall, three types of mediation strategies are commonly referenced (Livingstone et al., 2015; Nikken & Jansz, 2014; Wu et al., 2014; Livingstone & Helsper, 2008), namely:

- active mediation, which involves negotiation between parents and children regarding the content being viewed with digital technology,
- co-viewing, with parent(s) remaining present alongside their children, and
- restrictive strategies whereby parents set rules regarding the content, location, and duration of digital technology use.

Specifically, Nikken and Jansz (2014) focused on Dutch parents of children aged two to 12 years of age and identified five mediation styles in family homes including the three reported above, as well as restrictive content-specific mediation and supervision, for example, banning certain websites, and close monitoring of children's online access. This is also been referred to as content management (Sharkins et al., 2016) and content risk (Staksrud & Livingstone, 2009). Content risk can include violent or sexual content that may be inadvertently displayed when children engage with online digital content (Staksrud & Livingstone, 2009). Plowman (2015) also reported children's digital interactions to be strongly mediated by parents but in

her research, parents were sometimes unaware of how to deal with issues such as optimal screen time. For Plowman (2015), the regulation of children's digital play needed to be flexible, and parents needed to keep an open mind in their mediation strategies.

With a rapidly changing media landscape, new strategies are continuously needed to manage children's online safety. Some parents enforce time limits or use software filters to manage their child's online time while others may use more active strategies, such as talking with their child about internet safely, and co-use devices (Smahelova et al., 2017; Zaman et al., 2016). Most parents and carers use a combination of mediation strategies. For example, the Australian Office of the eSafety Commissioner (2018b) reported that parents used a variety of strategies to supervise their young children's activities including viewing what is on their screen, viewing their children but not what is on their screen, checking on them intermittently, monitoring the amount of internet use, and using parental controls so they do not need direct supervision. In addition, the report identified some who gave no supervision at all. Shin and Li (2017) acknowledged the lack of consensus as to which mediation strategy is most popular or effective and that not all parents practice the same levels or types of mediation.

Blum-Ross and Livingstone (2016) stated that children who were heavily restricted in their internet access tended to be exposed to fewer risks (both physical and content related risks), but also to obtained fewer opportunities for learning and engagement. Further to this, an eSafety Commissioner report suggested that parents of two to five-year olds tended to favour a restrictive parenting style, whereas as children got older, parents returned to an open parenting style (Office of the eSafety Commissioner, 2018a). Specifically, the same report indicated that these parents were 24% more likely to identify with a restrictive digital technology parenting style, including attempts to control access and set rules around online time (Office of the eSafety Commissioner, 2018a).

Mediation may be most effective when there are other safeguards also at work such as physically supervising the child's online time, and installing built-in platforms and in-app software on home devices (Blum-Ross & Livingstone, 2016). Overall, Blum-Ross and Livingstone (2016) note that active mediation strategies encourage parents to hold an opportunity-based perspective, as parents are the main digital technology providers who usually select the devices, apps, and games that children access. Additionally, Sweeney et al., (2019) noted that the strategies parents chose tended to be motivated by fears of possible negative effects, which were not necessarily the real risks. Finally, some families did not

have rules or expectations regarding their children's digital technology use (Mendoza, 2009). Mediation strategies that worked to guide the children and 'co-experience' best positioned them to participate online in a safe and positive way.

2.7 Digital technology policies in early years centres

The interests of children should feature prominently in policy and practice (OECD, 2020; James & Prout, 2015). Recently, the EYLF (AGDE, 2022) focussed on early childhood education, care, and development as a national policy priority. The mandating of digital technologies in early years contexts are part of Bronfenbrenner's (1979) macrosystem and needs to be fully considered in this research. The value and use of digital technologies in early years contexts is increasingly important in research, policy developments, curriculum, and practice (Schriever et al., 2020). Therefore, digital technology polices must cover all elements of digital technology use by, with and for children in early years centres. For example, digital technology policies need to outline the processes for protecting the privacy of children and ensure their safety when using digital technologies, as well as protect their rights (Edwards et al., 2018). Home-centre communication through apps or social media accounts need to protect the privacy of children in ways that families are aware of what may be stored and who owns the data. Digital technology policies should also outline early childhood centre obligations regarding the collection, storage and sharing of personal and sensitive data. Thus far, there is little evidence that digital technology policies exist for these purposes.

The Statement on Young Children and Digital Technologies sets out four digital pedagogical principles to guide early years educators (ECA, 2018). The principles revolve around: 1) relationships (educators, children, and families), 2) health and wellbeing (physical interaction and emotional wellbeing), 3) citizenship (children's legal rights and online safety), and 4) play and pedagogy (digital play, learning and pedagogy). Each principle offers relevant practice advice. The Statement also identifies potential tensions resulting from the lack of a digital technology policy, namely, when services do not inform families or children as to how long their digital data is held in the system, issues surrounding signed consent regarding the sharing of images or information by the centre, and whether social media and digital documentation allows information to be further shared by educators or families (ECA, 2018). Children's images are sometimes included in posts or data without formal parental consent. The goal of enhancing children's agency (Burr & Degotardi, 2021; Nolan et al.,

2021) and allowing them citizenship in their digital world (ECA, 2018) extends to digital technology policy creation and implementation in early years education. While adults usually make the overarching decisions regarding the children's digital environment, children should have the right to actively choose what they engage with and how they develop their digital skills. All children have a right to exercise their agency when engaging in safe and constructive digital activities, both in their education and home contexts. Research and governing frameworks highlight the importance of children's agency as a construct in early childhood education (Burr & Degotardi, 2021; Nolan et al., 2021). Specifically, the EYLF defines agency as 'being able to make choices and decisions, to influence events and to have an impact on one's world' (AGDE, 2022, p. 64).

Additionally, the ECA Code of Ethics discusses educators' commitment to providing agency for children. Specifically, [As an educator] 'In relation to children, I will […] create and maintain safe, healthy, inclusive environments that support children's agency and enhance their learning' (ECA, 2016). The ECA Code of Ethics is based on inherent values within the profession which enable effective and ethical decision making. The Code maintains that it is important for the sector to create and maintain learning environments that support children's agency and enhance their learning in relation to digital technologies. It also stresses security and the safeguarding of information, especially on shared digital platforms. Murcia et al., (2020) have presented a framework for identifying and developing children's creative thinking while coding with digital technologies which highlights the importance of children's agency. Characteristics of children's creative thinking under agency include displaying self-determination, finding relevance and personal meaning, having a purpose, acting with autonomy, demonstrating personal choice and freedom, and choosing to adjust and be agile (Murcia et al., 2020). Further, Murcia et al., (2020) note the crucial role of the educator in shaping the socio-emotional climate to enable children's play and learning agency. Therefore, the digital environment of young children fosters and shapes their experience, attitudes, and aptitude with digital technologies.

International guidelines provide context for how digital technologies are used, allowed, purposed, and managed. Both the UNCRC, General Comment Number 25 (2021), and the U.S. Department of Education's four guiding principles provide a foundation on which digital technology policies can be established. For, example, General Comment 25 defines digital technologies, how they are increasingly important across children's lives and how the rights of the child need to be protected. It states the "rights of every child must be

respected, protected and fulfilled in the digital environment" (p. 1) and that "guidance to parents and caregivers should encourage children's social, creative and learning activities in the digital environment" (p. 15). The guiding principles reiterate that digital technologies can strengthen relationships between parents, families, educators, and children. When used appropriately, digital technologies allowed for efficient communication, as well as for information sharing and data storage.

Currently in Australia there is no government expectation that early years centres hold a digital technology policy, despite expectations established in the EYLF (AGDE, 2022) and NQF (ACECQA, 2012) to do so. Outcome 2 of the EYLF (AGDE, 2022) states that educators must "provide clear, accessible information for families and communities about the service's policies including child safety and wellbeing, Code of Conduct, record keeping practices, and complaints and investigation processes" (p. 42). Centres must therefore allow access to their documentation, so that others are aware of the processes and procedures that guide their practices. The challenge before the Australian government is to guide early years centres in the development of digital technology policies in the education context (Wilson et al., 2023); these policies need to cover all aspects of everyday technology use.

Existing research into what could be included in digital technology policies is not extensive. Resources provided by the Office of the eSafety Commissioner include an eSafety Early Years program which includes online safety resources to support children under five and their families (Office of the eSafety Commissioner, 2023). Specifically, the program comprises webpages for children under five, teaching and learning resources and professional learning modules. This may offer foundational help for early childhood educators and directors for what they might include in a digital technology policy. Zancanella and Rice (2021) suggest that digital technology policies should include elements such as: 1) identifying and accessing devices, 2) choosing learning management systems, and evaluating programs, applications, and other materials that support digital literacies, and 3) opportunities for professional learning that include digital literacies as part of online instruction. They state that most current technology policies, in general, focused on mediation strategies such as micromanaging device use, preventing access to inappropriate websites, and making technology supported learning appealing to those who doubt its necessity and quality (Zancanella & Rice, 2021). However, they, and others, argue that it is more important for policies to focus on quality of learning, rich and challenging online experiences, and access to professional learning about digital usage for educators (Zancanella & Rice, 2021; Rice &

Deschaine, 2020; UNICEF, 2012). Regardless, any digital technology policy must allow for early years centres to operate with a safe digital environment.

Luo et al., (2021) have highlighted the many theories available to guide the digitalisation of early years education. Recently, the Office of the eSafety Commissioner (2022) noted that each early year's service usually does maintain a written policy describing the acceptable use of digital technology referenced against the NQS and EYLF. They provide a checklist (eSafety Checklist for Early Learning Services) as to what should be built into policies so that everyone understands the risks associated with being online, provides meaningful experiences for children, supports staff, and supports communicates with families. Their suggestions include the following (Office of the eSafety Commissioner, 2022, p. 2):

- safe online expectations for children and educators. For example, age-appropriate access to technology, the taking of photos and videos, the use of centre name or location on social media, personal and professional use of social media by employees,
- procedures and processes around the capturing, storing, and sharing of children's images and videos,
- terms about sharing of personal data online,
- when online parent communication tools are used, outline data storage and sharing procedures are to comply with relevant legislation. For example, the Privacy Act 1988 or state or territory legislation,
- signed parent consent to collect and share personal information, images, or videos of their children online,
- how children, educators and parents can raise concerns about digital technologies,
- how breaches of policy can be recorded,
- links to support agencies or further information, and
- timelines for policy review so that policies remains current.

Each of these recommendations forms a base for what could be included in digital technology policies across contexts. However, the list is not exhaustive and leaves room for directors and educators to create context-specific usable digital technology policies and procedures. Digital technology policies will be revisited in the results, cross-case analysis and discussion, and conclusion of this thesis.

2.8   Conceptual framework

A conceptual framework is the system of concepts, assumptions, expectations, beliefs, and theories that supports and informs the research (Maxwell, 2012; Miles & Huberman, 1994). Specifically, it is a visual or written product that explains the key factors, concepts or variables and the presumed relationships among them (Miles & Huberman, 1994). The development of a conceptual framework informs the research design, including refining the aims and objectives, the development of realistic and relevant research questions, and the selection of appropriate methods (Maxwell, 2012). Concepts framing this study have been explored in this literature review, and include: 1) young children's digital environment, 2) types of digital technologies, 3) digital skills and capabilities, 4) educator and parent attitudes, 5) mediation strategies, 6) digital technology policy, and 7) young children's agency with digital technologies. The double arrows in Figure *2.1* represent the dynamic and bidirectional interaction each concept has with another. For example, children's digital skills and capabilities allow for an interaction with the digital environment. Equally so, the digital environment allows for the development of children's digital skills and capabilities. Luo et al. (2021) also highlights the causal relationship between educator attitude and digital competence; digital attitudes are significantly and positively related to educators' digital competence (Tondeur et al., 2020; Scherer et al., 2018; Siddiq et al., 2016). Each proposed relationship has been investigated in this research and incorporated into the research questions that frame the study. Ultimately, all the concepts have contributed to the degree to which children were able to demonstrate agency with digital technologies. The conceptual framework is presented in Figure *2.1*.

Figure 2.1. Conceptual framework

Young Children's Digital Environment

Types of Digital Technologies   Digital Skills and Capabilites

Educator and Parent Attitudes

Mediation Strategies   Digital Technology Policy

Young Children's Agency with Digital Technologies
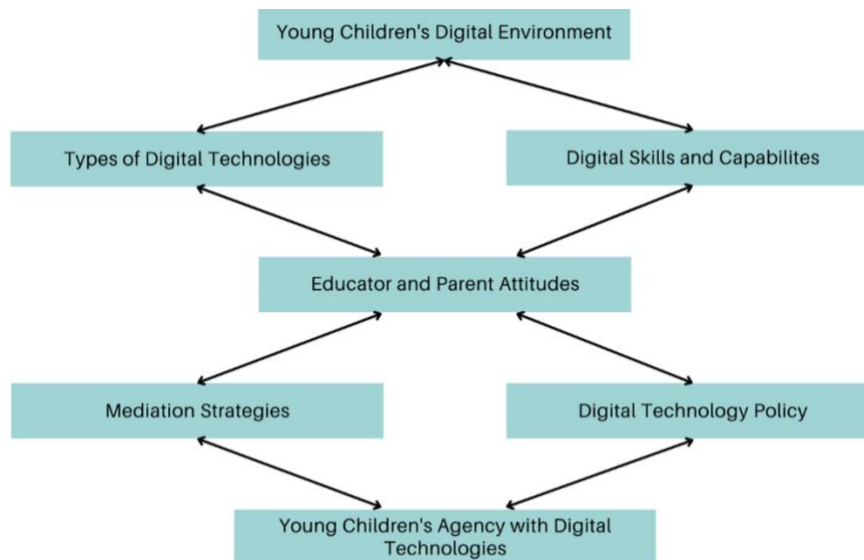
2.9   Chapter summary

In summary, this chapter has addressed many aspects of digital technology use by, with and for young children. The reviewed literature has provided detailed insights into the research context underpinning this study, including: 1) the digital environment of young children, 2) types of digital technologies young children engage with and why, 3) young children's digital skills, 4) both positive and negative aspects associated with young children using digital technologies, 5) main mediation strategies employed by educators and parents, and 6) digital technology policies in early years centres. The literature review has in turn provided a conceptual framework for the study and a foundation for analysis of the data collected in this study.

The literature review has examined current research into the digital technologies evident in both education and home contexts, including definitions of digital technologies, and the skills required by children to utilise digital technologies. Importantly, it has identified three main gaps. Firstly, research has not widely focused on young children before formal schooling. One of the primary goals of this study is to add to the literature on young (three- and four-year-olds) children's use of digital technologies. Secondly, it would appear that mediation strategies guiding young children's engagement with digital technologies in early years contexts is under-researched. A goal of this study is to identify how adults manage their children's use of digital technologies. Importantly, while there is research into parent mediation strategies, to date this has not included educator mediation strategies. Finally, applied research investigating digital technology policies in early years education was not evident in the literature search and is an important area for further research.

Having presented the literature relevant to this study, the next chapter introduces the research overview, theoretical framework, and the methodological approach that guided data collection. The chapter details the selected paradigm and epistemology which informed the research design and methods, and data analysis required to answer the research questions, before explaining the research context and introducing the study participants.

3 Chapter 3 - Research overview, theoretical framework, and methodological approach

3.1 Introduction

The previous chapter introduced the literature relevant to the research questions and the focus of this study. This chapter now describes the research overview, theoretical framework, and the methodological approach. The study aim was to explore how early years educators and parents ensure safe and positive engagement and interactions for young children using digital technologies, and an objective was to collect data to help identify intersections between the education and home contexts in relation to the types of digital technologies, children's practices and mediation strategies, and whether one influenced the other. The primary purpose was to answer research questions pertaining to educator and parent management of children's use of digital technologies, namely: 1) identification of the digital technologies young children engage with, 2) understanding of the main attitudes held by educators and parents, and 3) understanding of the mediation strategies used by educators and parents. The secondary purpose was to determine whether digital technology policies in early years centre impacted children's interaction with digital content and devices in both the education and home contexts. Ultimately, this study sought to make recommendations to inform digital technology policymaking in early years centres.

This chapter presents details on all elements of the study design, including: 1) paradigm, 2) epistemology, 3) methodological approach, 4) context, 5) participants, 6) data collection, 7) data analysis, 8) coding and data condensation, 9) measures of research quality, 10) ethical considerations, 11) limitations, and concludes with a summary.

3.1.1 Research overview

The specific aim of this research was to investigate what digital technologies were being used by, with and for children at three and four years of age in their education and home contexts. Additionally, it sought to understand educator and parent attitudes towards young children using digital technologies and how they guided children's digital interactions. Accordingly, the research employed a qualitative approach, using a multiple case study design. The key concepts that grounded and informed this research are: 1) educator and parent practices and fostering of children's online experiences and the nature of children's actual online experiences, 2) educational practices integrating digital technologies in early years centres, 3) opportunities for centre-based digital technology policy development, and 4) government investment in early childhood digital technology policies and regulatory systems for

supporting quality digital technology practices with young children. Each of these concepts created and informed the research aims and objectives, the structure of the research, and the methodological choices. Specifically, this research combined theory and practice in early years centres and family homes, to understand what digital technologies are used and by whom, to understand how children engage with digital technologies and how they are guided in online activities. This was undertaken through interviews and observations of the above in daily practice. The paradigm and epistemology, methodological approach, context and details surrounding data collection and analysis are discussed in the following sections and initially summarised in Figure *3.1*.

Figure 3.1. Structure of the research

Research Overview				
Paradigm	Constructivist			
Epistemology	Subjectivist			
Methodological Approach	Case Study Research: Multiple Case Studies			
Context	Western Australian Early Years Centres			
Participants	Four Case Study Centres			
	Centre A	*Centre B*	*Centre C*	*Centre D*
	Director (1)	Director (1)	Director (1)	Director (1)
	Educators (2)	Educators (2)	Educators (2)	Educators (2)
	Parents (3)	Parents (3)	Parents (3)	Parents (3)
	Children (3)	Children (3)	Children (3)	Children (3)
Data Collection	Desktop Audit, Interviews, Observations, Memos, Digital Policy Document Review			
Data Analysis	Thematic Analysis			

3.2   Paradigm

According to Moon and Blackman (2017), reality exists on a continuum from one absolute reality to where multiple realities co-exist. Most human research involves perception, and a construction of reality. The constructivist paradigm chosen for this study assumes that knowledge is socially constructed by people active in the research process, and researchers attempted to make sense of the complex world of lived experience from the perspective of those who lived it (Schwandt, 2000). Creswell (2003) further acknowledged that constructivist researchers generate a theory or pattern of meanings as data is collected. In this study, reality exists according to both me, as the researcher, and to individual participants, with each having their own unique perception and understanding of digital technologies.

Therefore, every effort was made to understand the subjective world of individual human experience (Guba & Lincoln, 1989) and to present based on empirical evidence, peoples constructed reality as accurately as possible.

3.3   Epistemology

Within the constructivist paradigm, a subjectivist epistemology was employed to understand the relationship between children's digital behaviour and their environment. A subjectivist epistemology assumes that there are multiple constructions of reality, and it targets the understanding of current phenomena (Pham, 2018). The study aimed to gather information of the multiple perspectives surrounding the child, including the director, educators, parents, and children themselves. Each influences the natures of a child's digital technology interaction and whether they experience safe and positive engagement of online interactions.

Participants was sought with a view to understanding their interpretation of the world around them, in relation to the research questions. It was understood that each present a view individually shaped by location (both social and theoretical) and the lens of the observer (Maxwell, 2012). In this study, multiple interviews and observations allowed for the collection of a rich pool of qualitative data, allowing for a detailed picture of the investigated topic. Each participants' interpretation of reality helped to shape the underlying assumptions regarding the integration of digital technologies into early years centres and safe and positive online experiences for children, and in turn provided a richer understanding of the research.

This epistemological stance assumes that I make meaning of data through a combination of my own thinking and processing of data informed by interactions with participants (Kivunja & Kuyini, 2017). Punch (2005) suggests that the researcher constructs knowledge socially based upon their personal experiences of real life within the settings investigated. For example, in this research, the approach to data collection was personal and interactive, and the perspectives of multiple types of participants (educators, parents and children) were sought.

Understanding surrounding young children's digital technology use can be interpreted differently by those surrounding the child. Conflicted understandings within and between the child's community, educational context, and even within their immediate family can cause tension in the practical, day-to-day management of children's digital technology exposure which can be further complicated when the child engages with digital technologies across several contexts. By adopting a subjectivist approach, both the research and the participants were able engage in an interactive process where dialogue became a valuable source of data

(Kivunja & Kuyini, 2017). Capturing multiple participant perspectives and understandings, across the education and home contexts enabled an understanding of people's views regarding children's interactions with digital technologies, and how early years educators and parents attempt to provide safe interactive experiences for children. Acknowledging that the study was designed and enacted through a constructivist lens is critical to understanding how the data has been interpreted.

3.4   Methodological approach

Initially, information was sought about the backgrounds of participants and the research contexts. This was achieved through a desktop audit of each participating early years centre's documentation, and the immediate context was understood through observations within each, as case studies. Then, the perspectives of a range of relevant people were sought through multiple tiered interviews as the research questions demanded a detailed exploration of digital technology use and the strategies used by educators and parents to ensure positive digital interactions for children.

3.4.1   Case study research design

According to Feagin et al., (1991), a case study is an in depth, multifaceted investigation using qualitative research methods, of a single social phenomenon. Qualitative data has the potential to more fully describe a phenomenon from multiple perspectives (Stake, 1978). Specifically, a case study research design was chosen to allow a deep immersion into the child's context, as perceived and understood by the range of significant people within their lives. According to Denzin (1988), Peshkin (1993), Yin (1994) and Lincoln and Guba (1985), qualitative case study research:

- can be descriptive (of the setting/s) and interpretive,
- investigates a contemporary phenomenon within its real-life context,
- allows the researcher to pay attention to the idiosyncratic as well as the pervasive, seeking the uniqueness of each case,
- as an emergent design (in that themes and frameworks emerge through the data analysis process), and
- uses mainly inductive data analysis.

This research utilised both interview data sources and direct observations to gain insight into the topic, without interfering with the participants' natural environment. Specifically, parents, educators and children's behaviour were observed and questioned without manipulation (Rowley, 2002). Each case presented rich detail that enabled the expansion of knowledge through the sharing of other experiences and accordingly, a multiple case study design was employed, as follows.

3.4.1.1 Multiple case studies

A multiple case study design approach was implemented to better understand the differences and similarities between cases (Baxter & Jack, 2008; Stake, 1995). Additionally, Yin (2003) suggests that this approach allows for the analysis of data both within each case and across cases. As data was collected, it was examined, categorised, and tabulated to assess whether it supported or differed from the initial propositions underpinning the study (Rowley, 2002), and the iterative process of qualitative research required regular evaluation to determine what was important and what should be explored further. The research aims and objectives overall formed the basis for the selection of the qualitative data collection methods to allow for a thorough investigation of the topic from as many participant perspectives as possible.

In line with a multiple case study design approach, four different early years centres formed the units of analysis. However, the multiple case analysis allowed for a specific focus on the topic and not solely the case, i.e. each early years centre. Additionally, a multiple case study allows a more detailed investigation of the nuances and potentially far-reaching implications of a topic on a case-by-case basis. For example, if the issue of mediation of children's digital technology usage was raised by several participants in one setting, it allowed for a cross comparison of the importance of the topic in other settings. Of note, while findings are relevant to the specific settings in which the data was collected, multiple cases suggest the data and findings may be applicable elsewhere. This will be further addressed in section 3.9.

A multiple case study design was chosen because as it allowed the data to be organised by early years centre, thus enabling me to determine the extent to which early years centres digital technology policies and practices affected young children's technology use both in their home and in their classroom. The design also allowed results to be segmented into four cases, illustrating similar themes across centres, as well as key differences. Vannoni (2015) suggested that multiple cases allow the researcher to provide an analysis of the contrasts and

similarities identified through a cross-case comparison, which, in this thesis is presented in chapter five.

3.5 Context

3.5.1 Western Australian context

This study was undertaken in Western Australia (WA) and therefore the findings are most relevant within this context. WA's early learning settings vary across the state, and include public, private, school, home, and online learning settings. Digital technologies are incorporated into many early years centres, as was the case in this study whereby all four centres included digital technologies within their classroom environments. According to the EYLF for Australia (AGDE, 2022), digital technologies enable children to access global connections and resources and encourage new ways of thinking. Additionally, a key learning outcome revolves around children resourcing their own learning through connecting with people, place, technologies, and natural and processed materials. Importantly, AGDE (2022) defines technologies broadly as:

> *…much more than computers and digital technologies used for information, communication and entertainment. It involves the development of new objects or tools by people that help them in their lives. There are 3 broad types of technology: mechanical, analogue technology and digital technology* (p. 68).

However, the use of digital technologies in classrooms in positive and safe ways differs between centres, and implementation is at the discretion of each centre. Centres may or may not have an active digital technology policy and the document may not be publicly available. While the WA education context sits under a national learning framework, there is no single standardised digital context for every child.

3.5.1.1 Covid-19 Context

It is important to acknowledge that this research was undertaken during a global pandemic, whereby participants suffered unprecedented economic, social, civil, and cultural disruption (Covid-19). Digital technology use increased drastically due to online learning, and new uses emerged for devices in both education and home contexts. The degree of impact of Covid-19 varied across cases, and even participants within the research.

Within the WA context, Covid-19 heavily influenced the operational running of early years centres from March 2020 until post data collection. Centres were mandated to stay open

during the state lock downs to continue providing care for children despite most adults working from home. Not all centres employed the same strategies, policies or pandemic guidelines. Of the four participating centres in this study, all remained open but with restrictions placed on entry. For example, outside visitors were not allowed in for a period (early 2021), while two centres barred parents entirely from the premises. In these cases, educators allowed the children in and out through one gate on the property border as parents arrived. Importantly however, while data collection took longer, it did not significantly disrupt the study overall. Each centre allowed data collection to continue, and observations were still possible, in and around mandated restrictions.

In the broader context, schools across Australia quickly developed guidelines for home learning incorporating digital technologies in both communication with parents and their children, and in learning and teaching activities. The various education departments and the Office of the eSafety Commissioner provided schools with basic advice on using digital technologies in the interim and unpredictable period of Covid-19. Adults also did not escape the impact of the pandemic in their individual learning and reliance on digital technologies. With adults potentially using digital technologies more than previously, their attitudes towards their children's usage may have altered across this time.

3.6   Participants

3.6.1   Case studies: early years centres

Four early years centres were included in this multiple case study to investigate potential patterns of theoretical replications (Figure *3.2*). This number of cases was deemed sufficient for adequate evidence gathering of mediation strategies, children's digital experiences and discussion around available digital technologies (Rowley, 2002). Within each of the four early years centres, the centre director, two educators and three families were invited to participate in interviews. Observations were undertaken in each centre, with specific focus on the three selected children of participating families. These children ranged between three and four years old, and represented a range of socioeconomic status, gender, family composition and ethnicity.

Figure 3.2. Early years centre participants
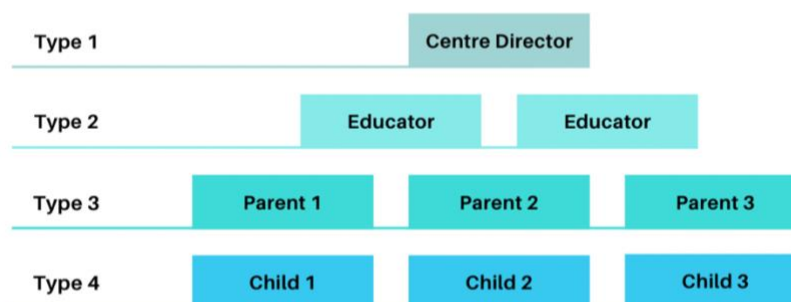
The four centres were identified through purposeful convenience sampling, and represented a range of different governance structures and socio-economic positioning. A key criterion for selection was that each centre had been awarded a minimum Meeting Quality rating by the Education and Care Regulatory Unit. Each centre met the requirements of quality practice and pedagogy, as described within the NQF (ACECQA, 2018). The four participating early years centres represented:

1. University Centre
2. Not for profit
3. Faith-based
4. For profit - public listed company.

As illustrated in Figure *3.2*, participants included each centre director, two educators who taught the focus children, three parents and their three respective children. The recruitment process relied heavily on each director and is set out in 3.6.1.1.

3.6.1.1 Recruitment process

Centre directors were initially sent an invitation email which was then followed up by an offer to meet in person to discuss the study in greater depth. At the recruitment stage, Covid-19 restrictions were not in place and face to face meetings were undertaken. Each director was emailed the *Director Participant Information Statement* (Appendix A) and the *Director Consent Form* (Appendix B) to enable them to make an informed decision about participation. Once each director had returned the necessary documentation, I worked with each to recruit centres educators, parents, and children. Specifically, each director was asked to contact their educators with the *Educator Participant Information Statement* (Appendix C)

51

and the *Educator Consent Form* (Appendix D) to solicit educator volunteers. Once at least one educator per centre had agreed to participate, the director was requested to send an invitational email to all centres' parents. This included a *Parent Information Statement* (Appendix E) and a *Parent Consent Form* (Appendix F), and parents were invited to respond directly to myself. In addition to the email, hard copies were provided upon request.

3.7   Data collection

Data was collected using a range of methods including a desktop audit, interviews, observations, memos, and document review. Interviews and observations took place with all four early years centres over a nine-month period from November 2020 to July 2021. All data was de-identified, and pseudonyms given to each centre and all participants. The centre's designated pseudonyms are: Centre A, Centre B, Centre C and Centre D.

The research involved in-depth interviews with educators and parents and lasted an average of 22 minutes each. The interviews were accompanied by observations of the participating children in their classrooms engaging with digital technologies when possible. Observations of children's digital experiences ranged from approximately 15 minutes to 3 hours, depending on the activities and children's willingness to participate. Both the interviews and observations explored what digital technologies children were engaging with, the features of those technologies, and how parents and educators guided online safety while encouraging online opportunities.

3.7.1   Desktop audit

Prior to observations and interviews, a desktop audit was conducted to determine the main ways by which each centre incorporated digital technologies. This was performed remotely through each centre's website and supporting documentation. The primary purpose of the audits was to ascertain any public facing information regarding the use of digital technologies in the centre, and whether there were any policies pertaining to use and management. Audits included examination of each centre's website for any references to digital technologies, and this included searching website text for any references to digital technologies. Additionally, imagery, photos and graphic content was also searched for evidence of digital technology usage. Finally, the audit sought evidence as to whether professional learning was provided to staff around digital technologies. Detail pertaining to the desktop audit is presented in the chapter four.

3.7.2 Interviews

An initial part of the study involved one-to-one semi-structured confidential interviews with each participating child, their parent, educator, and centre director. Thirty-six interviews were undertaken and the breakdown of interview participants is shown in Table *3.1* below.

Table 3.1. Number of interviews per centre

	Centre A	Centre B	Centre C	Centre D	Total Number
Directors	1	1	1	1	4
Educators	2	2	2	2	8
Parents	3	3	3	3	12
Children	3	3	3	3	12

The interviews were carried out on the following dates indicated in Table *3.2*.

Table 3.2. Interview date per participant

		Centre A	Centre B	Centre C	Centre D
Director		03/11/2020	06/11/2020	24/11/2020	4/12/2020
Educator	One	01/12/2020	23/11/2020	24/11/2020	11/12/2020
	Two	01/12/2020	23/11/2020	15/06/2021	11/12/2020
Parent	One	25/02/2021	18/03/2021	26/02/2021	23/04/2021
	Two	18/03/2021	19/03/2021	05/03/2021	23/04/2021
	Three	23/03/2021	19/03/2021	19/03/2021	29/04/2021
Child	One	23/03/2021	01/04/2021	25/03/2021	23/04/2021
	Two	16/06/2021	01/04/2021	15/06/2021	23/04/2021
	Three	23/03/2021	01/04/2021	15/06/2021	23/04/2021

Table *3.3* shows the length of each individual interview. Adult interviews took between 10 and 40 minutes and the children's interviews were all under 10 minutes. On average, directors spoke for 21 minutes, educators for 22 minutes and parents for 24 minutes. Children spoke for an average of four minutes.

Table 3.3. Interview lengths (minutes:seconds) per participant

		Centre A	Centre B	Centre C	Centre D	Average
Director		25:52	15:01	22:02	20:50	20:56
Educator	One	10:38	28:29	30:19	19:04	
	Two	28:46	24:03	13:36	22:11	22:08
Parent	One	28:01	26:30	21:23	11:01	
	Two	22:15	20:10	21:17	16:25	
	Three	29:16	20:26	32:52	37:14	23:54
Child	One	09:30	04:39	03:09	02:17	
	Two	06:36	01:54	05:26	01:16	
	Three	00:32	03:09	02:51	02:56	3:41

The depth of the interviews was dependent upon each participants' ability to recollect and reflect on past experiences (Vasudevan & Riina-Ferrie, 2019). All interviews took place at

the early years centre or in a neutral setting, whichever best suited the participant. Most were undertaken in a classroom, a centre office, or the centre foyer, and if elsewhere in a café or location of convenience. Notes were taken where necessary and were backed up online. Interviews were recorded using an Olympus digital voice recorder for later transcription. Each interview audio recording was backed up immediately for data protection.

The semi-structured interviews were conducted using principles framed by Chaudron et al., 2015, Jago et al., 2012, Livingstone et al., 2014, and Livingstone et al., 2015. During some interviews, I took the opportunity to expand or introduce new questions to test, draw out, better understand or confirm data and/or analysis. However, overall, key questions were set to allow for comparable data to be collected.

The set interview questions related directly to the study's research questions. However, to further engage interviewees and ensure questions were relevant to their situation, a small number of customised questions were included. For example, each centre director was asked specifically about digital technology policy and potential staff tensions in respect to utilising digital technologies. Each educator was asked about the digital technology used in their classrooms, and children's reactions to them. Parents were asked in greater detail about mediation strategies, what and how digital technologies were used in the home, what types of content children accessed and the positives and negatives associated with their use. Participating children were asked general questions to elicit what they knew about digital technologies and their usage. The semi-structured interview questions are included in Tables 3.4, 3.5 and 3.6.

Prior to each interview, all participants were provided with information (additional to the *Participant Information Statement*) as to the general purpose of the study, what happens to the interview data and how it would be treated, who was involved, why participant cooperation was important, the aims of the interview and expected duration, and a reminder of the importance and value to the research to hear everyone's honest ideas, opinions, and experiences (both positive and negative). Each participant's consent to participate was recorded, and the position and functioning of the recording device checked prior to each interview commencing. Participants were also invited to voice any questions in relation to the study and every participant was thanked at the end of their interview.

3.7.2.1 Director interviews

Four centre directors were interviewed. Their purpose was to ascertain to what degree each director was involved in shaping the type and number of digital technologies used in their

centre and any rules surrounding their use. A purpose was to gain an understanding of general digital technology use and whether director's observed any problems or opportunities, or reasons to change or develop digital technology policies. The director interview schedule included six categories of questions: 1) personal, 2) centre-based, 3) digital technology policy, 4) limitations, 5) communication and 6) staff. Interviews took place either in the directors private office, or in a shared space with other educators present. Table *3.4* below shows example questions in each category. The full set of semi-structured interview questions can be found in Appendix G.

Table 3.4. Sample Director interview questions

Category	Example
Personal	What is your personal view on young children's use of digital technologies? Do you have any concerns or worries around their use of digital technologies?
Centre based	What digital technologies do you use/ allow the use of in your Centre? Do you value the availability of digital technology learning experiences for the children in your Centre?
Digital technology policy	Does your Centre hold a digital technology policy? What does it cover? In the past year, have you conducted a review into your Centres use of digital technology? What was the catalyst for this review?
Limitations	Equity issues around access, affordability, and the need for computer literacy of early childhood teachers and faculty are sometime barriers for early childhood programs and professionals. What limitations, if any, has your Centre faced for implementing or providing access to digital technologies?
Communication	Does your Centre utilise digital technologies for communication between your Educators and parents?
Staff	Are there any obvious conflicts or tension within your staff around their belief of what digital technologies should be used for? Are you aware of any staff concerns around the expectation of using digital technologies to implement the curriculum, or for using digital technologies as a teaching medium?

3.7.2.2 Educator interviews

The educator interview schedule was more comprehensive as questions also sought to explore what digital technologies children were using in their classrooms and how they were used. Educators were asked questions categorised as: 1) general, 2) children's skills, 3) types of digital technologies, 4) concerns and worries, 5) experience with digital technologies in the classroom, 6) parents and digital technologies, and 7) early years centre. Questions were designed to elicit detailed answers about digital technology usage in each context. Interviews took place in a shared office space, sometimes with another educator present.

Table *3.5* below shows example questions from each category and the full set of interview questions can be found in Appendix H.

Table 3.5. Categories of Educator interview questions, and examples

Category	Example
General	How would you define digital technologies? What do you personally use digital technologies for? What is your personal view on young children's use of digital technologies?
Children's skills	How would you define children's digital literacy? What digital literacies do you observe the children demonstrating whilst engaging with the technologies?
Types of digital technologies	Do the children have access to digital technologies in their classroom room? What digital technologies do they have access to? Which of the available digital technologies require online access?
Concerns and worries	Do you have any concerns or worries around young children's use of digital technologies? Has it ever occurred that a child is exposed to inappropriate or harmful content while accessing digital technologies in the Centre? What happened and how was the situation dealt with?
Your experience with digital technologies in the classroom	Have you used digital technologies as a research tool with children? Have you incorporated your learner's ability to engage with digital literacy as a resource, as an expectation for children to be 'school ready'?
Parents and digital technologies	Does the Centre report the children's digital technology use to parents? If so, in what way? Does the Centre use digital technologies to communicate with parents?
Your early years centre	Do you believe that new and innovative digital technologies should be brought into the learning environment so educators and children can learn how to use them? In your opinion, could your Centre utilise further digital technologies for the children's use? What could you recommend?

3.7.2.3   Parent interviews

The parent interview schedule was the most comprehensive, as parents reflected on both their own digital skills, their child's digital skills, and how digital technologies might be used in the home. The parent interview schedule included five broad categories: 1) general, 2) social interaction, 3) parent concerns, 4) parent mediation and 5) personal experience with online safety. While the interview schedule contained over 40 questions, not all were asked at each interview. For example, if the child did not engage with online games, questions pertaining to online games were not asked. Parent interviews took place in either the child's classroom, a common space (centre foyer) or in a neutral setting such as a café. Table *3.6* below shows example questions in each category and the full set of questions can be found in Appendix I.

Table 3.6. Categories of Parent interview questions, and examples

Category	Example
General	Does your child have access to digital technologies at home? At what age could the child operate a device on their own (e.g., iPad, smartphone, tablet)? What digital technology did they utilise/ learn first? Do the available digital technologies require online access? In which device does he/she usually use the internet? Do you use any digital technology to encourage, stimulate, and/or educate your child?
Social interaction	Does your child interact with anyone else online? Eg. multiplayer games, YouTube commenting, social media. In what ways can they, or do they interact with others using digital technologies?
Parent concerns	Do you think any technologies are particularly "positive" or "negative" for your children? Which ones? Why? Do you have any worries or concerns about your child using these technologies? Or about the use of digital technologies at home? If you do, what do you do about it?
Parent mediation	Does your child use all device(s) everywhere (at home, at school, at restaurants, etc.)? Do you say how long, when or where your child can use their device/s or play games? If so, why? Are you currently employing any methods to reduce your child's time engaging with digital technologies? Eg. search history or software installed on the device/s your child uses to block inappropriate content.
Personal experience with online safety	How many hours per day do you use digital technologies? Have you yourself ever been confronted with something inappropriate? What did you do?

3.7.2.4   Children interviews

Lastly, each participating child was asked a set of simpler questions pertaining to their digital skills, the digital technologies available in their home, and whether they had to abide by any rules in their home or early years centre. Talking about these devices in conjunction with observations provided evidence of children's perceptions of digital technologies. Questions were largely determined by the activity the child was engaging with. Examples of questions were as follows: *What can you show me? What are you watching? What can you do? Does mummy or daddy ever tell you have to stop doing something? Does your teacher help you?* For each question, I observed and listened to what the child was able to do on different devices, and sometimes, this required a prompt for the child to show what they could do on the device. All children's interviews took place in their classroom while regular activities continued around them.

As the children's interviews were conducted in their early years centre, it was important to monitor for disruption to the classroom activities. If required, the plan was to pause and return to the research at a later stage. Actions that could have been taken included: 1) ensuring that the children had agency and that they could choose to not participate, and 2) if children became disrupted or disturbed in any way, I would intentionally create distance and re-engage with the child at a later stage. While these options were available, they were

ultimately not required. The set of semi-structured interview questions can be found in Appendix J.

3.7.3   Observations

Observations allowed for the documentation of perspectives of classroom practice and children's interactions with digital technologies. Ten structured observations of practice, pedagogy, and children's digital interactions were undertaken and documented. Observations allowed first-hand data to be collected where digital play occurred naturally, rather than relying on second-hand accounts obtained in the interviews (Merriam & Tisdell, 2015). The length of each observation was determined by each early years centre and was dependent on the activities planned and classroom environment. No attempt was made to alter existing programs. Each director gave permission to come on to the premises as a visitor and made the introduction to individual classroom educators on the day of observations. In some cases, the director determined the best time and day for observations when children were likely to be engaged in digital play, and in other cases, the observation times were randomly selected at times of convenience. The length of each observation was determined by educators and children exercising agency over digital activities and experiences. In most cases, this was for an hour at a time. In some cases, multiple visits to the same classroom were required to observe the focus children if they had been absent during the first observation, or were not participating in a digital activity. Table *3.7* below lists the participating children (allocated pseudonyms) present in the specific classrooms of each centre.

Table 3.7. Observation by centre, classroom, and focus child

Centres	Classroom	Focus Child/ren
Centre A	Classroom One	Violet and Matthew
	Classroom Two	Hope
Centre B	Classroom One	Elliott
	Classroom Two	Moses and Faith
Centre C	Classroom One	George
	Classroom Two	Raine
	Classroom Three	Harry
Centre D	Classroom One	John, Millie, and Leyah

Real time reflections in a research journal, as well as an observation checklist were completed. This process led to the generation of research journals based on individual observations providing a detailed description of what occurred in each centre. Journal observations included information about the environment, activities and children's

interactions and reactions towards digital technologies. During observations, a checklist was kept of children's behaviours and actions when relevant to digital technology use. This observation schedule included possible types of behaviours from children and educators in their education context. Each of the possible behaviours was gleaned from examples from prior research such as Chaudron et al., 2015, Jago et al., 2012, Livingstone et al., 2014, and Livingstone et al., 2015. It was created as an original schedule of all expected behaviours that could be analysed. Child behaviours included physical movement, fine motor skills, posture, emotions, and interactions with peers and others. Educators' behaviours included the facilitation of children's agency when engaging with digital technologies and outlining time remaining on devices for children. Each schedule was paper based and completed live, with the written data converted to electronic versions and backed up online after each observation. The observation schedule can be found in Appendix K.

Lastly, photos were taken on a smartphone during observations to capture the children using digital technologies as well as evidence of their behaviour for later analysis. Each photo was taken to maximise anonymity and focused specifically on the child's hands and activities. This was included in the initial consent process, and each child was able to say whether they preferred no photo. Evidence of the observations are included in chapter four.

3.7.4   Memos

Punch and Oancea (2014) note that memos can record the ideas formed throughout the analysis process. Memos may be substantive, theoretical, methodological, or personal. For example, memos may be created when something unique is observed in the classroom or to later substantiate a comment from a participant. Memos point toward new patterns and a higher level of pattern coding, often allowing for more conceptual levels of thinking. For example, when a repetitive theme emerges among participants answering specific questions, memos can provide further context. Additional memos, notes, and preliminary analysis in this study were always kept electronically and backed up online. While not all memos were evidenced in the analysis, they did collectively contribute to the research journals.

3.7.5   Digital technology policy review

A review was conducted of digital technology policies and procedures documentation held by each centre, however none existed in any of the participating centres. Directors and educators

were asked about their knowledge of any documentation as part of their interview, as well as in a follow up email if they had been unsure at the time of answering.

3.8   Data analysis

Qualitative analysis tools were used for data collection in this study. Data analysis was multifaceted, and included the audit content, interview data, observation data and memo notes, all requiring specific methods of qualitative analysis. All were analysed for common themes in relation to the research questions as well as any additional related information the participants offered. Exploratory analysis was initially conducted to identify common or contrasting themes, and any underlying theoretical notions. This was followed by descriptive coding, then thematic and analytic coding guided by the research questions.

Thematic analysis demands an active role in constructing and interpreting realities from meanings (Xu & Zammit, 2020). Vaismoradi et al., (2013) states that the premise of this method involves finding repeated meanings across a data set. Each theme, according to Braun and Clarke (2006), represents a specific pattern that captures crucial information about the data in relation to the research questions. Themes are generated inductively from the raw data (Nowell et al., 2017). Accordingly, thematic analysis was employed in this study as it allowed for accessible and flexible data analysis which aligned with the constructivist epistemology.

The process of thematic analysis first required familiarisation with the data before the generation of initial codes. This included conducting and transcribing the interviews and observations, as well as reviewing memos and notes to document any reflections on classroom practices and interesting anecdotes. A code is a word or short phrase that is informed by grounded theory (Xu & Zammit, 2020). The codes were identified initially through a descriptive coding process. In this research, the codes were generated using an inductive process, where the codes came directly from the data set itself (DeCuir-Gunby et al., 2011). Similarities and differences across data sets (observation notes and interview transcripts) were easily identified, and unanticipated insights were explored further (Braun & Clarke, 2006).

Following the generation of codes, emerging themes were generated. This included identifying broader patterns of shared meaning (Xu & Zammit, 2020). Some codes and themes were discarded in the process (Clarke & Braun, 2014), especially when they did not contribute to the aims and purposes of the research. The reviewing stage included checking whether the themes captured the essence of the coded data, and that the themes worked in the

data set as a whole (Clarke & Braun, 2014). The coding process was ever-changing and iterative, with new themes identified as further data was collected (Clarke & Braun, 2014). As new themes were identified, previous transcripts were again reviewed for content that might support them. The final step involved defining each theme by assigning informative names to each theme for the reporting phase. Overall, thematic analysis was valuable for summarising key features of the data, and the themes are presented throughout the following chapter with specific examples presented as evidence. The discussion chapter delves further into derived themes, where in addition to specific excerpts from participants, literature is used to confirm and contrast evidence when determining the answers to the research questions (Tuckett, 2005).

Overall, an iterative process was used to develop explanations and examine them in conjunction with the literature (Strauss & Corbin, 1990). The identified emerging issues were then presented as a series of tentative assertions, of which some became more solidified in a cross-case comparison. All data was inductively categorised through a combination of the language used, images captured, repeated examinations of field notes, audio recordings, interview transcripts and documentation to organise the data effectively and report the findings (Abell & Roth, 1992). Inductive analysis enabled the data to be analysed, tested, and refined from the identified assertions into their final form. Overall, inductive approaches aid an understanding of meaning in complex data through the development of summary themes or categories from the raw data (Thomas, 2003). Further, findings are shaped by the assumptions and experiences of those conducting the research and analysing the data (Thomas, 2003).

3.8.1   Desktop audit

A desktop audit of all four centres was undertaken to examine published evidence of how each centre incorporated digital technologies and whether they each had a formal digital technology policy available to the public. This included an examination of each centre's website for references to digital technologies, in written or image form. Centre websites were searched for keywords, themes, or graphical representation relating to digital technologies, and the audit also sought evidence of educator professional learning around digital technology. Each reference was noted in memos and used in the overall data analysis.

3.8.2 Interviews

Thematic analysis of interview data was undertaken as it allowed flexibility in interpreting large data sets by sorting them into broad themes. All 36 interviews (four directors, eight educators, 12 parents and 12 children) were transcribed in full. Transcriptions were undertaken through Otter.ai, and then checked and corrected for accuracy. Otter.ai is an online service that allows real-time transcription of uploaded audio files. The data is stored for as long as the user requires and can be withdrawn at any time. According to their privacy policy, Otter.ai "maintains and implements physical, administrative, and technical safeguards to protect the confidentiality, integrity, and availability of personal information" (Otter.ai, Item 10). The free version was utilised as it sufficed the needs of the research. Initial coding of the interview data extracted the key themes and important distinguishing information (Xu & Zammit, 2020; Clarke & Braun, 2014; Vaismoradi et al., 2013). At the first stage, each interview was examined, and initial codes noted. Once codes were identified from each interview, with direct quotes as evidence, they were imported into a table that included frequencies of recurring codes. Similar words, phrases, or events were grouped into the same category (Clarke & Braun, 2014), and categories were gradually modified or replaced during subsequent stages of analysis. Finally, the categorised data was analysed for themes and sub-themes which were then used to interrogate the data sets from each case.

For each centre, the data were categorised into major significant themes, sub-themes and minor themes. The emergent significant themes across all centres coalesced around: 1) digital technologies (centre and home), 2) attitudes, 3) mediation strategies, 4) children centred themes, and finally 5) children's perspectives. Themes within each centre offered rich data but not all were presented in all centres. A list of emergent themes, sub-themes and minor themes in relation to adults (directors, educators, parents) and children is presented below in Table *3.8*.

Table 3.8. Summary of themes, sub-themes and minor themes

Participants	Theme	Sub-theme	Minor theme
Adults	Digital technologies: Presence and use	Digital technologies in the centre	Digital technologies with online access
			Desired digital technologies for the centre
		Intersection between the centre and the home	Parent communication
			Parent awareness of digital technologies in the centre
		Digital technologies in the home	
	Attitudes: Towards young children using digital technologies	Positive aspects	
		Negative aspects	
		Concerns	
	Mediation strategies	Limitations and guidelines	
		Classroom management	
		Software and filters	
		Control of online access	
		Control of in-app purchases	
		Control of exposure to inappropriate content	
	Children: Effects of digital technologies	Digital skills	
		Digital literacy	
		Attention span	
		Social interaction	
		Behaviour	
		Digital games	
Children	Children's perspective	Digital technologies in the centre	
		Digital technologies in the home	
		Digital skills	
		Other skills	

While centre presented slightly differently, all data collection methods contributed to the overall themes that emerged, including observations of how the children and educators interacted with digital technologies in their classrooms.

3.8.3 Observations

Observation data was analysed in two ways. Firstly, the listed behaviours on the checklists were qualitatively analysed. Each behaviour was recorded as either present (tick), emerging

(dot), or absent (dash). However, observation data was limited as the frequencies of behaviours were not demonstrated by children or educators in any consistent manner. Secondly, additional observational notes taken at the time were analysed by coding actions, anomalies in interactions and other noteworthy activities to identify themes. As previously mentioned, this included analysis of photos capturing the children using digital technologies and as evidence of their behaviours.

3.8.4   Memos

For more in-depth analysis, journals with memos were kept. In conjunction with the interview and observation coding process, memos included information about the learning environment, activities, and children's interactions and reactions towards digital technologies. Patterns were evident in memo analysis, which shed further light into the use of digital technologies and contributed to the overall identification of themes. Memos were revisited for evidence to support key emerging themes or scoured for confirming or related material when themes were identified through the coding / categorisation process.

3.8.5   Digital technology policy review

A document review was conducted to determine existing policies and procedures in each centres in relation to digital technology use. Although no specific digital technology policies were evident in any of the four centres, the implications will be discussed in the following chapter. Importantly, some participants shared their beliefs regarding the lack of policies or guidelines surrounding digital technologies with young children.

3.9   Measures of research quality

According to Guba and Lincoln (1994), research is trustworthy if it has credibility (internal validity), transferability (external validity) and dependability (reliability). One method of promoting credibility is through triangulation (Stahl & King, 2020). Triangulation uses multiple sources of evidence, in this case observation, interview and journal/memo/notes data, to corroborate findings. This allowed a comparison of first-hand observations of children's skills against directors, educators and parents assessments of each child's capabilities. Triangulation helped to establish rigour and establish validity and trustworthiness (Creswell & Plano Clark, 2007).

      Qualitative researchers maintain that patterns and descriptions from one context may be applicable to another (Stahl & King, 2020), however by design, qualitative methodology

does not aim for replicability. Therefore, the aim is for the transferability, whereby the research provides a rich description for application in others settings (Stahl & King, 2020). For example, parent views presented throughout the findings of this study, while only derived from four cases, may be representative of a wider group of parents.

Dependability relates to the trustworthiness of a study (Stahl & King, 2020). A key aspect of dependability is the anticipation of peer review and a commitment to fair and just research practices. This includes separating fact from the interpretation of facts. It was important to be vigilant and to recognise the extent to which the subjective nature of my values and passions influence the presentation of results. The combination of each aspect produces credible and trustworthy results, ensuring high-quality research.

3.10 Ethical considerations

This study was conducted in accordance with the Curtin University regulations for ethical research. All participants were provided with information for a third-party contact to raise concerns if required. The Curtin research office assessed that there were no significant risks for participating directors, educators, parents, or children. No personal or sensitive information was collected, and all information collected was de-identified.

Children exercised agency with digital tasks, and interactions with children occurred at their request. I was mindful of the need to be emotionally supportive and not disturb the children in their normal activities especially in relation to a potential power imbalance when undertaking interviews.

3.10.1 Informed consent

As outlined in 3.6.1.1., all participants were sent a letter of invitation to participate with an attached consent form. The invitation outlined the research purpose and aims, as well as participant involvement. At each data collection stage, participants were asked if they understood all aspects of the research and reminded that participation was voluntary and that they withdraw at any point. Parents were asked to give consent on behalf of their children.

Several extra measures were taken to ensure children's ongoing safety and comfort. Ongoing consent was sought as to their continued participation and willingness to engage. To protect the right of the child, children were not forced into talking and were able to talk in between their activities if they so choose. The child consent plan acknowledged that if a child declined to play or to talk, it would be interpreted as their right to withdraw consent and stop

participating in that observation period. However, his did not occur and all participating children were observed and interviewed largely as scheduled.

3.10.2 Confidentiality and privacy

Throughout the thesis, pseudonyms have been used for all participants and centres, and photos do not show children's faces, to maintain anonymity. Confidentiality was always maintained with the data only accessed by myself and my supervisors.

3.10.3 Researcher reflexivity

In this type of study, it is important to recognise that the experiences and knowledge a researcher brings are integral aspects of the research (Robson, 2011). In qualitative research, reflexivity assumes that researchers are an instrument of the research, and therefore must identify biases, feelings or thoughts that might inadvertently influence the data collection and analysis process (Watt, 2007). While consideration was given to keeping personal influence to a minimum, I acknowledge that there may have been times when I unintentionally affected or influenced the participants and therefore the data obtained.

The relationship with early years centre staff was professional at all times. While rapport with parents became personal, I was always aware of their position of trust, and interviews were organised through centre directors. The content of the parent interviews contained information about the child's home life which required each parent to be honest about digital technology use within the home. Lastly, developing a relationship with children became essential in examining children's skills children with devices and understanding their digital literacy. Great care was taken to use best practice throughout the entire research process.

3.10.4 Power imbalance

When conducting observations and interviews, it was from the premise of a perceived power imbalance between myself and participants (Creswell, 2003). In this study, every attempt was made to create a safe and comfortable environment during the data collection. This included familiarising the children with the presence of someone new in their classroom. Some educators explained that I was there to 'see what we do in our classroom', and others simply said there was a visitor, and the novelty of having a visitor in the classroom quickly waned. The information sent to participants highlighted that participation was voluntary, and no

pressure was placed on any individual to participate. The *Participant Information Statement* provided to each participant included statements such as "submitting a signed consent form indicates your willingness to participate in the research, that you understand the requirements of your involvement in the project and that you are happy to have your information used as described". Every attempt was made to listen to participants openly during interviews, so they felt heard, and relaxed to share their valued opinions.

3.10.5 Risks to participants

There were no obvious risks to participant involved. Interviews occurred in an environment deemed appropriate by the early years centre. Any questions or concerns that parents or educators held were addressed prior to, or during interviews. Observational data was collected during the normal running of classes which minimised disruption, and while there may have been a slight chance of educator and/ or child anxiety resulting of knowing that their actions and or responses were being closely observed, no-one expressed concern throughout the data collection phases. If anxiety was to be an issue, planned mediation strategies included:

- Ensuring that the children had agency and that they were aware they could choose to not participate.
- If children within the classroom environment become disrupted or disturbed by my presence in any way, distance would be created, and participants would be re-engaged with the observations at a later stage.
- All participants were given ample opportunity to ask any questions they liked.

As mentioned, no participants needed to utilise any of the options above. Additionally, the potential benefits of being provided with a deidentified report for each of the four centres, seemed motivation enough for enthusiastic participation.

3.11 Limitations

Qualitative research can be both time consuming and labour intensive. In this study, 36 individual interviews were conducted to gather deep insight and understanding from many perspectives as possible, including a granular view of the digital environment of young children (multiple perspectives on the same issue). The consistency of the approach, including the consistency of the interview questions, ensured more reliable results. However,

the immersive and detailed nature of the multiple case study research was time consuming and restricted the number of centres that could be included. With the ongoing evolution of the digital environment, partly due to Covid-19, the time between interviews may have influenced the way participants engaged with the interview questions, as well as their understanding of digital skills and literacy. For example, if a centre expected parents to aid the facilitation of online learning during a Covid-19 lock down, they may have been forced to learn new, or advanced, digital skills. In each case, some interviews were conducted six months before the next, and so digital technology use at that point of time was a snapshot of evidence in time.

A further limitation was that implementing and progressing the research was completely reliant on early years centre directors giving initial consent, and disseminating information to their educators, and centre parents. Every effort was made to simplify the process, and communication was maintained through regular emails, phone calls and site visits. In one case, the director was having difficulty recruiting participants and resorted to talking to parents at drop off and pick up times. This proved successful in recruiting the three parents through a non-traditional channel.

Other limitations surrounding qualitative research include the potential for bias. MacDonald and Walker (1976) stated that a lack of rules around case study research opens possibilities for both real and imagined findings. Researcher bias is the tendency to prejudice or unduly influence the process or results of the research (Schoch, 2020). In this study, I remained intentionally open to data and evidence presented even when the scope of questions was outside of the research, and remained conscious of my own interpretation of feelings, opinions, experiences and possible prejudices. Case studies can unintentionally promote bias due to their heavy reliance on human participants as the primary instrument of data collection and analysis. To mitigate this, multiple data sources were used, which allowed for triangulation of data.

Lastly, participant volunteers may have found the research topic appealing, have strong opinions on digital technologies and children, or are already knowledgeable in this area. Due to participation being voluntary, certain individuals may have automatically excluded themselves, such as parents self-conscious about the extent of their child's digital technology use. Likewise, centre directors not proud of digital technology use in their centre may have chosen not to participate. To the best of my knowledge, this limitation did not present itself in the research.

3.12 Chapter summary

In summary, a desktop audit, interviews, observations, memos, and a digital technology policy review were chosen as the methods best suited to gather evidence to answer the research questions which guided this study. A qualitative approach allowed for a detailed examination and construction of themes within the aims of the research, and specifically, how the themes were interpreted by different participants. The data collected has the potential to add to existing knowledge and understanding in relation to children and digital technology, and contributes additional information, specific to the early years age group in a WA context. The premise is that similar responses would be obtained in other early years centres, and by other parents. Overall, this chapter has described the methods used in this research, and the following chapter presents the findings from all participants, organised by the early years centre as discrete cases, and then the emergent themes. Each piece of data is ultimately used to answer the research questions.

4   Chapter 4 - Results

4.1   Introduction

As outlined in the previous chapter, five data types were collected using different methods: 1) desktop audit, 2) interviews, 3) observations, 4) memos; and 5) digital technology policy reviews. A desktop audit was initially performed, followed in succession by interviews and observations in tandem. Memos were recorded throughout the interview and observation collection period and there were no digital technology policies to be reviewed. The data were collected and analysed under a constructivist paradigm, with a subjectivist epistemology to allow for an assertion of constructed realities of what digital technologies meant, especially in reference to young children interacting with digital technologies.

This results chapter provides an overview of the data collected from each centre. Each case is further broken down by: 1) participants, 2) desktop audit and digital technology policy, 3) observations by classroom, 4) interviews by theme, and finally, 5) a summary. Observations are presented by classroom in each centre, and interviews presented under key themes, namely: digital technologies, attitude, mediation strategies, and effects of digital technologies on children as well as their perspective. The chapter summary informs the cross-case analysis and following discussion chapter.

4.2   Centre A

Centre A catered for children five years and under and provided learning-focused play-based programs. Demand for the centre was high as it was a part of a wider campus structure in an inner-city suburb. At the time of data collection, Centre A had minimal integration of digital technologies in most of its classrooms and were focused on nature play and wooden activities such as block building. There was little evidence of embedded use of digital technologies, except for iPads and Beebots used on occasion. The centre held no written digital technology policies, nor implemented specific rules regarding digital technology use. As evidenced in the interviews, educators were not required to pre-screen videos before they were shown to the children, and educators sometimes brought their personal phones into the classrooms to play music for the children.

This section reports on the data obtained from Centre A and includes a description of participants, a desktop audit and digital technology policy, observations of the centre's practices, key themes presented in the interviews, and a case summary. The observations are further organised into classroom one and two. The key themes are further segmented by

section, namely, the presence and use of digital technologies, attitudes towards digital technologies, mediation strategies to ensure safe and positive experiences for children using digital technologies, the effects of digital technologies on children, and the children's perspectives of digital technologies and their digital skills.

The socio-economic indexes for areas (SEIFA) ranks areas in Australia according to relative socio-economic advantage and disadvantage. A SEIFA score is created using information about people and households in a particular area (ABS, 2016b). The average SEIFA score is 1000 and the middle two-thirds of SEIFA scores fall between 900 and 1100. The distribution of scores is divided into ten equal groups. For example, the lowest scoring 10% of areas are given a decile number of 1, up to the highest 10% of areas which are given a decile number of 10. Centre A is located in a low socio-economic area with relative social disadvantage (Table *4.1*). Notably, the score sat closer to average in terms of its index of education and occupation.

Table 4.1. SEIFA rankings for Centre A's suburb

SEIFA Indexes	Score	Decile
Index of Relative Socio-economic Disadvantage	898	1
Index of Relative Socio-economic Advantage and Disadvantage	932	2
Index of Economic Resources	838	1
Index of Education and Occupation	990	5

At the time of data collection, Centre A was approved to provide childcare by the Government of Western Australia, Department of Communities. All staff were qualified in children's services or education. There were six classrooms total, two nurseries for under two-year-olds, two groups for two- to three-year-old children and two groups for three- to five-year-old children. The research primarily took place in the two preschool rooms for the three- to five-year-old age range. The 2019 National Quality Standard accreditation saw this centre achieve an exceeding rating in all seven quality areas, the highest rating an early years centre could achieve. On their website, the centre stipulated that partnering with parents was important and they encouraged the regular exchange of information about the children.

4.2.1 Participants

Centre A participants consisted of a director, two educators, three parents and three children. The director and educators were generally aware of the range of digital technologies available for use with children at three and four years of age but did not effectively utilise many in their

teaching practice. One educator was interested in increasing the integration of digital technologies in the classroom. All parents interviewed had either a laptop or iPad, at minimum, and were technologically competent. This cohort of educators, parents and children were diverse, including varying ethnicity, background, and digital literacy skills. Each participant of Centre A participant is summarised briefly in Table *4.2* below.

Table 4.2. Centre A participant descriptions, including interview dates and location

Role	Pseudonym	Interview Date	Interview Location	Overview
Director	Margaret	3/11/2020	Margaret's office	Female director with many years of experience in early years settings. Had held the director position for two years at the time of interviewing.
Educator One	Stephanie	1/12/2020	Centre foyer	Female educator, responsible for supervising children, preparing food and cleaning. Involved at the centre for 10+ years.
Educator Two	Judy	1/12/2020	Educators shared office space	Female. Age group leader. Involved in the centre for many years. Very interested in the integration of digital technologies.
Parent One	River	25/2/2021	Educators shared office space	Female. Worked in internet studies. Prefaced her interview by stating she had thought about online digital technologies a great deal. Lived in a shared home and co-parented two children with another couple.
Child One	Violet	23/3/2021	Centre classroom and outdoor space	Female, three years of age. Confident and able to communicate what digital technologies she interacted with, both in the home and learning settings.
Parent Two	Gemma	18/3/2021	Centre foyer	Female. Two child family. Studying so used the internet and digital devices a lot. Specific interest in the effects of social media.
Child Two	Hope	16/6/2021	Classroom outdoor space	Female, three years of age. Quiet child. Able to demonstrate basic understanding of digital devices she interacted with.
Parent Three	Vimon	23/3/2021	Empty classroom	Female. Both parents aware of the risks involved with their child accessing inappropriate content. Explained her husband was a teacher and used digital technologies regularly. She had an interest in classical music and only allowed her child access content to that.
Child Three	Matthew	23/3/2021	Classroom outdoor space	Male, three years of age, only child. Did not provide much evidence of digital capabilities. Played independently for majority of observation.

4.2.2 Desktop audit and digital technology policy

A desktop audit, performed in March 2021, revealed no information on the digital technologies used in the centre. For example, there were no images displaying digital

technologies on the centre's website. While the desktop audit did not reveal any communication tools used, this subsequently emerged during the interviews. As there was minimal information available on the centre's website, interviews were used to obtain information about the centre's attitudes, and nature of digital technologies used.

The centre's website was revisited in April 2022 to ascertain if any significant changes had been made in relation to digital technology. The website had changed slightly, with a new homepage and video introducing visitors to the centre. The director commentated the video which included a montage of the centre's activities, however, there was no spoken reference to digital technologies. One scene showed a child playing an electronic keyboard, a new centre resource since the visit the previous year. The video showed children's faces and their reactions to the activities, but no new images or information referenced digital technologies in any form.

There was no formal or written digital technology policy at Centre A. When asked if the centre held any form of digital technology policy, Margaret (the director) answered, *"not to my knowledge"*. When asked if she had thought about creating a digital technology policy, she answered *"no"*. Finally, when questioned whether parents had asked about a digital technology policy, she replied *"nope"*. The educators talked about a few classroom rules but noted there was no written policy to guide them, either for themselves, or for use with or by the children. Centre parents did not query the lack of a digital technology policy and had not enquired as to digital technology online accessibility given to their children in the centre context.

4.2.3   Observations: Centre practices

Observations in Centre A comprised three visits to two different classrooms: classroom one with two focus children (returned twice), and classroom two with one focus child (once). While Centre A utilised a few digital technologies, it was the only one in this study to use Beebots. The following relates to observations within each classroom.

4.2.3.1   Classroom one

The primary purpose of the observations was to observe the level of children's engagement with digital technologies in the centre. The first (Violet's and Matthew's classroom) consisted of one and a half hours observing the children playing outdoors and there were 16 children present. During the outdoor play, there were no digital technologies available for the children to independently engage with. Violet engaged in a large amount of talking, singing,

and interacting with peers while Matthew displayed quite the opposite behaviour in terms of involved social interaction.

While the children did not independently engage with devices during the observations, the educators utilised digital devices. This included the use of a digital camera to take photos of the children engaged in play (Figure *4.1*). The educator asked the child almost every time if they gave permission for their photo to be taken, for example by stating, *"Do you want me to take a photo or not?"* Each photo was later uploaded to Storypark and shared with the parents. Storypark was the online platform used at the centre which that allowed users to share photos, engage in discussion boards and share and read news and updates. Educators also used the platform for curriculum planning. Its primary purpose was to allow users (educators and parents) to connect and communicate in real time. A longer explanation of the purposes of Storypark is addressed in the parent communication section of this case.

Figure 4.1. Digital camera use by an Educator

During this observation, both focus children sat with me on a bench beside an outdoor library and asked to be read a story. The opportunity was taken to conduct their interviews at that time while the two children willingly created conversation. Whilst the children did not demonstrate any digital skills at this time, they were able to communicate what they believed they could do when they interacted with digital devices. Their participation in the conversation was considered their ongoing consent, as they were each asked if they would like to answer some questions about technology and what they used at home and in the centre. Violet enquired as to why a phone was then bought out (with a voice recorder to

capture the conversation) and what would be done with their *"voices"* once they had been captured. She specifically asked if her voice would be listened to again, or if it meant she would be famous. She was reassured that it was so the important things she said would not be forgotten. At no stage did either of the children seek to leave the conversation, and in fact stayed engaged longer than anticipated.

On the third centre visit, the observation included some of the children of classroom one engaged with Beebots. This included observing Violet, as shown in Figure *4.2* and Figure *4.3*. The educator who facilitated the 30-minute session was specifically trained to lead the Beebot sessions, and the priority of this observation was to observe this educator's pedagogical practice with Beebots. Firstly, the educator explained how to operate the digital toy, demonstrating what each arrow did, and then explaining the basic functions, as shown in Figure *4.2*. The children were then supported to demonstrate agency in their Beebot interactions. Figure *4.3* depicts Violet experimenting with the different buttons to operate the Beebot independently.

Figure 4.2. Violet being taught how to move the Beebot by her Educator

Figure 4.3. A display of the buttons on the Beebot

A recycled digital technology provocation station was also observed in classroom one. This included technologies such as phones, keyboards, calculators, and varying other digital artefacts, as pictured in Figure *4.4*. The provocation station was available for free play when the class schedule allowed for it. No children were observed with engaging this station during the three visits, but the educators stated the children enjoyed playing with the artefacts on a regular basis and it encouraged role play.

Figure 4.4. 'Technology corner' in classroom one

4.2.3.2   Classroom two

The second observation (of Hope's classroom) consisted of 45 minutes watching the 24 children play outdoors. During the observation, Hope was primarily engaged in solitary sandpit play. Hope interacted with her educator, sharing what she was doing but she did not seek guided or directed play collaboration.

There were no online accessible digital technologies permanently present either indoors or outdoors of classroom two. However, an educator used a centre laptop for the children to play a 15-minute video between outside play time and lunchtime. The video comprised an animation designed for children's entertainment, and no attempt was made by the educator interact whilst the video played. They explained that watching videos on the laptop was not a common occurrence for this classroom. In Figure *4.5*, Hope is situated close (front row in pink hat) to the laptop and was engaged with the content for the duration of the video.

Figure 4.5. Children of classroom two

Similar to classroom one, there was a recycled digital technology provocation station set up in classroom two which children could access autonomously. It included phones, keyboards, and varying other digital artefacts, as shown in Figure *4.6*.

Figure 4.6. 'Technology corner' in classroom two

Overall, observations recorded the use of few integrated digital technologies within Centre A. This centre had few digital technologies available and hence many digital skills were not demonstrated by children or educators. Despite this, the children were able to share their digital literacies and perspectives on how their educators and parents mediated the digital technologies they accessed.

4.2.4 Interviews: Themes

The data obtained from the observations was in addition to the interview data from directors, educators, parents, and the children. The questions related directly to the research questions and a wide range of themes emerged as follows: 1) presence and use of digital technologies, 2) educator and parent attitudes towards digital technologies, 3) mediation strategies to ensure safe and positive experiences for children using digital technologies, 4) the effects of digital technologies on children, and 5) the children's perspectives of digital technologies and their digital skills.

It is important to remember that the Covid-19 pandemic may have influenced some themes in Centre A interviews. From March 2020, Covid-19 significantly affected the way in which education was delivered. For this centre, Margaret acknowledged that the disruption to normal life created opportunities for using digital technologies in ways that may not typically occur. She said, *"that's one thing that I can thank it [this past year] for because it's opened up these opportunities...we wouldn't have even really given thought to or considered."* These opportunities included online learning capabilities and increased digital communication between the centre and the parents. For example, although the centre remained open during multiple lockdowns throughout 2021, Centre A educators relied heavily on digital communication rather than the face-to-face contact, as drop-off and pick-up of the children to classrooms became limited. Given the risks associated with meeting in person, parents were also more reluctant to spend time in the classrooms and so digital communication became paramount to maintaining links between the centre and the child's home.

Additionally, Margaret determined that digital technologies were *"evolving all the time"* and that the needs of the centre changed over time. She stated *"...we've begun to look at the centre and say okay, what does the centre need now?"* For example, as educators increasingly utilised digital technologies in their personal lives, they became more adept at using devices in the classrooms. During the pandemic when the educators could not take children offsite or even outside their classrooms, they relied on devices such as the iPad, to show children videos and images of the outside world. The types of digital technologies present in the centre, and the attitudes of educators, parents and children over the data collection period were therefore significantly impacted by the pandemic.

4.2.4.1 Digital technologies: Presence and use

This section outlines the digital technologies used in Centre A. It includes digital technologies within the centre (including digital technologies with online access and desired

digital technologies for the centre), the intersection between the centre and the home (including parent communication and parent awareness of digital technologies), and finally, digital technologies in the home. The types of digital technologies and their purposes differed between contexts but similar digital technologies were evident across households as revealed by parents and children.

4.2.4.1.1 Digital technologies in the centre

The director was aware of the devices used in centre classrooms. Margaret talked about iPads, headphones, a projector and screen, and a light studio. She stated that *"every room does have an iPad and if the children have a question, we use the iPad to demonstrate research with the children."* Educators additionally explained about the educator laptops (used for programming and Storypark), digital cameras, Beebots (programmable bee robots) and Cubettos (wooden coding robots).

Both the director and educators primarily referenced the iPads, and their use in teaching and learning. The iPads were used for YouTube, interactive applications where the children learned sequential patterns, Jolly Phonics, animated stories and songs, and were sometimes used solely to relax the children. Margaret added, *"we do try to use it for more technical things rather than cartoons and stories."* Stephanie, the first educator, stated that she used the iPad as a small group research tool, and it encouraged social interactions through discussion. The main advantage was its versatility, particularly the ability to instantly access content in response to children's interest. Stephanie pointed out that the children could *"...listen to a story, it might be something on YouTube based on their...interest."* Judy, Centre A's second educator, added that the children used iPads to take photos. She said *"...the kids have a go when it's in its protective cover."* When not in use, the iPad was kept on the educator's bench, out of children's reach as it charged in preparation for the next use, as shown in Figure *4.7*.

Figure 4.7. Educator iPad in classroom two

iPads were also used as an administration tool for parents to sign their children in and out of the centre. Margaret stated, *"there's two [iPads] just sitting there sitting up here on the bench...we use Quick Kids for our signing and our signing out."* The two iPads were located in the reception area of the centre.

While iPads were mentioned most frequently, other digital technologies were present across the two Centre A classrooms. The director and educators commented on the CD player with four headphones (Figure *4.8*) and Bluetooth speakers (Figure *4.9*) as teaching and learning tools. Margaret said, *"every room has headphones, and a connector box so we can connect certain children to one form of musical storytelling."* The audio content available through the headphones included several movie soundtrack CDs which often encouraged children to dance, sing and dress up.

Figure 4.8. Stereo for use in classroom one

On occasion, music in the classroom was played on an educator's phone through Bluetooth speakers. Judy explained that having the phone connected to the Bluetooth speaker was beneficial as they did not always have the CDs children requested but could search and download tracks on their phones instantly. Judy indicated that *"if it's Indigenous music, or if it's songs that the children have been interested in ... if someone downloads it, then they can pair it up with [the Bluetooth speaker]."* Margaret also pointed out that the centre had *"a big pulldown screen and we've got a projector, normally we plug the computer in, and the children then have the big screen."*

Figure 4.9. Bluetooth speaker in classroom one

The educators in classroom one also talked about the use of Beebots and Cubetto, with one commenting that the children were *"very lucky here"* (to have access to such devices). However, only one or two educators within the centre were specifically trained to use these technologies. Judy explained that the centre had *"specific educators who are like, really whiz bang on those. So, like, in my room, [Name], see, she does the Beebots and the Cubetto with the kids."* The educator would explain to the children what the buttons on devices did, and then work alongside them. This was evidenced in the observations of children interacting with Beebots, whereby the operational instructions were demonstrated before they were given autonomy to operate the device. Stephanie highlighted the importance of the children understanding the operational elements of devices ahead of independent use.

The centre had a digital camera that the educators used primarily to take photos of the children engaged in activities. Lastly, Margaret explained that there was a light studio set up for use on special occasions. She said, *"we've set up a light studio downstairs, so it [overhead projector] gets used in the light studio."* While the digital technologies described

were being used in this centre, few had online accessibility. The distinction between online accessible digital devices and non-online was not a dominant theme, however, it is a critical one when considering the risk of potentially harmful online interactions.

4.2.4.1.1.1 Digital technologies with online access

The director referred to online access for devices used within the centre multiple times throughout her interview (*"they have access to online"*). Margaret understood that the devices needed online access to be used as research tools, however, she did not comment on the children's understanding of what being online meant. She said, *"we use online access for the children if we're researching with them. So, they themselves don't go online."* Margaret clearly understood that the internet was required for certain research tasks that educators engaged in with the children. Neither educators nor parents distinguished between online accessible digital technologies from others when discussing children's digital activity.

4.2.4.1.1.2 Desired digital technologies for the centre

At the time of interviewing, the affordability of digital technologies was not considered a high priority by the director. Margaret explained that she had input into the centre's budget, saying *"if it was something that I felt we really needed to look at and concentrate on, I would have the opportunity to put that forward."* Margaret did not mention petitioning for more digital devices for the centre. She did however talk of her desire for video conferencing with classrooms in other countries using their existing technologies. She stated, *"we want to maybe connect with a school overseas and talk to some other children."* The centre also used a projector and screen for storytelling which they planned to use more in the future by holding virtual video calls with other classrooms, and parents as 'mystery readers' whereby the children had to guess whose parent was reading a story.

Stephanie indicated that there might be benefits from utilising digital cameras if the children themselves could learn how to use them independently. One of her desires for her classroom would be *"letting them access the camera…that would probably be the next step for us in terms of digital technology."* The references to desired digital technologies reinforced that digital technologies could be further integrated into the centres context.

4.2.4.1.2 Intersection between the centre and the home

The bridge between the centre and the family home is defined in this study as the digital communication exchange between parties, and parent awareness of digital technology usage in the centre. This included parental involvement in learning about what was being used with

or by their children when in the centre. It was not clear whether children's use of digital technologies in the centre affected how they interacted with digital technologies in their home, or vice versa. This section describes the communication tools that parents and centre staff used to exchange information of what the children were doing in the centre, and how aware parents were of the digital technologies were being used.

4.2.4.1.2.1 Parent communication

A key use of digital technologies was the communication of children's development and care to parents. Meaningful communication with parents was a key element of many early years centres' practice and was addressed in every Centre interview. Margaret stated that she would have liked the centre to use digital technologies in ways that encouraged more parental involvement. The centre's chosen communication platform was Storypark, and all parents were signed up to it upon enrolment at the centre. Storypark was used for disseminating the newsletter, daily highlights and for curriculum sharing between staff. The key benefits according to Margaret were that *"educators put a bit of news and a few photos of things that have happened during the day and parents can access that. And then that's where my newsletter goes in the community section."* Parents therefore received updates on what their child was doing throughout the day. Parents had expressed concern at not being given individual updates on their child, but Margaret explained that updates were given according to the activities at any given time, which may not always include every child. She stated, *"often parents will say to us, I didn't get anything about my child today or and we explain that to them, that, you know, it's not today, but maybe tomorrow."*

Margaret mentioned that the application was not fully utilised as educators did not use the separate curriculum planning function. Despite this, Margaret explained that Storypark performed well as a communication tool (*"they [parents] feel included - it's safe and secure"*). Judy commented specifically on the sharing of information by digital means. While educators did not develop curriculum on the platform, they could upload documentation and send it digitally to parents. For example, parents received the classroom lesson plans for the upcoming fortnight. The educators were also mindful to explain to parents why devices were being used when they appeared in Storypark updates. Judy stated, *"we actually say what we use it for you know, today we did still life paintings but what we did we looked on the iPad for examples of it."* She also added that in addition to the centre disseminating information via Storypark, parents could interact with and in response to the centre. She said *"parents will often write little messages...so that's another way parents interact and give us*

information digitally." This demonstrated that when an educator was made aware of what occurs at home, it can potentially influence interactions within the centre. Despite all parents being able to access Storypark, they were not always aware of the technologies or content used with their children in the centre.

4.2.4.1.2.2 Parent awareness of digital technologies in the centre

As educators explained in their interviews, parents also admitted to not proactively enquiring as to the digital technologies being used in the centre, or how they were used. River (parent one) knew that the centre sometimes used iPads as her child had previously told her they had watched Bluey, and Storypark had showed images of iPads being used as research tools (*"I know that they'll sometimes look up some information on the iPad or watch Bluey or whatever"*). River commented on the use of Storypark to communicate the daily updates, and how that fostered discussions with her child outside of the education context. Her view of Storypark was that it was a *"little surveillance app"*, but it allowed parents to see what the children learnt during the day.

Gemma (parent two) acknowledged that the use of digital technologies in the centre was not necessarily negative and children should be taught how to use them rather than withdraw technologies altogether. She knew they had access to iPads at the centre A, and she was *"happy with that."* She added that *"they've done other things too. I think it was called Roblox [Beebots] or something"*, indicating her awareness of the few digital technologies used in the centre. Overall, Centre A parents did not appear concerned nor attentive to the digital technology aspects of the centre.

This assessment was shared and confirmed by the educators. Stephanie (classroom one) responded that she had not received any correspondence from parents pertaining to digital technologies. She did recall one parent expressing a concern in the previous year when she came to pick up her child and saw them engaged with the iPad. She stated that when the parent *"…sees us doing something on the iPad, she doesn't like it, because she's concerned, he's getting too much."* Judy reiterated that parents had not asked about the use of digital technologies in her classroom, or about any software used. According to Judy, parents may have been adequately informed as to the digital technologies utilised in the centre during their orientation tour of the centre, and therefore may not have felt the need to specifically ask. Overall, lack of parental awareness of digital technology use in the centre may manifest in other ways. For example, it may influence the amount of time parents allow their child to access devices in at home, and this will be further examined in chapter five.

4.2.4.1.3 Digital technologies in the home

Parents and children were both able to describe the digital technologies found in the home in detail. The number and type of digital technologies differed between households and children were afforded access according to each parent's management practices. The digital technologies present in each home is now outlined.

The first household (River and Violet) included a children's iPad with pre-approved apps, a television with Plex, parent mobile phones, speakers in every room, monitors in the children's bedrooms, motion centred lights, a studio with a big screen television and sound system, and computers. River explained that her child Violet *"…has her own iPad."* River explained that she tried to utilise the educational possibilities of the digital technologies in her household, for example, *"...there's one little game that teaches her a few Greek words… or one that teaches her the alphabet."* She explained that there was a speaker in all rooms and that lights could be switched on and off differently using a central control. The children in the household interacted with music by dancing, and the lights by changing colours on the controller. River added that Violet had supervised access to her dad's studio which enabled her to watch movies and television on a theatre-type screen. Saturday mornings were designated as studio time for Violet and her dad, where *"they watch the big screen and I stay in bed…sometimes that'll be like two or three hours of TV. Sometimes if she's tired, she'll come home and say, I had a big day, I just want to watch some TV."* Violet spent up to five hours some days engaging with technologies which included iPads, screens outside the home, and their home television theatre.

The second household (Gemma and Hope) included an iPad with games and ABC Kids, a PlayStation, a television with Netflix, Disney and ABC Kids and parent phones. Gemma explained that her children were allowed access to ABC Kids each day for a maximum of half an hour except for the occasional movie. She stated *"with the iPad, I give them generally… 30 minutes to do a bit of free play. They go on ABC apps."* She also stated that she could complete housework chores when the children were occupied with digital technologies.

The third household (Vimon and Matthew) intentionally limited digital technologies to a parent phone, a work laptop (parent use only), a recycled laptop (child's use) and a camera. Vimon explained that her phone was used to play her child classical music each day for a limited amount of time, and that they sometimes *"play music through speakers."* Vimon also commented on Matthew's desire to take photos using her phone, stating *"he loves taking*

photos." However, she explained that the primary focus of the phone was communication with family. Together with his parents, Matthew used the phone to video chat with his grandparents. Vimon reiterated the device was a communication or work-related tool only. Overall, even after acknowledging the communication benefits, she stated *"I wouldn't say we value it a lot."* Lastly, after noticing her child wanting to interact with her work laptop, Vimon created 'pretend play' by providing a recycled laptop. She said she had *"a spoiled laptop at home for him. So, he just opens it up and just types it away without any screen or whatever."* This allowed the child to roleplay and interact with digital technologies without needing to understand the purpose and functionality of the device. Each three households contained different digital technologies, strongly influenced by the parent's personal attitudes towards their use.

4.2.4.2   Attitude: Towards young children using digital technologies

The participants held a range of opinions about digital technologies and how they managed digital technology interactions with their children. Opinions ranged from the importance of maintaining balance between children spending time with digital technologies and other activities, the necessity of knowing the purpose and function of digital technologies, the importance of digital literacy for school readiness and being cautious of the addictiveness of digital interaction for children. These positive and negative opinions were shared by participants as follows.

4.2.4.2.1   Positive aspects

The positive aspects of digital technologies being used by, with and for young children included the ability for instant research, independent use, the provision of educational content and the practical application enabled by devices. Both educators praised digital technologies for allowing meaningful educational experiences in their classroom. Stephanie stated that digital technologies helped both educators and children research topics of interest. She explained, *"...what I like is that it's there for us to help research topics of their interest."*

Centre director Margaret stated that although children were exposed to digital technologies from an early age, they did not necessarily need or want much interaction with devices, as *"it's probably beyond their ability at this point."* She also stated, *"I think that [from ages] three to four, other than looking at the picture that's on an iPad or something…there's not that much interest in technology or understanding."* She did however note that children interact with digital technologies from an extremely young age, stating,

"from the time they're in the bassinet, they're given an iPhone." Judy referred to digital technologies as a way of life. She argued that tablets and iPads were part of children's learning experiences, and that they needed to be better prepared for using them at school. She stated, *"it's just the society that we live in…at home, school, work, social life, it's everywhere."*

When discussing the use of digital technologies in the centre, Margaret addressed the issue of balance, stating, *"I think there's a balance between what are we giving the educators to do that takes them away from the child."* Both educators similarly reflected on the importance of a balanced approach to digital technologies in the classroom, stating that children should be expected to competently operate them, but Stephanie stated that while digital technologies are good, *"you don't want to use them all the time. Like there should be a specific, 15, 20 minutes, and then off you go and play."*

Both educators highlighted the need for digital technologies in the classroom to build children's school readiness skills. Judy understood that children used digital technologies from a young age and were expected to know digital technology operational basics when they transitioned into school, noting that children have *"their own iPads, smartphones, tablets. I think it's a necessity."* She reiterated that digital technologies were an instant teaching and learning aid which allowed educators to follow up on children's interests with research for children ultimately to gain knowledge.

There were other positives according to Centre A parents. In line with the educators, River recognised that digital technologies allow for a child to 'look up', research, or watch videos on a concept or topic that piqued their interest (educational or otherwise). She said that Violet could explore concepts she was interested in. Parents commented primarily on children's ability to be independent in choosing what to watch or do on their device, explore concepts they were interested in, access alternative perspectives that parents couldn't necessarily supply, and access instant information and means of communication. For example, River stated: *"it gives her [Violet] a way of learning independently that's really lovely. We'll go to her Greek app, for example, and pick up little words there and explore it herself and feel like she's having her own autonomous experience."*

Gemma noted the benefit of her child having access to educational digital content, such as Bluey. She enjoyed the aim of the show in seeking to teach children real-world concepts. Aside from educational benefits, other digital content connected children to the wider world in a positive way, such as the representation of minorities which provided a

reason for Gemma allowing digital content in her household. She stated:

> *…it is sort of educational. And it has purpose. And it's not just like senseless and I find that's really good. I really like seeing lots of diversity now, which I think is really good to be inclusive… [my] daughters…need to see themselves represented in media.*

Vimon also indicated the educational value of digital technologies. She was reluctant to allow her child access to digital content without purpose, saying:

> *I think if they use it for educational purpose, so things like learning a language. They decided to, you know, go onto YouTube and learn a language. I think that's good. You know that that is a useful tool. Learning how to draw using YouTube is also great. Learning coding, which is very common now. I think it's good.*

A further positive aspect of digital technology home integration included the use of digital content when cooking with their child. Vimon highlighted its practical application, stating *"he loves watching that, because he can tell, so mummy, what is he cooking? What are they doing? And, you know, so he's kind of relating what they are doing to what we are doing. So, it's still a practical thing."*

Lastly, the immediacy of digital content was described as a positive in that it offers instant answers and solutions. This had become normalised for children seeking information via online devices, although Gemma highlighted that anxiety can be generated when information cannot be immediately accessed. Overall, educators and parents outlined many key positive aspects, but spoke more readily of the negative aspects and their concerns surrounding young children's access to digital technologies.

4.2.4.2.2 Negative aspects

Parents spoke at length of the negative aspects including the physical impact of too much time spent engaging with digital technologies, inappropriate exposure and the disruption to a child's normal development and learning. Participants referred to inappropriate exposure, or inappropriate content in different ways, according to their values and perspectives, perhaps in terms of appropriateness in the classroom in mind and the compromised value and safety of digital content was commonly addressed as a negative aspect of young children accessing digital technologies. Of note, while this research references digital technologies including devices with and without screens, most participants referred to devices with screens when discussing the negatives. For example, no concern was expressed around the amount of time

children spent playing music and dancing to changing lights, but issues surrounding the amount of screen time was consistently raised.

Firstly, participants were cautious about the amount of time children spent on digital technologies. Stephanie stated, *"So, you know, are we giving them too much screen time and taking away from their, their normal play?"* Both educators stressed the need to use digital technologies in moderation with other activities throughout the child's day; if not, the effects could be detrimental to the child's development.

Participants also described the negative effect of digital technologies on children's behaviours, bedtime routines and getting to sleep. Judy was concerned about children being exposed to content that they did not yet understand and its impact upon their behaviours and attitudes surrounding play. She said she could, *"...see it re-enacted in their play. And it's like, 'Why did you say that?' or 'Why did you do that?', Oh I saw that on the TV. I saw that when I was on YouTube."* Vimon noted that her child's behaviour was negatively affected if there was too little moderation of digital technology engagement. She said, *"if they get too addicted, they will have meltdowns more often."* Vimon also stated that screen-based devices could interrupt her child's sleep time.

A further emergent negative was exposure to inappropriate digital content. River commented that it sometimes informed children of things outside of parent control. She was not always in favour of *"how it connects her [Violet] to the broader world outside of our household"* and cited examples including racism, fat-phobia and sexism, the introduction of gender roles, and how body shapes and sizes are perceived. River lamented that digital content can *"connect her [Violet] to this broader world full of problems beyond our household in ways that, you know, we can't always control."* River was less concerned with the physical digital device as she was with content. She commented on the amount of time both she and her partner spent considering what digital technologies were present in their home. She said,

> *...many of the platforms that we use today are for profit platforms, and they're built to sell things. They're not built to be good at teaching the kinds of things we want to teach our kids.*

River further highlighted the centrality of content when she stated:

> *And so, I think that understanding the, the politics and the economics around platforms and content production, does leave me a bit uneasy about a lot of the stuff that our kids would be naturally what they would be exposed to, if we*

weren't very careful about that.

Importantly, this suggests that some parents do discuss their child's technology use and mediate their exposure accordingly. The other two parents also expressed unease with the risk of their children inadvertently accessing inappropriate content, including advertisements in YouTube and the autoplay function which generates a constant roll of videos. Vimon added that children are *"learning really bad stuff"* and blamed YouTube autoplay: *"their programming is very smart if you ever stumble across something, you click on it they will show you similar content"* for showing children *"rubbish."* All the negatives above were raised by participants, but there was a clear distinction between the negative aspects their main concerns.

4.2.4.2.3   Concerns

The key concerns of parents intersected with some of the negatives mentioned above and included issues surrounding the equity of access to digital technologies, the low value of some digital content, and the addictive nature and over stimulation encouraged by digital content. The main concerns of the educators included the limited number of devices per classroom. Stephanie explained that having only one device limited its effectiveness, *"because everyone will want to be around the iPad."* However, the provision of resources was dependent on budget and the priority assigned by the director. Judy raised a concern that children may be so intensely focused on digital technologies that they stop concentrating on their own communication and language development. She speculated on impact in terms of *"interaction, eye contact, socialisation... I sometimes worry [about their] verbal communication and language."*

Gemma acknowledged that children had different levels of access, and her concern revolved around allowing her child access to digital technologies so that she was on par with her peers when she reached school age. She asked herself, *"when the kids are in school, how will they compare to their peers? By having access to technology from a young age could this be an advantage?"* She also held concerns about her own digital technology usage and how her boundaries may affect her child. She admitted to struggling with *"boundaries with my technology and how much I'm on it because they're obviously seeing how much I'm on it too."* This insight reinforced adult's use of digital technologies, separate to children. A concern for Vimon was the potential detrimental effect of limiting Matthew's exposure to digital technologies because he may miss out on certain information or content that children

at this age may be accustomed to. She recognised that others may *"…think that we are depriving him of learning opportunity, because he's not exposed to TV. But I think the kids nowadays are getting too much information."*

Other parental concerns revolved around children mindlessly scrolling on their device, the inappropriateness of some television shows deemed suitable for children, and the over stimulation of engaging in too much screen time. Some of these concerns were future worries for when their children may be exposed to cyberbullying, or the negativity involved with social media. River stated:

> *I'm much more concerned about the way in which again, it grabs your attention, and they'll just be like, endless unboxing videos or endless videos of like, bits of playdough turning into other things that just doesn't, it feels like it's just junk…. we, similarly we don't want Netflix on because again, there's just like a lot of junk on there.*

Violet clearly loved her iPad, and often requested it for self-regulation purposes. River said, *"sometimes she'll be crying. And I'll say, do you want a hug? Is there anything you want? You know, is there a solution to this problem, she'll say the only solution is iPad, I need iPad!"* This was a concern for River as she explained that her child could watch shows endlessly or request time playing games, instead of choosing other options. According to River, Violet will *"go through phases where she just wants to watch endless Octonauts or endless Bluey or the same movie over and over again, and she'll even just go back and watch the same section… over and over again."* Gemma expressed concern around digital technologies affecting children's futures and the negative potential of social media. Gemma stated navigating social media can prove *"very tricky because there's just so much negativity."*

Vimon described two main concerns, namely Matthew's exposure to aggressive games, and again, the over stimulation generated by digital technologies. She allowed content that was educational but was aware that children sometimes played *"quite aggressive games, which is not very good for their brain development."* She also expressed concern around the amount of stimulation imposed on children from prolonged engagement with devices and digital content. She reiterated that her child should be spending more time outside for healthy development and that *"technology is quite draining. So, they get really tired. I think it's just too much stimulation."*

Lastly, Vimon feared the addictive nature of digital technologies as *"they only want*

the technology and refuse to do anything else." She stated that a lot of children, after being exposed to digital content, became obsessed, and so had intentionally limited her child's access. In summary, each parent chose different ways of mitigating their concerns, and the following section outlines the mediation strategies both educators and parents employed as safeguards.

4.2.4.3 Mediation strategies

The combination of negative associations and concerns leads parents and educators to employ various mediation strategies to ensure healthy, safe, and positive online interactions. Educator and parent management strategies differed and were largely dependent on the individual child. For Centre A, the main mediation strategies employed included: 1) limitations and guidelines, 2) classroom management, 3) software and filters, 4) restriction of online access, 5) restriction of in-app purchases, and 6) restriction of exposure to inappropriate content. Judy articulated the benefits of mediation strategies, as follows:

> *I think, like with everything I think it's in in moderation, and the supervision and knowing what your child or the children in your care, what they're actually doing, what they're accessing, and that it's within the boundaries of their capabilities, and what they should be exposed to, at that time of their life and what they can understand and what they can process.*

The need to educate children about operating devices and accessing appropriate content forefront for parents. Gemma stated, *"...education and technology are really great. Instead of just like, pulling them away from it, show them how to use it appropriately."* While this centre's mediation strategies were applied to all children, each household imposed their own mediation strategies, according to what worked best for them.

4.2.4.3.1 Limitations and guidelines

With no articulated digital technology policy in place, it was initially difficult to ascertain if and what rules existed in respect to digital technology use in the centre. Despite this, the educators explained that there was an expectation to ensure safe and educational practice. The first guideline was that only specific applications were loaded onto the devices for both educator and children access. The centre had a central informational technologies support person and Margaret stated that *"IT are very specific about locking the iPads down"*. The other two guidelines were that educator's personal devices were not allowed in the classrooms, and children's interaction with digital technologies was always supervised.

However, the educators stated that personal phones were sometimes used if needed to play music for the children. The children did not use devices unattended. Margaret stated, *"we don't tend to let the kids use them just go without an adult"*, and educators reiterated that they managed any digital devices used in classrooms themselves. Lastly, the educators were encouraged to give preference to YouTube Kids over YouTube to minimise inappropriate content or content unintentionally aimed at adults.

In the home contexts, all parents imposed time limitations on digital technology use by their children, especially during mealtimes. River added that there was no digital time before bed. She said, *"I try to get her [Violet] to stop watching TV by six o'clock so she can play a bit before dinner…. After dinner there's no iPad time ever."* Vimon also imposed time limits ("*not longer than 10 minutes, and it's not every day*") so her child *"does not get addicted."* She added that a *"timer works well."* She noted however that if her child was at a friend's home or in a different environment, they did not enforce the ten-minute quota. In addition to the time limit, Vimon explained that her child did not have free access to the digital technologies in the home. Access was always dictated by one or both parents. Limiting the time children spent with digital technologies meant that they were pursuing other activities as part of a balanced lifestyle.

4.2.4.3.2   Classroom management

The way in which educators manage children's behaviour around digital technologies can have a major impact on the device's usefulness and value in the classroom. Digital technologies can be used to calm children down, and the way the informal rules and regulations are implemented may (or may not) encourage healthy expectations and consistency of use. Stephanie commented that digital technologies could help educators get children to sit still in the classroom. She said, *"we have used at times when the group can be quite loud and boisterous …You just want to give them some time where they can calm down and relax."* Judy added that when the rules are set from the beginning, digital technologies can be used in a controlled and managed way in the classroom. The need for a unified approach to management was key for the educators. However, it relied upon educators knowing how to operate the digital devices and having prepared content so that children remained engaged.

4.2.4.3.3   Software and filters

Educators did not comment on any software or filters on devices in their classrooms. Centre

A parents commented on software, but neither River or Gemma had installed any safety-related software or filters at the time of interviewing as their children did not yet use browsers. River stated that Violet did not use a browser because she could not write or type but referred to a whitelist, whereby parents load acceptable digital content for the child to view. When asked if they had any filters or safety-related software installed, Gemma answered *"I don't really at the moment, because I feel like I don't need to."* While not voiced by the other Centre A parents, this was important as it highlighted a potential lost opportunity for early mediation. Even before children can type or 'search' online, they still can access content accidentally via voice activation, or by clicking links unknowingly. Therefore, parents must be vigilant of this possibility.

4.2.4.3.4   Control of online access

Judy talked to the importance of adults knowing what the children were being exposed to while River talked around the iPad's online capabilities and how either parent sat with their child while the device was being used to access anything online, creating interactive opportunities between parents and children. River said, *"sometimes she'll ask us to attend more like, she'll be like, what's happening here? Or tell me about that. What did he say?"*

Lastly, River was the only parent to comment on any tension caused by devices in their household and related to the way device mediation was managed. In their home, a server acted as a filter for what could be accessed, with digital content uploaded by either parent for the child to 'choose' from. This allowed the child to demonstrate agency in choosing what to engage with, but from a safe, pre-loaded list of options. For River, *"that system gives us a lot more control over what she can and can't see"* and it meant that *"at least we know, ok, you've got Bluey on there. You've got this. You've got that…We download that to our household server, which then streams to various devices."* River stated that it was "*not the approach that I would probably have taken myself"*, but it worked for their household.

4.2.4.3.5   Control of in-app purchases

Another mediation strategy was to monitor the financial spend on in-app purchases, both by the child or by the parent on behalf of the child. River commented on her child's ability to convince her partner into installing new applications that sometimes cost money. She added that both parents worked together to determine what types of digital applications to install on their household devices and an appropriate amount to spend on them. River stated that Violet *"doesn't spend any money by herself. But she is good at being like, I want you to get it for*

me. I need it!" The applications chosen for Violet did not allow for a spend of real money once operational so that there were no accidental downloads. No other participants commented on in-app purchases.

4.2.4.3.6 Control of exposure to inappropriate content

Participants referred to inappropriate content exposure in ways which aligned with their values and perspectives, and according to the curriculum requirements in the classroom. One educator stated that the children have never been exposed to anything inappropriate in their classrooms. For the parents, while inappropriate content was a concern, most claimed that their children have so far been protected from inappropriate digital content. River reiterated that content required mediation and explained her horror at YouTube Kids, whereby her child could access inappropriate content even when engaged with children's shows. She also commented on the advertisements that popped up which showed Violet aggressive behaviours, or movie previews she would not be watching. Hence the need to control what her child viewed. She further explained they combated inappropriate exposure by *"downloading shows and videos on the tablet"* and *"pre-screening things"* which is not *"100% effective."* Having control over what children engaged with allowed parents to limit their children's exposure to potentially harmful content by choosing particular shows, and using applications such as ABC Kids.

Both Gemma and Vimon were aware that some YouTube advertisements were inappropriate for their child. Gemma added that while sometimes content may be not age appropriate, it did not necessarily negatively impact their child. For example, in relation to Barbie, she said *"…some things that are a little bit more grown up. So, for example, I feel like Barbie is not really a great influence."* Gemma added that she sometime skipped parts of movies or shows being shown to her girls. She added *"I think a lot of old Disney shows are highly inappropriate…and I'm just looking at them like, no, no, I'm going to like skip this."*

Inappropriate exposure was not perfectly managed in either the home or education contexts, and all participants made a conscious effort to monitor content appropriately. While participants highlighted the difficulty of guiding children's access to inappropriate digital content, all these mediation strategies did appear to protect children from unsavoury digital content and promote safe and positive online interactions.

4.2.4.4 Children: Effects of digital technologies

Children's digital skills, digital literacy, attention span, social competencies and behaviour form a key research component of this study. While educators and parents largely determined what children's access, children's capabilities ultimately influenced by how they interact with digital technologies. The following presents findings from the adult participants of Centre A.

4.2.4.4.1 Digital skills

Children's digital skills included what they were able to do with digital technologies. The director acknowledged that children learn digital skills efficiently, and when given the opportunity, could operate devices autonomously. Margaret acknowledged that her educators were *"encouraging children to do it [operate the iPad]."* She said children, *"know that they do know them, they know they press buttons, then they know that there's a consequence to that pressing of a button, so that button will do this or that and they learn that very, very quickly."*

From the parent perspective, all claimed that their child could scroll down and across, zoom in and out, swipe, skip ads and take photos. River stated that Violet would *"give us directions like 'search forward, search forward, I want that one, search more that way'"* and that she could *"scroll down or scroll across or like make my picture bigger or smaller."* Gemma explained that Hope could not yet select smaller things because she did not yet possess the finer motor skills (e.g., to operate the phone), but could turn the television on (*"she knows how to put the TV on"*), scroll through and select shows, and turn the PlayStation on. She admitted that *"when it comes to selecting, like a small thing, that would be the thing that's still tricky"* but that it was *"...just a matter of practising the fine motor because she's happy to scroll and stuff."* Unsurprisingly, parents, more than educators, most readily talked about children's digital skills while educators spoke more to children's digital literacies.

4.2.4.4.2 Digital literacy

Digital literacy is defined as the child's ability to find, evaluate, and communicate through media (Twinkl, 2023). Children's digital literacy and their digital skills are intermixed, depending on how they interact with digital technologies. In centre A, all children possessed different digital operating abilities. However, according to Stephanie, *"I can tell you that some three- and five-year-olds can use an iPad or an iPhone better than...adults."*

Judy noted that children at this age know how to use cameras and smartphones, can call people overseas, have memorised songs from movies, know what Netflix is and know to

'type' on a laptop. She said *"...a lot of them know how to use cameras because like, you know, they're looking at that big picture now [on the screen]"* and *"a lot of them know how to use smartphones because I've seen them swiping. I've had a few parents say that their children have called people overseas."* Judy also stated that sometimes in the classroom she will *"...bring out the laptop to do stuff and they know the keys and the numbers, what things do."*

If children have high levels of digital literacy, they are potentially afforded more opportunity for in-depth learning. For example, educators googling an event can sometimes trigger details a child may not have recalled earlier. Judy mentioned children *"...might not be able to remember everything. But when they see things [when an educator googles the event] that can spot 'Oh, yeah. And then we did. X, Y and Z as well."* Children's digital literacies can be expanded if opportunities are provided in an age appropriate and safe way.

4.2.4.4.3   Attention span

One educator stated that digital technologies can build children's attention spans while the other conceded that it differed between individual children. Stephanie said, *"I think you can maintain their focus longer"* while Judy noted:

> *...you've got some children that are just not interested yet at all, you've got some children that'll come and have a look and then move off. And then those that are just glued and will not move. Even if it's turned off. They're still staring at it.*

Vimon was the only parent to comment on the effect of digital technologies on their child's attention span, noting her child was unable to passively watch a show without interacting with others. She said, *"...he will stay, he'll sit there for two, three minutes and he'll come to me."* It became clear from interviews that individual children's attention span when engaging with digital technologies fluctuated greatly.

4.2.4.4.4   Social interaction

Educators observe children interacting socially in the classroom every day. Digital technologies either encouraged or discouraged social interaction. Judy explained that devices fostered social interaction when discussion was encouraged, and ideas shared:

> *... we discuss ok, what -what do we want to learn? What do we want to find out? You know, what things do you want to know or what? So, you're talking to them getting the ideas from them. So, then we'll write down things? That's like,*

okay, let's type in, you know, what shall we type in to look for in that specific, you know, interest of this dinosaur? I want to know, you know, what does he eat? Or, you know, what was his colours or things like that. So, then you're getting, you're drawing out from the children what they want to learn.

River acknowledged that the content of age-appropriate shows can provide frameworks that allow them to operate socially. She acknowledged, *"[Bluey] gives them these frameworks and packages for how to interact with other people that, you know, little kids don't actually seem to naturally know."* She noted that it can be difficult to teach children how to share and play, and what to do if someone does not want to play. In this instance, some digital content can be effective in encouraging appropriate child and parent interactions and collaboration between siblings.

Vimon agreed that digital technologies encouraged social interaction between children and parents. She stated that her son talked to her all the time when engaged with digital content. For example, *"he will say, mummy sing with me, or mummy, what is that instrument? Or is this this, or is this that?"* Social interaction and behaviour are not dissimilar, as evidenced by the following.

4.2.4.4.5   Behaviour

Gemma's mainly spoke around the behavioural effects of digital technology including the difficulty of getting children off devices:

I think that it really depends on the type of day and time of day as well. Because I do find if they had too much screen time, and all of a sudden there was like an abrupt change, they'd definitely be a bit cranky.

Children's behaviour and digital technologies influence each other across the home and education contexts. Thus far, the effects of digital technologies have been discussed with the adult participants of Centre A. In the following, the children of Centre A shared their experiences relating to digital technologies in their lives.

4.2.4.5   Children's perspective

Three Centre A children were interviewed to determine their understanding of digital technologies and their digital capabilities. Each child engaged with digital technologies in differing ways. This section presents the children's perspective on digital technologies in both the centre and home contexts and their own digital skills, and includes the degree of agency afforded to autonomously practice their digital skills.

4.2.4.5.1 Digital technologies in the centre

Violet was using Beebots on one of the centre observations. She described the elements of the Beebots as, *"they are arrows"*, *"it makes it go to the person"* and *"press it four times."* This indicated that she understood the basics of Beebot programming. She experimented repetitively with the Beebot and practiced how to move it in different directions. She frequently made mistakes but did not show frustration and demonstrated a clear understanding of forward, back, and left and right as evidenced in the following exchange with her educator:

> Educator: *Wonderful! Now have a look at them at the top before you press any, all right, so this arrow is, anybody know what direction that might make Beebot go?*
> Violet: *It makes it go to the person*
>
> ...Educator: *That way, so there's an actual name for it, that's left*
> Child: *And that's right*
> Educator: *Oh! Look at you go! Right, what's that one?*
> Violet: *That's left.*
>
> ...Educator: *In front, this one is forward*
> Violet: *And, and, that way is back.*
>
> ...Educator: *Do you think it's gonna go all the way to [Name]? Or do I need to press it more times?*
> Violet: *More times*

While Violet engaged with the Beebot in the centre, she also described the digital technologies she engaged with at her home. However, neither of the other two focus children spoke about the digital technologies in the classrooms, perhaps illustrating little engagement with devices in the centre.

4.2.4.5.2 Digital technologies in the home

Each child identified the digital technologies they used or had in their homes. Violet talked about her own 'kids iPad' (*"it's a new iPad"*) and that she had a studio at her home. When asked what digital technologies she knew about, she explained that she had a studio at home with a 'big TV' and an iPad for the kids, and that *"...me and my sister watched Trolls."*

Hope successfully explained the digital technologies she engaged with at home. This included a TV, PlayStation and watching 'Elsa' (from Frozen). She said that she watched TV, and watched shows through her PlayStation:

Researcher: *Yeah, [Name], she told me that you get to play on the PlayStation. Is that right?*
Hope: *Mmm*
Researcher: *Yeah. Do you get to watch your shows?*
Hope: *[Nods]*

Lastly, when asked what digital technologies he engaged with, Matthew replied with '*no*' to questions such as *"can you tell me what your favourite TV show is? Do you have a favourite TV show?"* or *"do you watch TV at home?"*, which aligned with his parents' answers. Interviews demonstrated that the children could explain what digital technologies they engaged with in their home, and the skills required to operate those which they had access to.

4.2.4.5.3 Digital skills

Hope was the only child to address digital skills. She shared (by nodding her head in response to the questions) that she could turn the PlayStation and the television on:

Researcher: *...what else might we do on the PlayStation? Do you know how to turn it on?*
Hope: *[Nods]*
Researcher: *…And you can already turn it on? Can you turn the TV on?*
Hope: *[Nods]*

Like Hope, each child indicated that they were able to operate digital technologies and were able to explain what they used in both their home and education contexts.

4.2.5 Summary

Centre A was more traditional in terms of learning materials and resources and operated without a large number of digital technologies. However, both the director and educators agreed that digital technology use for this age group is a necessity, and children need to be taught how to use devices to be ready for their schooling. This was highlighted for the director by the Covid-19 pandemic. All Centre A staff emphasised the importance of maintaining balance in relation to digital technology use given its potential impacts on children's learning and development. While the centre did not have a formal digital technology policy in place, there was an appreciation amongst staff around basic rules of use in the classroom.

Centre A parents' key considerations focused on concerns surrounding the digital content children can access when using devices. Importantly however, these concerns were confined to home use only. All three parents and children used digital technologies in some capacity in their homes. The amount of time spent on devices (regardless of the value of the content consumed) also dominated parents' consideration of use. Parents did not draw links between use at the centre and at home.

The digital literacy skills of staff, parents and children were varied, but mediation strategies were broadly similar. Centre A children could vocalise and demonstrate their digital skills when asked, and they were aware of some of mediation tactics imposed on them in relation to digital content and devices. Importantly, the findings from Centre A offer a rich source of information for recommendations to policy makers about digital technology use in early years centres, especially in relation to post pandemic learning and teaching. Parents of Centre A have also provided strong evidence for effective mediation strategies, and finally Centre A children themselves have provided valuable insights into their understanding of digital technologies, and the opportunities they provide for both education and entertainment.

4.3   Centre B

Centre B housed multiple digital technologies, and the educators were apt in operating them. The centre had no official digital technology policy, so educators used their discretion when using the devices with the children. Each classroom had a tablet for supervised use with the children, and educators were provided with shared laptops for their professional work. The centre itself had a strong and stable internet access, and devices were used daily in the classrooms.

This section reports on the data obtained from Centre B and its participants. It includes a description of participants, findings from the desktop audit and digital technology policy, observations of the centre's practices, key themes presented in the interviews, and a case summary. The observations are divided by classroom one and two, and key themes are segmented by section including the presence and use of digital technologies, educator and parent attitudes towards digital technologies, mediation strategies to ensure safe and positive experiences for children using digital technologies, the effects of digital technologies on children, and the children's perspectives of digital technologies and their digital skills.

The SEIFA ranking for Centre B indicated that it was in an area with a higher-than-average score across SEIFA indexes, including economic resources and education and

occupation. Table *4.3* shows the decile ratings were 8 and above, which indicated the centre sat in the highest 30% of areas across Perth.

Table 4.3. SEIFA rankings for Centre B's suburb

SEIFA Indexes	Score	Decile
Index of Relative Socio-economic Disadvantage	1087	10
Index of Relative Socio-economic Advantage and Disadvantage	1087	10
Index of Economic Resources	1113	10
Index of Education and Occupation	1041	8

Centre B included six play studios for zero to five-year-olds. The centre employed two full time early childhood teachers, and its professional staff were working towards or had completed their Diploma. The facility was new at the time of data collection and came under the banner of a not-for-profit company. Nature Play Australia facilitated the creation of the outdoor environments, which were designed to encourage children to consider sustainable practices. Overall, their early childhood curriculum development was guided by the EYLF and Framework for School Aged Care. Data collection was carried out across two play studios which included the oldest children in the centre.

4.3.1   Participants

Nine interviews were conducted in Centre B and included the director, two educators and three parents and their children. The three children were observed in their learning environment for any interaction with digital technologies. Participants represented a broad cross-section of backgrounds and ethnicities and held a range of opinions around digital technologies in both the home and education contexts. The staff were all highly experienced educators, and participating parents all fluent technology users. A summary of each participant is shown in Table *4.4* below.

Table 4.4. Centre B participant descriptions, including interview dates and location

Role	Pseudonym	Interview Date	Interview Location	Overview
Director	Kahurangi	6/11/2020	Kahurangi's office	Female director in a new position. She was involved from the conception of the centre and had been its only Director. Lived locally and involved in the surrounding community.
Educator One	Rachel	23/11/2020	Resource room with interviews chairs set up	Female. Highly experienced educator. Lead Educator of her play studio (3- and 4-year-old age group). Grandmother and highly skilled in operating digital devices.
Educator Two	Chelsea	23/11/2020	Resource room with interviews chairs set up	Female. Highly experienced educator. Lead Educator of her play studio (4- and 5-year-old age group). Curious of the

				benefits of using digital devices in an educational space.
Parent One	Adi	18/03/2021	Resource room with interviews chairs set up	Female. Parent of an only child. Active and involved parenting style. Allowed child to watch unlimited content, but with awareness of what the content was.
Child One	Elliott	01/04/2021	Lunchroom	Three-year-old boy. High energy and always active. Watched shows that included his favourite superheros.
Parent Two	Penny	19/03/2021	Resource room with interviews chairs set up	Female, mum of two boys. Used digital technologies fluently. Allowed the television on in the home at any time. Highly involved with social media.
Child Two	Moses	01/04/2021	EYC classroom	Four-year-old boy. Confident and able to communicate well.
Parent Three	Jessica	19/03/2021	Resource room with interviews chairs set up	Female, mum of two. Positive towards digital technologies and incorporated them into daily life. Both parents of the household worked with social media and digital marketing.
Child Three	Faith	01/04/2021	EYC classroom	Four-year-old girl. Confident and enthusiastic. Led her classmates in games and free play.

4.3.2   Desktop audit and digital technology policy

A desktop audit conducted in March 2021 revealed no mention of what digital technologies were used in the centre. No images on the website showed digital technologies being used by educators or children in the centre. The website's frequently asked questions section included a sole statement that Centre B did not offer online enrolments. This was perhaps an indication of the centres level of administrative digital skills and literacy. On a re-evaluation of the website in April 2022, there was no further evidence of the inclusion or promotion of digital technologies, a digital technology policy, or professional learning for staff pertaining to digital upskilling.

4.3.3   Observations: Centre practices

The three focus children in the centre were observed on two separate occasions. One child (Elliott) was in the first classroom, and two (Moses and Faith) in the other. Both observations focussed primarily on the digital technology used within each classroom, by both the educators and the children. Centre B observations were carried out on a single day, at different times during the day and included the two classrooms, outside and the lunch room.

4.3.3.1   Classroom one

The first observation of Elliott's classroom consisted of 20 minutes of watching the children engaged in indoor mat time. All children (approximately 12 children) sat on the mat are were

engaged in music time where they sang along with an interactive music cartoon, as shown in Figure *4.10* below. The iPad, held by the educator, displayed an interactive music video, and was connected to a Bluetooth speaker to amplify the sound.

Figure 4.10. Children of classroom one engaged in music time

The music video was running the children through letters, colours, and numbers, and required their responses between segments. The educator prompted the children a number of times, but they mostly interacted solely with the iPad and responded directly to the iPad instructions. The educators also sang along with the children. Elliot is pictured on the front row, furthest left, dressed in a red and blue shirt. He was an energetic child who was involved with all classroom activities in the time he was observed.

4.3.3.2 Classroom two

The second Centre B observation was undertaken in Moses and Faith's classroom. This classroom was highly engaged with the digital technologies available to them. During the observation period, the children and educator sat on the mat and an iPad was used for the roll call, Jolly Phonics, and for checking the temperature. For example, the educator called out each letter, prompted by the iPad imagery, and the children replied when their name started with that letter. For example, when the educator asked, *"Anyone start with a 'm' 'm' 'm'?"*, Moses replied *"me!"*. When the educator was transitioning between activities, Faith stated, *"...my mum said that I could see Cinderella if I'm really good"*. She had previously been talking to her friend about her favourite movies. Furthermore, when starting the Jolly Phonics video and an advertisement played through the iPad, the educator stated *"...that's an ad, shall*

we skip it?" This level of engagement allowed the children to be involved in the operation of the iPad, albeit indirectly. Figure *4.11* shows the educator leading from the front with the iPad. All children were engaged with the screen.

Figure 4.11. Children of classroom two engaged with the iPad during mat time

The open dialogue between the educator and the children created a safe space for children to ask questions around how the devices worked and how they can be used. The children asked the educator which buttons to press as they navigated the weather app and whether the educator could turn the volume up so they could better hear the sounds. Figure *4.12* shows Moses and his educator checking the daily temperature in front of the class during mat time. Moses was highly engaged during both activities. He was able to share his name with the class and share the temperature using the iPad (supported by the educator).

Figure 4.12. Moses and his Educator checking the days temperature on the iPad

Faith answered questions, volunteered for activities, and actively sought me out to find out why I was in her classroom. When asked about her digital use she shared that she watched shows with her friend, *"I watch something with her"*. Next, the educator took a photo (using the iPad) of all children with their Easter bunny ears on and stated, *"…now that photo is on Seesaw, so you can tell your mummies and daddies to check it and see what we did today."* Seesaw was used by the centre as a communicative tool between the centre and the home, and its use was discussed in the interviews. Overall, both observations demonstrated the use of digital technologies in both classrooms, and provided information prior to the interviews. The themes that emerged from the interviews aligned with the observation data and offered rich insights into how digital technologies were used, both in Centre B and in the homes of participating centre children.

4.3.4 Interviews: Themes

The observation data provided an overview of the digital technologies present in the classrooms, but not necessarily how educators or parents valued them, or mediated their use. The key themes that emerged from the interviews included: 1) presence and use of digital technologies, 2) educator and parent attitudes towards digital technologies, 3) mediation strategies to ensure safe and positive experiences for children using digital technologies, 4) the effects of digital technologies on children, and 5) the children's perspectives of digital technologies and their digital skills. Each theme contributes to a greater understanding of what and how digital technologies are used in both education and home contexts.

The broader societal context, in terms of the Covid-19 restrictions at the time of data collection, was critical to how participants presented their views on digital technologies. Like the previous case, Covid-19 has significantly affected education delivery which Centre B director, Kahurangi, acknowledged. She talked to the implementation of a school readiness program, namely, *"it's still a project we're working on and developing. Corona slowed it down a lot, obviously, with this year kind of being wiped out."*

Digital technology usage in the centre had increased rapidly due to the need to keep parents offsite as much as possible. Educators were required to keep parents informed via digital means, and Centre B was looking to the future. Kahurangi understood that digital technologies were changing the learning landscape, including in the early years context. She stated, *"I think the future in early childhood will look very different within 10 years, you know, look at schools now they're using technology a lot more heavily."* She noted that most

children were digitally literate earlier in their lives, adding, *"two-year olds can use our smartphone better than some older people I know."*

Kahurangi also noted the need to better educate directors of early years centres on the meaningful and purposeful use of digital technologies to better integrate them into their centres. She said, *"I'll just be interested to see what research shows and definitely see how it can be used here in our sector, but in a really meaningful and purposeful way ...hopefully we can just hold that balance."* It was evident that the way the director viewed digital technologies influenced the way centre participants talked about digital technologies, online safety and its influence on children's learning and development.

Equity of provision of digital technologies to children of this age was important to Kahurangi. Being a new centre, affordability was another key aspect, and Kahurangi happily noted during her interview that Centre B had the digital technologies it needed to operate, specifically, *"…until we've got everything fully up and running as to the level it should be, technology would definitely take probably a backseat for a wee while."*

4.3.4.1 Digital technologies: Presence and use

This section outlines the digital technologies used by Centre B participants and includes: 1) digital technologies in the centre (including desired digital technologies for the centre), 2) the intersection between the centre and the home (including parent communication and parent awareness of digital technologies), and finally, 3) digital technologies in the home. Each participant held differing views as to the appropriateness of digital technology for young children, as demonstrated in the following.

4.3.4.1.1 Digital technologies in the centre

Being new, Centre B did not yet utilise a large range of digital technologies. However, they integrated selected technologies including the iPad, laptops, stereos, headphones, Bluetooth speakers, printer, and a recycled digital technologies provocation station into their classrooms. There was an iPad with Xplor installed in each classroom for the parents to sign their children in and out of the centre daily, and these had only recently been purchased. Therefore, these iPads possessed bigger screens which the educators stated were more helpful with groups of children, especially as they sometimes had up to 27 children crowded around one iPad. Rachel said this was *"really cool. Because it's bigger."* Between uses, the iPads were stored out of the children's reach, and left on charge, as in Figure *4.13* below. The iPads were also being used for accessing YouTube, interactive videos, phonics, photos, and

programming. Specifically, educators talked about showing the children an educational series (three 12-minute videos weekly) on topics such as recycling. Rachel also talked about ChuChu TV on YouTube, stating it was *"quite informative and educational."* She reiterated the effectiveness of the iPad as a tool for presenting content to the children because they enjoyed it. She said, *"they are drawn to it actually."*

Figure 4.13. iPad on charge in classroom two

The iPads were also used by the children themselves, in tandem with an educator. For example, at mat time the educator chose a child to come and help look up the UV index for the day using a weather app. During mat time, Chelsea and children would research *"what the UV is today. And write it on a poster. So that's something children will start to look up to see what it is."* She reiterated that short snippets of digital technology use like this were becoming more common in classroom over time.

Digital devices, namely the iPads, Bluetooth speaker, stereo and headphones, were used at Centre B to encourage children's exposure to music. The iPads connected directly to Bluetooth speakers to play music everyday as part of mat time. The screen was hidden so as to encourage dancing and singing, rather than simply watching the screen. The music was pre-approved by the educators and, as Rachel explained, there was a small number of songs used on rotation. She said, *"they can sing along, and you can all do the actions and stuff."* The stereo in classroom one (Figure *4.14*) was at educator height and out of reach of the children, and ready to play CD's when the children asked, or as part of a structured lesson. The headphones *"can be just plugged into the stereo...and then they just listen to whatever CD they choose."*

Figure 4.14. Stereo in classroom one

The purpose of the laptops sometimes mirrored that of the iPads. For example, the iPads and laptops were both used to play videos to the children with a specific focus, for example, NAIDOC (National Aborigines and Islanders Day Observance Committee) week. However, the laptops were reserved for educator use only and educators used them for their planning and programming, as well as for communicating with parents. Rachel noted that the laptops were *"shared across the service but not for like each individual staff member."*

Chelsea acknowledged that the printer was helpful for children to display their learnings by converting the digital to tangible. She said she would work with the children to print content and *"stick it back up and like, put it up on the on the wall…so it goes from being on the iPad, we've printed it, and then it goes up."* This was an example of a digital tool being used in the classroom for moving from play based activities to technology and back again. Lastly, the children had a section of their classroom set up with recycled keyboards, phones, and screens for pretend play (Figure *4.15*). Set up for free play time, Chelsea said the technology corner consisted of *"...just old keyboards that we brought in, and we did have a laptop at one point. And then we've had old telephones ... And we have had this like fake mobiles."* The technology corner was designed to promote imaginative play and to engage children in thinking and role play using digital technologies. Rachel stressed the importance of children using their imagination.

Figure 4.15. 'Technology corner' in classroom two

4.3.4.1.1.1 Desired technologies for the centre

The introduction of new digital technologies was not a priority of the centre at the time of interviewing. The director and educators talked about further utilising the iPads capacity for educational apps which they had not yet incorporated into their curriculum. Kahurangi mentioned that children are not yet interacting and engaging with the iPads on their own and that might be an opportunity for the future, and the educators indicated that an increased numbers of iPads would be useful.

As an educational tool, the interactive SMART board was described as a highly sought-after device. Kahurangi cited lack of budget as the reason for not yet acquiring them, saying, *"those big smart screens in terms of that interactive engaging style… but probably budget wise not so budget friendly right now."* Rachel added that a larger screen might aid children's engagement compared with the classroom iPad while Chelsea explained that it would enable the children to sit in a larger group, and undertake more than simple research. She had raised the issue of SMART boards previously in staff meetings and that the main benefit would be using it for research.

The director, educators, and parents all commented on the increasing use of digital technologies both in centre and at home. One educator, Rachel, commented on the need to be upskilled around digital technology use, noting, *"if it's going to be introduced then I reckon that some of us might need a bit of training."* The upskilling of educator's digital skills is essential for the introduction of new digital technologies.

4.3.4.1.2 Intersection between the centre and the home

Both educators claimed that they had no awareness of digital activities occurring in centre family homes and that this was not something they discussed with parents. Rachel assumed

that children with high levels of digital interaction at home would be competent in the classroom. She noted, *"…when you bring out your iPad…you can see the children that do use it, they will be the ones that come."*

Rachel commented on children's behaviours as evidence of the impact of watching television at home. For example, they talked about, dressed up as, and acted out shows such as Bluey, Spiderman, Batman, and fairy princesses. Chelsea commented on children's awareness of the rules that governed their use of digital technologies at home. For example, when children explained that they were not allowed on their iPad just before bedtime. Chelsea said that children, *"tell us, 'we've got an iPad at home'… and then you will hear some children say, 'oh, no, I'm not allowed my iPad until bedtime'…But you'll see some of them coming still holding as they're walking down the corridor."*

4.3.4.1.2.1 Parent communication
The platform chosen by Centre B to digitally communicate with parents was Seesaw. Seesaw was used to document the children's learning and development. Kahurangi said it's *"…what families can access very easily via their phone throughout the day, they get notifications about what the child's doing, and what's happening."* She added that every parent was given *"automatic access"* upon enrolment. Automatic access was granted so parents were aware of what was going on in the centre. Rachel stated that parents could also message them throughout the day via Seesaw if they desired. She described the most challenging aspect of parents sending messages was *"… having time to actually look at it."*

Parent communication in Centre B was also enabled through Facebook and online messages. Rachel stated that the educators did not message through Facebook (this was managed solely by the director), and that there were *"some parents that don't want to go on Facebook."* Seesaw and Facebook both allowed efficient communication but Chelsea stated that parents preferred to have the Seesaw application, as *"their preference."* The use of Seesaw, Facebook and online messaging was evidence of efficient digital communication between the centre and parents.

4.3.4.1.2.2 Parent awareness of digital technologies in the centre
When asked if parents had expressed concern around digital technologies being used in centre, Kahurangi answered *"nope."* Parents had not asked what the centre used, and in turn, there was no conflict relating to digital technologies between home and the centre. Rachel noted that when a parent had previously asked about what digital technologies were used in

the classroom, another parent had answered, *"not at all."* Chelsea added that she had never been asked about the digital technologies used in her classroom.

In relation to digital technology, Centre B parents appeared unawareness of what was utilised in the centre. Adi was aware that iPads were used but had never enquired about why, how, or what devices were used. She knew that the iPads were used to play music for the children, and she left the centre to use digital technologies at their discretion. She had not had any conversation with the educators about the digital technologies used; she had just *"kinda just left them to it."* Neither Penny and Jessica were aware of what was used in the centre. Penny acknowledged that technology could be good in a learning setting, but did not know *"how they did that [used digital technologies]."* Finally, Jessica was happy for the centre to use digital technologies as they desired. She was aware that the children, *"…watch interactive videos…. I didn't think it was too much."*

Communication between parents and Centre B was bidirectional and was aided by the centre's use of Seesaw as a communication tool. It was also evident that the children's aptitude for digital technologies in the centre was influenced by their use of digital technologies in the home. These are outlined as follows.

4.3.4.1.3   Digital technologies in the home

Overall, there were a larger number of digital technologies present in Centre B parent households. Adi talked about television, iPad, mum's phone and YouTube. She explained that her child watched shows while eating meals, and sometimes when out and about away from the home (*"if we are out and about and we want him to just sit still. We'll say here watch"*). To Adi, allowing her child to watch cartoons during meals was a bad habit they had formed, *"so that he watches, and he eats."*

Penny stated their household engaged most of the time accessing Netflix Kids through television. She said that Moses *"doesn't really play on anything, no iPads or no iPhones… it's mainly TV…just the kids Netflix."* She added that on occasion her children might have access to ABC Kids on the phone and, occasionally, the children with their mum, used the phone to FaceTime relatives (*"they talk to their Nana and Grandad over the phone"*). Penny added that her child *"hasn't shown any interest"* in using the camera on the phone.

Jessica, the third parent, commented on a high prevalence of digital technologies in their home, including a kids iPad (for shows and games), parent phone, a wireless speaker, and *"we also use a lot of streaming services and things like that. And our smart TV."* She added that her child, Faith, had an *"iPad that's solely for her, which she just uses to watch*

shows that she likes and plays games that she likes to play." Their home also had a *"wireless speaker that we put outside when we're playing outside"* to play music, and when inside, they *"sometimes put music on through the TV."* Jessica said she attempted to keep her personal phone off limits, only allowing Faith access in certain circumstances. She reasoned that if she were to allow Faith on her phone regularly, she would ask for it all the time. However, if the iPads batteries died or they needed Faith to sit still, they allowed her access if *"we want to keep her busy for a little while."* The prevalence of digital technologies in the three children's homes far outnumbered the digital technologies available in the centre. The parents heavily relied upon digital technologies in their homes and made a concerted effort to ensure the safe interaction of their children with the digital technologies.

4.3.4.2   Attitude: Towards digital technologies

Centre B's participants held a range of positive and negative attitudes and concerns which affected how digital technologies were implemented with young children. Among the main positives for Centre B educators were that the digital technologies provided visual stimulation that educators cannot provide on their own, and that when used in moderation, the technologies could be used as a research tool to encourage children's interests instantly. The main negatives included the excessive time children spent engaging with digital technologies, the physical effects of too much screen time, unhealthy patterns that forms when technologies are used as bribery, and behavioural ramifications once a child becomes attached to a device.

4.3.4.2.1   Positive aspects

Overall, participants of Centre B mainly agreed that digital technologies were beneficial when used appropriately and in moderation. Rachel indicated that digital technologies should only be used for 20 minutes a day in the classroom and be educational in nature. Chelsea added that *"if the children have an interest in something we'll encourage 'let's get an iPad', 'Let's have a look."* For example, if a child expressed interest in a specific animal, the educators could use the iPad to search up further information, pictures, or videos to encourage deeper learning. Chelsea added, *"if we didn't have that iPad, then that interest may just stop then."*

Most participants talked about the importance of using digital technologies in a balanced and healthy way. Kahurangi noted the need for a balance when using digital technologies with children, especially as children were introduced to them from a very early age, and stated, *"the balance between the technology definitely has its bonuses around*

supporting children's learning and development." Adi reiterated Kahurangi's message and the benefits of digital technologies when used in moderation. She also commented on digital technology's ability to enhance children's learning, saying, *"it's crazy how they learn so quickly."* She specifically noted that digital technologies encouraged Elliott's concentration as they often provided visual content and that this was *"exciting for him."* However, she cautioned against overusing digital technologies, especially at a young age as children *"…still need their active time."* If a balance is maintained, the collective concerns and worries may be kept to a minimum.

Another key attitude expressed by many was the expectation that children had basic competency to interact with digital technologies, important for the transition to school. Chelsea responded positively overall to the use of digital technologies by young children, saying, *"way the world is going"* and they *"should be using it"*. She noted the need for children to be taught how to use devices, included educating them on online safety, saying, *"…obviously, not all the time, but just introducing it, basics and showing them how to use it…we can educate on how to use it safely and start introducing that whole safe online and all this sort of stuff."* She also commented on children needing to be exposed to a greater number of devices in their early years centre (*"I am an agreement of them having access to at this age group"*) so that they are school ready. She noted that *"…in the majority of schools each child has their own iPad now and their own laptop and need to know how to use it."* While not applicable in the immediate transition to school, Chelsea was still aware of the reality of children using digital technologies as a part of their everyday lives, starting at age three or even younger.

Digital technologies were credited with keeping children occupied for set periods of time. Penny stated, *"it's the only time where they'll just sit down, and I can actually get stuff done."* Jessica also expressed her appreciation for the benefits of digital technologies including parents being able to take a break from entertaining the children. She said she could not keep Faith entertained the whole time, so they had digital technologies to *"give ourselves a break."* Her overall view on digital technologies was positive, and she commended their help in the parenting journey. She said *"we love it – I love technology. I couldn't do parenting without it…but I do understand like the good and the bad - there's reasons people don't use it at all and that's great for them but for us it works."*

Alongside keeping the children occupied, digital technologies could also be used to encourage behaviours. Adi stated that devices could be an effective teacher of content,

because children could more readily concentrate for longer periods of time. Penny believed digital technology could be used as a reward and incentive to control her children's behaviours, noting, *"if they've got like that reward, they're more inclined to do what is I've asked."* This thinking may have influenced parents to view digital technologies more favourably.

Only one parent talked about the different skills required to operate different types of devices. Adi stated that their child was too young for online games and that he spent most of the time watching content rather than interacting with it. She said, *"he's too small for video games and all that."* This may be more of a reflection on the parents' digital skills and an inability to develop his digital skills to operate different technologies. The attitudes of the parents were often affected by the way they engaged with digital technologies. Adi admitted to being "*useless*", saying, "*I guess, because I'm from the older generation IT, I think to myself, it's a waste of time.*" Penny used the computers at TAFE when she studied and used her mobile phone to access digital apps. She stated that she had never been exposed to anything inappropriate which perhaps influenced her thoughts surrounding digital content. Jessica was a highly engaged digital learner. She was the manager of a business run through Facebook, was savvy with her smartphone and declared she was very competent in operating digital devices. For this group, parents digital skills aligned with their attitudes towards digital technologies; for example, those who viewed digital technologies more favourably tended to learn the skills necessary to operate digital devices and their online capacities safely.

The capacity for educational digital content was acknowledged by all three Centre B parents. Penny suggested that Netflix Kids provided age-appropriate entertainment and that, *"I think they do learn like some things."* Jessica stated that digital content increased imagination, vocabulary and potentially exposed her child to more diverse ideas. She added the benefits of a "*variety of races on there and she's really started to notice this person has brown skin… I like the fact that she's starting to notice that already and notice that in what she's watching.*"

The interactive nature of digital technologies was another positive aspect for Centre B participants. Jessica acknowledged that interactive elements encouraged children to use their memory to do things such as remembering which pictures, words or icons perform certain actions. Digital technologies were highly regarded in Penny's household. Moses loved television (Moses will "*sometimes say that he loves TV*") but each positive aspects was

countered negatives associated with digital technology use and the dangers of online safety.

4.3.4.2.2   Negative aspects

The main negative aspect of digital technology for these participants was the excessive time children spent on them. Rachel stated that while she did not view digital devices negatively in her classroom, *"…if you're going to use it every day all the time that is a negative."* Similarly, Chelsea said that digital device use becomes negative when children are on it for too long, or *"…they start to rely on it for keeping them occupied."*

All three parents described negatives associated with technology use. Adi questioned whether digital technologies were appropriate for young children, and highlighted the importance of content that children engage with. She said, *"...we find it when we watch those kind of like action cartoons and just before bed, he has a bad night, restless…he carries on and dreams and doesn't close off or shut off his mind."* Jessica added that digital technologies distracted from the everyday household chores or activities, in much the same way that they distracted from bedtime routines. For example, when on a family camping trip and Faith was allowed to watch a movie in the middle of the day, she did not want to then disengage to go outside and play. Jessica's main concern revolved around the interruption digital technologies caused and the addictive nature of devices. She said, *"we worry about getting her too attached."*

A further negative was the conflict that arose when adults applied mediation strategies, or when children's behavioural issues arose. Adi stated that her husband always questioned whether they were on their phones too much, and as parents, they had disagreements over their own personal digital technology use. She said *"my husband always fights with us... And I feel like he's saying to me. But I think to myself, you're on your phone too."* Jessica agreed that sometimes both parents did not share the same perspective, and arguments could occur when the child spent too much time on devices. While her partner tried to get the children to put devices away, Jessica admitted she was a bit more lenient, "*so that might be where it gets a bit fuzzy*" and this caused tension. Finally, she stated that arguments occurred when the child persisted with asking for the device after the parents had stipulated there was to be no more interaction at that time. She said Faith would *"keep asking for it. Whereas if we just take it away completely, she forgets to ask for… we just find ourselves arguing over it she wants to watch it and we want her to get ready for bed."*

While arguments in Jessica's home around appropriate mediation strategies were common, Jessica purposefully encouraged conversations about managing digital technologies

in safe and positive ways. She claimed, *"…if we find that it's causing a problem"* they had a conversation to *"reset the attitude around it."* Overall, these parents agreed that digital technologies were good tools to use, so tension or conflict over the devices were worth resolving. In attempts to limit the negatives, participants shared their concerns that lead them to implement mediation strategies, and their concerns are outlined as follows.

4.3.4.2.3   Concerns

The main concerns held by the director around young children using digital technologies in Centre B was the obstacle they had become for educators during their workdays. Kahurangi said that while educators used the Seesaw application, she didn't want it to become a requirement for her staff to fill out unnecessary documentation. She feared it may cause educators to *"forget half of the things that you're meant to actually be doing, because you're just quickly doing it rather than having to really be thinking about what you're writing."*

Both educators expressed concerns as to the amount of time children used devices. Rachel said *"… if they're watching TV and iPad throughout the day, that's probably too much…not at this age."* Penny added that she didn't *"…think it's a very, like healthy thing to have."* Chelsea also said she encouraged children to not *"become addicted to it, because that some children need to have that iPad in the hand all the time, or they need to be watching something."* Another concern revolved around cyber-safety; Chelsea was specifically concerned about the *"the whole cyber safety thing."*

Parents communicated genuine concern around balance between active time and exposure to digital content that was too advanced because, in Adi's opinion, children learned by simply watching. She said that her son Elliott *"wants to re-enact things that he watches"*, The concern for all participants was primarily about children spending too much time engaging with digital technologies and becoming addicted to devices and digital content. Most commented that children needed to be active and outside where possible at such a young age. Their concerns influenced the types of mediation strategies chosen by the centre, and by each parent.

4.3.4.3   Mediation strategies

The main mediation strategies included: 1) limitations and guidelines, 2) classroom management, 3) restriction of online access, and 4) restriction of inappropriate content. These strategies were applied in different ways, depending on the context and situation. Older siblings in the households also affected the types of mediation parents chose. Not all

mediation strategies were successful, and children sometimes responded unpredictably to the same methods.

4.3.4.3.1 Limitations and guidelines

Centre B guidelines were not formalised in written policy, as revealed by the Desktop audit and digital technology policy review. The first indication of digital guidelines came from the centre director, Kahurangi when stated that educators could not to take personal phones into the classroom, but there was no further guidance on devices or digital content use. Kahurangi later admitted that educators sometimes use personal phones in the classrooms, but that they were not to have any photos stored on their personal devices due to *"confidentiality rules and stuff."* This was an example of an existing rule being flexibly applied.

The second unwritten guideline was that children were to be supervised when engaged with devices. Although the iPads were not password protected, activities were always educator led. When discussing the iPads and whether any filters or software installed on them, Kahurangi admitted that they did not have any meaningful security. She said, *"...we just lock it from certain signed apps."* Chelsea reiterated that when the iPads were in use, the children were always supervised. She said, *"if they're on the iPad we are there watching their every move."* Rachel was aware that the children may have been able to access online platforms using the iPad, but felt it was not an issue. She acknowledged that the children could potentially access search engines if they were skilled enough to do so, or even unintentionally. However, according to both educators, no children had accessed a search engine via the iPad.

Guidelines and time limits around the use of digital technologies differed between households. Adi explained that in their household, there was no digital technology time before bedtime, and Elliott was allowed to spend up to an hour and a half per day on devices. She had to be particularly mindful of time limits when Elliott was watching content on the phone. Adi said, *"I don't like it because he's sitting like this [motions as if phone is really close to the face]."* Adi and her husband sometimes resorted to trickery to apply time limits. She simply stated that they *"lie and say the battery is flat or something"* if the time spent on devices was becoming an issue. Penny explained that the television was turned off during dinnertime and they were allowed up to two hours per evening, up to one hour in the morning, and most of the weekend. Jessica's household also had a rule that there was to be no iPad before bedtime or during the week (*"we don't use it during the week"*). She admitted

that *"it's not set rules, like I said we're sort of a manage it as we go sort of family anyway if an issue pops up then we just manage it"* and that they *"don't impose like a time limit or anything like that. It's usually just like, your movies finished. Let's do something else. We're not, we're not very like, you can only do it for 10 minutes or whatever."* Jessica's household was the most liberal of the three in terms of flexible time limits.

Another mediation strategy was that devices were limited to special occasions or big trips and were sometimes used as a reward system. Jessica said they saved digital devices for *"special occasions… Or if she's being really good, we might use it as a reward as well."* This strategy is discussed further in the section on children's behaviour.

The final rule in all homes was that parents were aware of the digital content children engaged with. Penny explained that she was aware of what the children watched and that when choosing a show on Netflix, she would *"...sit with him and then he chooses. So, I always know what they're watching."* Penny also recognised the need to monitor content, arguing *"I don't think technology is a bad thing. But I think it has to be like monitored."* Her main concern was making sure Moses selected the right profile on Netflix. These limitations and guidelines were just some of the mediation strategies employed to manage children's use of digital technologies.

4.3.4.3.2 Classroom management

Centre B educators commented that digital technologies could assist in classroom management as they helped children collectively focus in a calm manner. For example, when engaged with a screen, the children would often sit quietly to engage with the content. Chelsea noted that music also acted as a mediation strategy for behaviour management *"as a calm down tool as well…where they calmly just sit down and just listen to some music."* Mediation strategies curbed many of the negatives shared by participants, and inevitably digital technologies had varying effects on children themselves.

4.3.4.3.3 Control of online access

All three parents were aware that the apps their children were using required online accessibility. Adi stated they were always aware of what their child was watching, Penny that Netflix required online access to work and Jessica said that all devices utilised the internet, but they did not engage with YouTube or YouTube Kids. The awareness of the need for some form of parental control over online access was reassuring to parents.

Two out of three parents stated that they did not allow their child to play online

games, mainly due to them being age inappropriate, or requiring advanced digital skills. Adi maintained that her son was *"too small for video games"* and therefore she does not *"let him play games."* Penny similarly stated, *"I have thought about it but like I don't know some of the games they're either like not age appropriate, or they're just like too babyish, or they can't do it."* The importance of parental awareness of their children's online activities was paramount to the parents of Centre B.

4.3.4.3.4   Control of exposure to inappropriate content

No educators commented on children being exposed to anything inappropriate in the classroom, citing effective classroom management strategies. Two of three parents however, discussed inappropriate content and the strategies they employed to pre-empt exposure. Adi stated that although she was unaware of her child accessing anything inappropriate, she admitted that *"...he has gone into, not inappropriate things, but just like scary.*" For example, Elliott sometimes watched Spiderman, which she thought may be *"a bit too advanced for him"* and therefore *"sometimes we feel is not a good idea.*" Adi additionally stated that the auto-play function on YouTube allowed videos to pop up that were not originally selected. She understood that children *"learn how to search them, do this and then the next thing I can be like, what are you watching?"*

The screening of apps on the iPad was a mediation tactic employed by one parent. Jessica stated that while *"we don't put a lock on it, we just hide it…it's a sole iPad for her. So, we've deleted everything and it just has Disney Plus, which has the M rating filter on it anyway. And ABC kids on there she can watch."* She added that this was enough to disallow her child from stumbling upon anything inappropriate.

4.3.4.4   Children: Effects of digital technologies

The influence of digital technologies on children was manifold according to Centre B participants. This section now addresses the interconnection between digital technologies and children's digital skills, digital literacy, attention span, social interaction, behaviour, and digital games as described by the adult participants of Centre B.

4.3.4.4.1   Digital skills

Discussion surrounding children's abilities to navigate on digital devices was common throughout the interviews. All three parents described their children's digital skills. Adi explained that Elliott knew how to skip advertisements, swipe, and scroll on the phone, but had not yet learned how to turn the television on or off. Penny stated that their child was not

yet able to navigate the phone except for scrolling. She said, in relation to Netflix, *"he needs like a little bit of help, but he knows. He knows how to like scroll through them."* Jessica said that Faith was *"…really into taking photos at the moment. And making videos and stuff like that".* Jessica noted that Faith was demonstrating increased hand eye coordination, increased vocabulary, and an increased imagination as a result of her digital engagement. Faith engaged in imaginative play, using characters from shows as her inspiration. Her mum stated:

> *you'll find even when she's playing on her own now, the things that she watches or has been listening to. She brings that into her play. Her imaginations really gone wild at the moment, so, I feel like that's a big contributor.*

Each of these emerging skills contributed to children building up their digital literacy to more deeply understand how to operate digital devices.

4.3.4.4.2 Digital literacy

Educators were aware of the children's increasing digital literacy. They commented on children *"clearly having devices at home"*, and that *"they can work it out for sure."* Rachel stated that children knew what technology was by the time they commenced at the centre, and both stated that children knew what iPads were and had a good knowledge of what and how they were used. Specifically, Rachel said, *"they know what a digital, iPad, technology is."* Chelsea added that children were confident to interact with the centre devices when given the opportunity. She said that when she engaged with the iPad in front of the children, they would make comments such as, *"o*h, I've got that on my iPad', or 'I know that."*

Children's digital literacy builds when they are exposed to and given opportunity to interact with digital technologies. Children understood the digital skills they possessed and could hold conversations with adults about the content they wanted to engage with, or the type of device they desired. Furthermore, their digital literacies were also be affected by their educators or parent's digital literacies, as they watched, modelled, and learned digital behaviours from them.

4.3.4.4.3 Attention span

One educator commented on the effectiveness of digital technologies in maintaining children's attention span, in comparison to more traditional methods of teaching. Rachel said if you read a book in the classroom, *"…they sort of start losing interest…but if you put a TV on"* they remained engaged for longer. The parents however suggested that digital devices

did not significantly lengthen their children's attention span. Adi stated that Elliott could not necessarily sit for any length of time when engaging with digital content. For example, if he was watching a show with a character he liked in it, he wanted to act and dress like the character and immediately be up and about doing so. She said *"...he's not one that's just glued to the TV.*" Jessica stated that Faith's attention span was similar on devices to when they read books, and the attention span on digital technologies depended on parent involvement.

4.3.4.4.4   Social interaction

Social interaction was encouraged through imaginative play facilitated by digital technologies. For example, educators commented on children using recycled keyboards and pretending to write their name or using a wooden block as a phone. Rachel said, *"…you might see a kid walking, pacing, talking, pacing ... So, role play is a really big thing to use technology."* Penny also said that digital technologies encouraged role play, and the children would often ask for time to interact with digital technologies.

Parents commented both positively and negatively that digital technologies affected children's social interaction. Adi exclaimed that Elliott always wanted his parent involved, and digital technologies occasionally acted as a conversation starter. Elliott *"wants us to be involved, whatever he's watching."* Adi also said that they had tried to explain to him the danger of too much time with digital technologies, but Elliott did not yet understand the concept.

Social interaction can also be hindered by digital technologies in that children often chose to engage with a screen over peers or teachers. Chelsea stated that children could become insular (*"they would rather do that than go and interact with anyone else"*), and that educators and parents need to be purposeful in making sure children learned face to face human interaction as well as screen interactivity. The mediation of digital technology time in the centre was in effect to *"make sure they have a little bit of normal interaction with humans rather than just on the screen."* Jessica also stated that digital technologies hindered parent to child interactions, and that it could be more difficult to interact when the child was spending time online. She added that it became hard to talk to her whilst she was engaged with digital technologies and you have, *"...to call her name a couple times or wave your hand in front of the iPad."* Lastly, Moses had learnt to sit down when the television was on, which according to his mum, was rare. Penny said occasionally Moses will *"zone out completely."* Social

interaction was often intertwined with children's behaviours, and each type of behaviour required different mediation strategies.

4.3.4.4.5 Behaviour

Educators did not specifically comment on children's behaviours in relation to digital technologies. This may be due to the limited exposure that children had while in the classroom. Parents however noticed a behavioural shift when their child engaged with digital technologies. Most unacceptable behaviour occurred when digital technologies were switched off. Adi said that when her child got upset, they would have to try *"and do something else and distract him."* Penny also stated that Moses became unreasonable when the television was turned off but he better managed his behaviour when allowed to turn the television off himself. Behaviour both affected digital technology use and was affected by digital technology use.

4.3.4.4.6 Digital games

Jessica allowed Faith access to four games on the iPad purposefully upload as educational apps only. She said the four games involved *"puzzles and problem solving… so they're all just matching the shapes or matching the colours together, and just like counting and letters and stuff."* No other parents or educators commented on digital games.

4.3.4.5 Children's perspective

The children were able to share information relating to the digital technologies in their homes, and two of three children were able to demonstrate their digital skills. However, overall, the children of Centre B shared a limited perspective, and their understandings may not be represented fully by the following.

4.3.4.5.1 Digital technologies in the home

Each child identified the main digital technologies they engaged with. Elliott watched Spiderman on both the television and the iPad, and sometimes on his parents' phone. Elliott loved Spiderman, as evidenced by answering *"yep!"* to each of the three questions, *"do you watch Spider Man in the morning? Do you watch Spider Man in the afternoon? And do you watch Spider Man at night time?"* There were multiple children in the conversation, but Elliott maintained his interest in the topic and answered the questions.

Moses, the second child, both watched shows and played games. Moses explained that he enjoyed the *"doggy cartoon"* and that he watched it with his brother. He said, in

response to the question, *"do you play any games on mummy's phone?", "yes! A big boat"* and *"it's easy"*. Faith, the third child, talked about the "*TV*" and playing games on the iPad. When asked "*what's on your iPad?*", she said *"everything"*. She also talked about watching things on the iPad with a friend when they came to visit their house.

In at least in two households, digital technologies were engaged by more than one person at a time which may indicate that some devices or content encourage social interaction. Each of the three children enjoyed access to digital technologies in both their home and education contexts. They however only commented on their in-home use.

4.3.4.5.2   Digital skills
Elliott communicated that he knew how to turn the iPad on, but that he did need his parents help *"cause it's a big iPad"*. Both Moses and Faith demonstrated their digital skills during the observation of their classroom, however, neither spoke about their digital skills in any capacity. The digital skills that children addressed was not assumed to be indicative of the digital skills they possessed.

4.3.5   Summary
In summary, Centre B was and had a restricted budget for expanding digital technologies. They did however make daily use of the devices they had. The observations revealed digital technologies being utilised in both classrooms. For example, iPads were used in both classrooms for different purposes and were always educator facilitated and demonstrated that educators could operate the minimal devices effectively, using digital content to their advantage as a teaching tool. Overall, Centre B used iPads, stereos, headphones, and Bluetooth speakers, which were all managed in a safe way by the educators. Online safety was not an obvious priority for the director and educators, perhaps because the centre had yet to increase the number of devices used with children directly.

In the context of this study, Centre B was most logistically affected by the pandemic whereby more restrictions were imposed on what visitors and parents could do at the centre, and all extra-curricular activities for the children were stopped. The director also mentioned that while they desired to gain insights from local primary schools in how to better transition the children, the development of the program had been on hold during the pandemic. There was a general acknowledgement that the centre educators needed and wanted to be upskilled in their digital literacies. Additionally, the director was interested in undertaking research into how other centres were using digital technologies.

The three Centre B parents were fluent in the use of digital technologies and an array of mediation strategies were being utilised. The three Centre B children were able to identify the digital technologies they engaged with, and this was largely confined to mostly watching digital content. It is possible that if the centre possessed a digital technology policy and a greater range of digital technologies, children could engage with greater independence, and more consideration given to safe and positive online interactions.

4.4   Centre C

Centre C was the only case to be connected directly to a primary school and was located on the same site. The school was a co-educational, interdenominational Christian primary school catering for students from kindergarten to year 6. There were three early years learning studios which included children three to five years of age. The walls between the classrooms were retractable, therefore each educator moved across classrooms as necessary. The director, Rebecca, moved freely to provide supervision to her staff, as well as for face-to-face time with the children. There was a designated shared educator office, which was connected to the resource room and a private kitchen and dining space. Accordingly, there was no physical division between educators when they used the space for planning, resource development, communicating with parents or having a break. The kindergarten was under the leadership of the primary school with policies and procedures imposed from above, and the kindergarten staff were included in the full school staff meetings.

The classrooms were modern and large, and offered a variety of activities for the children including digital technologies as well as non-digital options. The school was privately run and consisted of children from mainly affluent households with a high proportion of international students. Each classroom was at maximum capacity and there was a waitlist for enrolment, indicating its high demand.

The SEIFA rankings for Centre C are presented in Table *4.5* below, which indicate that it was in a higher-than-average socio-economic area with relative social advantage. Notably, the score sat below average in terms of economic resources, but, higher than average with its education and occupation index, and sat in the top 20% for decile rating.

Table 4.5. SEIFA rankings for Centre C's suburb

SEIFA Indexes	Score	Decile
Index of Relative Socio-economic Disadvantage	1038	7
Index of Relative Socio-economic Advantage and Disadvantage	1050	9
Index of Economic Resources	948	2
Index of Education and Occupation	1077	9

The centre focussed on creativity, achievement, respect, and compassion for others. The early learning studios had play spaces with a focus on water play which encouraged children to engage in imaginative play. The kindergarten and pre-primary classrooms incorporated elements of digital technologies for both staff use, and for staff to use with children to develop their skills and understanding of devices, and digital content knowledge. The classrooms relevant to this research included the use of SMART interactive whiteboards, iPads, laptops, iPhones, Bluetooth speakers and a projector with screen.

4.4.1 Participants

There were nine participants in the Centre C centre: one director, two educators and three parents and their children. All adult participants were middle aged and female, and each had a specific interest in digital technologies. All three educators were eager to upskill in the area of digital technologies, and two out of three parents were liberal with their digital technology use. All parents implemented strict mediation of digital technologies with their children. Two out of three children demonstrated their digital skills in the classroom when they interacted with iPads, while the third child was able to explain what they understood about interacting with digital technologies. Table *4.6* provides a brief overview of each participant.

Table 4.6. Centre C participant descriptions, including interview dates and location

Role	Pseudonym	Interview Date	Interview Location	Overview
Director	Rebecca	24/11/2020	Resource room with interview chairs set up	Female. Educator with over 10 years of experience. Director for two years. She herself was a mother and valued digital technologies for both in centre use as well as in the household. She appreciated her educators understanding how to operate devices in the classroom and had a goal to introduce more into the centre.
Educator One	Kim	24/11/2020	Resource room with interview chairs set up	Female. Highly experienced educator who had had a few years off prior to interviewing due to having children of her own. She held the capabilities of digital technologies in high esteem and looked to use them with the children as often as appropriate. She researched heavily to understand how to use devices in a healthy and balanced way.
Educator Two	Laura	15/06/2021	Resource room with interview chairs set up	Female. Room leader who had recently returned to the workforce. She was eager to learn how to operate devices effectively and admitted that sometimes the children helped her with the interactive SMART screen and iPads. She provided a wealth of knowledge in the classroom, and desired to expand her digital literacy for the children's sake. She

				also understood the need to communicate digitally with parents due to the pandemic.
Parent One	Tanisha	26/02/2021	Primary school classroom / parent workplace	Female. School teacher, and a parent of seven children. She promoted the use of digital technologies in a managed way, and with the age of children in mind when choosing digital content. She promoted other activities over digital technologies when possible. She herself used digital technologies regularly. Lastly, she was not aware of what digital technologies her child interacted with in his classroom.
Child One	George	25/03/2021	Classroom one	Male, four years of age. Youngest of seven siblings. He was allowed access to the iPad, sometimes watched television, and explained that his older siblings sometimes let him do whatever he wanted on devices. He was able to demonstrate his competency on the iPad during observations.
Parent Two	Christina	05/03/2021	Resource room with interview chairs set up	Female. Was an early years educator herself and did not think that digital technologies should be used by children of three and four years of age. She allowed few digital technologies in her home.
Child Two	Raine	15/06/2021	Classroom two	Female. Only child. Confident four-year-old girl who knew what digital technologies were but wasn't allowed to use them much at home. She was able to explain her favourite shows, and a few of her household rules of what she wasn't allowed to watch.
Parent Three	Wanda	19/03/2021	Offsite café	Female. Passionate about the merits of digital technologies. Mother of two who used digital technologies a lot herself and accepting of them being used in her son's classroom. She did however manage the devices closely and protected her children from accessing digital content freely.
Child Three	Harry	15/06/2021	Classroom three	Four-year-old boy. Youngest of two children. He competently explained his digital skills and what digital technologies were present in his life.

4.4.2 Desktop audit and digital technology policy

The desktop audit undertaken in March 2020 revealed no images of digital technologies across the centre's website. There was also no mention of digital technologies being used in the classrooms as a learning tool, or any other reference. The website allowed anyone to submit online queries, and an administration contact email address was provided but there was no reference to a digital technology policy or initiatives evident.

A second desktop audit was carried out in April 2022 to determine if any new information pertaining to digital technologies, digital content, digital technology policies, or imagery had been added to the website. Significant changes were noted with the inclusion of multiple pages and information to parents and community about online learning, a virtual

walk through of the school site, support links, a Privacy Policy, an Early Learning Parent Handbook, and a Covid-19 response page.

The website provided links for parents including: 1) a Common Sense Media guide, 2) an eSafety online safety guide for parents and carers 3) an eSafety guide mobile apps, 4) a Seesaw link and 5) a link to eSmart Schools. The website emphasised that the centre used many different apps and platforms to support learning and for communication between the centre and families. Specifically, Centre C promoted the use of Seesaw which was stated to offer powerful learning loop between students, teachers, and families. The eSmart Schools link was prefaced by the statement that it supports schools in developing a culture that promotes smart, safe, and responsible use of technology. Centre parents could access these links through the school website, as Centre C did not have its own site.

The website also included a Privacy Policy, which had been last updated in February 2019 but published online between March 2021 and April 2022. It included material on how the school used personal information, a clause on photos, images and video, management and security of personal information and data breaches. However, the policy did not reference the types of digital technologies used onsite, or for what purposes. Lastly, an Early Learning Parent Handbook had been published for 2021 and 2022. The handbook included the following information in relation to digital technologies:

- an image of a child using a light table,
- a Code of Ethics referencing the security of information about children, particularly when shared on digital platforms,
- reference to methods of assessment including digital portfolios,
- information on parent communication stating that in addition to whole school communication, the Early Learning Centre provided area specific information via email or through Seesaw,
- general information on preparing for kindergarten, which advised parents to keep television viewing to a minimum during the week and exclude viewing before school, and
- a short summary stating that when children used technologies or computers, they were learning about how machines work, practicing hand eye coordination using the mouse, learning the processes necessary to use technology and learning how to express ideas through technology and share ideas with others.

These inclusions demonstrate the growing use of digital technologies, especially in terms of the centre using them for operational and information sharing purposes. A digital technology policy was still lacking, and there was no mention of digital professional development for educators in a list of PD opportunities for staff. When asked if one existed, centre director Rebecca replied, *"we don't have one at this stage."* Instead, informal and unwritten centre guidelines dictated the use of digital technologies in the classrooms.

4.4.3   Observations: Centre practices

A number of observations of the three Centre C classrooms were undertaken, each including one of the focus children from the centre. Observations were carried out with the objective of observing the children interacting with digital technologies of any kind, and in some cases, the educators were also observed interacting with digital technologies. Each classroom had a specific combination of permanent digital technologies, with the older children (four- and five-year-olds) having access to the largest number of devices. The observation findings are as follows.

4.4.3.1   Classroom one

Classroom one included the interactive SMART board, and multiple iPads accessed by the children during supervised periods, and educator laptops and iPhones. In addition, educators explained they had access to Beebots which they used occasionally depending on the children's digital skills and abilities at any point throughout the school year. At the time of observation, the interactive SMART board was being used to play background music while the children moved between activities. Another educator explained that the SMART board was sometimes used to watch videos and to assist with research. During the observation, children were completing an art session followed by a facilitated mat time that included a story (Figure *4.16*), and then a session where they could choose to use the iPads if they wished. There were eight iPads set out as a provocation station which were used on rotation until the lunch break. George, focus child one, was present in this classroom.

Figure 4.16. Children in classroom one engaged in mat time activities

George was an active and conversational child who was able to explain how he played the iPad game (Figure *4.17*), and what he could do with the device. He demonstrated skills such as dragging and dropping, counting (*"give teddy nine Easter Eggs"*), talking and interacting with the iPad and then with the educator when he was asked questions. He encountered a couple of challenges while using the online counting game, stating, *"I can't read the numbers"*, and urged me to help him read the instructions. He repeatedly failed but persisted without appearing frustrated at each attempt. Lastly, when the educator asked all the children to put their devices away, George knew how to close the app, switch the device off and put the iPad away with its cover closed without being prompted.

Figure 4.17. George playing a counting game on the iPad

4.4.3.2 Classroom two

Classroom two included the same digital technologies as classroom one, as well as an overhead projector (Figure *4.18*), and a recycled digital technologies corner for children to role play with (Figure *4.19*). This classroom had more space for additional provocation stations, and the children were of four and five years of age.

Figure 4.18. Projector for educator use in classroom two

Figure 4.19. 'Technology corner' in classroom two

During the observation of the second classroom, there was a provocation station set up with six iPads (other stations included robot making, jelly and play dough). Each iPad was loaded with pre-approved apps including Writing Wizard, Book Creator, PicCollage, Stop Motion, codeSpark, Kodable, ScratchJr, Tickle and Box Island. Children were allocated 30 minutes on the iPads and were allowed to choose apps independently. When asked, the children at the station answered questions about their favourite television shows as Bluey and Rainbow Sparkles. They all said they used mummy's phone for reading and learning, Reading Eggs and to watch cartoons. Raine, focus child two, used Book Creator throughout the observation.

Raine came from a household that did not engage readily with digital technologies, and this was evident through her interview. She was not able to explain, in any detail, what digital skills she held, or the capabilities devices offered. She was, however, eager to use the iPads when they were offered in the classroom and explore the apps before deciding on a creative application. Figure *4.20* shows Raine engaging with Book Creator on the iPad.

Figure 4.20. Raine engaged with the application Book Creator on the iPad

4.4.3.3   Classroom three

Classroom three included a limited number of iPads, educator laptop (Figure *4.21*), Bluetooth speaker (Figure *4.22*), and an interactive SMART board.

Figure 4.21. Educator's laptop and phone in classroom three

Figure 4.22. Bluetooth speaker in classroom three

On the first day of observation, the children watched a 25-minute episode through the ABC Kids application on the SMART board (Figure *4.23*). To achieve this, the classroom dividing wall was pulled back and two kindergarten classes combined to watch the digital content.

Figure 4.23. Children watching the ABC app on the SMART board in classroom three

During the second observation at the centre, the children of classroom three attended their music lesson (one of two per week) in a different classroom. The music classroom included an amplifier (speaker), an educator laptop to play the music (connected to the speaker), an interactive SMART board and a classroom phone. During their lesson, the educator told a story about two best friends and when she asked the children '*what do you think the two friends talk about?*', they stated (without prompts) *"Mario Kart"* (classroom child), *"Nintendo Switch"* (classroom child) and *"Mario World'* (Harry, child three).

Harry, the focus child in this classroom, was a confident, involved and technically literate child. He asked many questions during the class and was engaged in all the different activities across the day. He was able to explain that his house had a television, a Nintendo Switch, and an iPad. He also talked about the shows he watched, such as Play School and Andy. While the observation did not include Harry interacting with devices, his interview provided detail of Harry's perspective on digital technologies.

4.4.4 Interviews: Themes

The key themes that emerged from the interviews are as follows: 1) presence and use of digital technologies, 2) educator and parent attitudes towards digital technologies, 3) mediation strategies to ensure safe and positive experiences for children using digital technologies, 4) the effects of digital technologies on children, and 5) the children's perspectives of digital technologies and their digital skills. The data was collected during Covid-19, as with each other of the three centres.

Centre C participants were sensitive to the effects of the pandemic They understood that it had affected the way the centre operated, and the way the director and her educators utilised digital technologies. Interactions with parents through their online platform had increased significantly, and face to face contact was limited over the course of data collection. The director, Rebecca, acknowledged that parent interaction through Seesaw had increased over the past year due largely to Covid-19. For example, the director was having to provide more detailed updates to parents over email. She specifically mentioned that, *"...it takes time using digital, having to email parents at the end of the day, it takes longer than just a face-to-face conversation about something that's happened. I've got to think about my wording..."* She reiterated the uniqueness of the Covid-19 context and commented on not seeing parents as much face to face due to parents not being able to come into the classrooms. She added, *"...this year's been, like I said before, unusual. I don't see a lot of parents this year.... Because we had quite strict rules with like coming on campus up until this term."*

Both focus educators mentioned the impact of the pandemic in terms of digital technologies usage in the centre, and that communicating with parents was made easier through digital means. Laura stated *"...when we were in lockdown, and we were doing everything through Seesaw, I was inundated...with questions... How do I do that? I'm like, oh, I'll just find that out and then I'll tell you!"* This underlined the rapid changes faced by educators having to learn how to operate digital technologies so that digital communication

with parents would be most effective. Kim said that the children also learnt how to communicate digitally, sometimes sending videos of themselves. She said that with Covid, they moved to online teaching and for six weeks, *"we recorded ourselves, and then posted it on Seesaw."*

Tanisha, the first focus parent, was the only parent to raise the issue of Covid-19 encouraging the use of the internet, especially to access to online books. She said, in relation to a book app called Epic, *"towards the end of the year because of COVID, I didn't see many reading books so the Epic is good because then you get a whole range of books."* She reiterated the notion of digital technologies changing constantly and said children *"…really do need to know [about the internet] by about year five and six. But they also need to learn to adapt and to change because everything's changing all the time".* While she acknowledged that digital technologies have become more prevalent now, largely due to Covid-19, she explained that digital technologies should not necessarily be used at this age. Christina, parent two, suggested that limiting digital technology use for her child was no different to what she grew up with, and that unless her child was going into an information technologies role, it was not something she needed to know. Lastly, Wanda acknowledged the changing modern world, saying, *"when I look at the way that the technology is used, people being really savvy on computers, it is the way of the future."* With all participants commenting on the nature of the changing times, not only because of the pandemic but with constantly evolving digital technologies, it adds weight to the need to undertake an audit of digital technologies in early years centres. The following outlines Centre C participants digital engagement at the time of data collection.

4.4.4.1 Digital technologies: Presence and use

This section outlines the digital technologies used by the participants of Centre C. It includes: 1) digital technologies in the centre (including digital technologies with online access and desired digital technologies for the centre), 2) the intersection between the centre and the home (including parent communication, parent involvement and parent expectation), and, 3) digital technologies in the home.

4.4.4.1.1 Digital technologies in the centre

Each Centre C classrooms had equal access to the digital technologies available within the centres digital technology resource base. For example, if an educator decided to use the interactive SMART board, they could request it for their classroom. Digital technologies

available across the three classrooms included educator iPhones, educator MacBooks, iPads, interactive SMART boards, Beebots, digital cameras, a light table, Bluetooth speakers, and a recycled digital technologies corner. Both the director and educators stated they like to encourage children to interact both with devices, each other and with the educator. Kim, stated that they had previously used a light table, saying they had used it to *"look at x rays and things like that."*

Educators were provided with iPhones, MacBooks, and iPads for their own independent use, as well as for use with the children. The iPhones were used to take photos to be added to Seesaw, and to connect to the Bose Bluetooth speakers to play music. Kim said, *"...we've got iPhones that we actually use in the class to take photos to connect with Seesaw which…is like digital e- portfolios and things like that."* She said, *"previously, we had iPads, but the quality of the photos and things like that was not as good. And even the recording kind of had lags. And it wasn't as clear."* Rebecca stated that the digital technologies used in classrooms dictated the room layout and consequently where the educators situated themselves in the classroom. For example, educators previously had desktop computers, but the move to MacBooks warranted the removal of permanent desks in the classrooms. The MacBooks were used by educators for programming, communicating with parents through Seesaw, and personal research.

The iPads were used to capture and magnify images, watch videos, listen to songs whilst watching the actions, interactive games, educational apps such as Kodable, and watch Play School episodes on ABC Kids. In most cases, videos were selected to reinforce the curriculum focus at that point in time. For example, allowing the children to watch ABC Kids helped reinforce their understanding of the topic. Laura stated, *"a playschool episode that does talk about where I belong, I belong in my family, I belong in my community, and it talks about how culture and all that sort of thing, influences you know, where we belong."*

The interactive SMART board was used for several purposes like the iPads. In addition, it offered a larger screen so more children could gather around to watch shows, as well as interactive applications such as counting and phonics games. Kim stated that the children often labelled it as a television. She also used the interactive SMART board with the children in her classroom for research. She noted that the SMART board could be *"integrated with things like math activities and doing things that are more interactive games, of researching things like showing photos of different, things for art projects, or, trying to get real life examples of things."* Laura reiterated the value of education shows and sometimes

used the interactive SMART board to play it through. She admitted that she only *"discovered partway through the term [ABC] has a brilliant series on there."*

Both educators also commented on the Beebots available to the children, however they had not yet used them at the time of interviewing. The Beebots were made available only to classroom one and two, which included the eldest children before they transitioned to primary school. Importantly, the Beebots required skilled educators to facilitate children's learning, and Laura said, *"the ICT teacher in the school actually came into the classroom and taught me and taught the children…how to use the Beebots."*

Lastly, Centre C also had a recycled technologies station. Kim talked to the stations, saying they included, *"computers that no longer work to give exposure to that role play. And they roleplay with different things that are maybe antiquated, phones and cameras, all that sort of stuff."* The aim of these stations was to make children aware and exposure them to different types of digital technologies. The combination of all the digital technologies at Centre C gave the children a range of choices and opportunities to practice of their digital skills. Importantly, the centre had room (spatially and within the educator's ambitions) for more advanced digital technologies, beyond what was currently in use.

4.4.4.1.1.1 Digital technologies with online access

Rebecca was aware that the devices they used required online access including the laptops, iPhones, and SMART board. She was aware that with online access, children could potentially navigate out of a supervised activity or application, into another. She however reiterated that children would usually ask for her assistance, saying the digital screens, *"are connected to the internet. But they generally, if they click out of something, they'll just be like, 'oh, Mrs. [Name], this is gone funny."* The educators relied on online access and supervised any use of online connectivity capabilities with the children.

4.4.4.1.1.2 Desired digital technologies for the centre

While Centre C extensively incorporated digital technologies in the teaching and learning context, Kim mentioned that the next step would be the incorporation of technologies usually used with much older children, such as 3D printers. Laura highlighted the different expectations of various age groups. As she was new to teaching younger children this year, she needed to utilise more age-appropriate content, and to find more digital technologies that three and four years olds could also operate. She also noted her desire for upskilling her digital technology skills through professional development, stating *"we haven't done PD*

within school." She noted the need to source training outside of the centre and cited her participation in Apple courses which focussed on the 'how' to operate their technology.

4.4.4.1.2 Intersection between the centre and the home

Rebecca made every effort to communicate with parents and understand their home context. She was able to ascertain information on children's digital technology use and literacy when children explained how they spend their free time, and when role playing characters of shows or games. She acknowledged that sometimes during an orientation meeting with parents and she asked about the child's interest, parents would say*, "the iPad, or a game that's on the iPad or something…without saying too much that kind of tells me maybe how much time the children spend on technology."*

Rebecca stated that conversations with the children sometimes revealed the digital content children interacted with at home. She noted *"certainly, like I have had one of the girls in my class say, 'oh, I was allowed to watch that, and I'm not allowed to watch that now"* and *'when I get home from school, my mum sets a timer, and I can have 10 minutes."* Kim also acknowledged that some children used more digital technologies at home than others. Although hard to measure, she stated that often when a child engaged with digital technologies, it was to the detriment of other learning opportunities. Knowing the types of digital technologies children interacted with at home may have informed decisions surrounding the content shown in the centre. Conversations with provided insights into how long or what devices they engaged with at home, and therefore, educators were informed as to the nature of children's digital literacies at the intersection between the centre and home.

4.4.4.1.2.1 Parent communication

Kim acknowledged that conversations with parents were important but that sometimes it was difficult to offer advice. Kim acknowledged that educators needed to be *"a lot more deliberate and focused on how we use it [digital technologies]"* and that *"...sometimes it's hard to know what to say to people because there's so, like so much division among. I'm wanting to make sure I say the right thing."* She noted that most communication with parents came from the centres leadership, or school-wide communication when parents inquired as to what appropriate digital exposure might be.

Digital communication with parents, both inside and outside working hours, were mentioned several times during the director interview. Rebecca used Seesaw and Outlook as the main methods of communication with parents, aside from face-to-face communication.

She said, *"...we use Seesaw to like take pictures, stories, videos, whatever, of certain topics or things that we're doing throughout the week, achievements of the children."* She added that as well as parents being able to message educator through Seesaw, they also emailed so educators needed to check both regularly. However, educators agreed that, *"Seesaw has become a communication tool."*

Laura said she had little to no personal communication about digital technology with centre parents, except once when she was asked if she had an opinion on screen time limits. She responded to the parent that there were *"...recommended guidelines, you can go online, it depends where you look, the less the better. Some say no screen time until they start school, but I don't think that's very practical because their parents are on screens all the time."*

4.4.4.1.2.2 Parent involvement

According to both educators, centre parents rarely asked about digital technology use and were unaware of what was being used in centre, except for one minor example. Laura explained that the interactive SMART board had been noticed by one parent and she was once quizzed on how often the device was used in the classroom. Laura stated that the device was rarely used, and that she *"did not have access to it all the time."*

Kim stated that perhaps parents thought digital content was just a digital version of what was traditionally used. For example, when asked, *"...so parents, do they ask you about what is being used in the classroom?", she answered, "not really."* Laura answered similarly, *"no, I probably have to say no to that."*

Two Centre C parents commented on the digital technology used in the centre, both admitting to having no knowledge of what was used in the classrooms. Tanisha admitted, *"I wouldn't have a clue what they're doing!" and "no, I never ask!"* She hoped that they did not use digital technologies, saying, *"no, I don't know if they do [use technology] ...I don't think they even do...I hope they don't!"* She noted that Seesaw updates did not show children using devices and said, *"...I don't think that they are on technology, we get pictures of what they're doing throughout the day and they're on Seesaw, so it doesn't look like they're on technology and if they were then I'd be like asking why."* Christina also did not think that children used technologies in the centre but admitted it would become more prevalent as they got older.

4.4.4.1.2.3 Parent expectation

Rebecca revealed feeling pressured by the centre parents' expectations, amongst all the other requirements of being a director. Parents expected constant updates of what their child was

engaging with throughout the day, which required the educators' taking photos, uploading them, and providing an accompanying explanation. Rebecca stated, *"I don't have time to upload pictures of the kids and write a story about everything they're doing every day."* The unrealistic expectation of constant communication possibly connects with the view that digital technology usage needs to be balanced and appropriate in the education context.

4.4.4.1.3 Digital technologies in the home

Each household included differing levels of digital technologies. The first parent, Tanisha, identified an iPad (with ABC Kids and games such as Reading Eggs, Mathletics and Epic), phones, and a TV (pre-downloaded movies and Foxtel) in her home. She stated that her son George had, *"the ABC kids or he's got some games online, or downloaded movies."* Sometimes George accessed YouTube. Tanisha said, *"sometimes he'll go on YouTube, if they [older siblings] put it on and I'm around and I'm watching"* and the siblings also usually watched a movie together on Friday nights. She stated that George did not watch mainstream television, *"generally they're just watching a DVD."*

Christina stated that Raine watched television (STAN, Netflix, Disney) and used a parent's phone. She stated that Raine will, *"watch a little bit of TV mainly on the weekend. Sometimes as a treat she might have 20 minutes on my phone playing like Reading Eggs or something educational."* Raine did not play games, and mostly watched Paw Patrol, Doc McStuffin or Barbie movies. Christina was *"not a massive fan of them but you know, like, there's only so much Paw Patrol you can watch!"* She also commented on a tablet they had in the home that was not being used. She added that she was *"not very good with technology so I locked myself out of it."* Lastly, Christina noted that Raine had a camera with a digital game installed on it. The camera *"does have a couple of games on there that she does play like a little fish and she's not quite figured it out yet."*

Lastly, Wanda stated, *"in terms of digital technology, it's the TV, the Switch and iPad."* Wanda's child Harry used the iPad, where everything was pre-approved and mirrored her phone (shared between siblings). The iPad included access to Disney and other iPad games (playschool app) which included advertisements and popups, so the parents bought a Nintendo Switch to circumnavigate advertisements. They also had a television (Disney Plus, Netflix, ABC Kids) and the children sometimes accessed the parent's phone.

4.4.4.2   Attitude: Towards young children using digital technologies

Centre C participants attitudes towards young children using digital technologies revealed positive and negatives. The number of positives slightly outweighed the negatives, however, concerns were expressed as an extension of the negatives. Importantly, adults looked upon digital technologies favourably, provided they were mediated successfully.

4.4.4.2.1   Positive aspects

Rebecca mentioned that digital technology use in the centre was usually additional to the home context. Furthermore, she was aware of the different access children had to technologies in their homes. She acknowledged *"…at our school we do have families that have quite strong beliefs in around technology use and are definitely monitoring the use of children on technology."* She explained she was aware that some children were not allowed to watch anything on the television after school while there were other children who *"can do whatever they like… and some parents are quite strict about it."* She reiterated the importance of the centre knowing what was going on in the home context when she said, *"I'm mindful of using too much technology time in the classroom because I'm not sure how much technology time they might have had before school or after school as well."* Rebecca commented that the availability of digital technologies in the centre may influence parents. For example, parents who do not widely use digital technologies in their homes may appreciate digital technologies featuring less prominently in their child's education setting. She said that digital technologies were introduced progressively across the year as a "*good stepping stone, especially for those parents who aren't particularly keen on a lot of technology use*."

In terms of digital skills, Kim acknowledged that a lot of the children in her class held more knowledge than adults when it came to operating digital devices, and the increased use of devices in the classroom was mainly enabled by educators' skill and preparedness. Kim allowed children access to digital technologies with supervision. Laura understood that children knew how to use digital technologies, and that educators had to keep upskilling to be useful in helping children engage with devices. She said *"I know the minute you turn it on they know so much more than you! And you're constantly behind the eight ball!"* Laura added, *"they're digital natives, it comes easily to them. I think, why not encourage it?"*

Centre C educators stated that children should be allowed access to digital technologies as part of their education but stipulated that online digital technologies always required supervision. Centre director Rebecca said the presence of digital technologies could

be beneficial to children, while Rebecca said, *"I think it has its place in the classroom, it definitely can get children who are not really interested in learning like numbers and things."* Laura added, *"I think there's definitely a place for it. And I think it's important, and I think we should probably use it."* Rebecca and Kim both spoke of balance when using digital technologies. Kim said, *"I guess that by exposing them from a young age with guidance, I feel that it becomes something that they're more familiar with and more fluent with."*

While Kim recognised that online communication was an effective way to connect, she stated that she was more confident using devices in the classroom that were not connected to the internet. During lockdown, children and educators connected via Zoom and represents an example of the rapid shift to digital technology. She maintained a positive attitude toward digital technologies for connecting with others and used Zoom for parent teacher interviews. Kim added that digital technology, *"should be used for purposes that aren't already met."* In this case, online communication platforms performed well in the absence of face-to-face communication and represents the purposeful utilisation of digital technologies.

Tied to their opinions, both Kim and Laura recognised the value of digital technologies. Kim stated that they aided understanding, increased ability to do online learning, allowed parents and children to send videos to teachers, children were already familiar and fluent, and presented a good way of connecting and communicating. She noted that children learned to utilise digital technologies like learning to speak, adding *"I think they become, native speakers of that language... that's what they grew up with, from the moment they were born, there were people, with phones, taking photos of them, doing facetime and other things."* Laura stated that children needed to develop their digital skills, under the supervision of their educators, as part of the curriculum. She added, *"...we should probably use it."* She also noted that because their parents were on screens, children were inevitably exposed to digital content, therefore making it impossible to avoid.

Another positive was that digital technologies occupied children when parents required extra sleep, time to do chores, or relax. Christina's main positive was for extra sleep (*"I just want to have a little sleep"*). Tanisha said they, as parents, were aware and intentional with digital technology use. Wanda said their child loved technology time, as evidenced by him being highly engaged and sitting still when interacting with devices. Wanda said digital technologies had a place in their home, *"... on the weekends they're just wanting it, or they prefer it over anything else."* Her children enjoyed interacting with digital technologies, and

when managed appropriately became an enjoyable family activity. Wanda added that they used digital technologies to create weekly family nights, where they either watched a movie, played Nintendo, looked at photos or watched home videos. She did caution, however:

> *...we try not to glorify it too much in our house. But nor is it, you know, we don't demonise it either that they can't enjoy it. It's something that we all enjoy, really it's the length of time and I've got lots of controls over what they're watching.*

Wanda stated that children ultimately needed to know how to use digital technologies and that exposing them earlier took away some the mystery. For example, she allowed Harry to use the camera so that he could learn how to take selfies. She added that parents who understand the internet can use it to their advantage in parenting. All of these positives indicated that educators and parents generally looked favourably upon young children using digital technologies. However, they also recounted negatives and voiced concerns with young children being exposed to digital content and devices so early in life.

4.4.4.2.2 Negative aspects

The negatives associated with children using digital technologies mainly revolved around the time spent on devices versus time spent developing gross motor skills. Rebecca stated, *"I think the recommended amount of time is very limited for a three-year-old."* Kim was concerned about, *"the safety aspects, particularly when it comes to things that might be connected to the internet.*" She also raised questions as to where digital technologies sit on the hierarchy of skills children are expected to develop. Laura added that dedicated digital technology time can potentially disrupt the amount of time available to other curriculum areas. The challenge was *"finding ways to integrate it."*

One challenge associated with online content in the classroom included the instability of internet connections. For example, if an educator allocated a certain time to digital content and the internet dropped out, learning was interrupted. Kim explained, *"if you have like a 20-minute window. Then there's all this stuff that could go wrong [with internet that sometimes works]."* A further negative was the cost of devices for educator and children's use, especially with the potential for devices to be damaged when regularly used by three and four-year-olds. For this reason, each iPad used by the children in Centre C had a protective case.

Another reported negative was the detrimental effect of digital technologies on children's behaviour. Tanisha said her child struggled to get to sleep after digital technology

time. Christina also commented on Raine's adverse behaviour when given too much technology time. She lamented *"too much screen time from her and it's scary… I end up bitten and scratched and I mean, her sleep, she's a different child."* She said that Raine became fixated and could not be interrupted, so social interaction became challenging. She said, *"…she would absolutely lose her mind. And she now knows that if that's how she behaves, she definitely doesn't get any more."* Wanda stated that her child became insular, held the device too close to their face, was addicted, and turned into a black hole when technology time was not balanced.

Tanisha feared that children were becoming addicted to digital technologies, and she hoped they were not being used educationally. She commented that George, *"if he gets hold of it he'll just run off somewhere and you won't, you won't find him. They're addicted."* Tanisha was a primary school teacher which possibly influenced her thinking in relation to the educational value of inappropriate digital technologies being use. She lamented digital technologies being used as a babysitting tool and for entertainment, saying, *"I think they use them as a babysitting tool. I don't think educationally parents use them a lot for that… We go out for coffee and it's easier to hand them a phone and they can sit there quietly."* She added that she did not think that primary school aged children needed a lot of technology in schools as *"they get enough of it at home."*

A further negative aspect concerned the potential for conflict. Digital technologies caused tension within and between educators, and they sometimes caused tension between the centre and parents. Rebecca recalled an occasion when one educator read to children from an e-book rather than a physical book, which another educator disagreed with. Tension had also surfaced between the centre and a parent after a child was shown a video that affected him in his home context. Rebecca explained, *"[Talking about a video that had been shown in class on the interactive SMART board] …this parent was really unhappy about it….I guess seeing things represented visually, can impact children. And she was just saying, like, her son wasn't sleeping well."* Conflict could also occur within the household. Wanda mentioned that the iPad caused tension between siblings, saying *, "Oh, definitely [causes tension] … there's so many options because they know it's not just the iPad, it's the Switch, it's the TV, it's mummy and daddy's phone."* Balancing the use of devices in the home and the education context was a challenge for all Centre C participants.

Lastly, Tanisha addressed the future of digital technologies for George. In response to the question *"…so how much do you think it's going to be part of their future?",* she replied

"technology? Very big". I followed up with *"so you think they should be learning it from this age?"* and she replied, *"not from that age [pointing to her child sitting in the room], no."* Similarly, Christina's view on digital technology were informed by her beliefs that Raine would not need to be readily able to operate technologies once she is grown.

4.4.4.2.3 Concerns

Rebecca's main fears were around the dangers of children accessing inappropriate content online. She shared the efforts of her research into cyber safety and her concern at the potential exposure to inappropriate content that children of this age face. Her main concern was *"cyber safety in general. I have been doing quite a lot of online learning about cyber safety recently on the e safety commission's website."* She was aware of the need for limitations as to what children viewed and interacted with. She said, *"the statistics scare me...Of the age groups of children when children should be exposed to certain things online."* A key concern for Rebecca was the potential for children to discover inappropriate content while engaging with online games. This scared her, *"they're like, playing with something that they shouldn't be or even the ads that come up in games, and it's just kind of a scary world."*

Rebecca additionally pointed out that she had seen evidence of children being exposed to inappropriate content and being upset or distressed in response. She said, *"... they realised that the image they've seen is too inappropriate for them or the video they just watched was way too inappropriate for anything they should be looking at."* Kim was worried about older siblings showing their younger sibling a TikTok video. Her concern was *"passiveness, and, and when they're at home, safety. A lot of them have got older siblings, for example, who might access something that's not really appropriate."* Her definition of inappropriate was *"non educational stuff like tech, or TikTok or something like that on phones and that, that kind of watching for entertainment."* Rebecca also expressed concern around YouTube, saying, *"YouTube as well. Like although you have YouTube Kids, like, the content that's on there, and what children can access and they're, like, obsessed with watching people open things on YouTube."*

The other main worry was the time spent engaging with digital technologies to the detriment of other things, for example, playing outside. Kim highlighted the potential long-term effects on children who engaged with digital technologies more than with outdoor and indoor play, developing talking skills and creating with others, and consolidating their learning outside of digital play. She questioned, *"are their brains ready to deal with deal with that?"*

The centre's parents shared other concerns. Tanisha's concerns related to her child's aggressive behaviour when first disconnected from digital technologies, saying that it could take up to ten minutes for him to wind down. Her other concern was that devices were used passively which was not good for the child. Christina's main concern lay with inappropriate language use in some children's shows, particularly Disney movies, *"it's normally like, only G rated ones. I find them a bit adult...They use the word I-D-I-O-T."* Another concern was that the language in many songs was not appropriate for young ears, and her daughter would come home asking to watch things that her friends watched, such as Bluey or PJ Masks, which were not allowed in her household. Wanda's main concern surrounded the lack of parent awareness of what children wanted to access online. Her priority to combat this was to be informed and smarter than the kids. While she wanted to get better than her children at operating digital technologies, she was *"pretty sure she never will be."* Wanda added that she didn't know much about social media but acknowledged that she would need to care.

Each concern influenced the mediation strategies chosen by the centre, and participating centre parents. While some expressed a range of concerns, others felt they had a handle on children's digital interactions and were therefore less concerned as to what they might encounter. Importantly, the centre director was aware of potential negative effects and the educators voiced their concerns in a more general sense, not specific to their education context.

4.4.4.3 Mediation strategies

For Centre C, their main mediation methods and tools included: 1) limitations and guidelines, 2) software and filters, 3) control of in-app purchases, and 4) control of exposure to inappropriate content. Each participant mitigated children's interactions with digital technologies in different ways, as set out below.

4.4.4.3.1 Limitations and guidelines

In the centre, while the actual guidelines were not disclosed, Rebecca explained that as far as she was aware, no children had accessed or been exposed to any inappropriate content. She said, *"no, not really. Not in school, they're pretty good...they know the rules."* Kim stated that the educators were not permitted to use technologies for relaxing the children in the classroom, and prior to being provided educator phones, they were required to remove any images of the children immediately from their personal phones by transferring them to their work computers.

Parents shared their household guidelines which included no technology before bed, no devices in rooms, no or limited technology time on holidays, and conversations included the amount of technology time allowed in the family home. Tanisha stated, *"our rule in our household is that there is no computers or iPads and that in the bedrooms."* She added that their iPad was password protected and therefore they knew when their child was using it.

Tanisha added that George, being one of many children in the family, was given greater leniency in his allocated digital technology time but, *"when we go home, he doesn't have very much I try not to let him have an iPad"* and *"I'm conscious of that, that I don't want him on it too much."* The limits imposed on George included no use before bedtime and on holidays. These limitations were put in place because in her opinion, *"technology is not good."*

Christina stated that her child was allowed just a little bit in the morning and the afternoon on weekends. When she did spend time on digital technologies, Christina was always aware of what Raine was accessing. She said, *"if she's watched too much in the morning, I don't let her go in the afternoon."* Overall, Christina was highly selective with what she allowed her child to watch and the limitations she enforced.

Wanda stated their child spent roughly four to five hours engaging with technologies over a typical week, consisting of movie nights, Nintendo Switch, and iPad time. Their household rule, however, was that the children had no access to screens Monday to Thursday. Wanda added that they had controls in place and while they allowed Harry access, he was not able to just use it whenever he wanted. She admitted that Harry, being the second child, had fewer rules than his older sibling had at the same age, *"I think being second, he's watched her [the older sibling] and we've allowed him to do it"*, but Harry was expected to explore educational applications first (Reading Eggs for 20 minutes), before free choice on the iPad. She said, *"...we tried to instigate this rule. And it's going pretty well so far."* She added that they maintained these guidelines by setting the expectation early, so that the children knew they could be trusted and explore with agency. Wanda said that her guidelines were about maintaining balance, and her goal was to *"have as much control without being controlling"*, *"create a balance in our home"* and monitor Harry's use of digital technologies in terms of *"what and how long."*

4.4.4.3.2 Software and filters

Kim said that safe browsers and filters had been installed on their classroom technologies, and that educators were required to download videos beforehand to check pop ups and

advertisements before showing them to the children. These measures had worked so far in terms of inappropriate content. She added, *"we're encouraged to use particular, safe, browsers and things."*

Laura highlighted the children did not have free reign and that digital technology use was always educator led. However, she did acknowledge that every now and again, *"I'd have kids that would scoot off into something like watching something on YouTube, but the protection in the school is quite strong. I haven't yet had the experience that kids have ended up looking at something they shouldn't be."* She reiterated that educators viewed all content first, and that she used primarily ABC Kids, as she trusted its content. She also noted that the school's software stopped inappropriate exposure if the children accidentally ventured into other apps. She said with this age group, *"you have so much more control."*

In the households, Christina did not have home internet so there was no need for password protection or software at this stage. Tanisha and Wanda said their devices were password protected but their children did access them without supervision. Wanda stated that passwords were installed on the iPad and the television for everything she could think of:

> *Disney, I think has a password lock. As does Netflix. Obviously, ABC for kids is that app, I'm not worried about that. Safari, they can't open on, and then I'm just trying to think of the other stuff. We don't have the actual YouTube app, so they don't have access to that, or kids, YouTube for kids as well. I don't have that. So, I guess what we've had what we can put a password on. I have done.*

She also mentioned that the iPad mirrored her iPhone, again limiting access to content or apps that she allowed. With Apple ID, *"they can't download stuff because I have to do it, it's all through my phone, password protected, fingerprint protected. And if they want a new game, I have to do it."* All of these approaches provided a level of protection, so the children did not stumble into inappropriate digital content and were directed towards digital content educators and parents alike were satisfied with.

4.4.4.3.3   Control of in-app purchases

Two parents mentioned that their children had not spent money on in-app purchases while engaged with digital content. Wanda added that they are all blocked through the parents Apple account, saying, *"it's all blocked… it's never going to happen to me."* No other participants commented on in-app purchases.

4.4.4.3.4 Control of exposure to inappropriate content

Both the director and educators were confident that children had not been exposed to inappropriate content in the centre. By contrast, Tanisha stated that George may have encountered inappropriate content such as Haunted house, Naughty Kids, Mr Bean, Jenny Jenny which were all videos on YouTube. She added that while the siblings monitored what George accessed, it sometimes meant he was exposed to content better suited to the older children. Christina stated that if something was scary, she talked to Raine and explained things like monsters aren't real. Previously, Raine had viewed inappropriate content (including shooting and killing), not in her home context. Christina explained that it was not always possible to control the environment but to manage inappropriate exposure, she pre-approved content she had previously watched or from reviews she had read. She stated that she was not a huge fan of Bluey, that it was a *"bit hit and miss sometimes, sometimes the shows can be really good and other times they're just a bit, like toilet humour I find a bit inappropriate."* Lastly, she commented on the language in songs on the radio, saying *"I used to put the radio on, and I just found like, most of the songs that have come on the radio were just a bit too inappropriate for young ears and so I switched stations."*

In the third household, Harry accessed digital technologies on Friday and Saturday nights when the family watched movies and played Nintendo Switch. Wanda stated that she introduced Switch because, *"... we noticed that some of the games on the iPad and stuff had lots of adverts and pop ups. So, we wanted a way that they could play together without all that other stuff."* She confirmed that her household did not use YouTube in case of exposure, as "*anything can happen."* However, she did confess that her child may have been exposed to a scary movie preview or something aimed at someone older. Wanda had disallowed the children access to an internet browser (Safari), so that they could not search for anything without the parents help. Her main mediation strategy was to eliminate the digital technologies that Harry might access.

Each of these mediation strategies employed by parents sought to protect children from the risks associated with digital content and devices. Each child was given different freedoms and agency according to the parents attitudes parents, the resources they had, and the mediation strategies they chose to employ. This was also the case in Centre C where the director and educators controlled the digital technology time and exposure. Each strategy mitigated the effects on digital technologies on children, as follows.

4.4.4.4 Children: Effects of digital technologies

This section now addresses the interaction between digital technologies and children's digital skills, digital literacy, social interaction, behaviour, and digital games. These themes were identified through the adult participants of Centre C.

4.4.4.4.1 Digital skills

Children's digital skills and literacy emerged as a theme across several interviews and explained in a myriad of ways. Christina commented on her child's ability to take photos with her phone camera, saying, *"she always puts the camera on."* While the educators and parents did not comment more specifically on children's digital skills, the way they spoke about children's digital interactions evidenced digital skills. These included children being able to turn devices on and off, skip advertisements on videos, and switch between applications on the iPads.

4.4.4.4.2 Digital literacy

Kim stated that children's digital literacy was *"really good"* at this age, and she said, *"I've had kids trying to explain to me how to solve my phone. Or when my internet doesn't work, they suggest going outside to find a better connection."* She was mindful that the children in her class may be ready for more advanced digital learning if given the chance. For example, she stated that children had the capability to use coding programmes not currently integrated into early learning curriculum.

She motioned that the children in her class could tell you how things worked, for example, how to turn the phone on, call emergency services, knew what *"facial recognition"* was, and said things like you can *"download it from the app store"*, for example:

> I've been talking to children about emergency services, and, telling them to dial, you know, triple zero, and they're like, 'No, you don't need to do that'. 'You just press the two buttons on the side. And where it says emergency SOS' you swipe to the right. They don't even know left and right but they know that you swipe to the right.

Furthermore, Kim explained how children were able to instruct her on the use of a device and were able to state what was occurring when she was using the device. They also used language that demonstrated understanding of the language needed when interacting with digital technologies. She inferred that the children had more digital literacy than the educators. When Kim said to the children *"we don't have that on the iPad"*, they simply

responded *"download it from the App Store"* to which Kim added, *"some of our other teachers might even be like, what is an app store?"* Kim saw that the children had considerable digital literacy at this young age, and she wanted to make sure they were given opportunities to hone these skills and further develop their understanding.

Laura also talked to the children being digitally literate. She said, *"I mean, some of them are really savvy with things, so you've gotta keep your eye on them."* Lastly, Christina shared that her child understood that the internet equals data, showing that she had a good grasp of the digital basics. She said, *"I normally say have no data. So, she knows what data, well, she knows, the word."* These examples provide evidence of young children's developing digital literacy.

4.4.4.4.3   Social interaction

Digital technologies fostered social interaction both in the classroom and in the home. Kim stated that digital technologies helped children have greater awareness of the world around them and it provided a different way of communicating. Christina stated that Reading Eggs encouraged social interaction, saying, *"we do we read the stories together sometimes."* Wanda stated that her children shared the iPad for shows and movies, thereby encouraging social interaction. She added that both parents and children loved Friday night family nights as a social activity.

However, both Christina and Wanda noted that sometimes digital technologies discouraged social interaction. Christina stated that when the screen was on, Raine would become so engrossed that she became difficult to interact in a normal capacity. She said, she sometimes had to *"actually have to go over and turn the TV off"* to have a conversation with her. Wanda said that when Harry was engaged with the iPad, he could become very insular. While she recognised that this happened sometimes, she did not mind because *"we've got controls around it and we understand that that's their time"*. She added that the *"iPad is a bit more insular. So, when you're on it, you don't really want anyone to disturb you. So, it doesn't always foster obviously, the best interaction with our kids."* Social interaction and social behaviours were interlinked in the participants examples, as follows.

4.4.4.4.4   Behaviour

Tanisha stated that time spent engaging with digital technologies sometimes had negative effects on her child's behaviour. For example, her child would get aggressive when asked to come off a device, adding *"it's very negative...on his behaviour...that's why I don't like it"*

and *"I think that's why we do a lot away from technology because it does alter their behaviour."* Tanisha also noted the impact of digital technology time on the bedtime routine. Christina was not a huge fan of digital technologies, and she said the more Raine watched, the more she struggled to regulate her emotions. Christina said, *"I did notice that the more she watches TV or does anything the more she struggles to control her emotions."* Wanda admitted that her child reacted negatively when device time ended, and she could see the neurological impact as children displayed greater hyperactivity following time spent on digital technologies. She said, *"they're probably charged like that for about 15 or 20 minutes where they actually need downtime, even though they've had downtime on the internet or whatever they're doing, a show, they actually need downtime without a screen."* All three parents identified negative behavioural patterns following digital technology interaction which in turn justified the mediation strategies they employed.

4.4.4.4.5   Digital games

Reading Eggs and Mathletics featured across many interviews as educational games that children tended to play. Tanisha added, *"...there's an app that has a whole pile of books, Epic"* which George sometimes accessed, but, *"he'll very rarely play games."* She added that if George did play digital games, *"they're usually just, not paid ones, just silly ones."*

Wanda commented on several iPad games available to her child, noting that when they did play, they usually chose short interactive games such as, *"where's my water. ... it's a Disney game."* She acknowledged they had a lot of brain teaser type games such as Toca Boca installed on the iPad which both her children played. This included a game*, "where you've got all these chefs, and you've got to make food… I'm not saying that they're great. But they are better than some of the games I've seen."* Wanda did not allow her children to engage with Minecraft or any fighting games, but games on the ABC Kids and the Play School apps that were quick and interactive, *"five or ten minutes, and then they get bored of it."* Each of the games allowed by Centre C parents were designed for the age group and demonstrated children engaging with digital content semi-autonomously.

4.4.4.5   Children's perspective

The children of Centre C were able to share their perspective on digital technologies in their education and home contexts, and one was able to demonstrate that digital technologies encouraged the facilitation of other skills. Furthermore, two children shared their favourite thing to do with digital technologies.

4.4.4.5.1 Digital technologies in the centre

Regarding the digital technologies available in Centre C, Harry and George were the only children to speak about the iPads. George's favourite game was a teddy bear game, which he was playing at the time of his interview. He agreed that the iPad was his favourite when asked.

Raine stated their favourite thing to do on digital technologies in the centre was to draw on the iPad, because it used lots of colours. She said, *"I just love doing this because I love doing the lines."* Each child stated their favourite was the iPad, perhaps due to its versality, range of content, and easy access in their education contexts.

4.4.4.5.2 Digital technologies in the home

All three children described the digital technologies available to them in their homes. George did not have his own iPad but said that he played on his brothers iPad. He said, *"he lets me play anything! He has all the games!"* Raine said that she had an iPad at home where she could play Reading Learn (reading game), a TV where she could watch Bluey and Rainbow Sparkles, and mummy's phone that she could do Reading Eggs. Raine recognised that her parent mediated her technology access, saying, "*my mum doesn't want me to watch it [Paw Patrol]*".

Harry said that he had a TV, an iPad (where he could play games on Play School and watch Play School and Andy), and a Nintendo Switch. In relation to the iPad, he said, *"I have some Play School games*", and *"we watch Play School."* He went on to explain that he watched Andy on the iPad also, and demonstrated a degree of digital literacy and understanding when he suggested that he could not talk with Andy while watching him on the iPad. Harry lastly talked about his Nintendo Switch when prompted:

> Researcher: *What about do you have a Nintendo Switch at home?*
> Harry: *Yeah!*
> Researcher: *Do you - as well?*
> Harry: *We borrowed Mario from [Name]*
> Researcher: *Oh, did you? Okay, and then you had to give it back?*
> Harry: *Yep*
> Researcher: *Cool, man.*
> Harry: *We gave the chip back*

Harry indicated that he interacted with numerous digital technologies at home and understood somewhat about digital content and how devices worked. He knew that Nintendo Switch games required a chip which he borrowed it from his friends and was expected to return it.

Both his interview and observations indicated his interest in digital technologies, especially trying new things on the devices.

4.4.4.5.3 Digital skills

The children disclosed some of their digital skills in their interviews. George knew how to turn the iPad on and off and explained how the iPads were to be returned to the allocated area in the classroom. He was able to both tell and show which button to press and close the case before returning it to the shelf. Raine also knew how to turn the iPad off and was able to explain how to zoom in and out. She attempted to define the internet (*"turn it up and it's the internet"*) and Netflix (*"type of show"*) and added about the iPad that *"you have to drag it with your fingers."* Lastly, Harry was able to determine that he could not interact with digital characters, that he understood what was happening in the shows he watched, and that content (of the Nintendo game) was stored on a chip and could be used by different machines.

4.4.4.5.4 Other skills encouraged by digital engagement

During George's interview, he was engaged with playing a game on the iPad. During his interview, he talked about achieving levels in the game he was playing. He demonstrated that he was able to count when engaged with the game and showed that he could communicate simultaneously while playing. George displayed multiple skills while being interviewed.

4.4.5 Summary

As Centre C was attached to a private Christian primary school, it had sufficient financial stability to purchase digital technologies as required and comprised large classrooms filled with adequate toys, provocation stations, and space for the children. The parents were heavily involved in their children's learning, and all had strong opinions about how children engaged with their educators, classrooms, and resources. Of the four centres, parents at this one were the most involved with conversations about digital technology. Digital technologies were central to the centre's programs, and included daily digital technology time. While the wider school leadership dictated policies and procedures, at the time of data collection, the website contained no reference to digital technologies, or the management of digital technologies in the centre.

Centre C observations recorded many instances of children engaging individually with digital devices in the classroom, and they were given the autonomy to choose what app they interacted with on the iPads. Centre C integrated the highest number of digital technologies of all four centres in this study, and included the digital technologies that educators used with

children in the classroom, and the digital technologies that children used under the supervision of educator in the classroom. Children were able to engage with a recycled digital technologies station, Beebots, a light table and iPads. Overall, this centre provided rich data for later discussion.

4.5   Centre D

Centre D was an inner-city centre for babies to school aged children. The centre used a limited number of digital technologies across their classrooms and held no digital technology policy to guide their use. The centre promoted the digital technologies they did have, but with supervision and for educational purposes only. The staff were primarily female with many newly graduated early years practitioners. The centre was one amongst many under the banner of a larger organisation across WA and therefore resources were allocated according to the organisation. Centre D comprised many children with working parents who were technologically skilled, and who employed a range of mediation strategies to manage their children's exposure to digital content.

The SEIFA ranking for Centre D revealed that it was in a higher-than-average socio-economic area with a relative social advantage (Table *4.7*). While the score sat well below average in terms of economic resources, it was in the top decile for education and occupation.

Table 4.7. SEIFA rankings for Centre D's suburb

SEIFA Indexes	Score	Decile
Index of Relative Socio-economic Disadvantage	1043	8
Index of Relative Socio-economic Advantage and Disadvantage	1080	10
Index of Economic Resources	918	1
Index of Education and Occupation	1118	10

Centre D had designed their space so that everything flowed into one another. It was evident from the online information that multi-functional furniture was used, and elements of the classrooms rotated so that children were exposed to different aspects and ways of learning. Derived from the Reggio Emilia approach, the centre aimed to encourage children's creativity, choices, investigation, thinking and reflecting in the different spaces. The centre included a baby room (0-16 months), toddler room (16 months – two and a half years) and a kindy room (two and a half years – five years) and provided various facilities including swipe card security, SMART interactive whiteboards and classroom technologies including computers and iPads. All educators held qualifications from Certificate III and Diploma in Children's Services through to BA level Early Childhood Qualifications.

4.5.1 Participants

All three focus children within a single classroom were observed on one day. However, I returned to Centre D four times to undertake participant interviews. Overall, 9 interviews were conducted in Centre D: one director, two educators, and three parents and their children. All participants appeared to be generally digitally capable, and each had thought about their perspectives on digital technologies prior to interview. Each parent specifically was aware of and mediated their child's digital environment, and the three children were from single child homes. Each Centre D participant is summarised in **Table** *4.8* below.

Table 4.8. Centre D participant descriptions, including interview dates and location

Role	Pseudonym	Interview Date	Interview Location	Overview
Director	Serena	04/12/2020	Centre foyer	Female. Director who had been in the position for two years. She had worked in the childcare sector since 2005 and held knowledge of staff management. She had quite a positive view of digital technologies if they were used in a meaningful and supervised manner in the centre.
Educator One	Letti	11/12/2020	Centre foyer	Female. Recently moved to Western Australia to work in the Early Years sector. She had much knowledge of how to use digital technologies with young children, and felt the Centre lacked enough variety of devices to expose the children so they were school ready. Worked across multiple classrooms.
Educator Two	Donna	11/12/2020	Centre foyer	Female educator with international experience in the sector. She was interested in improving her personal digital skills so that she could more effectively utilise digital technologies as a teaching tool. Strong digital technology capabilities.
Parent One	Steven	23/04/2021	Classroom one	A father of one, working as a delivery man who used the phone and digital technologies for work. He was highly involved in the parenting of the child and limited digital technology exposure in the home to half an hour per day.
Child One	John	23/04/2021	Classroom one	A four-year-old boy who understood that his digital technology use was being limited. He expressed that he was able to choose the show he watched. He was interested in the iPad when the educator used it in the classroom to take photos of his classwork.
Parent Two	Maria and Jeff	23/04/2021	Classroom one	This mum and dad interviewed together as they were observing their child in the classroom. They each were interested in digital technologies, used devices

				themselves and were keen to use more educational applications for the child.
Child Two	Millie	23/04/2021	Classroom one	Female, only child, four years of age, and had an awareness of what an iPad and phone were. She was also interested in the SMART board in the classroom. She was bi-lingual and watched videos both in Korean and English through YouTube.
Parent Three	Omar	29/04/2021	Offsite at a cafe	Male, father of one. Understood and communicated the risks and benefits of allowing his child access to digital technologies. He encouraged the safe and supervised use of using digital technologies educationally, and for communication with family.
Child Three	Leyah	23/04/2021	Classroom one	Female, three years old, only child. Shared how she used digital technologies, however during her interview she was more interested in talking about the natural world.

4.5.2 Desktop audit and digital technology policy

The desktop audit, performed in March 2021, did not reveal any information pertaining to digital technologies. The centre website did not include details about digital technology use in the centre nor were there any images involving digital technologies.

A second desktop audit was performed in April 2022 to examine whether the centre had progressed with incorporating digital technologies and whether a formal digital technology policy was available to the public. Again, there was no evidence of any digital technology policies or professional development provided to staff. There was however a newly available *Parent Handbook, Community Cubby* and *Parent Information* tab that provided some information about digital technologies and their use by young children. The Handbook held information pertaining to Xplor, which the centres used for parent digital communication. It summarised Xplor as providing information about the daily program, and observations and stories about the children and their involvement in learning projects, available to parents in real time via a smartphone app. The application was also used for parents to sign their children in and out of the centre, through the Xplor parent app or in the centre Xplor Hub. The Handbook included information for parents on digital portfolios used to demonstrate children's progress, which included photos and children's work. Lastly, the Handbook included childcare policies and procedures. While it did not detail digital technology rules for use, it did address the confidentiality of centre records surrounding the protection of data.

The Community Cubby provided links to information on learning, nutrition, physical activity, support and wellbeing. Articles for parents included: 'The best ways to explore music with children' (with a picture of a child and headphones), 'Cooking is Learning: Our free recipe eBook', 'The best online workouts to keep the whole family active' and '12 of the best virtual places to visit with your children'. Finally, the Parent Information tab provided further information on the parent application Xplor. Each addition indicated that the centre acknowledged the need to inform parents of the digital platforms used to house data, communicate with parents, and provide further information for parents through digital means.

While Centre D did not offer a public digital technology policy, they did however have a social media guide for the centre's Facebook use. Serena, the Centre D director acknowledged, *"we don't have one at this stage."* No educators were aware of a digital technology policy; however, they did discuss expectations and guidelines for digital technology use in their classrooms which is addressed later in this chapter. Lastly, parents had not chosen Centre D based on their digital technology policy. In fact, no-one mentioned even being aware of the centre's digital engagement expectations in classrooms.

4.5.3   Observations: Centre practices

The three focus children, John, Millie and Leyah, were observed across a four-hour period on a Friday. There were no special events happening on the day of observation, and as the weather was too hot to allow the children outside, they were engaged with inside and under-cover play. This included activities such as mat time, art and craft, morning tea and free play. The most popular provocation stations included the Lego station, a block building station and two iPads which children used with an educator to engage with a counting application.

4.5.3.1   Classroom one

Classroom one utilised multiple digital technologies, and the children appeared competent in operating the iPads, the interactive SMART board, and knew the concept of plugging the *"teacher's laptop into the screen so we can see our photos".* During the observation, a mat time was facilitated by the educator whereby the SMART board was used as a teaching aid (Figure *4.24*). The educator connected her laptop to the SMART board, and showed photos of the children that their parents had sent in. This became 'news time', as children stood up one by one and shared what they were doing in their photo. None of the three focus children were chosen to share during the observation.

Figure 4.24. Mat time in classroom one

At no time during the observation did I observe the three children engaged with digital technologies, except as part of wider classroom use. At separate points, the focus children interacted with me while she sat on the classroom couch, and this created an opportunity for interviews. John was highly engaged in all the educator led activities. He was very happy to have the educator take a photo of his artwork with the iPad. John explained what he watched on television, and when he was allowed to watch it. He could also use his parent's phone to watch videos of himself and see photos of when he was a baby. In conjunction with his parents' interview, he explained that he only had a limited time to watch television per day. Millie was timid in her approach to the activities and to her peers. It was her first day at the centre, so she spent her morning exploring all areas of the classroom but did not engage with technologies. Millie was not able to offer any indication of her digital skills, however she did talk about her favourite show, saying, *"I love Paw Patrol!"*. For context, her family had just immigrated, and she did not yet have her normal digital environment set up. Lastly, Leyah was the youngest of the three focus children. She spent her time building block towers on her own. At mat time, Leyah responded appropriately to her educator when asked a question, and she was highly engaged when the SMART board was used. When asked, she was able to explain that her mummy and daddy's phone was *"just for calling"*, not for watching or playing, and that she was allowed to watch cartoons and movies on the television.

4.5.4 Interviews: Themes

In addition to the classroom observations, the interviews provided detail on how participants utilised digital technologies with and for the children. The key emergent themes included: 1) the presence and use of digital technologies, 2) educator and parent attitudes towards digital

technologies, 3) mediation strategies to ensure safe and positive experiences for children using digital technologies, 4) the effects of digital technologies on children, and 5) the children's perspectives of digital technologies and their digital skills. Each themes contributed to an overall understanding of what and how digital technologies were used in both the education and home contexts of Centre D participants.

The key themes were affected by the then context in which the centre operated. The Covid-19 pandemic significantly impacted the running of Centre D throughout the time of data collection. While the centre limited outside visitor access (but never shut completely), the pandemic forced it to communicate with parents in new ways, and educators became more reliant on digital communication when parents were reluctant to attend or were limited in their face-to-face contact time. Importantly however, Omar (the third parent) was the only Centre D participant to highlight the impact of the pandemic on their child's digital technology use. He noted that the time spent with technologies had increased due to having to communicate via video and social media. Omar explained to his child that the phone was only to be used to communicate with grandparents, not to *"watch movies"*. He said, *"with the pandemic situation, because she's not able to travel, she's not able to meet any of her grandparents, we have to do it [give her screentime at bedtime]."* This use of a device for communication had caused the child to think deeply about what was happening in the world to have caused this change in communication.

Omar added that the use of digital technologies had escalated due to pandemic. He said, *"...our usage has definitely gone up during the pandemic as well…. even the news and stuff we're trying to use the speaker to kind of get more like audio kind of thing without seeing the screen all the time."* He acknowledged that the pandemic had caused an over dependence on digital technologies, both for them as parents, and for their child, Leyah. He said, *"I think that's the most crucial bit like with the pandemic like this is the most critical thing that's caused all the over dependence on technology."* This overdependence may have led to an unprecedented increase in digital skills among children.

4.5.4.1 Digital technologies: Presence and use

This section outlines the digital technologies used by Centre D participants. It includes: 1) digital technologies in the centre (including desired digital technologies for the centre), 2) intersection between the centre and the home (including parent communication and parent involvement), and finally, 3) digital technologies in the home. Each participant described the digital technologies used, and their desired uses for digital technologies when managed well.

4.5.4.1.1 Digital technologies in the centre

Centre D utilised a range of digital technologies. Those present in the kindergarten room included an interactive SMART board, an iPad for parents to sign their children in and out, several iPads in child friendly cases for use with the children, educator laptops, iPods, a classroom phone, a recycled digital technologies station, and a digital clock. Each was used for different purposes, which included playing music and showing videos to the children.

The most prominent digital technology was the interactive SMART board (Figure *4.25*). Serena said that they used it for the facilitation of activities such as pilates or yoga *"so that they can see the people doing it and then... follow from there."* The SMART board was set up permanently in the kindergarten room, and was used for similar purposes as the iPad, but on a bigger scale. Letti added that the SMART board was also used to play songs, do dancing and listen to stories. For example, she said, *"we let them read over the over the Smartboard when they want to know more about animals in the zoo or things like this… so it's a resource method."* Serena highlighted its capability to be used for the whole class as a teaching aid for discussion and showing digital content.

Figure 4.25. Educator iPad, laptop, and SMART board in classroom one

The iPads were used for purposes such as a language application, drawing, photos, and as a research tool for the educators who always led the activities when they were being used in the classroom. Serena, director, mentioned several uses, including using *"a programme called ELLA, which is the Early Learning Languages Australia"*, *"children ask, 'Well, how do I draw this?'. So, we'll, we'll go into YouTube. And we'll watch someone, you know, do a tutorial on how to draw something to give the children that opportunity to learn that as well"* and for *"for most of the things. So, taking photos if the children are talking about something,*

and we quickly want to jump on and do some research and quickly follow up on that straightaway." Donna said the iPads were also used for playing relaxing music when the children were sleeping, but *"they can't see it…it's just the sound that comes out of it."* Both Serena and the educators agreed that the iPads were most useful for small group learning for simple purposes. Letti said, *"I like to use the iPad as well to, when it's a small learning group, or when they want to draw something, we look have a look on shapes."* The iPads were also used to take photos of the children, or for sharing the children's activities and artwork with parents through Xplor as shown in Figure *4.26*.

Figure 4.26. Educator using the iPad to take a photo of a child's artwork

The educators were provided with shared laptops for their programming, and for playing videos, songs, dancing, listening to stories, and research when connected to the interactive SMART board. Serena said that the educators *"…play through the laptop through the TV [interactive SMART board]."* Donna stated that while there was only one laptop per room, this was not an issue, *"each room has their own laptop but it's only one laptop per room...we always have access [to a laptop when needed]."*

Another digital technology available to the educators were iPods. Serena said, *"we use iPods for recording the children's information."* Additionally, each classroom had a classroom phone (Figure *4.27*) to call either reception, or other rooms within the centre.

Figure 4.27. Educator iPad and classroom phone in classroom one

Lastly, as with all centres across this research, Centre D had a recycled technologies corner for children to play with. This, Letti stated, encouraged imaginative play and the children liked it lot. She said, *"they are very interested…they pretend to take pictures."* The technology corner in classroom one was as pictured below in Figure *4.28*. The combination of digital technologies shaped the attitudes of those involved in Centre D, as well as the digital skills and capabilities of the children.

Figure 4.28. 'Technology corner' in classroom one

4.5.4.1.1.1 Desired technologies for the centre

The desired technologies for Centre D included cameras, animation programmes and devices for playing music. Letti expressed her desire for cameras and animations using computers. Donna stated that she would like to have a radio or stereo available to play music (*"to have something else in the background")*, or a Bluetooth speaker for music while the children

engaged in outside play. She said that when the children hear music, they *"get excited to start dancing, they drop what they were doing, and then when the song is finished to go back to what they were doing. I think it's calming having it in the background as well."* At the stage of interviewing, the centre played music through the iPad.

Letti acknowledged that educators need upskilling around digital technologies to maximise benefit from devices such as SMART boards. She admitted to being *"not really skilled I have to say…it takes also so much time sometimes to figure it out until you know how it works."* She said also that the lack of educator skills in this area was proof that it was good for children to learn digital skills early. Without the necessary skills, some educators found it frustrating to use devices efficiently. She said, *"I feel like sometimes I get frustrated."* More advanced digital literacy could be promoted through technology centred professional development.

4.5.4.1.2 Intersection between the centre and the home

Letti mentioned that children shared what they had been doing at home, which sometimes included digital technologies. Donna was also aware that children interacted with digital technologies at home. She explained that while digital technology use in the centre was limited, conversations sometimes revolved around digital technologies regardless. She said, *"…sometimes when we ask the children like, oh, how was your weekend? What did you do? Did you do something fun and stuff? Then occasionally, we get the response, oh I was watching iPad."* She added that it felt like sometimes it was straight out of the learning environment and *"onto the screen until they get home. So, I feel like they're having a lot more access to it at home than they have here definitely."* The link between home and centre occurred largely through parent communication and parent involvement in the centre, as detailed in the following.

4.5.4.1.2.1 Parent communication

Serena spoke about digital communication with parents via Xplor. She said that parents signed up for the app when they enrolled their child and it was then used for signing children in and out of the centre, and to *"check on their children throughout the day if they don't want to call so that they can just have updates straight away."* Donna, when discussing the amount of communication between Centre D and parents, stated that only *"some parents do. Not necessarily a lot."* Both educators discussed interactive parent communication through Xplor, in that parents could upload photos from home which could then be incorporated into mat

time. Letti noted that communication increased around children's birthdays, whereby the educators would upload photos of the child, and parents commented on them. Donna also said some parents, *"when they're doing some really fun stuff on the weekend, then they upload photos for us and then we can incorporate that through mat session and have a look at it and then the children can share what they've done over the weekend."* Donna acknowledged that parent communication through Xplor bridged a gap between the centre and home, adding, *"there's always a comments section on each report that we post so the parents then can comment."*

Letti stated that Xplor made recording tasks a more efficient as educators could copy and paste updates such as meals for parents. When asked about the efficiency of using the app over handwritten updates, Letti said *"...it makes it faster actually."* Omar was the only parent to comment on the centre's use of digital technologies. He said that his daughter had imitated some behaviours she had seen on digital content that he was not happy with. Consequently, he had conversations with the educators about curbing the behaviour and making sure they were aware of its origin. He said the content had *"left an impression on us as well that we've got to be very careful of what she's seeing at this age."* Xplor provided an opportunity to view the intersection between the home and education contexts, and parent involvement.

4.5.4.1.2.2 Parent involvement

Serena stated that parents were not really involved or did not ask about the types of digital technologies used in the centre. She said, *"most families don't really ask. Like, in the kindy room when I show them around, I tell them about the screen and why it's there, so that the kids don't go, 'I sat down and watched TV today'."* Both educators stated that they too had not been asked about the digital technologies used in the classroom by any centre parent. Letti said *"no, never"*, in response to the question, "*have you ever had a parent ask you what digital technologies you have been using the classroom?*", and again answered *"no"* when affirming that parents never enquired.

Letti said that parents were updated daily with posts. She said parents *"know that we are using the laptop for songs, dancing, music, learning videos and yoga and stuff like that, but no one has ever asked specifically."* Steven and Maria were not aware or concerned about what their child accessed. Maria added *"no, it's not a concern, as long as it's safe for them and it's beneficial for them!"* Omar stated that digital technology use was paramount to their choice of early years centre. He said, *"one of the big factors for us continuing here for the*

last few years was because we get an update. We get the updates as well and all that kind of stuff…We know what's happening in the day." While interviews indicated that parents were interested in the centres' digital technology use, the general sentiment was that parents trusted the centre to manage it appropriately.

4.5.4.1.3   Digital technologies in the home

Households included iPads and televisions, and digital content was provided through Netflix, Google Home, and audio books, and each participating household allowed their children access to digital technologies. Steven said their child was allowed half an hour of television every day when he first got home, and he usually chose to watch Morphle on Netflix. He added, *"there's no iPads, there's nothing else. It's literally until we get things settled and that's it for the day."* He stated the reason for this was practicality, as it allowed both parents to prepare dinner. They also had a Bluetooth speaker that was not used, and they had tried YouTube once but decided that Netflix was enough.

The second household comprised Maria and Jeff, and daughter Millie. Maria admitted to being more liberal with technology use in their home. They allowed Millie access to YouTube through the television and a phone in car and at restaurants, Netflix, and a tablet. Maria stated that they did, *"try not to use lots of devices for her now"* but the devices she had did access were utilised extensively.

Omar imposed time limits and restrictions on the content accessed by Leyah but allowed her to watch Netflix, interact with Google Home, listen to audio books and engage in virtual video calls with overseas family. Omar said "*those are the ones that we actually use for like, hey, let's play some music. Let's listen to a story in there as well."* They often listened to stories, and Leyah was allowed to watch a movie on weekends. Omar added that Leyah, *"really loves hearing about those movies as well. So, your regular kind of Frozen, Moana, that's something that she's really fascinated with."* The presence and use of digital technologies in each household were influenced by parental attitudes towards digital technology use by their children.

4.5.4.2   Attitude: Towards young children using digital technologies

Adult participants of Centre D described a range of positives and negatives in relation to children's digital technology use, as well as their main concerns. Educator's main positives were that digital technologies acted as an effective research tool, and devices could create a positive learning environment through video and information sharing in differently ways to

how an educator might do it. Parents acknowledged that digital technologies exposed children to new content and languages and it allowed them time to get things done when the children were occupied. Reported negatives included the risk of addiction or children viewing inappropriate content, adults not possessing the skills necessary to provide the children adequate learning opportunities, and physical ramifications. These concerns governed the way digital technologies were then managed for children.

4.5.4.2.1 Positive aspects

A key positive in Centre D revolved around the online capabilities of devices as a spontaneous research tool which Serena said, *"can really foster that learning straightaway."* She highlighted the centre's commitment to digital technologies as a research tool, whereby educators used them to encourage investigation of specific topics, or extend learning when children showed interest. She said, *"if we don't know something, we can go 'oh, look, I don't know, how can we find that out?', and we can teach them about research."* Letti also believed in their value as research tools, but she had to impose time limits. She said, *"it is a good way of resource, we can research a lot of different things and questions children have."*

Letti agreed that digital technologies were especially good when the children used a device to learn together. With reference to the SMART board, she said, *"...the better resource is actually with the biggest screen so I can sit on the mat and no-one is crammed."* Furthermore, Donna also stated that when learning videos content was pre-approved, children were not at risk of exposure to anything inappropriate, and children were engaged for longer. In addition, they learned to role play from watching digital content. Overall, Donna observed the children, *"sharing and engaging with friends, it's pretty good because they compare each other to the characters, and they get into the right kind of behaviour."*

A further positive was children's exposure to new language and content. Steven said, *"it's quite good to see that she's learning and she's picking up, I hope for the better."* Maria suggested that Millie learnt different things, such as new words from videos, which in turn, expanded her vocabulary. For example, Millie often said things that did not necessarily originate from her parents, such as *"oh - that's cool!"* Additionally, YouTube tested Millie's understanding of language when she played online games that delivered instructions in Korean. Maria added, *"she's picking up a lot in English. I think, it might be technology helping...Mostly in English, but then you know YouTube sometimes randomly picks up other language."* Maria believed Millie's access to digital technologies was acceptable, as long as it was limited and monitored. She also approved of online games, *"I think games are also*

very beneficial for them because they interact" but she noted, *"...the thing is the children tend to follow what the parents are doing."* Omar agreed that digital content may have taught Leyah new things:

> *I think positives are really, it helps broaden their thinking as well…we've switched on shows that talk about dinosaurs or something of that sort, like we've seen a genuine interest develop for…I want books on dinosaurs, I want to see things about dinosaurs. And it really helps kind of broaden her horizons as well. So, it does help…we've switched on shows where they have like a message in it as well. I think she understands it, and she's able to appreciate it, she's able to pick up nuances. So that's something that's very, very good… when she's watching something that's educational, it's good.*

Both Steven and Omar suggested that another positive was that they, the parents, got a break. Omar said, *"we do need that break sometimes. It's like…you've got to go watch something."* For the Centre D children, digital technology time was part of their routines, and was valued in each household.

Steven suggested that devices such as pedometers that tracked children's activity might be value, saying, *"you [could] try to track how much they're walking, like a pedometer."* Lastly, Omar valued digital technologies when used in moderation. While recognising that they were a good enabler, he said, *"kids should not know at this age what YouTube is all about, like, what's the next video."* He concluded that *"literally our lives revolve around technology."*

4.5.4.2.2 Negative aspects

The most prominent negative was the risk of children's addiction. Letti emphasised that free and physical play, away from devices, was best as, *"it's kind of an addiction what you see in the children already, as soon as they see an iPad, even the first day here, they know exactly what it is and how to use it. So, it's a bit scary."* She had noticed that children were talking in the classroom about extensive digital technology use, such as "*I'm going to watch this. I went to the movies and watched this movie. I'm gonna play my Wii."* In her opinion, children had too much access.

Serena acknowledged that digital technologies and their potential applications could cause conflict within the centre. She cited the expectations for educators to log nappy changes digitally, which according to some, was impractical and unfair to the child. She said, *"it doesn't really treat the children fairly. If they're having to sit there wait for us to log*

something for them. You know, we should be able to dress them appropriately. And then log the nappy afterwards." While the educators voiced their concern with the implementation of this rule, they eventually *"found a way that worked, that treated the children fairly, but we also worked with what the company wanted."* Some educators experienced similar tensions around the logging of mealtimes. While parents relied on the information, some educators found it impossible to log the amount of food individual children had eaten. Importantly, these negatives were confined to the centre as far as I was aware.

Another negative included educators not having the necessary skills to operate the digital technologies, and devices not performing adequately. Letti stated that sometimes it took persistence to understand the technology and use it to its full capacity. In relation to the SMART boards, she said, *"the way we could use it was only limited and it frustrated me a lot because it didn't work."* She stated that lack of digital skills was a challenge, and that it may be more beneficial to the classroom when educators were more confident in their use. Both Centre D educators said that another challenge was, *"the internet wasn't great"* and *"our internet connection sometimes it's not the best"*, which affected device use with the children. Lastly, there was limited resources, and so educators and children had to share devices.

Steven stated his preference for his child to have no access to digital technology. He said that John was *"a bit young for it [iPad use] isn't it?...Don't get me wrong, I want him to be able to use, I want him to be have digital skills but that'll happen later."* Yet another negative involved the physical ramifications of interacting with devices. This included concerns around the child's eyes and posture, and the inability to get children outside when they were engaged with screen time. Lastly was the potential risk of exposure to content children were not yet ready for or was unacceptable to their parents. Omar said, *"I think one of the cons obviously is like unmoderated, unfiltered like that, that is something that's very scary."* Exposure to inappropriate content was a recurring theme in this study. Many mediation strategies were employed to combat inappropriate exposure but firstly, educators and parents shared their main concerns in greater detail.

4.5.4.2.3 Concerns

Serena was not concerned with the digital technologies children used in Centre D, but she was aware that children accessed digital content more freely at home. She commented on the internet being limitless and that children potentially accessing anything, intentionally or accidentally, saying, *"you can't control what's being put on there. You just don't know what kids are watching."*

In agreement with the director, both Letti and Donna did not have any major concerns about how digital technologies were used in the centre, as children's exposure was limited. Donna raised concerns around children's unhealthy home use in that they appeared to watch too much, but she reasoned that this may be to keep them quiet and for convenience, especially for city living households where outdoor spaces are limited.

Omar's main concerns revolved around potential exposure to inappropriate content. He said, *"that's the real kind of scary thing for me as a parent is like, unrestricted access, and especially things like smartphones, which are like an access to everything and anything."* He added, *"I just feel like there's very little that we can do to kind of protect the kids and just make sure that they're getting access to the right information and not just seeing anything and everything that's out there."*

Steven's main concerns were that John was still a bit young for the iPad and that screen time was passive, noting, *"...probably doesn't promote his...imagination."* He stated that it was an effort to get John off technology and outside to play. Maria was also concerned about the physical aspects, as well as the challenge to get her child outside into nature. She had, *"concern about her eyes"*, *"she'll bend down...so that's not good for growing"* and *"we try to get her to go out to the nature as much as possible, but that depends on, I guess if you have time or not, because we work five days a week."* Unrestricted access was a primary concern to most adults in Centre D and was managed through a range of mediation strategies.

4.5.4.3 Mediation strategies

For Centre D, the main mediation methods and tools employed were as follows: 1) limitations and guidelines, 2) software and filters, 3) control of in-app purchases, and 4) control of exposure to inappropriate content. These mediation strategies are detailed in the following four sections.

4.5.4.3.1 Limitations and guidelines

Centre guidelines included no personal phones allowed in the classrooms, digital technologies to be used for educational purposes only, and informal time limits imposed for use with the children each day. Serena reinforced that digital technologies were to be used solely for educational purposes and with strict supervision, saying, *"...we don't really have at any point of the day in this service where the children are exploring digital technologies by themselves."* She liked her educators *"to use technology to facilitate the children's learning."* but stipulated that educators were to watch any videos prior to showing them to the children

because *"someone could label it [digital content] as safe and it's not safe for the children."* Letti agreed about pre-screening content, saying, *"we know for sure that there's no content in it that we don't necessarily want."*

Letti said that educators adhered to having a *"certain time limit during the day"* although Donna stated that it depended to what extent and what they were doing on it. She said, *"I think it all depends on to what extent and what they actually watching on it or doing with it. I think that they should spend more time away from it."* Overall, mediating the content and the time spent were of primary importance to the educators.

In terms of households, the main mediation strategies included time limits, limited access to devices, control over content, and degrees of imposed parental supervision. One parent did not use their phone at home so that their child received his full attention. Steven allowed John half an hour per day on the television, and he was given the choice as to when this occurred. He said they had been trying, *"to give him a choice as well, say look you can watch your show now or you can watch it later."* He was reluctant to allow more access, saying "*some of those go for like an hour and we go no, no. That's enough."*

Maria and Jeff allowed their child 15 hours access per week, of which their child would be semi-engaged as she played with her toys. Omar imposed strict time limits, saying, *"an hour on a daily basis, like complete screen time and actual technology. At the moment, she's at least acknowledging the boundaries, like she's not taking our mobile phones or something like that. She's not playing anything there."* Similar to others, Omar did not allow technologies before bedtime, saying, *"...we've definitely made sure that probably an hour or hour and a half before bedtime, we don't expose her to any screens."* Omar also disallowed the phone at the table while the family was eating. Furthermore, the parents were the ones who controlled when devices were turned on and off. He said, *"even for switching off, we ask her that, hey, you've got to tell us when things are done, or when you've seen three episodes so that you can switch it off. And then we switch it off."* Omar added*, "...we've kind of put a lot of restrictions for Leyah, like she doesn't have her own device or anything like that. Like it's very, very limited screen time as well."*

Omar noted that when content was not moderated, it became very hard to manage Leyah's time and behaviours This became problematic when outside of the home, *"as soon as she goes outside where she sees the screen, she just glued to it. So, if we go to like a restaurant or something, you can see that her attention is completely diverted."* Omar explained that he did not agree with mediation strategies employed by some of his extended

family members such as pretending a device had run out of battery. He said this was because *"she's creating a dependence and creating that kind of artificial thing rather than having her"* regulate her own behaviours and interactive time. Limitations and guidelines were a popular mediation topic for these educators and parents.

4.5.4.3.2 Software and filters

In the centre, Donna stated that the iPads had software installed that limited which apps were downloaded to it. She said, *"on the iPad we can only access YouTube Kids. Or the podcast, I found good relaxing music on the podcast."* However, there were no software filters on the laptops. *"It's pretty much free, there's, I haven't seen any blocked pictures or websites."* This may be something for the centre to address in the future.

Of the parents, Maria filtered her child's access by installing passwords on devices. Importantly, the tablet was password protected (*"there is a passcode [on the iPad] yeah"*). Omar also had a passcode installed on devices to help with security. He said, *"on the phone we've got all fingerprints and passwords like she can't access the phone without us giving her access."*

4.5.4.3.3 Control of in-app purchases

Maria stated that no money had been accidentally spent on in-app purchases or anything similar possibly due to her devices being password protected. Arguably, with the combination of passwords, guidelines and filters, parents may have limited children's ability to make in-app purchases.

4.5.4.3.4 Control of exposure to inappropriate content

In the centre, the most inappropriate content the children were exposed to was advertisements, which both the director and educators deemed inappropriate but acceptable. Serena said they used YouTube and therefore advertisements popped up and, *"...the kids will watch the ad that's on there and then play the video afterwards...Lots of food advertising and stuff. Nothing inappropriate, though."* Donna reiterated this, saying, *"I think the most and I wouldn't say inappropriate but was a pregnancy test."*

All three parents were confident that their children had not accessed inappropriate content, except something in either an advertisement or a show that the child found emotionally confronting. Steven said that if John accessed something scary, he would tell him. He said, *"we do always vet it anyway, right at the start we didn't consider something might be too scary for him. But he tells us like it's scary."* Maria stated their child had no

exposure to inappropriate content except maybe some advertisements on YouTube, and she would, in the same way Steven's child would, call the parents if she could not skip over it. Omar was cautious of the content his child might encounter and tried to mitigate her exposure to advertisements and be attentive when his child needed assistance. He added that Leyah would sometimes watch animated advertisements for digital games. Omar stated further that they pre-screened the content they allowed Leyah to view, saying, *"we are very careful that we're only switching on movies, which either we've seen, and we know the content or we're very, very sure that this is not something that that's got like any kind of extreme violence or anything."*

4.5.4.4 Children: Effects of digital technologies

Centre D participants then discussed the influence of digital technologies on children. This section now addresses the interaction between digital technologies and children's digital skills, digital literacy, social interaction, behaviour, and digital games.

4.5.4.4.1 Digital skills

Steven described John's digital skills. He said *"he knows how to turn it [TV] on and off. He can't turn on Netflix."* Maria and Jeff stated that their child could pick and choose, scroll, zoom in and out, decline calls if watching a video on the parent's phone, skip ads, but could not turn the television on or off herself. Maria said, *"...she likes to watch the videos...she'll just click on her own as well"* and *"she knows what she wants once you unlock it, then she scrolls to the page that has YouTube and then she presses, clicks on it, and then that's it...And she'll decline my calls...Yeah, she will skip ad."* Omar stated Leyah operated the phone fairly well and could use the television remote. He said, *"if we're switching on Netflix, she knows that she's got a profile there."* He added that even though exposure to the devices had been limited, Leyah knew how to scroll, find what she needed, switch things on and off and operate the camera. He added that children work out how to operate digital technologies quickly, and that perhaps given *"unrestricted access, Leyah might be able to do like a lot of functions, that scares m*e." He said also when he sees her interacting with the phone when engaging in a family video call, that she *"is able to pick up a lot of it. But we're kind of avoiding letting her run the entire thing as well."* Lastly, Leyah had discovered how to interact with Google Home. Omar said when Leyah was *"listening to a song she'll be like, ok, what song is this? And then she'll come and tell us that oh, this is a song from [inaudible speech] or something like that."* This example of an interaction with Google Home was the

only demonstration of this type by a child revealed in this research.

4.5.4.4.2 Digital literacy

Letti stated that children of this age, in addition to being able to swipe, and open and close apps on devices, demonstrated understanding devices in their pretend play as they observed adults and tried everything out. She said children build their digital knowledge through trial and error, adding, *"they pick it up very quickly because they see the pattern in it. Or they are observing us as well. And then they remember the parents showed them certain things at home and then they know how to do it."*

Donna explained that the children had developed a digital literacy by three and four years of age, evidenced by their ability to press buttons, walk around with devices, take photos, swipe open, scroll through options and use devices for educational learning games such as ELLA. She said, *"when we ask them if they can give us the iPad, occasionally I have a kid already swiping it open for me, so that I can take photos…they kind of know what they're doing with it."* She also pointed out that when *"we are having songs on through YouTube over the laptop… I can see them like scrolling. I want to listen to this. I want to listen to that."* These examples evidenced children's emerging digital literacy at this young age.

4.5.4.4.3 Social interaction

Two out of three parents said that digital technologies sometimes hindered social interaction. Steven stated there is little to no interaction when his child was glued to the television, and, *"that's why I don't like it."* John became engrossed in the content. Maria stated also that there was no interaction when Millie was watching videos or the television and it was difficult to interrupt her when she was engaged with a screen. Maria added that Millie usually chose the passive option of watching videos over playing games.

Sometimes, however, digital technologies did foster social interaction. Maria stated when Millie played games, she preferred online games with her parents. Omar stated that digital technologies could encourage social interaction, especially through virtual video calls with grandparents. He said, when Leyah was video chatting with her grandma, *"she'll take the phone to the corner and read the story with her and then just kind of interact."*

4.5.4.4.4 Behaviour

Steven stated that because the digital technology time was part of his child's routine, his behaviour was generally good and unaffected at bedtime. However, John showed frustration

if interrupted while watching television. Maria stated that Millie got angry when separated from digital technologies, saying, *"we do say oh that's too much TV for you, let's go to the park and she gets angry, and she throws a tantrum."* Omar also noted that Leyah had shown negative behaviour when digital technologies were turned off. He said, *"she might on occasion, she might throw a tantrum."*

According to Omar, Leyah would display signs of fear when confronted by the content in her animated shows that she was perhaps unsure of or didn't like. He said that they increased their supervision of content as, *"we've had a couple of instances where we switched on something and then we realised that it's actually having like a change in her behaviour as well."* He also said that Leyah sometimes mimicked what she had seen online. He said *"...she saw the cartoons kind of running around hitting each other and kind of laughing about it. And we could see in her behaviour that she would hit."* Lastly, he reiterated that their role as parents included mediating what Leyah viewed so that her behaviour remained age appropriate. Omar explained to Leyah if what they viewed lead to inappropriate behaviour, she would not be allowed to watch it again.

4.5.4.4.5 Digital games

Maria was the only parent in Centre D to say that her child played online games. They allowed her access to games that tested her understanding, especially her second language skills. She added that Millie would not *"initiate, like turning on the tablet to play the games. It's more of us, we'll turn it on and she'll into it. It's like she wants us to play with her"*, so it became an opportunity for social interaction. Omar stated that not only did his child not engage with online games, but that Leyah was not aware of the option, saying, *"no, no, she doesn't even know about it."*

4.5.4.5 Children's perspective

The children of Centre D did not provide rich detail on their experiences with digital technologies. They refrained from commenting on their digital skills, or their use of digital technologies in their education environment. However, they commented on digital technologies in their homes, as outlined below.

4.5.4.5.1 Digital technologies in the home

John was able to explain, in detail, what he watched on television and when he was allowed to watch it. In agreement with his parents' interview, he competently explained, *"no it's too long so we have to watch only half of it"* and added that he watched things on mummy and

daddy's phone, such as videos and pictures of when he was a baby. He also said that he did not play games on the phone. John was fluent with his explanations and shared details with excitement and enthusiasm. He maintained his train of thought even when another child was interrupting on the side. He laughed and gestured, explaining that when he was little, he was *"still me"* even when he was a baby.

Millie was not able to offer any indication of her digital skills, although she did talk about her favourite show. Her family had just immigrated, and her home did not yet have a television or her normal digital set up. Lastly, Leyah shared that she watched *"all kinds of cartoons and movies."* She said she did not have an iPad or tablet, and her parents phone was just for calling people (*"...my phone is just for calling"*), and not for games, confirming what her parent had said. Lastly, Leyah said that she did not know Netflix and her parents had to put the television on for her. Both Millie and Leyah were quiet and reserved when asked questions, but still managed to provide a couple of answers when asked. Leyah in particular was more interested in sharing about other topics important to her, rather than digital technologies.

All three children said their favourite digital activity was watching television. John explained in detail what happened on his favourite show, Morphle, as follow:

John: *Morphle can change into things*
Researcher: *Really? What can he change into?*
John: *He can change into lots of things*
Researcher: *Really? Lots of different animals?*
John: *Um, trucks and animals… and he can change into hammers*
Researcher: *Oh yeah, that sounds pretty cool*
John: *He can turn into dump trucks*

Millie's favourite show was Paw Patrol, and she explained further that she knew the main characters. She was most animated when she explained:

Millie: *I love Paw Patrol!*
Researcher: *Do you love Paw Patrol?*
Millie: *I like Chase*
Researcher: *Oh, do you - is that your favourite?*
Millie: *Yes*

Leyah said her favourite show was Sunny Bunnies. In describing it, she stated, *"their light reflection comes and then they disappear on the land."* She said,

> Researcher: *And what about what do you watch on the TV?*
> Leyah: *I watch, um, all kinds of cartoons and movies*
> Researcher: *And movies?*
> Leyah: *Yeah!*
> Researcher: *That's pretty lucky. What's your favourite?*
> Leyah: *Sunny Bunnies*

While the children did not offer insights into their digital skills or literacies, they did engage with digital content in their homes.

4.5.5   Summary

With an inner-city location, Centre D was busy and operating at its maximum quota. It included fewer digital technologies than most centres in this research, but those that were integrated within the kindergarten room were used effectively, for example, iPads and the interactive SMART board. The SMART board was observed being used to show pictures of the children outside the centre that parents had sent in through Xplor, the chosen communication platform. In this instance, parents were successfully using the platform as a home to centre communication tool. All digital communication with parents was through email, Facebook or Xplor, and a parent described conversations with the educators about behaviour his child was mimicking from digital content through these channels.

As with the other centres in this research, no digital technology policy was evident. There was however a social media policy governed by the umbrella organisation as this centre was one of multiple campuses. The main digital technology guidelines included educators having to preview the digital content shown to children, and not bringing personal devices into the classroom. Lastly, children were limited in what they were able to engage with autonomously in the centre, with free access only given to a recycled digital technology station for imaginative play. While the perspectives of the three focus children was not thorough, it was substantial enough to provide a voice for later discussion.

4.6   Chapter summary

This chapter has described in detail, the data gathered from each early year's centre. The key themes to arise revolved around the presence and use of digital technologies in all children's lives, both positive and negative attitudes towards children's digital technology interaction and mediation strategies chosen by the adults to guide these interactions.

The results formed the basis for the cross-case analysis and discussion in the following chapter, whereby identified themes are linked with existing literature, and outliers highlighted. The chapter presents a cross-case analysis to show the similarities and differences between each early year's centre, and the data is thematically organised across the children's education contexts and their homes. The results allow for the identification of discrepancies between the expectations of participants around digital technology use by young children, and its actual use by young children. Importantly, the children's interviews communicated their perspective of digital technologies in their education and home contexts.

5 Chapter 5 - Cross-case analysis and discussion

5.1 Introduction

The previous chapter presented data from all four cases and highlighted the themes that emerged from multiple data sources. The finding showed that children, parents, and educators who accessed a higher number and variety of digital technologies were more confident to operate devices and showed higher levels of digital literacy. Safe access to digital content and basic understandings of devices set young children on a trajectory of better school readiness, and more generally, for a life of regular interaction with digital technologies. Most children in this study demonstrated digital capabilities in some form by the time they were three and four years of age.

This chapter starts with a cross-case analysis which explores emerging themes between the centres and highlights differences between each. Analysing themes across the four centres provided critical insight into overall digital technology use and mediation strategies across contexts. A Digital Technology Activity Framework (DTAF) (Wilson et al., 2023) allowed the data to be understood in terms of the different purposes and uses, and by whom, in the early years context (Figure *5.1*). The chapter then presents a discussion on each of the key themes common to all centres. These include: 1) digital technologies, 2) attitudes, 3) mediation strategies and, 4) digital technology policies in each centre. Each section focuses primarily on the education context followed by the home context, as most findings reflected digital technology use in centres. The chapter then concludes with recommendations for developing digital approaches and policies in early years centres. The recommendations represent a synthesis of the key findings and propose a series of guiding principles which might in turn inform digital technology policies. This would ensure that children's agency is recognised, positioning them as meaningful participants in their digital technology use. Finally, the chapter summary focuses on addressing the research questions.

5.2 Cross-case analysis

The cross-case analysis was conducted to explore the themes that emerged between the centres and to highlight any differences between each. The analysis was informed by the findings and allowed for a further classification of the types of digital technologies present in the classrooms of the four centres, as well as a comparison of the key attitudes and mediation strategies used by adults to guide children's digital interactions. This section firstly introduces the DTAF (Wilson et al., 2023) that allowed the results to be structured in a

meaningful way. The DTAF was employed to examine the broad use of digital technologies in early years centres, evident in both the literature (Murcia & Cross, 2022; AGDE, 2022; ECA, 2018; Danby et al., 2013) and observed in practice during this research. The DTAF comprises multiple layers outlining digital technologies usage in early years centres and helped identify opportunities for more effective digital technology use. From there, this section presents a cross-case analysis of the common themes and compares the similarities and differences between each centre's use of digital technologies according to directors, educators, and parents. This analysis focussed primarily on exploring the types of digital technologies used in the centres, the main attitudes held by participants, and the mediation strategies used to guide young children's interactions.

Figure 5.1. Digital Technology Activity Framework (DTAF) for Early Years Centres (Wilson et al., 2023)
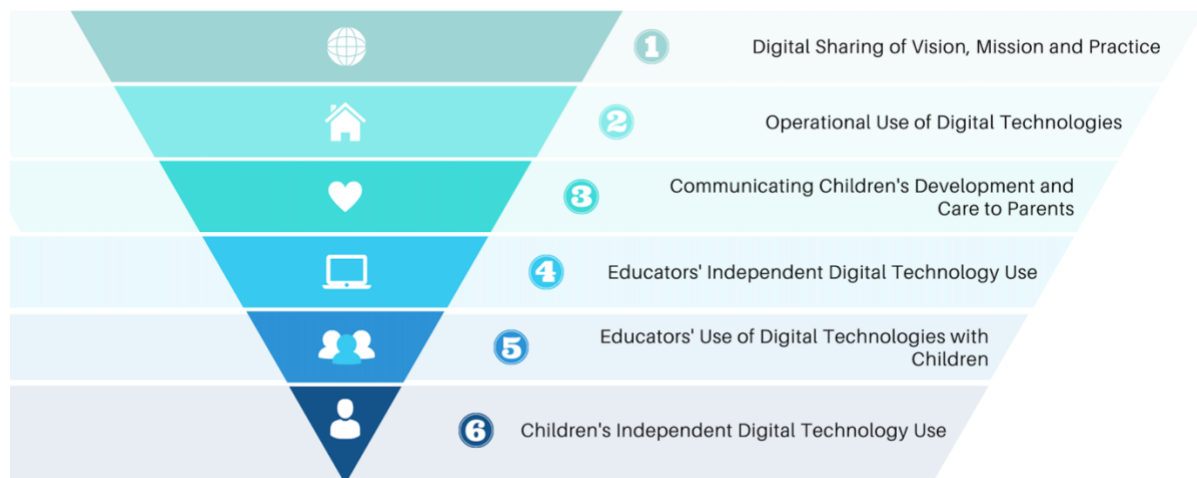
As shown in Figure *5.1*, the DTAF formalises the uses of digital technologies in early years centres. Digital technologies were used by (layer six), with (layer five) and for (layers one to four) young children in this context. At the broadest level (layer one), digital technologies aid the sharing of vision, mission, and practice of the centre. In all four centres, this was achieved through the centre's website, which sometimes offered virtual tours and video chat capabilities to interview parents or children (especially relevant during the pandemic). This is followed by the operational level of digital technology use (layer two). This includes emails to parents, direct debit for account payments, digital record keeping (children's immunisations and birth certificates), and Centrelink connection for funding and fee subsidies, and includes digital technology policy documents and links to online enrolment information and packs. At layer three, digital technologies are used for communicating

children's information to parents. In the four centres, an online platform (either Seesaw, Storypark and Xplor) was used. Emails, website forms, social media, and phones were also used as methods of communication with parents.

Layers four – six indicate levels of digital technologies present in the centres, including educators independent use of digital technologies, educators using digital technologies with children, and children using digital technologies independently. Educators independent use included tablets (writing observations on a digital platform), smartphones (to take and edit photos and for communication with parents), laptops (programming, web searching, downloading teaching resources, accessing online curriculum documents, writing, and sharing), classroom phones (onsite communication), and digital cameras (photographing the children engaged in activities). Digital technologies were also used with young children on a regular basis across all four centres and included tablets (videos to reinforce what had been being learned and showing animated stories and songs, often through YouTube), a Bluetooth stereo (movie soundtracks and Disney channel) and Beebots. Lastly, children were permitted to interact with digital technologies independently, and this included a recycled digital technologies provocation station, listening posts (station with multiple headphones) and Beebots.

Table *5.1* presents examples of the potential use of digital technologies in each layer informed by the literature outlining what may be present in early years centres and the opportunities they may provide (Murcia & Cross, 2022; AGDE, 2022; ECA, 2018; Danby et al., 2013). The examples were also informed by my own professional experience in WA early years centres.

Table 5.1. Digital technology use in early years centres at each DTAF (Wilson et al., 2023)

Framework Layer	Examples of usage
Layer 1: Digital sharing of vision, mission, and practice	• Website • Video chat • Virtual tours online
Layer 2: Operational use of digital technologies	• Direct debit & Child Care Subsidy (CCS) integration • Online enrolment and orientation packs • Digital record keeping • Digital technology policy documents including educator professional development
Layer 3: Communicating children's development and care to parents	• Online communication platform • Emails • Social media • Tablets
Layer 4: Educators independent digital technology use	• Tablets • Mobile devices • Laptops • Landline phone • Digital cameras
Layer 5: Educators use of digital technologies with children	• Tablets • Bluetooth stereos • Tangible coding devices • Projector and interactive screens
Layer 6: Children's independent digital technology use	• Recycled digital technologies • Listening post • Tangible coding devices

While Table *5.1* presents examples of digital technology for each layer overall, Table *5.2* presents the actual digital technologies utilised by each centre in this research mapped against each layer of the DTAF.

Table 5.2. Types of digital technologies being used by each centre

Layer of Framework	Type of Digital Technology	Centre A	Centre B	Centre C	Centre D
Layer 1: Digital sharing of vision, mission, and practice	Early years centres' website	X	X	X	X
	Video chat (interviews or conversations with parents)				
	Virtual tours online				
Layer 2: Operational use of digital technologies	Direct debit				
	Online enrolment				
	Orientation packs				
	Digital record keeping	X	X	X	X
	Child Care Subsidy (CCS) integration				
	Policy documents				
Layer 3: Communicating children's development and care to parents	Storypark	X			
	Seesaw		X	X	
	Xplor				X
	Phone	X			
	Newsletter	X			
	Facebook		X		X
	Emails	X	X	X	X
	School website			X	
Layer 4: Educators independent digital technology use	Tablets	X	X	X	X
	Mobile devices	X		X	
	Laptops	X	X	X	X
	Landline phone	X			X
	Digital cameras	X		X	
	Projector / screen	X		X	
	iPods				X
Layer 5: Educators use of digital technologies with children	Tablets	X	X	X	X
	Bluetooth speaker	X	X	X	
	Stereo	X	X		
	Headphones		X		
	Beebots / Cubettos	X		X	
	Projector / screen	X		X	
	Mobile devices			X	
	SMART interactive whiteboard			X	X
Layer 6: Children's independent digital technology use	Recycled digital technologies	X	X	X	X
	Beebots / Cubetto	X		X	
	Light table	X		X	
	Tablets			X	
	Listening post (stereo and headphones)	X	X		

For layer one, each centre had an active website, but none offered a virtual forum for centre tours for parents. At layer two, tablets were used as an administrative attendance tool in three of the four centres for parents to sign children in and out, and every centre kept digital records of enrolled children and their registration information. This research was not able to ascertain further operational uses of digital technologies in any centre, and there were no digital technology policies evident in any of them, nor reference to staff professional development. At layer three, each centres utilised an online platform to communicate with

parents, all of which possessed similar capabilities, and all four utilised emails to communicate with parents.

The final three layers related the digital technologies in the classrooms. All four centres utilised stereos or speakers, while three utilised educator laptops and tablets, and two of utilised headphones and SMART boards. The remaining technologies used by a single centre included iPods. Centre A and Centre C both employed the largest number of digital technologies and devices and each centre used digital technologies with online capacities. While Centre A allowed children access to the tablets, with the Director stating, "*we're encouraging children to do it*", not all centres permitted children to independently operate working digital devices. All four centres allowed children access to a recycled digital technologies provocation station and two of the four allowed children to independent and creative play at light tables. Centre C allowed children controlled access to tablets with pre-loaded applications for them to choose and engage with. By contrast, in Centre D, children were only allowed free access to a recycled digital technology provocation station, where they could role play with older devices. However, children were not given freedom of access to operational digital technologies at layer six.

The cross-case analysis also allowed for the comparison of themes relating to attitudes, mediation strategies, and the effects of digital technology interaction on children using all data sources. Firstly, findings were examined to gain an understanding of director attitudes and motivations and the most common themes surrounded positive and negative attitudes, centre guidelines and digital technologies used to aid parent communication. All four directors stated their rules included no personal phones in classrooms, however none spoke of formal digital technology policies to guide to educators, or parents on optimal digital technology use and management. The majority (three of four) of directors discussed the importance of a balanced approach to children using digital technologies. One director declared that children already knew how to operate digital technologies, and one suggested that young children did not in fact have much interest in them.

Furthermore, two directors were not concerned with how digital technologies were used in their centre, while the other two directors' main concerns revolved around balance, their staff's ability to operate the existing digital technologies, and concerns around children's online access outside the centre. In addition to concern around educator digital literacy, two directors added that a lack of educator skill could be a barrier to effective digital technology use in the classroom. According to one director, this sometimes caused tension or frustration,

especially when certain educators demonstrated a consistent lack of digital literacy. Two also added that tension arose when an educator used technology excessively.

Centre C was the only centre to directly address parent expectations over digital technology use, and two directors stated that parents did not ask about digital technology use in the centre. Lastly, Centre D's director believed the digital technologies should be used solely for educational purposes under strict supervision. This contrasted with two other directors who stated that they sometimes allowed digital technologies to be used for wellbeing or creative purposes with the children. Table *5.3* summarises the main themes addressed by the four centre directors.

Table 5.3. Centre director themes

Theme	Centre A	Centre B	Centre C	Centre D
Positive aspects	X	X	X	X
Negative aspects	X	X	X	X
Concerns	X	X	X	X
Centre limitations and guidelines	X	X	X	X
Inappropriate content	X			
Classroom management	X	X		
Software and security			X	X
Parent communication	X	X	X	X
Parent involvement	X	X	X	X
Home and centre intersection	X	X	X	X
Children - digital literacies	X	X	X	X
Children - attention span	X	X		
Children - social interaction	X	X	X	

Across all four cases, educators addressed issues relevant to their own positions on the positive and negative aspects of young children using digital technologies, concerns, and centres limitations and guidelines on digital technology use. Similarly, all four cases presented evidence of thematic connections between the centre and the home contexts. Table *5.4* summarises the educator themes according to each centre.

Table 5.4. Educator themes

Theme	Centre A	Centre B	Centre C	Centre D
Positive aspects	X	X	X	X
Negative aspects	X	X	X	X
Concerns	X	X	X	X
Centre limitations and guidelines	X	X	X	X
Online access	X		X	
Parent communication	X	X	X	X
Parent involvement	X	X	X	X
Parent expectation			X	
Home and centre intersection			X	
Children - digital literacies	X	X	X	X

Next, the emergent parent themes were common to all four centres. Centre A and B parents spoke to the most themes while Centre C and D parents primarily discussed digital technology use by, with and for young children extensively. Table *5.5* summarises the parent themes according to each centre.

Table 5.5. Parent themes

Theme	Centre A	Centre B	Centre C	Centre D
Positive aspects	X	X	X	X
Negative aspects	X	X	X	X
Concerns	X	X	X	X
Own technology use	X	X	X	X
Involvement with centre	X	X	X	X
Family limitations and guidelines	X	X	X	X
Online access	X	X		
Expenditure of real money	X		X	X
Inappropriate content	X	X	X	X
Software and filters	X	X	X	X
Children - digital literacies	X	X	X	X
Children - attention span	X	X		
Children - social interaction	X	X	X	X
Children - behaviour	X	X	X	X
Children - digital games		X	X	X

Almost all parents were aware of the digital technologies their children engaged with in their home contexts. They imposed guidelines, including time limitations, for management of their use. However, more than half were unaware of how or why digital technologies were used in their child's early years centre, or how they were managed. Most parents trusted their centre to guide effective digital technology use in the classrooms, despite the lack of published procedures, policies, or guidelines.

5.3 Background

The cross-case analysis revealed that children's digital experiences in their education context and what they experienced at home were quite different, confirming previous research (Plowman, 2015; Parette & Blum, 2014; Gutnick et al., 2011). Observations of children indicated a disconnect between parents' understanding of their children's exposure, and the reality of their interactions within their centre. For example, parents were not always privy to the digital technologies children accessed in their classrooms, or how the educators used them as teaching tools. Better home-centre communication is needed to bridge this gap. There was a clear link between the education context, the child's digital literacy, and their home use. For example, if children were independently engaging with digital technologies at home, they

were inclined to ask their educators for more time and access to digital technologies, and often volunteered to help educators use devices in the centre.

Children used both online and offline digital technologies in both their education and home contexts, for learning, playing, and connecting with others. Being online offers opportunities for creative exploration, improvement of language skills, problem solving, critical thinking, and relationship building (Office of the eSafety Commissioner, 2020a). Importantly, access and opportunities to take advantage of digital technologies have been widely discussed during the Covid-19 pandemic (Flack et al., 2020). Equity issues surrounding access, affordability, and the need for early childhood educators to have computer literacy act as barriers for early year education (Livingstone et al., 2015).

Centre directors described the limitations their centre faced in providing access to digital technologies. Overall, however, children in this study were given access to digital technologies in their education settings on a regular basis, and each child was given equal opportunities to build their digital skills and capabilities. Equity of access and affordability appeared more varied in the home contexts with greater variations occurring in terms of digital devices or content. Despite this, this study recognises that all children are exposed to digital technologies, and therefore there is a need to focus on the opportunities associated with its use in appropriate ways. Digital technologies, attitudes, mediation strategies and policy findings are now discussed against the existing literature.

5.4   Digital technologies

The types of digital technologies young children engaged with in both education and home contexts provided insight into what children find interesting. As with findings from other studies (Johnston et al., 2022; Edwards et al., 2018; Major & Watson, 2018; Axford et al., 2018; Australian Bureau of Statistics [ABS], 2016a; Marsh, 2016), it became evident that the types of digital technologies young children engaged with were governed by educator and parent attitudes (Hatzigianni & Kalaitzidis, 2018; Palaiologou, 2016a; Sharkins et al., 2016; Marsh, 2016: Dias et al., 2016), their own digital skills and capabilities (Bers et al., 2019; Dong, 2018; Elkin et al., 2016), and their access to a range of digital technologies (Blum-Ross & Livingstone, 2016; Livingstone et al., 2015; Nikken & Jansz, 2014). Young children in this study were all provided with opportunities for daily interactions with digital technologies in their centres, some more so than others, but at all times, their children's interactions were guided and supervised. Children were generally granted more agency and freedom of choice in their home context. Importantly, most educators and parents did not

always distinguish between online and offline technologies when discussing children's digital activity, but they did recognise that they themselves, and the children, preferred online devices because of their ability to access the web through sites such as YouTube and Google for educational purposes as well as for wellbeing, entertainment, and creative purposes (Murcia et al., 2022; Johnston, 2021; Bohnert & Gracia, 2021; Murcia 2021). The types and purposes of the available digital technologies in the education and home contexts are outlined in the following paragraphs.

5.4.1 Education context

Given the growing presence of digital technologies in homes, children's digital experiences and practices need to be acknowledged by education providers. Digital technologies in early years centres created learning opportunities for children to build knowledge gained from digital interactions at home. Mourlam et al., (2019) previously suggested that educators need to provide children with developmentally appropriate rich learning experiences to build their digital skills and knowledge before entry to school. Educators in this study were aware of the expectation for early years centres to integrate digital technologies into young children's education, with some citing the EYLF. Learning Outcome 5.5 of the EYLF references digital technologies and the requirement for educators to guide children in their use, to support them in navigating their ideas, and help them represent their thinking in a digital manner (AGDE, 2022). Educators are expected to provide access to a range of digital technologies, and to teach children skills and techniques such as clicking, swiping, and icon recognition. Overall, the EYLF's digital-based learning outcomes place an expectation on early years educators to facilitate children's learning with digital technologies. Schriever (2021) recognised that the EYLF expected educators to provide the opportunities for children to become confident learners and effective communicators through interaction with digital technologies. While this study confirmed that each centre educators were providing children opportunities, these were not always regular and consistent.

The types of digital technologies young children engaged with in centres were often determined by the digital skills of those around them. Tondeur et al., (2020) suggested that educators' attitudes and digital competence were two factors influencing digital practices in the classroom and this aligned with educators in this study who admitted their digital aptitude influenced their digital technology use with children. Not all educators were confident in their own digital literacies, or their ability to implement digital interaction effectively in the

classroom (Nikolopoulou & Gialamas (2015). Nikolopoulou and Gialamas (2015) also reported that negative educator attitudes and lack of confidence contributed to ineffective digital technology integration in the classroom. Effective ongoing digital professional learning is essential to provide educators with the capabilities to select, use, integrate, and evaluate appropriate digital technologies for use in the educational environment (Nikolopoulou, 2021; Donohue & Schomburg, 2017). For example, in Centre A, while children had to access Beebots, there was only one educator trained in their use, thus limiting the amount of time children could interact with this type of technology. Understandably, if more educators were trained and confident, digital technologies could be offered more widely in daily activities. As an example, one educator referred to time with digital technologies as 'screen time', instead of understanding that digital technologies incorporated all different types of capacities. In their study of 1994 young children, McArthur et al., (2022) highlighted how screen time influenced some developmental and behavioural outcomes for preschool children. In their study, screen time was defined as television, computer, or video games (McArthur et al., 2022). This definition highlighted similar limitations with educators in this study. Sometimes it was difficult to ascertain educators' digital literacy and understanding of digital technologies when used in this context. For example, another educator in Centre A questioned the use of digital technologies in the classroom, stating that too much screen time took children away from physical play. The term screen time does not fully encapsulate what children might potentially achieve with digital technologies and does not embrace all types of technologies used in the centres. By contrast, Johnson et al., (2022) acknowledged digital technologies included devices such as personal computers, tablets, cameras, calculators, and digital toys, as well as systems such as software and apps, augmented and virtual reality, and the internet. Each type of technology held a purpose in the classroom when used by, for and with young children.

Digital technologies were used for similar purposes across the four cases as acknowledged in prior research. For example, Houen and Danby (2022) reflected on digital technology integrated into early childhood education and care. They identified common purposes, several of which were also found in this study. Primarily, digital technologies were used for information seeking, investigating and problem solving, to support home and school relationships though communication and connection and to move from technology into play-based or movement orientated activities (Houen & Danby, 2022). In addition, both Murcia et al., (2022a) and Murcia (2021), found that digital technologies were consistently utilised for

creative purposes. These included elements of playfulness and problem-solving, and were often socially constructed in nature as interactions involved dialogic conversations and questioning while demonstrating personal agency. Each of these purposes was reflected in the participant voices within this study.

Digital technologies were used for information seeking, investigating and problem solving most often with the three- and four-year-olds in the classroom. For example, a tablet was used to investigate the type of fish Nemo was in Finding Nemo after a child asked the question during Centre B's mat time. YouTube (and YouTube Kids) were widely used platforms across the four early years centres, and while YouTube may not always be the most effective teacher of content for all children, it promoted learning when used as a teaching tool (Davidson et al., 2014). When selected well, class discussions following the videos became a valuable educational component. For example, in Centre B, an educator held a tablet in front of the children and encouraged them to answer the questions posed by the commentary on a video, pausing when the children were not answering confidently, or the content needed further elaboration. Using digital technologies as a teaching tool enabled some educators to broaden the way they taught and incorporate relevant and timely research directed by children's interests. In another example evidenced across the four centres, the practical use of YouTube and Zoom facilitated virtual meetings, and information and image searches by educators with the children. Houen and Danby (2022) suggested that digital technologies in classrooms offer further opportunities for children (with educator supervision) to engage in online shopping, construct emails (to external people), and access Google maps or Google Earth. In addition, as observed in this study, educators used either a tablet, SMART board, or Bluetooth speaker to facilitate story time with the children. While research by Girmen and Kaya (2018) focused on older children, they did state that digital stories allowed for creative and effective technology integration through multimedia tools such as video and communication apps. In Centre A in this study, the director revealed that the iPads were sometimes used to share stories with the children. Digital story time represents simply another way digital technologies can be utilised as a classroom teaching tool. In this study, all types and purposes of digital technologies were important in the education context.

Digital technologies were also employed to build home and school relationships, support communication and connect globally. For example, videos or photos from parents of Centre D were shared on the classroom SMART board, thus intermixing the education and home contexts via digital means. Digital technologies were used as a means of direct

communication between the centre and home. Both NQF Element 6.2.1 and EYLF Principle 2 (partnerships) stipulate educators use digital technologies for communication with parents to enable the documenting of children's experiences and routines (White et al., 2021; Stratigos & Fenech, 2021).

Research by White et al., (2021) focused on selected commercial digital documentation platforms available to early childhood educators across New Zealand and Australia. They commented on the value of Storypark and Seesaw (along with others), which were also utilised in this study. However, while Stratigos and Fenech (2021) acknowledged the benefits of communication platforms, they cautioned the lack of empirical research into their impact on children's experiences and educators' practices. In this study, all four centres utilised digital platforms to facilitate centre to home communication. For example, Storypark allowed educators and parents to share photos, engage in discussion boards and share and read news and updates. Importantly, there was no evidence of the four centres providing conditions around digital platform use in general, or information about how their chosen platform was used in the centre. Parents were given automatic access to each digital platform upon enrolment and were expected to keep up to date accordingly, as highlighted previously by Reynolds and Duff (2016).

Global connection included an example of parents appearing on Zoom video calls and reading to the children of Centre A via a projector and screen. This aligns with previous research. For example, Morgan (2013) suggested that Skype, and assumingly Zoom, Teams or FaceTime, could be used in the classroom to keep in touch with classmates on holidays or at home, and even with scientists, authors, or others across the globe. While research by Morgan (2013) focused on older American children skyping children in Japan, the concept applies in the early childhood setting and presents a real opportunity for global connection. Digital technologies were used to transition from technology into play-based activities, and vice versa, in some classrooms. For example, a Centre B educator printed a picture of a topic children had researched under the educator's supervision and turned it into an art activity. Additionally, digital content promoted play-based activities. Houen and Danby (2022) stated that digital technologies provide movement opportunities for young children such as playing with digital robots or using virtual game devices that required whole body movement, in response to one of ECA's key principles to 'provide opportunities for children to explore and experiment with the functions of a diverse range of digital technologies' (2018, p. 21). In this study, Centre D educators showed children Pilates video tutorials, thus the digital technology

for movement provided an opportunity for play. This can also include creative and independent play, as outlined by Murcia et al., (2020) and stipulated by AGDE (2022). For example, children were allocated time on iPads or Bluetooth speakers to listen to music or audio books. In Centre C, children were given 40 minutes to engage with iPads, loaded with pre-loaded and pre-approved apps for children to choose. Danby (2013) reiterated that children naturally have different preferences for different technologies which are often depended on their early experiences, particularly in how they have been introduced to it. For example, when parents encouraged children to use a creative app at home, they were more likely and confident to choose the same or a similar app in their education context.

Importantly, digital technology can supplement real-life investigations, physical activity, outdoor experiences, and direct physical and social interactions (Zabatiero et al., 2018; Donohue & Schomburg, 2017). Zabatiero et al., (2018) surveyed 515 adults to understand their perspectives on young children and digital technology. While they found many cautioned against overuse with reference to children's health, results also indicated many educational and creative opportunities that add to young children's lives. Similarly, Donohue and Schomburg (2017) acknowledged that digital technology can be used to support learning and development. They provide an example whereby children are learning about Autumn, and use iPads to source pictures online, and then the educator introduces an app that the children interact with to consolidate their learning. The educator featured said, *"the way children interact with technology is not that different from the way they interact with any other learning tool"* (Donohue & Schomburg, 2017, p. 74). This technology / play interchange was repeated by educators in this study. By way of support, the NQF Quality Area 3: Physical Environments, advocates the greater integration of digital technologies as a complementary resource in learning environments. It mandates quality physical environments to provide opportunities that support experimentation with digital technologies and promote children's exposure to enhance their learning (ACECQA, 2018). In this study, digital technologies that promoted movement were widely used where possible.

Finally, in line with previous research (Murcia et al., 2022; Fielding & Murcia, 2022; Murcia, 2021; Murcia et al., 2020; Duffy & Bruns, 2006), this study found that digital technologies, such as Beebots and tablets, enhanced creative expression and fostered creativity in children. The A-E Framework, developed by Murcia et al., (2020), lends itself to recognising creativity in early years contexts. Elements such as children displaying agency, connection and experimentation all apply to notions of creativity when interacting with

digital technologies. These elements were displayed by children in this study and illustrated by educators as they spoke about children's digital interactions. Duffy and Bruns (2006) also recognised that children's early communicative and creative experiences can be aided by digital technologies. Their research focused on social networking adaptative technologies and while they did not specifically focus on digital technology interactions and young children, they reported that certain digital technologies promoted interactive and intercreative engagement between peers, and between peers and educators. For example, in Centre A children were required to do, think, and reflect creatively to generate ideas when engaged with Beebots. Other opportunities for creative play, specifically Centres A and C, included allowing the children access to light boxes to experiment and play with tangible elements integrated with digital technology. Every opportunity provided to the children generated agency for the acquisition and advancement of digital skills. Accordingly, it can be argued that the implementation and effective facilitation of digital technologies by, with and for young children is increasingly important in early years education. However, while it was important to examine digital technologies in the education context, it is equally relevant to determine children's interactions in the family home.

5.4.2 Home context

In line with findings from Given et al., (2014), most households in this study contained a television, a smartphone, and a tablet. The primary uses of the digital technologies were for children to engage with pre-approved applications such as ABC Kids, Disney Plus, YouTube, YouTube Kids, or Netflix. In this study, the range of digital technologies available in homes was always expanding and the rapid increase in available digital technologies was largely due to more parents working from home, and older siblings requiring devices for schooling, exacerbated by the Covid-19 pandemic. In this study, children's views about digital technologies were shaped more by their home use than the educational context possibly due to greater access to a larger number of diverse devices at home, and the freedom to integrate digital technologies with their practical play.

Creativity through and with digital technologies was also fostered in the children's home contexts, as has been previously highlighted in research by Kucirkova and Sakr (2015), and McPake et al., (2013). Kucirkova and Sakr (2015) stated that children's interactions with digital technologies need to be evaluated to understand how they might shape children's creative expression. They found that children used non-digital and digital resources to

express their creativity in different ways. McPake et al., (2013) focused on the potential of digital toys and games to expand young children's early communicative and creative experiences. In this study, different digital devices were used throughout the home. As demonstrated in two Centre B households, digital technologies encouraged the development of creative behaviours through constructed stories and role-play games in response to movies or video games. Children successfully integrated digital technologies with their practical play by using cameras to document their own perspectives on the world, as well as to perform song and dance items using CD players.

Additionally, watching shows on Netflix motivated some children to read related stories in books or play with toys based on movie characters. For example, one child in Centre B dressed like the main character of his favourite show, and another expressed herself creatively when engaged with an online game that allowed her to pick and choose a storyline. According to Gjelaj et al., (2020) digital technologies provided new opportunities to engage with attractive and relevant play, exploration, and development. The interactivity of digital technologies with learning tools may enable children to learn at faster rates, in conjunction with their early education context.

In this study, parental caution influenced the degree to which children were given access to digital technologies. Plowman and Hancock (2014) previously concluded that parent anxiety may be due to supposed harms surrounding digital technologies, such as excessive screen time and the potentially harmful nature of digital content. They noted that parental anxiety depended largely on the age of the children and their own confidence to operate digital technologies (Plowman & Hancock, 2014). Centre C parents were generally more cautious around what they allowed in their household. This centre was faith-based, whereby the morals and values held by the families may have dictated the digital content children were allowed to access. The apps on two household iPads were mainly educational and when Netflix was accessed, it was monitored closely for parent approved shows only. One parent only allowed her child to watch pre-downloaded movies that she had screened, and she was always present to turn it off if deemed inappropriate. Another parent allowed their child only ten minutes per day with a device when and if the parent chose. Parents dictated young children's digital technology use in the households in this study, and the types of technology children could access was often not their choice, but that of their parents.

5.5 Attitudes

The types of digital technologies children engage with are dependent largely on parental perceptions and attitudes (Dias et al., 2016; Nikken & Jansz, 2014). Research by Nikken and Jansz (2014) of 792 Dutch parents of children aged between 2 and 12 years old, found that parents altered their mediation strategies when they viewed the internet as having a positive effect, and used more mediation strategies when they believed it a negative impact. One type of mediation strategy reported in the current study was the limiting of access to devices and content, thus dictating the digital technologies children engaged with. Previous research encouraged educators and parents to be cautious with children access to digital technologies, but strive for balance (Plowman, 2015; Ernest et al., 2014). Research by Plowman (2015) into children's everyday use of digital technologies stated, *"parents resourced and supported play and learning and sought to ensure a balanced range of activities"* (p.44). Furthermore, Ernest and colleagues (2014) stated, *"current research and trends indicate screen time and technology have both positive implications and potential risks; thus, parents, teachers, administrators, and other stakeholders should educate themselves about current use and what is healthy for children's growth and development"* (p. 186). The attitudes of parents and educators in this study offered insights into both positive and negative aspects associated with children using digital technologies. While directors and educators held a range of attitudes, they were tentatively positive provided digital technologies were used in a balanced and safe way. Parents also had largely positive attitudes, but most were deeply aware of negative aspects in line with prior studies by Rideout and Robb (2020), Dias et al., (2016) and Nikken and Jansz (2014). An exploration of attitudes provided a base for better understanding of the stated benefits, main concerns, and chosen mediation strategies of educators and parents.

5.5.1 Education context

The attitudes of the directors and educators influenced the way digital technologies were used in the classrooms. Due to the increase in digital technologies in centres, educators hold responsibility for preparing children for the future by helping them develop appropriate skills. Aldhafeeri et al., (2016) examined 195 Kuwaiti early childhood educators attitudes and found that while educators were competently skilled and the classrooms were well resourced, educators were hesitant to integrate digital technologies into their curriculum practices. These educators disallowed children the opportunities to develop digital skills by not granting agency to learn through digital interaction. Conversely, Hatzigianni and Kalaitzidis (2018)

acknowledged that educators were open to using digital technologies with young children and recognised that digital technologies had to be used with children's rights in mind, therefore allowing children to be 'young explorers' and 'creators' (Hatzigianni & Kalaitzidis, 2018). When directors and educators were digitally skilled and felt confident interacting with digital devices, they were more favourable towards introducing young children to digital technologies (Luo et al., 2021; Nikolopoulou & Gialamas, 2015). Luo et al., (2021) recognised that attitudes and competencies are related, and therefore that positive attitudes promoted improvements in educators' digital competence. Accordingly, when educators felt positive about digital technologies and used them in their classrooms, children were able to practice their digital skills, as well as learn via digital means. Nikolopoulou and Gialamas (2015) focused on the barriers surrounding the integration of computers in early childhood settings by evaluating educators' perceptions. They found that barriers were minimal when educators were confident with digital technologies. In line with other research (Dong, 2018; Hatzigianni & Kalaitzidis, 2018), most educators in this study indicated that digital technologies were beneficial to children's learning. In their study, Dong (2018) reported that 81% of early childhood educators believed that digital technologies benefitted young children's language, creative, literacy and problem-solving skills. In this study, three out of four directors specifically stated that digital technologies were beneficial to young children's learning, in the education context.

A predominant belief of educators in this study, as in the research by Hatzigianni and Kalaitzidis (2018), was that digital technologies were suitable in the education context when managed in a balanced, supervised, and safe way. The director of Centre A claimed that when used accordingly, there were early benefits for children. Centre A educators agreed that digital technologies were good if used in moderation and in fact should be used as children were expected to be familiar with them when they transitioned to school. Directors from the other three centres agreed about the balanced use of digital technologies to support and encourage learning and development. Centre B's director suggested that children spent too much time with technologies at home and therefore digital interactions in the centre needed to be managed wisely. The educators of Centre B agreed while the educators of Centre C suggested that children should be exposed early but with guidance, and acknowledged that children were already digital natives. UK researchers Helsper and Eynon (2010) acknowledged that the term 'digital natives' has been long established in policy and practice. Young children deemed digital natives are influenced by new technologies in the way they

communicate, socialise, create, and learn (Helsper & Eynon, 2010). Lastly, Centre D educators agreed with their director that digital technologies were a good resource, but children given too much access were at risk of becoming addicted. Therefore, physical and free play should be prioritised ahead of digital technology interactions. In this study, many educators commented that children already spent a lot of time on digital devices at home so the focus in the education context should be on play and interacting with the environment, other children, and other adults. Palaiologou (2016a) examined the attitudes towards digital devices of educators in their professional practice across five countries and found that a dominant ideology surrounding play-based pedagogy hindered the integration of digital devices into classroom practice. Additionally, Teichert and Anderson (2014) reported that some educators argued that digital technologies had little or no place in the classroom. In this study however, most agreed that digital technologies should be used with adequate supervision.

Another prevalent attitude towards digital technologies was the opportunity they offered to foster social interaction between and with young children. Young children using digital technologies could provide opportunities for social interaction, which require educators to model collaborative learning and turn taking (ECA, 2018). The Statement on Young Children and Digital Technologies (ECA, 2018) suggests to *"use digital technologies in early childhood education and care settings to promote social interactions between children, peers and adults"* (p. 8). The educators of Centre C jointly stated that children should have supervised access to digital technologies as they provide a good way to connect with others. Some educators in this study actively used digital technologies to promote social connection such as in Centre C where children worked together while playing on tablet apps at a provocation station. Conversely, other educators were concerned that children engaged with a device were not building social skills that enable them to successfully navigate relationships.

Another attitude expressed by some educators was that digital technologies distracted educators from face-to-face social interactions with children. The Centre A director particularly commented on how digital technologies interrupted the educators, saying, *"what are educators doing if they are engaging with a device instead of interacting with a child."* Educators explained they were required to complete record keeping paperwork using digital technologies. For example, educators were expected to upload photos or updates to the centres chosen platform, which some struggled to fit into their working day. They

commented on this being a barrier to face-to-face time with children. ECA (2018) cautioned against 'digital distractions' and the overuse of apps which also have workload implications (Stratigos & Fenech, 2021). Stratigos and Fenech (2021) reported that while most education apps were efficient and easy to use, educators were at risk of an increased workload and faced challenges to their work-life balance when using apps in their personal time. However, educators who have sufficient digitally capabilities should be able to seamlessly integrate the updating of digital platforms within their workday with the children in their learning environments (Wilson et al., 2023).

Lastly, concerns governed educator attitudes. The educators' main concern surrounding digital technologies was that children were at risk of accessing inappropriate content on platforms such as YouTube. This concern has been highlighted in previous research (Zabatiero et al., 2018; Kostyrka-Allchorne et al., 2017). Zabatiero et al., (2018) also emphasised the potential harm to children from exposure to inappropriate or violent digital content. In their investigation of children's media use, parental supervision methods and attitudes, Kostyrka-Allchorne et al., (2017) found that most parents do not use parental controls which increases the possibility of children accessing inappropriate content. Educators in this study referred to inappropriate content in different ways, in line with their values, and according to curriculum requirements in the classroom.

In addition, other minor concerns included children becoming passive when engaged with digital technologies, the addictive nature of children's interaction with digital technologies, and children becoming too reliant on digital technologies. Educators in this study also expressed concern over the limited available resources to effectively use digital technologies in their classroom. Sometimes this was due to a director or centre not budgeting or prioritising the inclusion of digital technologies. This aligned with findings by Nikolopoulou and Gialamas (2015) into 134 early childhood teachers in Greece who also cited lack of resources as a key barrier to digital integration. In this study, multiple educators commented on having only one tablet per classroom for many children, or slow / unreliable internet which severely limited the effectiveness of digital technologies in the classroom. A final concern was that digital technologies created a barrier to children spending time outside. While the inner city often presented outdoor space challenges, educators were quick to comment on the need for children to spend time outside as part of the learning experience. Time away from the outside meant that children were not fully engaging all their senses.

Similarly, core developmental skills needed to be practiced, which educators stated could not occur through interaction with digital technologies alone (Wilson et al., 2023).

While it is important to recognise educator's opinions and concerns, it is mandated that digital technologies be used with young children in an educational context (AGDE, 2022). This created challenges for some. For example, Centre A's director stated that children *"do not want or need devices"* and that most technologies were *"beyond their ability."* The attitudes of individual educators influenced the way digital technologies were introduced to the children in the classroom. Therefore, more government guidance is needed in this area so that young children are exposed to digital technologies in similar ways. A way forward is to ensure that educators are equipped with the skills and capabilities needed for effective use of digital technologies with young children, and this will be address in the recommendation section of this chapter.

5.5.2 Home context

Within the home context, several recurring attitudes emerged from the way parents spoke about digital technologies, and their children's interactions. Parent attitudes dictated the digital technologies used in the household, and the degree of their children's exposure. In a study involving 68 parents and 39 children across four countries, Dias et al., (2016) reported that most parents recognised the educational value inherent in digital technologies. Overall, the parents in this study who integrated the most digital technologies looked favourably upon them and their children's interactions with devices. For example, two digitally invested parents from Centre A allowed multiple digital devices in their homes for their children to access. Importantly, this centre's parents provided the only example of a household server being used specifically to control access to content. This same household also had a studio set up with a large screen and speakers, specifically for the family to watch digital content together. No other household had so many devices. Centre B parents argued that digital technologies maintained children's attention for longer, allowed them a break, were a useful reward and overall worked well for their families. This included allowing children access to the television, a tablet, the parent's smartphone, and Bluetooth speakers. Furthermore, the use of digital technologies during the pandemic was favoured by most parents as families spent more time at home together. The overall attitude of participants in this study towards digital technologies was positive provided they were safely managed. Lastly, a Centre D parent added that the most valuable feature of digital technologies for them was the ability to engage

with virtual video calls, supporting their connection with family overseas. The perceptions of parents had changed over time, with some allowing their child greater access as their digital skills and capabilities developed with age, in line with Plowman and Hancock (2014) who found that parental concern around children's digital interactions varied depending on the children's age and their personal level of confidence. Overall, study parents allowed digital interactions with strict controls in place. For example, Centre D parents stated that digital technologies were acceptable when use was limited and monitored effectively. They also argued that digital technologies were a good enabler and should be modelled appropriately by parents. While parents viewed digital technologies positively, they were also eager to share their concerns about digital technology use in their homes.

As with the educators, concerns about children's digital technology use dominated some parent's attitudes towards their children access to digital technologies. Concerns included children being exposed to inappropriate content, the behavioural and physical effects of digital technologies, school readiness, limited devices in the classrooms and equality of access, lack of outside play, the addictive nature of digital technologies, lack of imagination required when engaging with some digital technologies and overuse in both the home and education context. These concerns have been addressed in previous research. For example, Haughton et al., (2015) focused on the effect of digital technologies on young children mentally and physically, particularly the long-term effects on children from such a young age. Freina and Ott (2015) reiterated the potential risks of digital technologies with young children, particularly digital interaction. They analysed immersive virtual reality in education and its effects on university students, and cautioned for limited use with young children as they are still developing hand-eye coordination and balance. Plowman and Hancock (2014) also highlighted parental concerns, namely that digital technologies may have a negative impact on children's health and wellbeing such as disruption to sleep patterns. Concerns include adult apprehension around their own digital skills and literacy, and its effect on young children's digital skills and literacy (Durak & Kaygin, 2020).

The parents in this study expressed similar concerns to those previously expressed by parents nationwide (Office of the eSafety Commissioner, 2018a). The primary concern of parents in this study was the potential for children to accidentally access inappropriate content although there was no consensus on what inappropriate content was or what it included. Parents deemed 'inappropriate' content to be unnecessary, advanced, unrestricted content with non-age-appropriate language, or exposure to too much information or

stimulation. For example, social media and violent online games often caused young children distress or exposed them to content they did not understand. Zabatiero et al., (2018) and Kostyrka-Allchorne et al., (2017) analysed the possible effects of inappropriate content on young children and found that parents were concerned about their children accessing something they should be protected from. This study revealed similar concerns. For example, Centre A parents were most concerned about the politics and economics behind digital content and their inability to control children's access to certain digital content. The passive nature of some digital content was also deemed inappropriate by a few parents across centres.

Parents reported concerns around the behavioural and physical effects of digital technologies on children. They were wary of over-stimulation, and the drain on children's emotional capacity. Negative behaviour such as tantrums and bad language following time with digital technologies was another concern. Concern over eyes and posture did not feature as strongly as in other studies (Straker et al., 2018; ECA, 2018), but were mentioned at least twice. This possibly demonstrates a shift from the focus on the detrimental physical effects of digital technologies to concerns around detrimental digital content. Parents commented on the addictive tendencies of digital technologies, and its effect on children's behaviour and psychological states. Centre A parents specifically commented on the addictive and over stimulating nature of digital devices. Children being kept from being active and playing outdoors were minor concerns that contributed to some parent's attitudes. Others were resistant to the integration of digital technologies in all areas of their children's lives, and some cautioned the need for children to interact with digital technologies at all.

Concerns around children being school-ready, equality of access, lack of imagination required when engaging with some digital technologies, overuse, and affordability were minor contributing parental concerns. Naturally, parents of three- and four-year-olds recognised that their children needed digital skills and capabilities to be prepared for the transition to school. Parents generally agreed that early exposure to digital technology improved their children's overall development and school readiness, in line with findings by Gjelaj et al., (2020). Gjelaj et al., (2020) focused on teachers' and parents' attitudes about the role of digital technologies and reported that nearly half the parents were firm believers in technologies promoting children's school readiness. While parents in this study believed that digital technology could provide useful school readiness skills, they were concerned for their children in comparison to peers once they got to school, in terms of the digital skills children required to operate devices in the classroom. This was, and still is, a largely unknown for

parents. Equality of access was key when parents discussed digital technologies in the classroom, but they were aware that sometimes their children did not have the same exposure to diverse digital technologies like others. This was largely depended on budgets, and how digital technologies were prioritised in the home.

Parents attitudes were affected by their own digital technology use and apprehension around their own digital skills and literacy. To manage their children's digital activity, parents with basic levels of digital competency and awareness of online risks were more confident in knowing how to protect their children from these risks. Durak and Kaygin (2020) reiterated Donald and Ulla (2003) when they said, *"attitudes of the parents are of great importance, and parental style and parental control make a significant difference on the role media plays on lives of the children"* (p. 2276). Some parents stated they felt they had little control in terms of online safety, and what they could do to protect the child. While Durak and Kaygin (2020) focused on reviewing parental mediation of older children's digital technology use, the same concepts applied to parents of young children in this study. Parents mentioned their own use of digital technologies, the need to be mindful of their own boundaries, and to continuously educate themselves to stay in front of their children's understanding of digital technologies and online safety. They were also aware of how their mediation strategies impacted their child's digital technology use. For example, a Centre A parent expressed concern for their child's restricted time with digital technologies, hoping that her strict mediation was not detrimental to the development of her child's digital skills or ability to relate to other children.

Lastly, and perhaps most significantly, children's attitudes towards digital technologies also affected the way they were used in the home. Understanding children's attitudes towards daily technology use is a changing view within the field of research. This perspective views children as knowledgeable, strong, and competent, and is important to developing sound research aligned with the UNCRC (1989). In this study, children demonstrated their ability to learn digital skills even with limited access to devices. In line with previous research by Dias et al., (2016), children in this study had already developed skills for searching content, managing memory, and dealing with pop ups and advertising. Children demonstrated that they could use devices independently with or without close supervision. Overall, educators, parents, and children's attitudes contributed to the way digital technologies were integrated into young children's lives.

5.6 Mediation strategies

Mediation is important to children's engagement with digital technologies to ensure positive and safe digital interactions. The Office of the eSafety Commissioner (2022) echoed the sentiments of parents and educators in this study when they reported that mediation reduces negative digital experiences, but can also reduce exposure to the benefits of the internet. Ultimately, educators and parents were able to guide children's digital interactions as well as supervise the types of digital technologies children engaged with. Developing reasonable and wise mediation approaches for educators in early years centres, as well as for families in the home context, was of great importance in this study. Livingstone et al., (2017) argued that there exist a wide range of mediation strategies, including time and location limitations, content, or site restrictions, and restricted permissions and filters, as well as using digital technologies as reward systems. Each of the above were practiced in this study. Appropriate mediation strategies ensured children are both protected from inappropriate content and introduced to digital content that broadened their horizons.

Importantly, mediation strategies may be reactionary to children's behaviours. Hiniker et al., (2016) recognised that children may exhibit challenging behaviours when asked to move on to other activities, especially if they had experienced frustration or disappointment within a digital game. Sometimes digital technologies were blamed for children's poor behaviour, but generally educators and parents recognised that *"leaving any absorbing activity is not always easy"* (ECA, 2018, p. 12). This was evident in this study in the way children reacted to mediation strategies enforced by the adults. Pre-determined management techniques, outlined in policies and procedures, may contribute to more peaceful classrooms, along with family guidelines that are well communicated to children before they engage with digital technologies. Overall, time management strategies and emotional support from adults helped children self-regulate their digital behaviours more effectively, as reported in literature prior to this study (ECA, 2018). Many mediation strategies were practiced across contexts in this study including the following.

5.6.1 Education context

Educators are expected to make daily decisions about using digital technologies by, with and for young children (ECA, 2018). Australian research by Murcia et al., (2018) and Zabatiero et al., (2018) suggests exposure to inappropriate content and inconsistent mediation of digital technologies can negatively affect children's executive functioning including creativity and

computational thinking. Therefore, educators are pivotal in maintaining appropriate digital technology management strategies in their classrooms. Overall, educators in this study recognised the opportunities as well as the risks of children using digital technologies in their classrooms, and six different mediation strategies were employed across the four centres. These included content management, application management, software and filters on devices, supervision, the implementation of classroom guidelines and classroom management strategies.

Content management was of key importance. Prior research by Sharkins et al., (2016) determined that digital technologies are, *"effective if [they are] active, hands-on, engaging, empowering, and child-controlled"* (p. 439). They also reported that educators, *"have a responsibility regarding media, technology, and screen time (MeTS), and MeTS exposure should be based upon developmentally appropriate practices"* (p. 442). In this study, as a way of managing risk, all digital content shown in the classroom was pre-screened. While there were no set criteria determining what was appropriate, educators ensured content had not been created for an older audience, and most of the time, that the content was educational. Educators limited the use of YouTube and instead encouraged YouTube Kids to reduce children's exposure to potential inappropriate content, or advertisements that play mid-video. This was a common strategy across all centre classrooms, especially the two centres that used tablets and SMART boards to view online digital content. Successfully managing children's digital content choice meant children encountered more appropriate content in line with curriculum and educational aims.

Similar to content management, educators limited the number and types of apps available to children on devices. For example, in Centre C, children were allowed access to tablets, and were only able to choose from pre-approved downloaded apps including Writing Wizard, Book Creator, PicCollage, Stop Motion, codeSpark, Kodable, ScratchJr, Tickle and Box Island. Not all centres employed this method. Some did not allow children to interact with tablets autonomously. Educators in this study were quick to point to this strategy as key to enhancing children's agency while maintaining safe boundaries. The approach relied heavily on centres having an information and communications technology specialist onsite to install, update, and uninstall apps as necessary, and someone responsible for determining appropriate and beneficial apps. For example, Centre D used the app ELLA to allow children to learn another language. However, the educators were not able to supervise or assist children when they could not progress through an activity, and therefore the app was

rendered unsuitable. This highlighted one of the challenges with maintaining mediation strategies that work for both educators and children.

The implementation of software or filters on devices was another key mediation strategy. This aligned with research by Livingstone et al., (2015) in their investigation of software and technical tools to filter and restrict children's online activities. There is limited literature focused on this type of mediation strategy in the education context, and in this study, this strategy was only evident in one of the four centres. In another centre, tablets were not password protected, and in another, educator laptops had no limitations allowing educators unlimited access to any site. Each director was aware that an absence of adequate software filters on the devices gave opportunity for exposure to inappropriate digital content, for both educators and children. However, this mediation strategy was not adopted widely, possibly due to the absence of digital technology policies on security with centre devices. Instead, directors stipulated that educators supervise each time a device was used with the children.

Digital technology use was supposed to be supervised in all instances in all centres. Supervision was another strategy identified by Nikken and Jansz (2014) as important to the management of children's digital interactions. While there were no formal digital technology policies in any centre, the educators were, at minimum, required to supervise children's interactions with devices. Most educators explained that it was their responsibility to determine the digital content they used with their children, which is why they liked to be aware of any videos or images shown. For example, most times a video was shown to children, the educator was watching with them, or when children were engaged with Beebots, an educator guided the activity. Educator supervision of children's interactions determined safe digital activity in the classrooms, echoing the call from Hatzigianni and Kalaitzidis (2018) who encouraged the use of digital technologies in the education context in supervised and safe ways.

The implementation of guidelines that determined digital technology use in classrooms was another observed mediation strategy. In this study, classroom guidelines dictated no personal phones in the classrooms with the stipulation that if personal phones were used, no photos of children would be stored on them. Other guidelines indicated that digital technologies were to be used for educational purposes only, and there were daily informal time limits for use. While rules were mentioned, they were not formalised in any setting, and were often determined according to the directors and educators at the time. This

allowed for inconsistencies across classrooms, and the range of educator skills meant children were exposed to digital technologies in varied ways. Furthermore, the literature does not address classroom guidelines pertinent to digital technology use in early years centres.

Finally, digital technologies aided educators with classroom management in different ways. Research by both Johnston (2021) and Bohnert and Gracia (2021) argued that a focus on digital technologies as more than just as an educational tool may prove useful for children's overall wellbeing. Not all centres in this study reflected or understood this idea. In one centre, educators were not permitted to use devices to calm the children or divert their attention. However, in the other three centres, digital technologies were sometimes used to refocus children and as a calming tool. For example, educators used YouTube or Playschool videos, often with a curriculum focus, but occasionally for entertainment purposes. Thus, classroom management sometimes benefitted from the use of digital technologies when utilised appropriately.

Overall, appropriate educator mediation strategies have not been widely reported (Zabatiero et al., 2018; Sharkins et al., 2016). Each of the educator mediation strategies in this study required individual application. For example, while it may be simple for a parent to fully engage with their child and co-view digital content or digital games, it is impossible for educators to do so in the classroom. Accordingly, mediation strategies should be stipulated in digital technology policies so that directors, educators, parents, and children are all aware of the digital behaviours expected of them, and the consequences when mediation strategies are absent or used inappropriately.

5.6.2 Home context

Many of the mediation strategies employed by educators were also demonstrated in family homes. Parents' choice of mediation strategies were based mainly on their attitudes, their children's digital skills and capabilities, and the digital technologies present in their household. In line with Dias et al., (2016), each mediation strategy aimed to manage children's interactions and protect them. Prior research by Livingstone et al., (2015), Nikken and Jansz (2014) and Livingstone and Helsper (2008) indicated that parents employ active mediation strategies, co-view digital content, or employ more restrictive strategies involving strict guidelines. Nikken and Jansz (2014) specifically reported on two mediation strategies, namely supervision and technical and safety guidance. However, there is a lack of consensus

as to which strategies are most effective (Shin & Li, 2017), but each have proved valuable, both in previous research and in this study.

The primary mediation strategy used by parents in this study was to manage digital technology use and enforce time limits on their children's interactions. Every household allowed their children daily access to online digital technologies, however, parents had different ways of managing time limits. In general, time limits were enforced on when devices were used, for example, some disallowed digital technologies during the week, immediately before bed, on holidays, or limited access to only the morning and afternoon or for a minimal times per day. Some disallowed digital technology during meals or immediately before dinner as to keep children focused and promote family time at the dinner table. Time limitations were used by nearly all parents in this study, and this aligned with a report by the Office of the eSafety Commissioner (2018a) that stated parents of two to five-year olds were 24% more likely to identify with a restrictive parenting style, including controlled access and rules around online time. However, other researchers including Smahelova et al., (2017) and Zaman et al., (2016) have advocated the use of more active strategies including talking with the child, discussing how to use the internet safely and co-using devices, to ensure that children are accessing devices and digital content appropriate to their age and learning the skills necessary to navigating the digital world.

A second mediation strategy employed by parents was the management of digital content accessed by their children, and this aligned with previous research by Sharkins et al., (2016) and Staksrud and Livingstone (2009). Nikken and Jansz (2014) also stated that parents should be concerned with what children are allowed to visit, download, or use. Most parents in this study were concerned with knowing what their child was accessing and realised that digital content was varied in the degree of harm it posed. For example, one parent who stated that allowing their child access to online games was detrimental, simultaneously allowed their child freedom of choice on Netflix. Techniques such as disallowing children access to search engines, social media and online games were employed by all parents. Others registered multiple profiles on Netflix, so that children had their own profile on which to watch content. Lastly, some parents only permitted their children to watch pre-screened or pre-approved content.

Furthermore, in line with the educators, parents prioritised the management of apps on devices to help ensure safer and positive online interactions for their children. Livingstone et al., (2015) defined this as a restrictive strategy, whereby parents set the rules relating to

content, location, and duration of use by children. The key strategies in apps management included limiting the number of apps on devices, not installing apps with purchase capabilities and not installing apps that allowed advertisements or pop ups. One parent specifically blocked all app purchases by linking all devices to her personal Apple account, aware that any new purchases would require her password. Other security strategies included ensuring passwords were installed on devices that children accessed. Importantly, some parents commented that there was no need for software on the devices because children could not yet use a browser. This is noteworthy because children, though they might not yet be able to type into a search bar, may inadvertently use their voice to activate a search, or simply click until finding something they want to view. A mediation strategy to limit voice activation searches without permission may be for parents to disable Siri or Google's voice chat. Parents in this study did not indicate whether this option was available on their devices, but no-one had encountered this as an issue. These alternative ways of accessing digital content reiterate the importance of parents mediating children's access to devices and apps.

A further main mediation strategy involved the strict supervision of when children watched content, how they interacted with devices and what they were exposed to. Parents in this study exercised caution over content such as YouTube advertisements or age-inappropriate content. They repeatedly commented on the need for children to be supervised, which sometimes meant co-viewing content with their children. Thus, children were required to ask if they wanted to watch something, and parents were sometimes the only ones to turn devices on and off. For example, in one Centre C household, the parents encouraged interactions by co-viewing and co-interacting when possible. This included playing Nintendo Switch as a family and having a weekly movie night together.

The physical positioning of devices was another strategy for supervising children's digital interactions. Approaches such as keeping the phone at a distance from the face, no devices in the child's room, and keeping the devices away when not in use all featured as supervision strategies utilised by parents. Active mediation strategies such as these encouraged children's safe engagement with digital content.

Other minor strategies employed by parents in this study included encouraging activities other than digital technologies, having conversations with children if they encountered something inappropriate, allowing children autonomy in choosing when they engaged and allowing children to turn devices off when their allocated time was up. Sometimes parents used digital technologies as a reward, particularly on special occasions.

This acted as a successful mediation strategy by keeping digital technologies in balance with other developmental milestones. For example, one parent stipulated their child had to first engage with an educational app before being allowed free time on the device.

Family rules surfaced briefly as the final mediation strategy. Smahelova et al., (2017) previously reported rules around the time spent with digital technologies and the control of digital technology usage. Family rules and guidelines included many of the mediation strategies mentioned. Overall, parents used a range of mediation strategies, but there appeared little agreement as to which was best. Shin and Li (2017) had previously reported this lack of consensus surrounding mediation strategy effectiveness and noted that not all parents practiced the same levels or types of mediation.

5.7 Digital technology policies in early years centres

In this study, no centre held a formal digital technology policy that informed educators or parents as to how digital technologies were used and managed in centres, although informal guidelines in each aided educators in their use of digital technologies in the classroom. Incorporating digital technologies in centres requires a policy presence so that educators, parents, and children are aware of how the digital technologies are used, and more importantly, what is restricted for devices with online capabilities. Policies may also encourage greater parent interest and awareness of digital technology use in their child's education. For example, if parents are aware of what children can access to in their centre, this may help guide them on how much time to allow their child on devices in the home. Straker et al., (2018) explained that a goal for educators should be to support families in developing digital technology practices. Therefore, early years centres need to firstly understand their digital technology practices that are in the best interests of the child and that allow them citizenship in their digital world (ECA, 2018). All children should be able to actively choose the digital technologies they engage with and develop their digital skills. It needs to be recognised that children have a right to exercise agency when engaging in safe and constructive digital activities. This suggests a co-design process involving the child which could result in relevant and useable digital technology policies for early years centres. While adults currently make the decisions that determine the children's digital environment, children should contribute to how and why digital technologies are integrated into their education context. Furthermore, policies need to cover as much detail as possible to ensure that digital technologies are utilised in safe and positive ways.

In the Australian early years sector, there is a growing awareness of the need for leaders to develop and make available to all policies which guide and support children's health, wellbeing and learning with digital technologies (Wilson et al., 2023). Principles that could be included in policies are informed by the range of Australian early years sector governing frameworks such as the National Laws and Regulations, the NQF and the EYLF. These documents highlight the expectations surrounding digital inclusion in children's learning environments. They also emphasise the importance of children's agency in early childhood education, as do Burr and Degotardi (2021) and Nolan et al., (2021). Digital technology policies need to ensure recognition is given to children's agency, ideas, and experiences, and provide opportunities for children to engage in agentic creative digital play. Overall, digital technologies should contribute to the overall learning environment, and so in determining safe practices, children would be guided by appropriate learning opportunities. Having discussed the findings, the following section now outlines recommendations that emerged from this study that may be applicable to other early years education contexts, as well as parents utilising digital technologies in the home.

5.8   Recommendations

Following an evaluation of the results, and of previous literature, this study recommends the following for educators and parents in guiding young children access to digital technologies. The first recommendation is that adults (educators and parents) should be provided current and relevant guidance in the management of children's interactions with digital technologies (Wilson et al., 2023). This requires governmental bodies to provide relevant research to educational contexts, to be filtered to directors, educators, and parents. Adults must also be able to access reliable guidance online. Resources provided by the Office of the eSafety Commissioner (2023) include an eSafety Early Years program. Continued provision of information such as this would be valuable for early years educators and parents in informing them of what and how digital technologies should be used by, with and for young children.

The second recommendation is that digital technologies be better utilised at the operational level in early years centres. According to the DTAF, while centres use digital technologies for operational purposes, there were gaps where digital devices and content might be more effective than established methods. For example, centres could digitise operational elements such as online enrolment capabilities, the provision of digital orientation packs and by offering virtual centre tours. The time saved through digitisation of day-to-day

operations would be worthwhile for directors and educators, and should include increased home-centre communication. For example, parents are not always aware of the digital technologies' children access in classrooms, or how the educators use them as a teaching tool. Increased home-centre communication is essential to bridge this gap.

The third recommendation is that digital technologies be better utilised at the level of the individual child. As highlighted through the DTAF, digital technologies are not widely used independently by children. This means children are constrained in developing their digital skills and exercising agency. This recommendation encourages centres and parents to introduce digital technologies that enable children to experiment, make mistakes, and be creative with.

The fourth and final recommendation is that all early years centres have an active digital technology policy in place that is regularly reviewed and made public. Centres require digital technologies guides for use, with up-to-date policies and procedures. Recommendations for digital technology policy inclusion are prefaced in the following guiding principles.

5.8.1 Guiding principles

This study has identified six guiding principles for the development of digital technology policies that promote young children's digital interactions in educational settings as follows: 1) children's agency be encouraged with their use of digital technologies, 2) use of digital technologies is purposed at all times, 3) digital technologies are harnessed for the transition to school, 4) children and families are consulted in the generation of policy and regulations, 5) implementation of all six layers of the DTAF is facilitated, and 6) allow for, and capitalise on, the individuality of each early years centre. Each guiding principle is outlined below.

5.8.1.1 Children's agency

Research and governing framework emphasise the importance of children's agency in early years education (Burr & Degotardi, 2021; Nolan et al., 2021). Specifically, the EYLF defines agency as *"being able to make choices and decisions, to influence events and to have an impact on one's world"* (p. 64). Children's agency needs to be recognised when interacting with digital technologies in their education contexts. However, given the risks involved with children accessing online digital content, it is important to recognise that children exercising agency is not without limitations. Agency can include allowing children freedom of choice over pre-approved apps on safe devices in the classroom, such as time with a tablet or

Beebots, 10 minutes of a pre-approved YouTube video, or 15 minutes using a classroom camera. Children learn a range of digital skills and capabilities when given options, and they will understand that they can independently demonstrate agency. In agreement with the National Association for the Education of Young Children and Fred Rogers' Centre Position Statement on Technology and Interactive Media in Early Childhood Programs (2012), this study emphasises that digital technologies are most effective when they are active, engaging, empowering and child controlled.

5.8.1.2 Digital technologies with purpose

Digital technologies should be used with specific purpose in the education context. While attitudes surrounding young children using digital technologies vary, adults were in agreement with children spending purposeful time engaging with digital technologies. This approach ensures that time and resources surrounding digital technology are well-used and rationalised, and children derive the most benefit from their educational and home life experiences. The purposes of digital technologies may include: 1) encouraging cultural and everyday experiences of home, education, and community, 2) information seeking, investigating and problem solving, 3) supporting home and centre relationships, 4) moving from digital technology into practical real-life activities, 5) play and, 6) supporting communication and connecting globally (Wilson et al., 2023; AGDE, 2022; ECA, 2018; Danby, 2013).

5.8.1.3 School readiness

Young children need to be given every opportunity to develop the skills necessary for the transition to school. Williams and Lerner (2019) proposed school readiness comprises the readiness of the individual child, the school's readiness for children, and the family and community support of the children's development. Parenting beliefs, attitudes and practices are some of the most prominent family characteristics linked with school readiness (UNICEF, 2012). Digital skills and capabilities have become a key requirement for school readiness, as children are now expected to interact with digital technologies in the school classroom. Both the parents and educators must understand the requirements of the school transition period. Therefore, early years centres must communicate with school systems to understand the basic requirements of children moving into primary school. This would ensure parents are informed of the required digital skills and the exposure young children need in some form. The OECD (2020) suggested that as digital technologies evolve, there should be ongoing

dialogue to ensure children are best supported in their education journey from one system to the next.

5.8.1.4 Co-design with children and families

When considering the creation of digital technology policies and procedures, children and their families should be consulted in the process. The UNCRC (1989) highlighted the importance of children's views. General Comment Number 25 (UNCRC, 2021) reiterated that children have a right to be involved in decisions that affect them. Therefore, children should be co-designers of digital technologies that affect them. Co-creation of digital policies would offer greater guidance to educators on how to implement effective digital pedagogies in children's learning environments (Wilson et al., 2023). Furthermore, co-design strategies involving all stakeholders (e.g., children, parents, educators, and directors) would be beneficial in designing guidelines that will instigate change to educational practices. Importantly, children have their own views, knowledge, and opinions and it is essential that their voices are heard as advocated by James and Prout (2015). However, it is also important to recognise children's capabilities as three- and four-year-olds, and to acknowledge that they do not always comprehend the full consequences of their actions. Experts would therefore be required to guide and encourage children's views in developing digital technology policies that work for all involved.

5.8.1.5 Digital Technology Activity Framework

A further guiding principle surrounds the need to ensure that adequate opportunity is provided in the education context for enactment of all six layers of the DTAF. This research employed the DTAF as a tool for investigating digital technology use at all levels within early years centres. As such it provided a comprehensive framework for understanding digital technology use in early years centres, in relation to the NQF (ACECQA, 2012) and EYLF outcomes (AGDE, 2022). Each layer of the DTAF has the potential to guide effective digital technology use in early years centres.

5.8.1.6 Individuality of centres

Digital technology policies should not be so rigid that they become impractical for directors and educators to implement. Other influences such as budget constraints and learning style adaptations (e.g., Montessori) might be better implemented in different ways that allow for successful digital technology integration. Local community cultural practices should also

have space to inform digital technologies usage. The uniqueness of each centre should be reflected in its digital technology policy, while being guided by these overarching principles.

5.8.2   Digital technology policies

Early years centres need a digital technology policy to guide and support children's health, wellbeing and learning with digital technologies, informed by the above guiding principles. A digital technology policy should align with existing policies to enable educators, parents, and children to understand how and why digital technologies are used in the centre. This study has demonstrated that parents are often unaware of the extent to which digital technologies are used in centres by, with and for their children. While privy to their children's learning experiences through photos and updates that educators added to communication platforms, they did not always fully understand their children's digital skills and capabilities when using learning apps or engaging with digital content. Therefore, digital technology policies might reference the types of technologies (online and offline) that exist in the centre and their purpose in the classroom. A challenge exists in who determines the appropriateness of devices and digital content and therefore governing bodies must provide guidance on the suitability of digital technologies that best suit the age and literacy levels of the children. Guidance should also include professional learning opportunities for educators to improve the implementation of digital technologies. Additionally, digital technology policies should include management strategies, such as mediation strategies to shield children from inappropriate content or impractical digital device utilisation.

It is almost impossible to encounter an early year's educational institution without a digital technology presence as demonstrated by the participating case study centres in this study. In the digital era and the Australian context, it is concerning that no centre had a digital technology policy in place for guiding centre practices, educators' pedagogy, and children's educational experiences. The implementation of digital technology policies might challenge educators to abide by policies they personally object to. For example, if the expectation was for educators to utilise a SMART board with the children in line with curriculum practices, some educators might be ill equipped or not motivated to do so. The implementation of expectations like these would require directors enforcing new policies. However, offering educators clear, evidence-based policies has the potential to support consistency of practice, develop cohesion around digital technology use, provide clarity and transparency to parents and children, and make better use of the time and resource of the early years centre. Policies

should contribute to shaping the learning environment and ensure recognition is given to children's ideas and agency. This study makes the following recommendations for developing digital technology policies in early years centres. In line with the Office of the eSafety Commissioner's (2022) recommendations, the creation of digital technology policies should:

- consider research, recommendations, and guidelines for what young children should be exposed to, and where possible, consider children's home experiences. Children use digital technologies to both communicate and create, and educators therefore need to be imaginative and flexible in how they respond to what children already know,
- provide effective strategies for parent centre communication. Therefore, policies should allow for the use of digital technologies to support centre-home communication,
- facilitate opportunities for educators to learn and upskill, so they possess and maintain appropriate digital literacy and skills. UNICEF (2012) suggested it is imperative that educators are productively integrated in professional development around digital technology use,
- make recommendations to parents as to what digital content children might engage with, or strategies to ensure online safety,
- outline safe online expectations for children and educators. With most digital devices being online accessible, policies must include ways to manage safe and positive online interactions,
- outline the centre's obligations regarding how personal and sensitive data is collected, shared, and stored. This includes how parents' consent to collect and share their children's information,
- include how children, educators and parents can feedback their concerns and any breaches of policy,
- provide contact information for support structures around appropriate digital technology use for anyone to access, and
- remain fit for purpose, including being regularly reviewed.

Digital technology policies should change over time, but the digital safety of young children remains paramount. Early years centres already possess and apply policies and procedures pertaining to many areas of centre life, therefore adding a digital technology policy is not an

insurmountable task. The suggested guiding principles offer a foundation for policy development, and each centre would develop and implement their policies in various ways.

5.9   Chapter summary

This chapter has summarised and discussed the findings with reference to the existing literature and has highlighted recommendations that could contribute to the development of digital technology policies. The key themes discussed pertained to both the education and home contexts in terms of digital technology usage, attitudes, and mediation strategies. The chapter has then addressed the lack of digital technology policies in the early years centres and highlighted the gaps that require attention. The gaps are addressed by the recommendations from the study and include guiding principles to inform the development of relevant and forward planning digital technology policies. The final chapter concludes the thesis by answering the research questions.

6   Chapter 6 - Conclusion

6.1   Introduction

This chapter contains a final summary of the study and its findings of the research questions. Previous research on digital technologies in early years contexts is limited as it relied largely on adult perspectives (Given et al., 2014). This study confirmed that children hold their own unique perspective in how they approach digital technologies, highlighting their capabilities when engaging with devices and content. This has become more evident as children exercised greater agency in choosing their preferred digital technologies, exploring, and building their digital skills. The rationale for a case study research design was to better understand the differences and similarities between how digital technologies were used by, with and for young children in early years centres. The purpose of interviewing four types of participants within each centre was to gain a holistic understanding of digital technology use by three- and four-year olds. This study involved:

- observations of children in their early years education contexts,
- an investigation of digital technologies children engaged with and the capabilities they developed as they interacted with available digital technologies, and
- an examination of the educational benefits of digital technologies and how both parents and educators guided children's digital technology engagement.

This research is significant because it provides a rich description of digital practices within WA early years centres and the findings offer guidance in how digital technologies are best utilised and managed in both education and home contexts. This study adds to the body of literature related to educator and parent attitudes and mediation strategies by, with and for young children's interaction with digital technologies. The study design and outcomes should inform government resource and policy direction, early years centres, curriculum, and classroom practices, and the findings can guide Australian educators and parent strategies in ensuring children are engaged in productive digital learning experiences and positive online interactions.

This chapter returns to the key research questions (one main question and three sub-questions). The research questions that framed this study were:

How are digital technologies used by, with and for young children in early years centres and in the home?

- What positive and negative aspects associated with young children using digital technologies are reported by children, early years educators and parents?

- What main mediation strategies are employed by early years educators and parents to ensure safe and positive digital interactions for young children?

- What recommendations would be made for developing digital technology policies in early years centres?

The research questions were answered by employing a variety of methods including a desktop audit, interviews, observations, memos, and digital technology policy reviews. An outline of the methodological approach was detailed in chapter three. The chapter concludes with an acknowledgement of the limitations of the study and possible directions for future research that might build upon the findings of this study. It concludes with a final statement.

6.2 Digital technologies in early year centres and in the homes of children

This section addresses the first research question. Analysing how young children engage with digital technologies in their early years centre and in the home was the primary aim of this research. A Digital Technology Activity Framework ([DTAF] Wilson et al., 2023) was used to categorise the various uses of digital technologies in early years centres and discussions of the most common digital technologies present in homes provided further context for how children interacted with digital technologies.

In the education context, digital technologies were used regularly but not always to their full potential by children. The DTAF provided a framework for investigating and documenting digital technology use in early years centres and revealed that young children had mixed opportunities to exercise agency to interact with digital technologies in a safe and positive way. The first two DTAF layers framed the overarching operational uses of digital technologies in centres, such as centre websites, digital record keeping, and centre-wide policies that governed digital technology policy use. The third layer focused on communication between the centre and the home, whereby information was shared through digital means. For example, educators were able to share children's experiences with parents in their education contexts and provide updates on their child's activities. The remaining layers focused on the educational use of digital technologies by educators and children. Educators used digital technologies for preparing lessons, research, communication and taking photos which were uploaded to digital platforms or children's digital portfolios. Technology included the use of tablets, iPhones, laptops, and cameras. The study revealed

that children were allowed access to digital technologies such as tablets, stereos with headphones, Beebots and projectors with screens. These were all supervised, and in some cases, children were allowed independent access to listening posts, Beebots and recycled digital technology stations. Digital technologies included online and offline options, and all were used in safe and appropriate ways with the children. However, children in this study had limited opportunities to exercise agency in their digital technology interactions.

The most common digital technologies in participating homes were tablets, smartphones, and televisions. For example, children were given access to iPads to engage with pre-approved apps and games. Another common digital technology children accessed was a parent's smartphone. Phones were used for playing music, YouTube, FaceTiming relatives, learning literacy using Reading Eggs, and other digital activities. Lastly, children watched varying amounts of television through streaming services and pre-downloaded movies. Other digital technologies included Bluetooth speakers, monitors, motion centred lights, computers, or laptops, PlayStation, camera, Nintendo Switch, Google Home, and audio books. Most parents had basic digital literacy and skills, and were able to help their children with their digital technology engagement. These findings indicate that children aged three and four years old are surrounded by digital technologies and are able largely able to negotiate digital content.

6.3   Early years educator and parent attitudes

The second research question explored the positive and negative aspects associated with young children using digital technologies, as reported by educators and parents. Both shared similar attitudes about children's interactions. However, this study found that communication between educators and parents regarding children's technology use was not always meeting the objective of children's learning and development. In general, adults who felt they had adequate digital literacy looked more favourably upon digital technologies while educator motivation to upskill was at the forefront for most educators.

Many positive aspects were reported by educators and parents. Parents and educators both agreed that digital technologies were effective in promoting connection and social interaction, and were beneficial to their children's education and wellbeing when used in safe and well managed ways. Educators and parents recognised the educational value of digital technologies in educational contexts. Some parents stated that digital technologies engaged children's attention for longer, provided them with breaks, were a useful reward tactic and overall worked with their digital technology-heavy lifestyles. Overall, when digital

technologies were perceived to be used in balanced ways, they were viewed positively by educators and parents.

The negative aspects revolved around educator and parent concerns, as well as physical, social, and behavioural effects. For educators, their main concerns were that digital technologies distracted children from social interactions and building social skills for successful relationships. Children's behaviour was sometimes either passive, or they became addicted and overly reliant on digital technologies. Educators also voiced their concern around the demand digital technologies placed on classroom time, which detracted from face-to-face time with the children, especially when required to keep parents updated through digital platforms. Educators also expressed concern about the amount of time children spent engaging with digital technologies, both in and outside the centre.

Parents mostly fear that excessive use of digital technologies prevented regular physical exercise, disrupted sleep routines, and impacted social interaction. Parents shared similar concerns with educators when they referenced the addictive and over stimulating nature of digital technologies. Parents who took stricter approaches to time management were more resistant to allowing their children greater access in both home and educational contexts. Some were apprehensive due to their own lack of digital skills and literacy, and others believed children did not need access from such an early age. Educator and parent attitudes, both positive and negative, affected the way they managed children's use of digital technologies.

6.4   Early years educator and parent mediation strategies

This section addresses the research question relating to mediation strategies employed by early years educators and parents to ensure safe and positive digital interactions. The types of mediation strategies used by educators differed to those used by parents and were guided by the systems and processes dictated by their early years centres. Educator mediation strategies included content and apps management, software and filters on devices, supervision, and the implementation of classroom guidelines. Content management primarily focused on limiting access to YouTube, with a preference for YouTube Kids, and pre-screening digital content shown in the classroom. Educators also limited the apps available to children on devices, and this included restricting the installation of apps that had in-app purchase capabilities, and not installing apps that allowed advertisements or pop ups. Software or filters was another mediation strategy used in just one of the four centres. This required someone to manage the security features, and to keep software up to date. In addition, digital technology use by

children was supervised in all times in all centres, including when children were given agency to choose a digital technology. Educators were always nearby and aware of what children were engaging with. Lastly, while there were no specific digital technology policies evident, classroom guidelines functioned as a mediation strategy for managing digital technology use in centres. Importantly, classroom guidelines were sometimes interpreted differently by different educators, and were not always enforced strictly.

Parents used various mediation strategies to manage their children's digital technologies use and content exposure. Practical examples included children being required to ask the parent to watch television and parents being the ones to physically turn devices on and off, or allowing access through protected passwords. Parents also managed the amount of time their children interacted with digital technologies, and the context in which they were used. Children were generally disallowed access at mealtimes, during the week, before bed or on holidays. Parents also managed the physical positioning of digital technologies in their homes. This included keeping phones at a certain distance from the face, not permitting devices in children's room, and storing devices away between uses. Other parents permitted a short time per day under supervision. However, the most effective mediation strategy appeared to be content management. This allowed children to interact in a safe and considered manner. Like educators, parents were primarily concerned with managing children's digital content exposure. They disallowed access to search platforms, social media, and online games by selecting the apps children engaged with or by selecting the content for the child. Other parents utilised differential profiles on Netflix, so that children had their own profile on which to watch their programs. Lastly, some parents allowed their children to watch pre-approved content only. In this way, content management helped reassure parents that children were interacting with safe content. In summary, each mediation strategies gave educators and parents confidence when their children accessed digital technologies.

6.5 Digital technology policies in early years centres

This section addresses the final research question relating to recommendations for digital technology policies in early years centres. This study found no evidence of digital technology policies to guide the management of digital technology use in centres. One recommendation from this study is that governing bodies across Australia endorse a set of guiding principles that will inform educational outcomes, as well as policy directions. This should include guidelines for educators and parents to implement safe and productive technology practices in centres and homes. This study also advocates for consistency across the early years education

system that is endorsed by government and other stakeholders. Digital technology guiding principles should be evidence-based, meaningful and applicable to all contexts across Australia. They must also align with current broader policy recommendations, as promoted by the National Laws and Regulations, the NQF and the EYLF and the guiding principles offered in this thesis which have been created in conjunction with the literature as well as findings from the study. Briefly, these principles maintain that: 1) children's agency be encouraged in their use of digital technologies, 2) digital technology use be purposeful at all times, 3) digital technologies be harnessed for the transition to school, 4) children and families be consulted in the generation of digital technology policy and regulations, 5) technology inclusion occur across all six layers of the DTAF, and 6) policies allow for, and capitalise on, the individuality of each early years centre. These recommended guiding principles act as a foundation for the development of formal digital technology policies in all early year's centres, across all contexts.

6.6 Limitations

Details relating to the limitations and weaknesses of this study were discussed in chapter three. However, they are summarised again here as follows. In the recruitment phase, a first limitation was the reliance on centre directors to disseminate the information on the study to parents. This created a bottleneck during the participant recruitment phase as directors were not always able to progress study-related tasks alongside their substantive roles. Accordingly, alternative plans were made. Directors suggested personal recruitment by talking directly to parents as children were dropped off to the centre in the morning. This intervention allowed the research to continue according to schedule.

In the data collection phase, three main limitations were identified. Though one person performed all the interviews to minimise differences in how questions were asked and data collected, the time consuming and labour-intensive aspects were somewhat outweighed by the benefits of having a single person conduct the interviews. Another limitation was that some of the educator interviews were conducted in a common space, with either other educators or their director present. This meant that sometimes their answers were 'added' to by others, and in other cases, participants were more cautious with their answers. This was mitigated where possible by changing interview locations. Lastly with reference to participant interviews, the time between interviews may have influenced the data in terms of obtaining different perspectives. This was mainly due to Covid-19 measures instigating rapid change which in turn influenced both digital aptitude and participant attitudes towards digital

technologies. For example, some parents were expected to communicate digitally instead of face-to-face with their child's educator when centre pick up and drop offs were affected by Covid-19 protocols. Some parents were expected to allow their child access to devices such as tablets for online teaching when centres closed due to Covid-19 protocols. While digital technologies allowed for efficient communication, centres expected parents to be digitally competent and to readily allow their children access to digital content during these times. Therefore, those interviewed first may not have relied as heavily on digital technologies or determined their attitude towards their child's use of digital technologies. Data collection may have been hindered by parents' hesitation in reporting the digital technologies in their household. For example, parents in Centre D were the only ones to mention that devices were accessed from the car and at restaurants as well as at the home. The parents appeared uncomfortable in sharing this information despite being reassured that there was no judgement associated with collecting the data. Participants were also assured that pseudonyms would be used to de-identify them, encouraging all to feel confident to share their experiences.

In the data analysis phase, the main limitation surrounded thematic analysis which is subjective by nature and includes researcher's interpretation, which may limited the transferability of results. Overall, thematic analysis as it offered flexibility in line with a constructivist epistemology. Extra measures were taken to reduce bias. However, the trustworthiness of the thematic analysis was maximised by prolonged engagement with data, confirmation through triangulation across data sources and documentation of the analysis processes through memoing.

The observation schedule was another limitation as it became cumbersome during classroom observations. The observation schedule could not be applied as planned, in terms of keeping records of children and educator behaviours. As children's behaviour cannot be predicted, the number of behaviours they demonstrated varied too much to keep an accurate record. This limited the ability to quantify behaviours and therefore the memos provided evidence for qualitative analysis. The journaled notes mitigated this limitation and provided sufficient data to proceed with analysis. Each of these limitations was acknowledged before proceeding as unavoidable challenges of the data gathering process and were mitigated accordingly. They did not hinder the overall aim of gaining a deeper understanding of the role of directors, educators, and parents in guiding young children's engagement with digital technologies.

6.7   Future focus

This research suggests that early years educators would benefit from guidance and professional learning in operating and interacting with digital technologies for and with young children. Five practical recommendations include: 1) the greater incorporation of digital technology pedagogies into existing early years education courses, 2) support for professional development opportunities to ensure continuous upskilling of educators, 3) the development of guiding principles to inform digital technology policy in early years centres, 4) the provision of best practice and support material online available to all centres regardless of size and resources, and 5) continuing iterative research to inform the early years sector on issues related to children's digital technology use. Each recommendation is based upon evidence presented in this study, and should be considered by researchers, policymakers, directors, educators, and parents.

6.8   Final statement

Children are growing up in a digital age that requires them to possess requisite digital skills and literacy to navigate their world. The adults closest to them are introducing them to digital devices and content from an early age and in turn are being influenced by children's growing awareness and capabilities. This study has focused upon two of the most influential adult influences in a child's life, namely their parents, and their educators. Each plays a major role in guiding children's interactions with digital technologies, and these interactions are informed by the attitudes they hold towards digital technologies. The results show that while parents guide digital technologies in a variety of ways (in most cases successfully), educators are more challenged in effectively using and monitoring digital technologies in their classrooms. This is not due to unwillingness from educators, but rather a lack of guidance that ensure digital technologies are used in meaningful, educational, and creatives way by, with and for young children in their classrooms.

Accordingly, this study seeks to influence individual behaviour and community practice by offering insights into digital technology interactions in both the education and home contexts. This study encourages government policy and regulatory systems to adopt its guiding principles as a foundation of the establishment of digital technology policies in early years centres. Childhood is increasingly digitised, children are engaged in online digital experiences, and technology platforms continue to create content, so there is an increasing and pressing need to provide guidance and advice to the adults who foster children's construction of their digital lives now and into future.

References

Abell, S. K., & Roth, M. (1992). Constraints to Teaching Elementary Science: A Case Study of a Science Enthusiast Student Teacher. *Science Education, 76*(6), 581-95. https://doi.org/10.1002/sce.3730760603

Aldhafeeri, F., Palaiologou, I., & Folorunsho, A. (2016). Integration of digital technologies into play-based pedagogy in Kuwaiti early childhood education: Teachers' views, attitudes, and aptitudes. *International Journal of Early Years Education, 24*(3), 342-360. https://doi.org/10.1080/09669760.2016.1172477

American Academy of Pediatrics Council on Communications and Media. (2016). *Media and young minds*. Pediatrics. (2016),138:e20162591. https://doi.org/10.1542/peds.2016-2591

Aranda, G., Campbell, C., Ferguson, J., & Speldewinde, C. (2022). Introducing Digital Technologies into Play-Based Learning in Early Childhood. In *STEM, Robotics, Mobile Apps in Early Childhood and Primary Education* (pp. 525-551). Springer.

Arnott, L. (2016). An ecological exploration of young children's digital play: Framing children's social experiences with technologies in early childhood. *Early Years, 36*(3), 271-288. https://doi.org/10.1080/09575146.2016.1181049

Australian Bureau of Statistics. (2016a). *Household use of information technology, Australia, 2014–15*. Australian Bureau of Statistics. www.abs.gov.au/ausstats/abs@.nsf/mf/8146.0

Australian Bureau of Statistics. (2016b). *Socio-economic Indexes for Areas (SEIFA) 2016*. Australian Bureau of Statistics. www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001

Australian Children's Education & Care Quality Authority [ACECQA]. (2012). *Guide to The National Quality Framework*. https://www.acecqa.gov.au/sites/default/files/2020-01/Guide-to-the-NQF_2.pdf

Australian Children's Education & Care Quality Authority [ACECQA]. (2018). *National Quality Standards*. National Quality Standard | ACECQA

Australian Communications and Media Authority (2020). *Kids and mobiles: How Australian children are using their phones*. Kids and mobiles interactive report. Kids and mobiles: how Australian children are using mobile phones | ACMA

Australian Government Department of Education [AGDE] (2022). *Belonging, Being and Becoming: The Early Years Learning Framework for Australia (V2.0).* Australian Government Department of Education for the Ministerial Council. https://www.acecqa.gov.au/sites/default/files/2023-01/EYLF-2022-V2.0.pdf

Axford, C., Joosten, A. V., & Harris, C. (2018). iPad applications that required a range of motor skills promoted motor coordination in children commencing primary school. *Australian occupational therapy journal*, *65*(2), 146-155. https://doi.org/10.1111/1440-1630.12450

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report, 13*(4), 544-559.

Bers, M. U., Gonzalez-Gonzalez, C. & Armas-Torres, M. B. (2019). Coding as a playground: Promoting positive learning experiences in childhood classrooms. *Computers & Education, 138*, 130-145. https://doi.org/10.1016/j.compedu.2019.04.013

Berson, I., Luo, W., & Yang, W. (2021). Special Issue: Narrowing the Digital Divide in Early Childhood: Technological Advances and Curriculum Reforms. *Early Education and Development. 33*. 1-3. https://doi.org/10.1080/10409289.2022.1989740

Berson, I. R., Murcia, K., Berson, M. J., Damjanovic, V., & McSporran, V. (2019). Tangible digital play in Australian and U.S. Preschools. *Kappa Delta Pi Record, 55*(2), 78–84. https://doi.org/10.1080/00228958.2019.1580986

Blackley, S., Wilson, S., Sheffield, R., Murcia, K., Brown, P., Kok-Sing, T., Cooper, M. & Williams, J. (2021). How have Covid-19-related changes to tuition modes impacted face-to-face initial teacher education students? *Issues in Educational Research, 31*(2), 421-439. https://doi.org/10.3316/aeipt.228963

Blackwell, C., Lauricella, A., & Wartella, E. (2014). Factors influencing digital technology use in early childhood education. *Computer Education, 77*. 82 – 90. https://doi.org/10.1016/j.compedu.2014.04.013

Blum-Ross, A., & Livingstone, S. (2016). *Families and screen time: Current advice and emerging research*. Media Policy Project, London School of Economics and Political Science. http://eprints.lse.ac.uk/66927/1/Policy%20Brief%2017-%20Families%20%20Screen%20Time.pdf.

Bohnert, M., & Gracia, P. (2021). Emerging digital generations? Impacts of child digital use on mental and socioemotional well-being across two cohorts in Ireland, 2007–2018. *Child Indicators Research, 14*(2), 629-659. https://doi.org/10.1007/s12187-020-09767-z

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Bronfenbrenner, U. 1989. Ecological systems theory. Annals of Child Development. Vol. 6, 187-249.

Bronfenbrenner, U. 1979. The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press.

Burr, T., & Degotardi, S. (2021). From birth to three: Exploring educators' understandings of agency. *Australasian Journal of Early Childhood, 46*(4), 322-334. https://doi.org/10.1177/18369391211041775

Campbell, C., & Speldewinde, C. (2022). Early childhood STEM education for sustainable development. *Sustainability*, *14*(6), 3524-3524. https://doi.org/10.3390/su14063524

Chaudron, S, Plowman, L, Beutel, ME, Černikova, M, Donoso Navarette, V, Dreier, M, Fletcher-Watson, B, Heikkilä, A-S, Kontríková, V, Korkeamäki, R-L, Livingstone, S, Marsh, J, Mascheroni, G, Micheli, M, Milesi, D, Müller, KW, Myllylä-Nygård, T, Niska, M, Olkina, O, Ottovordemgentschenfelde, S.; K. Wölfling (2015). *Young children (0-8) and digital technology: A qualitative exploratory study across seven countries*. EU Commissioned Report, Publications Office of the European Union: Luxembourg http://publications.jrc.ec.europa.eu/repository/handle/JRC93239

Clarke, V., & Braun, V. (2014). Thematic analysis. In T. Teo (Ed.), *Encyclopedia of critical psychology* (pp. 1947–1952). New York, NY: Springer.

United Nations Convention on the Rights of the Child [UNCRC]. (2021). General Comment No. 25 (2021) on Children's Rights in Relation to the Digital Environment. https://www.ohchr.org/en/documents/general-comments-and-recommendations/general-comment-no-25-2021-childrens-rights-relation

United Nations Convention on the Rights of the Child [UNCRC]. (1989). Convention on the Rights of the Child. https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child

Council on Communications and Media. (2016). Media and young minds. *Pediatrics, 138*(5). https://doi.org/10.1542/peds.2016-2591

Creswell, J. W. (2003). A framework for design. In J. W. Creswell (Ed.), *Research design: Qualitative, quantitative, and mixed methods approaches* (pp. 3–26). SAGE.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Danby, S., Davidson, C., Ekberg, S., Breathnach, H., & Thorpe, K. (2016). 'Let's see if you can see me': making connections with Google Earth ™ in a preschool classroom. *Children's Geographies, 14*(2), 141-157. https://doi.org/10.1080/14733285.2015.1126231

Danby, S., Davidson, C., Given, L., & Thorpe, K. (2016). Composing an email: Social interaction in a preschool classroom. In S. Garvis & N. Lemon (Eds.), *Understanding Digital Technologies and Young Children: An international perspective* (pp. 5–18). Routledge.

Danby, S. (2013). Accessing knowledge through web interactions. *Educating Young Children, 19*(3), 30–32. https://doi.org/10.3316/aeipt.201865

Danby, S., Houen, S., Grant, S., Thorpe, K. & Davidson, C. (2013). Going online: Young children and teachers accessing knowledge through web interactions. *Educating Young Children: Learning and Teaching in the Early Childhood Years, 19*(3), 30–32. https://eprints.qut.edu.au/67549

Davidson, C., Danby, S., Given, L., & Thorpe, K. (2014). Talk about a YouTube video in preschool: the mutual production of shared understanding for learning with digital technology. *Australasian Journal of Early Childhood, 39*(3), 76–83. https://doi.org/10.1177/183693911403900310

Day, J., Freiberg, K., Hayes, A., & Homel, R. (2019). Towards scalable, integrative assessment of children's self-regulatory capabilities: New applications of digital technology. *Clinical Child and Family Psychology Review, 22*(1), 90-103. https://doi.org/10.1007/s10567-019-00282-4

DeCuir-Gunby, J. T., Marshall, P. L., & McCulloch, A. W. (2011). Developing and using a codebook for the analysis of interview data: An example from a professional development research project. *Field Methods, 23*(2), 136-155. https://doi.org/10.1177/1525822X10388468

Denzin, N. K. (1988). [Review of *Qualitative Analysis for Social Scientists.*, by A. L. Strauss]. *Contemporary Sociology*, *17*(3), 430–432. https://doi.org/10.2307/2069712

Department of Health (2017). *Australian 24-hour movement guidelines for the early years (birth to 5 years): an integration of physical activity, sedentary behaviour, and sleep.* Canberra. Commonwealth of Australia. https://www.health.gov.au/sites/default/files/documents/2021/05/24-hour-movement-guidelines-birth-to-5-years-brochure.pdf

Dias, P., Brito, R., Ribbens, W., Daniela, L., Rubene, Z., Dreier, M., Gemo, M., Di Gioia, R., & Chaudron, S. (2016). The role of parents in the engagement of young children with digital technologies: Exploring tensions between rights of access and protection, from 'Gatekeepers' to 'Scaffolders'. *Global Studies of Childhood, 6*(4), 414-427. https://doi.org/10.1177/2043610616676024

Donald, F. R. & Ulla, G.F. (2003). Kids and the New Millenium, A Comprehensive Analysis of Children's Media Use. http://kaiserfamilyfoundation.files.wordpress.com/2013/01/kidsmedia-thenew-millennium-report.pdf

Dong, C. (2018). Preschool teachers' perceptions and pedagogical practices: Young children's use of ICT. *Early Child Development and Care, 188*(6), 635-650. https://doi.org/10.1080/03004430.2016.1226293

Donohue, C., & Schomburg, R. (2017). Technology and interactive media in early childhood programs: What we've learned from five years of research, policy, and practice. *YC Young Children, 72*(4), 72-78. https://www.jstor.org/stable/90013713

Duffy, P., & Bruns, A. (2006). The use of blogs, wikis and RSS in education: A conversation of possibilities. In *Learning on the move: Proceedings of the online learning and teaching conference 2006* (pp. 31-38). Queensland University of Technology.

Durak, A., & Kaygin, H. (2020). Parental mediation of young children's internet use: Adaptation of parental mediation scale and review of parental mediation based on the demographic variables and digital data security awareness. *Education and Information Technologies, 25*(3), 2275-2296. https://doi.org/10.1007/s10639-019-10079-1

Early Childhood Australia (ECA). (2018). *Statement on young children and digital technologies*. Early Childhood Australia. http://dx.doi.org/10.23965/ECA.001

Early Childhood Australia (ECA). (2016). *Code of Ethics*. http://www.earlychildhoodaustralia.org.au/wp-content/uploads/2019/08/ECA-COE-Brochure-web-2019.pdf

Ebbeck, M., Yim, H. Y. B., Chan, Y., & Goh, M. (2016). Singaporean parents' views of their young children's access and use of technological devices. *Early Childhood Education Journal*, *44*, 127-134. https://doi.org/10.1007/s10643-015-0695-4

Edwards, S., Straker, L., & Oakey, H. (2018). Discussion paper: Towards an early childhood Australia statement on young children and digital technology. Canberra, ACT: ECA

Edwards, S., Nolan, A., Henderson, M., Mantilla, A., Plowman, L., & Skouteris, H. (2018). Young children's everyday concepts of the internet: A platform for cyber-safety education in the early years. *British Journal of Educational Technology, 49*(1), 45-55. https://doi.org/10.1111/bjet.12529

Elkin, M., Sullivan, A. & Bers, M. U. (2016). Programming with the KIBO robotics kit in preschool classrooms. *Interdisciplinary Journal of Practice, Theory, and Applied Research, 33*(3), 169-186. https://doi.org/10.1080/07380569.2016.1216251

Erinfolami, K. (2021). Six negative impacts of technology on children (and what you can do). 6 Negative Impacts of Technology on Children (And What You Can Do) (makeuseof.com)

Ernest, J. M., Causey, C., Newton, A. B., Sharkins, K., Summerlin, J., & Albaiz, N. (2014). Extending the global dialogue about media, technology, screen time, and young children. *Childhood Education*, *90*(3), 182-191. https://doi.org/10.1080/00094056.2014.910046

Falbe, T. (2015). Designing Web Interfaces for Kids. https://www.smashingmagazine.com/2015/08/designing-web-interfaces-for-kids/

Feagin, J. R., Orum, A. M., & Sjoberg, G. (Eds.). (1991). *A case for the case study*. UNC Press Books.

Ferranti, S. (2016). How screen addiction is damaging kids' brains. VICE. https://www.vice.com/en/article/5gqb5d/how-screen-addiction-is-ruining-the-brains-of-children

Fielding, K. & Murcia, K. (2022). Research linking digital technologies to young children's creativity: An interpretive framework and systematic review. *Issues in Educational Research, 32*(1), 105-125. http://www.iier.org.au/iier32/fielding.pdf

Fleer, M., & Rai, P. (2023). Zoom play: Affectively mobilised collective play across Family Day Care settings. *European Early Childhood Education Research Journal*, 1-18. https://doi.org/10.1080/1350293X.2023.2200019

Fleer, M. (2018). Digital animation: New conditions for children's development in play-based setting. *British Journal of Educational Technology*, *49*(5), 943-958. https://doi.org/10.1111/bjet.12637

Flack, C. B., Walker, L., Bickerstaff, A., & Margetts, C. (2020). Socioeconomic disparities in Australian schooling during the COVID-19 pandemic. *Melbourne, Australia: Pivot Professional Learning*, *13*, 319-340.

Freina, L., & Ott, M. (2015). A literature review on immersive virtual reality in education: state of the art and perspectives. *The International Scientific Conference eLearning and Software for Education, 1*(133), 133-141.

Gillen, J., Arnott, L., Marsh, J., Bus, A., Castro, T., Dardanou, M., & Holloway, D. (2018). *Digital Literacy and young children: towards better understandings of the benefits and challenges of digital technologies in homes and early years settings*. Policy briefing of DigiLitEY COST Action IS1410 and the Digital Childhoods SIG of the European Early Childhood Research Association. https://strathprints.strath.ac.uk/id/eprint/65712

Girmen, P., & Kaya, M. F. (2019). Using the flipped classroom model in the development of basic language skills and enriching activities: Digital stories and games. *International Journal of Instruction*, *12*(1), 555-572. https://doi.org/10.29333/iji.2019.12136a

Given, L., Cantrell-Winkler, D., Willson, R., Davidson, C., Danby, S., & Thorpe, K. (2014). Documenting young children's technology use: Observations in the home. *Proceedings of the Association for Information Science and Technology, 51*(1), 1-9. https://doi.org/10.1002/meet.2014.14505101028

Gjelaj, M., Buza, K., Shatri, K., & Zabeli, N. (2020). Digital technologies in early childhood: Attitudes and practices of parents and teachers in Kosovo. *International Journal of Instruction, 13*(1), 165-184. https://doi.org/10.29333/iji.2020.13111a

Government of Western Australia. (2012). *Education and Care Services National Law (WA) Act 2012*. https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_46304.pdf/$FILE/Education%20and%20Care%20Services%20National%20Law%20(WA)%20Act%202012%20-%20%5B01-d0-00%5D.pdf?OpenElement

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Sage.

Gutnick, A. L., Robb, M., Takeuchi, L., & Kotler, J. (2011). *Always connected: The new digital media habits of young children.* New York: The Joan Ganz Cooney Center at Sesame Workshop. http://www.joanganzcooneycenter/org/wpcontent/uploads/2011/03/jgcc_alwaysconnected.pdf

Haddon, L. & Vincent, J. (2014). *European children and their carers' understanding of use, risks and safety issues relating to convergent mobile media*. Report D4.1. Unicatt. http://eprints.lse.ac.uk/60147/1/__lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_Net%20Children%20Go%20Mobile%20Project_Reports_European%20children%20and%20their%20carers%E2%80%99%20understanding_2014.pdf

Hannaway, D. M., & Steyn, M. G. (2017). Teachers' experiences of technology-based teaching and learning in the Foundation Phase. *Early Child Development and Care*, *187*(11), 1745-1759. https://doi.org/10.1080/03004430.2016.1186669

Hatzigianni, M., & Kalaitzidis, I. (2018). Early childhood educators' attitudes and beliefs around the use of touchscreen technologies by children under three years of age. *British Journal of Educational Technology, 49*(5): 883–895. https://doi.org/10.1111/bjet.12649

Haughton, C., Aiken, M., & Cheevers, C. (2015). Cyber babies: The impact of emerging technology on the developing infant. *Psychology, 5*(9), 504-518. https://doi.org/10.17265/2159-5542/2015.09.002

Heikkila, M., & Mannila, L. (2018). Debugging in programming as a multimodal practice in early childhood education settings. *Multimodal Technologies and Interactions, 42*(2), 1 – 19. https://doi.org/10.3390/mti2030042

Helsper, E. J., & Eynon, R. (2010). Digital natives: where is the evidence?. *British Educational Research Journal*, *36*(3), 503-520. https://doi/org/10.1080/01411920902989227

Hiniker, A., Suh, H., Cao, S., & Kientz, J. A. (2016, May). Screen time tantrums: How families manage screen media experiences for toddlers and preschoolers. In Proceedings of the 2016 CHI conference on human factors in computing systems (pp. 648-660).

Holloway, D., Green, L., & Livingstone, S. (2013). Zero to eight: young children and their internet use. LSE, EU Kids Online. https://ro.ecu.edu.au/ecuworks2013/929

Houen, S., & Danby, S. (2022). Integrating digital technologies into ECEC programs. https://www.digitalchild.org.au/blog/integrating-digital-technologies-into-ecec-programs/

Hsin, C. T., Li, M. C., & Tsai, C. C. (2014). The influence of young children's use of technology on their learning: A review. *Journal of Educational Technology & Society*, *17*(4), 85-99. https://www.proquest.com/scholarly-journals/influence-young-childrens-use-technology-on-their/docview/1660156345/se-2

Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational technology research and development*, *58*, 137-154. https://doi.org/10.1007/s11423-009-9132-y

International Society for Technology in Education. (2007). *ISTE standards for students.* Washington, DC. https://www.iste.org/standards/for-students

Jago, R., Stamatakis, E., Gama, A., Carvalhal, I. M., Nogueira, H., Rosado, V., & Padez, C. (2012). Parent and child screen-viewing time and home media environment. *American Journal of Preventive Medicine, 43*(2), 150-158. https://doi.org/10.1016/j.amepre.2012.04.012

James, A., & Prout, A. (Eds.). (2015). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood*. Routledge.

Johnston, K., Kervin, L., & Wyeth, P. (2022, May 24). *Defining digital technology*. Australian Research Council Centre of Excellence for the Digital Child. https://www.digitalchild.org.au/blog/defining-digital-technology/

Johnston, K. (2021). Engagement and immersion in digital play: Supporting young children's digital wellbeing. *International Journal of Environmental Research and Public Health, 18*(19). https://doi.org/10.3390/ijerph181910179

Kalogiannakis, M., & Papadakis, St. (2019). Evaluating pre-service kindergarten teachers' intention to adopt and use tablets into teaching practice for natural sciences. *International Journal of Mobile Learning and Organisation, 13*(1),113-127. https://doi.org/10.1504/IJMLO.2019.096479

Kaye, L. (Ed.). (2017). Young children in a digital age: Supporting learning and development with technology in early years. In *Young Children in a Digital Age* (pp. 15-31). Routledge.

Kervin, L., Verenikina, I., & Rivera, C. (2018). Digital play and learning in the home: Families' perspective. In S. Danby, M. Fleer, C. Davidson, & M. Hatzigianni (Eds.), *Digital childhoods: International perspectives on early childhood education and development* (pp. 117–130). Singapore: Springer.

Kewalramani, S. & Veresov, N. (2022). Multimodal creative inquiry: Theorising a new approach for children's science meaning-making in early childhood education.

Research in Science Education, 52, 977 – 947. https://doi.org/10.1007/s11165-021-10029-3

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of higher education, 6*(5), 26-41. https://doi.org/10.5430/ijhe.v6n5p26

Konca, A. S. (2022). Digital technology usage of young children: Screen time and families. *Early Childhood Education Journal, 50*(7), 1097-1108. https://doi.org/10.1007/s10643-021-01245-7

Konca, A. S., & Koksalan, B. (2017). Preschool Children's Interaction with ICT at Home. *International Journal of Research in Education and Science*, *3*(2), 571-581. https://doi.org/10.21890/ijres.328086

Kostyrka-Allchorne, K., Cooper, N. R., & Simpson, A. (2017). Touchscreen generation: children's current media use, parental supervision methods and attitudes towards contemporary media. *Acta Paediatrica*, *106*(4), 654-662. https://doi.org/10.1111/apa.13707

Kucirkova, N., & Sakr, M. (2015). Child–father creative text-making at home with crayons, iPad collage & PC. *Thinking Skills and Creativity, 17*, 59-73. https://doi.org/10.1016/j.tsc.2015.05.003

Lauricella, A. R., Wartella, E., & Rideout, V. J. (2015). Young children's screen time: The complex role of parent and child factors. *Journal of Applied Developmental Psychology*, *36*, 11-17. https://doi.org/10.1016/j.appdev.2014.12.001

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage.

Livingstone, S. (2007). Strategies of parental regulation in the media-rich home. *Computers in human behavior*, *23*(2), 920-941. https://doi.org/10.1016/j.chb.2005.08.002

Livingstone, S., Ólafsson, K., Helsper, E. J., Lupiáñez-Villanueva, F., Veltri, G. A., & Folkvord, F. (2017). Maximizing opportunities and minimizing risks for children online: The role of digital skills in emerging strategies of parental mediation. *Journal of Communication, 67*(1), 82-105. https://doi.org/10.1111/jcom.12277

Livingstone, S., Mascheroni, G., Dreier, M., Chaudron, S., & Lagae, K. (2015). *How parents of young children manage digital devices at home: The role of income, education and parental style*. EU Kids Online, LSE. https://eprints.lse.ac.uk/63378/1/__lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_EU%20Kids%20Online_EU_Kids_Online_How%20parents%20manage%20digital%20devices_2016.pdf

Livingstone, S., Haddon, L., Vincent, J., Mascheroni, G. and Ólafsson, K. (2014). *Net Children Go Mobile: The UK Report*. London: London School of Economics and Political Science. https://netchildrengomobile.eu/ncgm/wp-content/uploads/2013/07/NCGM_UK-Report_FINAL-VERSION.pdf

Livingstone, S., & Helsper, E. (2008) Parental Mediation of Children's Internet Use. *Journal of Broadcasting & Electronic Media, 52*(4), 581-599, https://doi.org/10.1080/08838150802437396

Luckin, R. (2018). *Enhancing Learning and Teaching with Technology: What the Research Says*. UCL Institute of Education Press.

Luo, W., Berson, I. R., & Berson, M. J. (2023). A Social Media Analysis of the Experiences of Chinese Early Childhood Educators and Families with Young Children during COVID-19. *Sustainability, 15*(3), 2560. https://doi.org/10.3390/su15032560

Luo, W., Berson, I. R., & Berson, M. J. (2022) Enhancing preschool–home collaboration: lessons from virtual home visit experiences during the COVID-19 outbreak in China, *Early Years, 42*(1), 119-135, https://doi.org/10.1080/09575146.2021.2008880

Luo, W., Berson, I. R., Berson, M. J., & Li, H. (2021). Are early childhood teachers ready for digital transformation of instruction in Mainland China? A systematic literature review. *Children and Youth Services Review*, 120, 105718. https://doi.org/10.1016/j.childyouth.2020.105718

MacDonald, B., & Walker, R. (1976). *Changing the curriculum*. London: Open Books Limited.

Major, L., & Watson, S. (2018). Using video to support inservice teacher professional development: The state of the field, limitations and possibilities. *Technology, Pedagogy and Education, 27*(1), 49–68. https://doi.org/10.1080/1475939X.2017.1361469

Makransky, G., & Lilleholt, L. (2018). A structural equation modeling investigation of the emotional value of immersive virtual reality in education. *Educational Technology Research and Development, 66*(5), 1141-1164. https://doi.org/10.1007/s11423-018-9581-2

Mantilla, A. & Edwards, S. (2019). Digital technology use by and with young children: A systematic review for the statement on young children and digital technologies. *Australasian Journal of Early Childhood*. *44*(2) 182 -195. https://doi.org/10.1177/1836939119832744

Marsh, J. (2016). The digital literacy skills and competencies of children of pre-school age. *Media Education, 7*(2), 178– 195. https://oaj.fupress.net/index.php/med/article/view/8759/8534

Mascheroni, G. & Ólafsson, K. (2014). Net Children Go Mobile: risks and opportunities (2nd ed.). Milano, Italy: Educatt.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach*. Sage publications.

McArthur, B. A., Tough, S., & Madigan, S. (2022). Screen time and developmental and behavioral outcomes for preschool children. *Pediatric Research*, *91*(6), 1616-1621. https://doi.org/10.1038/s41390-021-01572-w

McPake, J., Plowman, L., & Stephen, C. (2013). Preschool children creating and communicating with digital technologies in the home. *British Journal of Educational Technology, 44*(3), 421–431. https://doi.org/10.1111/j.1467-8535.2012.01323.x

Mendoza, K. (2009). Surveying parental mediation: Connections, challenges and questions for media literacy. *Journal of Media Literacy Education, 1*(1), 28–41. https://doi.org/10.23860/jmle-1-1-3

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.

Mertala, P. (2019). Teachers' beliefs about technology integration in early childhood education: A meta-ethnographical synthesis of qualitative research. *Computers in Human Behavior*, *101*, 334-349. https://doi.org/10.1016/j.chb.2019.08.003

Mertens, D. M. (2019). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods*. Sage publications.

Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook (2nd ed.)*. Sage Publications.

Morgan, H. (2013). Technology in the classroom: Using Skype for exciting projects. *Childhood Education, 89*(3), 197-199. https://doi.org/10.1080/00094056.2013.793076

Moon, K. & Blackman, D. (2017). A guide to ontology, epistemology, and philosophical perspectives for interdisciplinary researchers. *Conservation Biology*, 28, 1167-1177.

Mourlam, D. J., Strouse, G. A., Newland, L. A., & Lin, H. (2019). Can they do it? A comparison of teacher candidates' beliefs and preschoolers' actual skills with digital technology and media. *Computers & Education, 129*, 82-91. https://doi.org/10.1016/j.compedu.2018.10.016

Murcia, K. (2021). Young children learning to code: A digital technologies framework for the early years. In K. Murcia, C. Campbell, M. Joubert, & S. Wilson (Eds.), Young children's rights in a digital world (pp. 255–266). Springer.

Murcia, K., Campbell, C., Joubert, M., & Wilson, S. (2022). *Children's creative inquiry in STEM*. Springer. https://doi.org/10.1007/978-3-030-94724-8

Murcia, K & Cross, E. (2022). Empowering early childhood teachers to develop digital technology pedagogies: An Australian action research case study. In *STEM Robotics, Mobile Apps in Early Childhood and Primary Education.* Springer. 35-53. https://doi.org/10.1007/978-981-19-0568-1

Murcia, K., Pepper, C., Joubert, M., Cross, E., & Wilson, S. (2020). A framework for identifying and developing children's creative thinking while coding with digital technologies. *Issues in Educational Research*, *30*(4), 1395-1417.

Murcia, K. & Tang, K.-S. (2019). Exploring the multimodality of young children's coding. *Australian Educational Computing, 34*(1), 1-15. http://journal.acce.edu.au/index.php/AEC/article/view/208/163

Murcia, K., Campbell, K., Aranda, G. (2018). Trends in early childhood education practice and professional learning with digital technologies. *Pedagogika, 68*(3), 235–250. https://doi.org/10. 14712/23362189.2018.858

National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center. (2012) *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth Through Age 8*. Washington, DC: National Association for the Education of Young Children and the Fred Rogers Center. Developmentally Appropriate Practice (DAP) | NAEYC

Nikken, P., & Jansz, J. (2014). Developing scales to measure parental mediation of young children's internet use. *Learning, Media and technology*, *39*(2), 250-266. https://doi.org/10.1080/17439884.2013.782038

Nikolopoulou, K. (2021). Mobile devices in early childhood: Teachers' views on the benefits and barriers. *Education Information Technology, 26*, 3279 – 3292. https://doi.org/10.1007/s10639-020-10400-3

Nikolopoulou, K., & Gialamas, V. (2015). Barriers to the integration of computers in early childhood settings: Teachers' perceptions. *Education and Information Technologies, 20*(2), 285–301. https://doi.org/10.1007/s10639-013-9281-9

Nolan, A., Edwards, S., Salamon, A., Straker, L., Grieshaber, S., Skouteris, H., Henderson, M., Highfield, K., & Bartlett, J. (2021). Young children's agency with digital technologies. *Children & Society*. 1-23. https://doi.org/10.1111/chso.12512

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1), https://doi.org/10.1177/1609406917733847

OECD (2020), *Digital Transformation in the Age of COVID-19: Building Resilience and Bridging Divides*, Digital Economy Outlook 2020 Supplement, OECD, Paris, www.oecd.org/digital/digital-economy-outlook-covid.pdf.

Office of the eSafety Commissioner. (2023). eSafety Early Years program. Melbourne: eSafety Commissioner https://www.esafety.gov.au/about-us/what-we-do/our-programs/esafety-early-years-program

Office of the eSafety Commissioner. (2022). *eSafety checklist for early learning services*. eSafety Commissioner. https://www.esafety.gov.au/sites/default/files/2020-07/Checklist%20for%20Early%20Learning%20Services.pdf

Office of the eSafety Commissioner. (2020a). *eSafety early years; online safety for under 5's*. eSafety Commissioner. https://www.esafety.gov.au/parents/children-under-5/online-safety-for-under-5s-booklet

Office of the eSafety Commissioner. (2020b). *Cyberbullying*. eSafety Commissioner. https://www.esafety.gov.au/key-issues/cyberbullying

Office of the eSafety Commissioner. (2018a). *Parenting in the Digital Age*. eSafety Commissioner. https://www.esafety.gov.au/sites/default/files/2019-07/eSafety%20Research%20Parenting%20Digital%20Age.pdf

Office of the eSafety Commissioner. (2018b). Supervising pre-schoolers online. eSafety Commissioner. https://www.esafety.gov.au/about-us/research/digital-parenting/supervising-preschoolers-online

Otter.ai. (2022). https://otter.ai/privacy-policy

Ozturk, G., & Ohi, S. (2022). What do they do digitally? Identifying the home digital literacy practices of young children in Turkey. *Early Years*, *42*(2), 151-166. https://doi.org/10.1080/09575146.2019.1702925

Palaiologou, I. (2016a). Teachers' dispositions towards the role of digital devices in play-based pedagogy in early childhood education. *Early Years: An International Research Journal, 36*(3), 305–321. https://doi.org/10.1080/09575146.2016.1174816

Palaiologou, I. (2016b). Children under five and digital technologies: Implications for early years pedagogy. *European Early Childhood Education Research Journal*, *24*(1), 5-24. https://doi.org/10.1080/1350293X.2014.929876

Papadakis, S., & Kalogiannakis, M. (2017). Mobile educational applications for children: what educators and parents need to know. *International Journal of Mobile Learning and Organisation*, *11*(3), 256-277. https://doi.org/10.1504/IJMLO.2017.085338

Papadakis, S., Kalogiannakis, M., & Zaranis, N. (2017). Designing and creating an educational app rubric for preschool teachers. *Education and Information Technologies, 22*(6), 3147-3165. https://doi.org/10.1007/s10639-017-9579-0

Papadakis, St., Zaranis, N. & Kalogiannakis, M. (2019). Parental involvement and attitudes towards young Greek children's mobile usage. *International Journal of Child-Computer Interaction, 22*(2019) 100144. https://doi.org/10.1016/j.ijcci.2019.100144

Parette Jr, H. P., & Blum, C. (2014). Using flexible participation in technology-supported, universally designed preschool activities. *Teaching Exceptional Children*, *46*(3), 60-67. https://doi.org/10.1177/004005991404600307

Pendergast, E., Lieberman-Betz, R., & Vali, C. (2017). Attitudes and beliefs of prekindergarten teachers towards teaching science to young children. *Early Childhood Education, 45*, 43 – 52. https://doi.org/10.1007/s10643-015-0761-y

Peshkin, A. (1993). The goodness of qualitative research. *Educational Researcher, 22*(2), 23-29. https://doi.org/10.3102/0013189X022002023

Pham, L. T. M. (2018). *Qualitative Approach to Research, a Review of Advantages and Disadvantages of Three Paradigms: Positivism, Interpretivism and Critical Inquiry*. (Master), University of Adelaide, Adelaide, Australia.

Pila, S., Lauricella, A., Piper, A., & Wartella, E. (2022). Preschool teachers' perspectives on (haptic) technology in the classroom. *Frontiers in Education, 7*, 1 – 12. https://doi.org/10.3389/feduc.2022.981935

Plowman, L. (2015). Researching young children's everyday uses of technology in the family home. *Interacting with Computers, 27*(1), 36-46. https://doi.org/10.1093/iwc/iwu031

Plowman, L., & Hancock, J. (2014). Six questions that parents ask about children's use of digital media: A review. *London: The Children's Media Foundation*.

Preradovic, N. M., Lesin, G., & Boras, D. (2016). Introduction of digital storytelling in preschool education: A case study from Croatia. *Digital Education Review*, 94-105. https://doi.org/10.1344/der.2016.30.94-105

Punch, K. (2005). *Introduction to Social Research: Quantitative and Qualitative Approaches*. Sage Publications.

Reynolds, B., & Duff, K. (2016). Families' perceptions of early childhood educators' fostering conversations and connections by sharing children's learning through pedagogical documentation. *Education 3-13(44)*, 100 - 93. https://doi.org/10.1080/03004279.2015.1092457

Rice, M. F., & Deschaine, M. E. (2020, April). Orienting toward teacher education for online environments for all students. *The Educational Forum*, 84(2), 114-125. Routledge. https://doi.org/10.1080/00131725.2020.1702747

Rideout, V., & Robb, M. B. (2020). *The Common Sense census: Media use by kids age zero to eight*. https://www.commonsensemedia.org/sites/default/files/research/report/2020_zero_to_eight_census_final_web.pdf

Robson, C. (2011). *Real World Research*. Blackwell Publishing. https://doi.org/10.1016/j.jclinepi.2010.08.001

Rogoff, B. (2003). *The Cultural Nature of Human Development*. Oxford University Press.

Rowley, J. (2002). Using case studies in research. *Management Research News, 25*(1), 16-27. https://doi.org/10.1108/01409170210782990

Scherer, R., Tondeur, J., Siddiq, F., & Baran, E. (2018). The importance of attitudes toward technology for preservice teachers' technological, pedagogical, and content knowledge: Comparing structural equation modeling approaches. *Computers in Human Behavior, 80*, 67–80. https://doi.org/10.1016/j.chb.2017.11.003

Schoch, K. 2020. Case study research. In *Research design and methods: An applied guide for the scholar-practitioner* (pp. 245–258). London: SAGE.

Schriever, V. (2021). Early childhood teachers' management of their changing roles regarding digital technologies in kindergarten: A grounded theory study. *Australasian Journal of Early Childhood, 46*(1), 32-49. https://doi.org/10.1177/1836939120979065

Schriever, V., Simon, S., & Donnison, S. (2020). Guardians of play: Early childhood teachers' perceptions and actions to protect children's play from digital technologies. *International Journal of Early Years Education*, *28*(4), 351-365. https://doi.org/10.1080/09669760.2020.1850431

Schwandt, T. A. (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. In *Handbook of qualitative research* (pp. 189-213). SAGE Publishing.

Segal-Drori, O., & Shabat, A. B. (2021). Preschoolers' views on integration of digital technologies. *Journal of Childhood, Education & Society*, *2*(1), 29-42. https://doi.org/10.37291/2717638X.20212172

Sharkins, K. A., Newton, A. B., Albaiz, N. E., A., & Ernest, J. M. (2016). Preschool children's exposure to media, technology, and screen time: Perspectives of caregivers from three early childcare settings. *Early Childhood Education Journal, 44*(5), 437-444. https://doi.org/10.1007/s10643-015-0732-3

Sheehan, K., & Rothschild, M. (2020). *Promoting Math Teachers' Confidence and Self-Perception of Efficacy with Educational Technology*. Common Sense Media

Shin, W., & Li, B. (2017). Parental mediation of children's digital technology use in Singapore. *Journal of Children and Media, 11(*1), 1-19. https://doi.org/10.1080/17482798.2016.1203807

Siddiq, F., Scherer, R., & Tondeur, J. (2016). Teachers' emphasis on developing students' digital information and communication skills (TEDDICS): A new construct in 21st century education. *Computers & Education*, *92*, 1-14. https://doi.org/10.1016/j.compedu.2015.10.006

Smahelova, M., Juhová, D., Cermak, I., & Smahel, D. (2017). Mediation of young children's digital technology use: The parents' perspective. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 11*(3). https://doi.org/10.5817/CP2017-3-4

Stahl, N. A., & King, J. R. (2020). Expanding approaches for research: Understanding and using trustworthiness in qualitative research. *Journal of Developmental Education, 44*(1), 26-29. https://www.proquest.com/scholarly-journals/expanding-approaches-research-understanding-using/docview/2467348904/se-2

Staksrud, E., & Livingstone, S. (2009). Children and online risk: Powerless victims or resourceful participants?. *Information, Communication & Society*, *12*(3), 364-387. https://doi.org/10.1080/13691180802635455

Storypark. (2021). *Terms of Use*. https://main.storypark.com/terms-of-use

Stake, R. E. (1995). *The art of case study research.* Sage.

Stake, R. E. (1978). The case study method in social inquiry. *Educational Researcher, 7*(2), 5-8. https://doi.org/10.3102/0013189X007002005

Straker, L., Zabatiero, J., Danby, S., Thorpe, K., & Edwards, S. (2018). Conflicting guidelines on young children's screen time and use of digital technology create policy and practice dilemmas. *The Journal of Pediatrics, 202*, 300-303. https://doi.org/10.1016/j.jpeds.2018.07.019

Stratigos, T., & Fenech, M. (2021). Early childhood education and care in the app generation: Digital documentation, assessment for learning and parent communication. *Australasian Journal of Early Childhood, 46*(1), 19-31. https://doi.org/10.1177/1836939120979062

Strauss, A., & Corbin, J. (1990). *Basics of Qualitative Research*. Sage Publications.

Sweeney, T. A., Georg, S. M., & Ben, F. (2019). Home internet use by eight-year-old children. *Australian Educational Computing*, *34*(1). http://journal.acce.edu.au/index.php/AEC/article/view/206

Tay, J. (2021). Digital technologies and Children: Does more digital interactivity make for better learning? In D. Holloway, M. Willson, K. Murcia, C. Archer, & F. Stocco. (Eds.). *Young Children's Rights in a Digital World, Play, Design and Practice*. (pp. 161 – 176). Cham: Springer. https://doi.org/10.1007/978-3-030-65916-5

Teichert, L., and A. Anderson. (2014). I don't even know what blogging is: The role of digital media in a five-year-old girl's life." *Early Child Development and Care, 184*(11), 1677–1691. https://doi.org/10.1080/03004430.2013.875540

Thomas, D. R. (2003). A general inductive approach for qualitative data analysis. Paper presented at School of Population Health, University of Auckland, New Zealand, August.

Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2020). Enhancing pre-service teachers' technological pedagogical content knowledge (TPACK): A mixed-method study. *Educational Technology Research and Development, 68*(1), 319-343. https://doi.org/10.1007/s11423-019-09692-1

Tremblay, M. S., Chaput, J., Adamo, K., Aubert, S., Barnes, J. D., Choquette, L., Duggan, M., Faulkner, G., Goldfield, G. S., Gray, C. E., Gruber, R., Janson, K., Janssen, I., Janssen, X., Garcia, A. J., Kuzik, N., LeBlanc, C., MacLean, J., Okely, A. D.; Carson, V. (2017). Canadian 24-hour movement guidelines for the early years (0–4 years): an integration of physical activity, sedentary behaviour, and sleep. *BMC public health*, *17*(5), 1-32. https://doi.org/10.1186/s12889-017-4859-6

Tuckett, A. G. (2005). Applying thematic analysis theory to practice: A researcher's experience. *Contemporary Nurse, 19*(1-2), 75–87. https://doi.org/10.5172/conu.19.1-2.75

Twinkl. (2023). What is Digital Literacy? https://www.twinkl.com.au/teaching-wiki/digital-literacy

UNICEF, 2012. UNICEF Annual Report 2012. https://www.unicef.org/media/92866/file/UNICEF-annual-report-2012.pdf

U.S. Department of Education (2016). Office of Educational Technology: *Early Learning and Educational Technology policy brief*. Early Learning and Educational Technology Policy Brief - Office of Educational Technology

Vannoni, M. (2015). What are case studies good for? Nesting comparative case study research into the Lakatosian research program. *Cross-Cultural Research, 49*(4), 331-357. https://doi.org/10.1177/1069397114555844

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences, 15*(3), 398-405. https://doi.org/10.1111/nhs.12048

Vasudevan, L., & Riina-Ferrie, J. (2019). Collaborative filmmaking and affective traces of belonging. *British Journal of Educational Technology, 50*(4), 1560-1572. https://doi.org/10.1111/bjet.12808

Watt, D. (2007). On Becoming a Qualitative Researcher: The Value of Reflexivity. *The Qualitative Report, 12*(1), 82–101.

White, E. J., Rooney, T., Gunn, A. C., & Nuttall, J. (2021). Understanding how early childhood educators 'see' learning through digitally cast eyes: Some preliminary concepts concerning the use of digital documentation platforms. *Australasian Journal of Early Childhood, 46*(1), 6-18. https://doi.org/10.1177/1836939120979066

Williams, P.G., Lerner, M.A. (2019). Council on Early Childhood and Council on School Health. School readiness. *Pediatrics, 144*(2). https://doi.org/10.1542/peds.2019-1766

Wilson, S., Murcia, K., Cross, E., & Lowe, G. (2023) Digital technologies and the early childhood sector: Are we fostering digital capabilities and agency in young children? The *Australian Educational Researcher.* https://doi.org/10.1007/s13384-023-00647-3

Wood, E., Nuttall, J., Edwards, S., & Grieshaber, S. (2019). Young children's digital play in early childhood settings: Curriculum, pedagogy and teachers' knowledge. In O. Erstad, R. Flewitt, B. Kümmerling-Meibauer, & I. Pereira (Eds.), *Routledge handbook of digital literacies in early childhood* (pp. 214–226). Routledge.

Wu, C., Fowler, C., Lam, W., Wong, H., Wong, C., & Loke, A. (2014). Parenting approaches and digital technology use of preschool age children in a Chinese community. *Italian Journal of Pediatrics, 40*(1), 1–8. https://doi.org/10.1186/1824-7288-40-44

Xu, W., & Zammit, K. (2020). Applying thematic analysis to education: A hybrid approach to interpreting data in practitioner research. *International Journal of Qualitative Methods, 19,* 1-9. https://doi.org/10.1177/1609406920918810

Yelland, N. (2011). Reconceptualising play and learning in the lives of young children. *Australasian Journal of Early Childhood, 36*(2), 4-12. https://doi.org/10.1177/183693911103600202

Yin, R. K. (2003). Designing case studies. *Qualitative research methods*, *5*(14), 359-386.

Yin, R. K. (1994). Discovering the future of the case study. Method in evaluation research. *Evaluation Practice, 15*(3), 283-290. https://doi.org/10.1016/0886-1633(94)90023-X

Zabatiero, J., Straker, L., Mantilla, A., Edwards, S., & Danby, S. (2018). Young children and digital technology: Australian early childhood education and care sector adults' perspectives. *Australasian Journal of Early Childhood*, *43*(2), 14-22. https://doi.org/10.23965/AJEC.43.2.02

Zaman, B., Nouwen, M., Vanattenhoven, J., De Ferrerre, E., & Looy, J. V. (2016). A qualitative inquiry into the contextualized parental mediation practices of young children's digital media use at home. *Journal of Broadcasting & Electronic Media, 60*(1), 1-22. https://doi.org/10.1080/08838151.2015.1127240

Zancanella, D., & Rice, M. F. (Eds.). (2021). Framing policies and procedures to include digital literacies for online learning during and beyond crises. *Journal of Adolescent & Adult Literacy, 65*(2), 183-188. https://doi.org/10.1002/jaal.1194

Appendices

Appendix A

DIRECTOR PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student Researcher:	Sinead Wilson

What is the project about?

The proposed research will investigate the digital technologies young children are engaging with, how parents and educators can best manage children's active learning with these technologies while staying safe online. A secondary aim of the research will be to understand if a correlation exists between technology use in Early Years Centres and technology use in the family home. Through qualitative analysis of data collected through both observations of young children, and interviews with the child, their parent/s, and their Early Years educators the research will present an in-depth investigation into Western Australian children's use of digital technologies. This will include an exploration of the opportunities and risks related to children's engagement with digital technologies, specifically at three and four years of age. Research evidence of effective strategies utilised by carers of children could inform governments and policy makers and enable them to create relevant and up-to-date policies for Early Years Centres, as well as provide valuable and informed advice to parents.

Who is doing the research?

This project is being conducted by Sinead Wilson. The results of this research project will help form a Doctor of Philosophy credited by Curtin University and is funded by the University. No money will be exchanged between you, as the research participant, and Sinead Wilson, as the researcher.

Why am I being asked to take part and what will I have to do?

The research will include interviews of both parents and educators of three- and four-year olds who attend one of four predetermined Early Years Centres. The first part of the project involves the researcher observing the child's interaction with digital technologies in their Early Years Centre. The observations will take place in the child's classroom, without any interference to their normal everyday activities. Photos will be taken (on a smart phone) to

capture the children using digital technologies and as evidence of their behaviour for later analysis. Every photo will be taken (by the researcher) to maximise anonymity, from a bird's eye view, focusing specifically on the child's hands and activities.

The second part of the project will involve one-to-one confidential interviews with the researcher (child, parent, educator and you as Director). We anticipate this interview will take between 20 – 90 minutes (the children's interviews will take considerably less time, approximately 15 minutes, or according to the activity they are engaging with). The interview will be semi- structured, but we are mostly interested in hearing your perspective on the topic. For you as the Director, the interview will take place at your Early Years Centre or in a neutral setting – whichever is most agreeable for you. As part of the interview process, the researcher will keep an audio recording so the conversation can be revisited at a later stage if needed. If you agree, the researcher may also take some notes while you are answering your interview questions. Following every interview, the researcher will make a full written copy of the interview. The process for the children's parents and educators will be similar and they will be provided with all the information pertaining to the research.

The researcher will ask for your assistance in recruitment of both educators and parents. This may involve an email out to all children's parents, or permission to disseminate a hard copy flyer, inclusive of the information relevant to their participation in the research. The researcher will work with you to determine the best strategy for your Early Years Centre.

Are there any benefits' to being in the research project?
This research hopes to improve our understanding of what devices three- and four-year olds choose to engage with and why, what most parents and educators deem concerning around the risks involved with allowing young children online, and what mediation strategies work well for children engaging online. This information may inform policies for Early Years Centres, the Australian Government, and you, as parents and educators of three- and four-year olds in Western Australian society.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?
There are no foreseeable risks involving your, the educators, the parent, or the child's participation in this research project. Please know that you can end your participation in the research. at any time if you so choose.

Who will have access to my information?
All stored information pertaining to either the observation or interview notes will be anonymised so participants cannot be identified through the results section of the PhD thesis. Only the researcher will have the ability to match your name if it is necessary to do so for any reason. Any information collected will be treated as confidential and used only in this project

unless otherwise specified. However, in the event of an audit or investigation, the information may be shared with staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data (including audio recordings) will be stored securely. The information collected in this study will be kept under secure conditions at Curtin University for seven years after the research has ended and then it will be destroyed. Lastly, the results of this research may be presented at conferences or published in professional journals. Again, no participants in this study will be identified in any results that are presented or published.

Will you tell me the results of the research?

If you opt in, you will be provided with a summary of the results and some advice around the favourable mediation strategies used to manage children's engagement and safety online. This information can be emailed directly to your email address should you provide it to the researcher. Results will not be individualised but based on all the information collected and reviewed as part of the research.

Do I have to take part in the research project?

Your participation in this research project is completely voluntary. You can withdraw your participation at any phase of the research with no explanation or reason. Your participation, or withdrawal if elected, will not affect your relationship with Curtin University, staff or colleagues.

Further information

If you decide to take part in this research, it will require a signed a consent form. Submitting a signed consent form indicates your willingness to participate in the research, that you understand the requirements of your involvement in the project and that you are happy to have your information used as described. Please take your time to consider your participation and ask any questions you have before signing the form. You will be provided with your own copy of this information statement and the consent form.

The Curtin University Human Research Ethics Committee (HREC) have approved this study (HREC number 2020-0608). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au. If you have any further questions or would like to contact the researcher, please email sinead.wilson@postgrad.curtin.edu.au.

Appendix B
DIRECTOR CONSENT FORM

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student researcher:	Sinead Wilson
Version Number:	1
Version Date:	23/10/2020

- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I know that I don't have to be involved in this project, but I would like to be.
- I voluntarily consent to take part in this research project.
- I have read the Information Statement provided to me and I understand its contents.
- I understand I will receive a copy of the Information Statement and this Consent Form.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I know that I will be participating in an interview as part of the project.
- I understand that the interview will be transcribed into written format, and the notes will be kept according to Curtin University guidelines.
- I understand that I am able to withdraw my participation at any time. If I choose to leave the study, any information collected will be used unless I direct otherwise.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that I need to sign my name in the space below, prior to my participation in the project.
- I understand that I may be asked to disseminate information to parents to assist the researcher in recruiting participants.

Further to these points, I agree/ do not agree to the following:

☐ I do	☐ I do not	consent to being audio-recorded
☐ I do	☐ I do not	consent to be contacted about future research projects that are related to this project
☐ I do	☐ I do not	consent to the storage and use of my information in future ethically approved research projects related to this project

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Statement and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	Sinead Wilson
Researcher Signature	
Date	

Appendix C
EDUCATOR PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student Researcher:	Sinead Wilson

What is the project about?

The proposed research will investigate the digital technologies young children are engaging with, how parents and educators can best manage children's active learning with these technologies while staying safe online. A secondary aim of the research will be to understand if a correlation exists between technology use in Early Years Centres and technology use in the family home. Through qualitative analysis of data collected through both observations of young children, and interviews with the child, their parent/s, and their Early Years educators the research will present an in-depth investigation into Western Australian children's use of digital technologies. This will include an exploration of the opportunities and risks related to children's engagement with digital technologies, specifically at three and four years of age. Research evidence of effective strategies utilised by carers of children could inform governments and policy makers and enable them to create relevant and up-to-date policies for Early Years Centres, as well as provide valuable and informed advice to parents.

Who is doing the research?

This project is being conducted by Sinead Wilson. The results of this research project will help form a Doctor of Philosophy credited by Curtin University and is funded by the University. No money will be exchanged between you, as the research participant, and Sinead Wilson, as the researcher.

Why am I being asked to take part and what will I have to do?

The research will include interviews of both parents and educators of three- and four-year olds who attend one of four predetermined Early Years Centres. The first part of the project involves the researcher observing the child's interaction with digital technologies in their Early Years Centre. The observations will take place in the child's classroom, without any interference of your normal everyday activities. Photos will be taken (on a smart phone) to capture the children using digital technologies and as evidence of their behaviour for later

analysis. Every photo will be taken (by the researcher) to maximise anonymity, from a bird's eye view, focusing specifically on the child's hands and activities.

The second part of the project will involve one-to-one confidential interviews with the researcher (parent and educator). We anticipate this interview will take between 20 – 90 minutes (the children's interviews will take considerably less time, approximately 15 minutes, or according to the activity they are engaging with). The interview will be semi- structured, but we are mostly interested in hearing your perspective on the topic. For you as the educator, the interview will take place at your Early Years Centre or in a neutral setting – whichever is most agreeable for you. As part of the interview process, the researcher will keep an audio recording so the conversation can be revisited at a later stage if needed. If you agree, the researcher may also take some notes while you are answering your interview questions. Following every interview, the researcher will make a full written copy of the interview. The process for the children's parents will be similar and they will be provided with all the information pertaining to the research.

Are there any benefits' to being in the research project?
This research hopes to improve our understanding of what devices three- and four-year olds choose to engage with and why, what most parents and educators deem concerning around the risks involved with allowing young children online, and what mediation strategies work well for children engaging online. This information may inform policies for Early Years Centres, the Australian Government, and you, as parents and educators of three- and four-year olds in Western Australian society.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?
There are no foreseeable risks involving your, the parent, or the child's participation in this research project. Please know that you can end your participation in the research. at any time if you so choose.

Who will have access to my information?
All stored information pertaining to either the observation or interview notes will be anonymised so participants cannot be identified through the results section of the PhD thesis. Only the researcher will have the ability to match your name if it is necessary to do so for any reason. Any information collected will be treated as confidential and used only in this project unless otherwise specified. However, in the event of an audit or investigation, the information may be shared with staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data (including audio recordings) will be stored securely. The information collected in this study will be kept under secure conditions at Curtin University for seven years after the research has ended and then it will

be destroyed. Lastly, the results of this research may be presented at conferences or published in professional journals. Again, no participants in this study will be identified in any results that are presented or published.

Will you tell me the results of the research?

If you opt in, you will be provided with a summary of the results and some advice around the favourable mediation strategies used to manage children's engagement and safety online. This information can be emailed directly to your email address should you provide it to the researcher. Results will not be individualised but based on all the information collected and reviewed as part of the research.

Do I have to take part in the research project?

Your participation in this research project is completely voluntary. You can withdraw your participation at any phase of the research with no explanation or reason. Your participation, or withdrawal if elected, will not affect your relationship with Curtin University, staff or colleagues.

Further information

If you decide to take part in this research, it will require a signed a consent form. Submitting a signed consent form indicates your willingness to participate in the research, that you understand the requirements of your involvement in the project and that you are happy to have your information used as described. Please take your time to consider your participation and ask any questions you have before signing the form. You will be provided with your own copy of this information statement and the consent form.

The Curtin University Human Research Ethics Committee (HREC) have approved this study (HREC number 2020-0608). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au. If you have any further questions or would like to contact the researcher, please email sinead.wilson@postgrad.curtin.edu.au.

Appendix D
EDUCATOR CONSENT FORM

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student researcher:	Sinead Wilson
Version Number:	1
Version Date:	23/10/2020

- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I know that I don't have to be involved in this project, but I would like to be.
- I voluntarily consent to take part in this research project.
- I have read the Information Statement provided to me and I understand its contents.
- I understand I will receive a copy of the Information Statement and this Consent Form.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I know that I will be participating in an interview as part of the project.
- I understand that the interview will be transcribed into written format, and the notes will be kept according to Curtin University guidelines.
- I understand that I am able to withdraw my participation at any time. If I choose to leave the study, any information collected will be used unless I direct otherwise.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that I need to sign my name in the space below, prior to my participation in the project.

Further to these points, I agree/ do not agree to the following:

☐ I do	☐ I do not	consent to being audio-recorded
☐ I do	☐ I do not	consent to be contacted about future research projects that are related to this project
☐ I do	☐ I do not	consent to the storage and use of my information in future ethically approved research projects related to this project

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Statement and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	Sinead Wilson
Researcher Signature	
Date	

Appendix E
PARENT INFORMATION STATEMENT

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student Researcher:	Sinead Wilson

What is the project about?

The proposed research will investigate the digital technologies young children are engaging with, how parents and educators can best manage children's active learning with these technologies while staying safe online. A secondary aim of the research will be to understand if a correlation exists between technology use in Early Years Centres and technology use in the family home. Through qualitative analysis of data collected through both observations of young children, and interviews with the child, their parent/s, and their Early Years educators the research will present an in-depth investigation into Western Australian children's use of digital technologies. This will include an exploration of the opportunities and risks related to children's engagement with digital technologies, specifically at three and four years of age. Research evidence of effective strategies utilised by carers of children could inform governments and policy makers and enable them to create relevant and up-to-date policies for Early Years Centres, as well as provide valuable and informed advice to parents.

Who is doing the research?

This project is being conducted by Sinead Wilson. The results of this research project will help form a Doctor of Philosophy credited by Curtin University and is funded by the University. No money will be exchanged between you, as the research participant, and Sinead Wilson, as the researcher.

Why am I being asked to take part and what will I have to do?

The research will include interviews of both parents and educators of three- and four-year olds who attend one of four predetermined Early Years Centres. If you would allow, part of your consent will grant permission for the researcher to also interview your child to ascertain their understanding of digital technologies and if applicable, online safety. The first part of the project involves the researcher observing your child's interaction with digital technologies in their Early Years Centre. The observations will take place in the child's classroom, without any interference of their normal everyday activities as set by the Educators. Photos will be

taken (on a smart phone) to capture the children using digital technologies and as evidence of their behaviour, for later analysis. Every photo will be taken (by the researcher) to maximise anonymity, from a bird's eye view, focusing specifically on the child's hands and activities.

The second part of the project will involve a one-to-one, confidential interview with the researcher. We anticipate this interview will take between 20 – 90 minutes (the children's interviews will take considerably less time, approximately 15 minutes, or according to the activity they are engaging with). The interview will be semi- structured, but we are mostly interested in hearing your perspective on the topic. For you as the parent/s, the study will take place at your family home, at your child's Early Years Centre or in a neutral setting – whichever is most agreeable for you. As part of the interview process, the researcher will keep an audio recording so the conversation can be revisited at a later stage if needed. If you agree, the researcher may also take some notes while you are answering your interview questions. Following every interview, the researcher will make a full written copy of the interview.

Are there any benefits' to being in the research project?
This research hopes to improve our understanding of what devices three- and four-year olds choose to engage with and why, what most parents and educators deem concerning around the risks involved with allowing young children online, and what mediation strategies work well for children engaging online. This information may inform policies for Early Years Centres, the Australian Government, and you, as parents and educators of three- and four-year olds in Western Australian society.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?
There are no foreseeable risks involving your, or your child's participation in this research project. Please know that you can end your participation in the research. at any time if you so choose.

Who will have access to my information?
All stored information pertaining to either the observation or interview notes will be anonymised so that you, or your child/ren, cannot be identified through the results section of the PhD thesis. Only the researcher will have the ability to match your name if it is necessary to do so for any reason. Any information collected will be treated as confidential and used only in this project unless otherwise specified. However, in the event of an audit or investigation, the information may be shared with staff from the Curtin University Office of Research and Development.
Electronic data will be password-protected and hard copy data (including audio recordings) will be stored securely. The information collected in this study will be kept under secure conditions at Curtin University for seven years after the research has ended and then it will be destroyed. Lastly, the results of this research may be presented at conferences or

published in professional journals. Again, no participants in this study will be identified in any results that are presented or published.

Will you tell me the results of the research?

If you opt in, you will be provided with a summary of the results and some advice around the favourable mediation strategies used to manage children's engagement and safety online. This information can be emailed directly to your email address should you provide it to the researcher. Results will not be individualised but based on all the information collected and reviewed as part of the research.

Do I have to take part in the research project?

Your participation in this research project is completely voluntary. You can withdraw your participation at any phase of the research with no explanation or reason. Your participation, or withdrawal if elected, will not affect your relationship with Curtin University, staff or colleagues.

Further information

If you decide to take part in this research, it will require a signed a consent form. Submitting a signed consent form indicates your willingness to participate in the research, that you understand the requirements of your, and your child's involvement in the project and that you are happy to have your information used as described. Please take your time to consider your participation and ask any questions you have before signing the form. You will be provided with your own copy of this information statement and the consent form*.*

The Curtin University Human Research Ethics Committee (HREC) have approved this study (HREC number 2020-0608). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au. If you have any further questions or would like to contact the researcher, please email sinead.wilson@postgrad.curtin.edu.au.

Appendix F

PARENT CONSENT FORM

HREC Project Number:	HRE2020-0608
Project Title:	The role of educators and parents in managing young children's engagement and safety online
Chief Investigator:	Dr. Karen Murcia
Student researcher:	Sinead Wilson
Version Number:	1
Version Date:	23/10/2020

- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I know that I don't have to be involved in this project, but I would like to be.
- I voluntarily consent to take part in this research project.
- I have read the Information Statement provided to me and I understand its contents.
- I understand I will receive a copy of the Information Statement and this Consent Form.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I know that I will be participating in an interview as part of the project.
- I understand that the interview will be transcribed into written format, and the notes will be kept according to Curtin University guidelines.
- I understand that I am able to withdraw my participation at any time. If I choose to leave the study, any information collected will be used unless I direct otherwise.
- I understand that any photos taken of my child anonymously, and may be used in the researchers PhD thesis, or in future publications.
- I understand that my child will be interviewed and their interaction with digital technologies will be observed by the researcher.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that I need to sign my name in the space below, prior to my participation in the project.

Further to these points, I agree/ do not agree to the following:

☐ I do	☐ I do not	consent to being audio-recorded
☐ I do	☐ I do not	consent to photographs being taken of my child
☐ I do	☐ I do not	consent to be contacted about future research projects that are related to this project
☐ I do	☐ I do not	consent to the storage and use of my information in future ethically approved research projects related to this project

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Statement and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	Sinead Wilson
Researcher Signature	
Date	

Appendix G

Interview Question Schedule: Director Questions

1. What is your personal view on young children's use of digital technologies?
2. Do you have any concerns or worries around their use of digital technologies?
3. Do you value the availability of digital technology learning experiences for the children in your Centre?
4. What digital technologies do you use/ allow the use of in your Centre?
5. Do they require online access? If so, which ones? Does your Centre have a high-speed connection to the internet?
6. Does your Centre hold a digital technology policy? What does it cover?
7. In the past year, have you conducted a review into your Centres use of digital technology? What was the catalyst for this review?
8. Equity issues around access, affordability, and the need for computer literacy of early childhood teachers and faculty are sometime barriers for early childhood programs and professionals. What limitations, if any, has your Centre faced for implementing or providing access to digital technologies?
9. Does your Centre utilise digital technologies for communication between your Educators and parents? In what ways do you find they're useful?
10. Are there any obvious conflicts or tension within your staff around their belief of what digital technologies should be used for?
11. Are you aware of any staff concerns around the expectation of using digital technologies to implement the curriculum, or for using digital technologies as a teaching medium?
12. Do you have any final comments around either the positive or negative factors associated with digital technologies and their presence in your Centre?

Appendix H
Interview Question Schedule: Educator Questions

1. How would you define digital technologies? What do you personally use digital technologies for?

2. What is your personal view on young children's use of digital technologies?

3. In your opinion, what are the positive aspects associated with young children's use of digital technologies?

4. In your opinion, what are the negative aspects associated with young children's use of digital technologies?

5. Types of digital technologies

6. Do the children have access to digital technologies in their classroom room? What digital technologies do they have access to?

7. Which of the available digital technologies require online access?

8. Are the children engaging with digital technologies every day? How long per day (typically) do the children spend engaging with digital technologies?

9. In what ways are the digital technologies monitored? Do they have software, ad blockers, or monitoring enablers installed?

10. Parents and digital technologies

11. Does the Centre report the children's digital technology use to parents? If so, in what way?

12. Does the Centre use digital technologies to communicate with parents?

13. Do you believe that digital technologies enable regular communication between educators and families about children's learning, development and daily routines?

14. Do you believe that Educators in Early Childhood settings should be able to support parents in understanding appropriate at home practices with their child's use of digital technologies?

15. Have you had conversations with parents around their child's use of digital technologies? What are the typical comments that arise from these conversations?

16. Do you believe that permission should be sort from both young children and their families to use as digital documentation (including photographs for sharing on any digital platform)?

17. Does your Centre seek permission from parents if they use digital documentation methods?

18. Do you believe that children should have access to the same types of digital technologies that they experience in the home?

19. Have there been any instances of conflicting views of the Centres use of digital technology with parents? What was the outcome?

20. Children's skills

21. How would you define children's digital literacy?

22. What digital literacies do you observe the children demonstrating whilst engaging with the technologies?

23. Do the children have opportunity to engage with digital technologies that foster social interaction? Which devices or digital activities do you find encourages social interaction the most?

24. How does digital technology affect the social engagement of children using it at the time?

25. Do you believe that children should have choice and agency when playing and learning with digital technologies?

26. What experiences has the use of digital technologies opened up to your learners?

27. What experiences has the use of digital technologies taken away from your learners?

28. What have you noticed in children's attention span when engaging with digital technology?

29. Concerns and worries

30. Do you have any concerns or worries around young children's use of digital technologies?

31. Has it ever occurred that a child is exposed to inappropriate or harmful content while accessing digital technologies in the Centre? What happened and how was the situation dealt with?

32. Have there been any instances of functional or dysfunctional imaginative play that have been a direct result of engaging with digital technology?

33. Your experience with digital technologies in the classroom

34. Have you used digital technologies as a research tool with children?

35. Have you incorporated your learner's ability to engage with digital literacy as a resource, as an expectation for children to be 'school ready'?

36. In your experience have you used digital technology to focus a group, or class of children? How was this done?

37. Have you used the use of digital technology for your learners as an incentive or a reward?

38. Your Early Years Centre

39. Do you believe that new and innovative digital technologies should be brought into the learning environment so Educators and children can learn how to use them?

40. In your opinion, could your Centre utilise further digital technologies for the children's use? What could you recommend?

41. Is there anything further you'd like to share with me about your views on children's digital technology use?

Appendix I
Interview Question Schedule: Parent Questions
General

1. Does your child have access to digital technologies at home? Apart from the smartphone, what other technological devices do you have at home?
2. According to you what is/are your child favourite device(s)? Why? What do they do with it/them?
3. At what age could the child operate a device on their own (Eg. iPad, smartphone, tablet)? What digital technology did they utilise/ learn first?
4. Did anybody teach him/her?
5. Can your child turn on a device and do they know/ have passwords?
6. Which devices can he/she use with someone else`s help (e.g. because they are difficult to use)?
7. Does your child have their own digital device, or do they share with a sibling, and/ or others?
8. Do they have access to your devices? If so, what does he/ she do with it?
9. How long per day (typically) does your child spend engaging with digital technologies? How many hours do you estimate your child spends online a week? 0-2 hours, 2-4 hours, 4- 6 hours, 6+ hours.
10. How much of this time is passive? Eg. watching videos.
11. How much of this time is interactive? Eg. chatting with friends.
12. What is the remaining time utilised for?
13. Do the available digital technologies require online access? In which device does he/she usually use the internet?
14. In your knowledge, what does your child access or do online?
15. Does your child play any online games? Which one(s)?
16. In which device does he/she usually play these game(s)?
17. Does your child take pictures, record videos or sounds with devices? Do they or you share them or upload them on the internet? Do they create or curate other content?
18. Do you use any digital technology to encourage, stimulate, and/or educate your child?
19. Does your child have access to digital technologies at their Early Years Centre? What device(s) can they access?

Social interaction
20. Does your child interact with anyone else online? Eg. multiplayer games, YouTube commenting, social media.
21. In what ways can they, or do they interact with others using digital technologies?

Parent mediation
22. Does your child use all device(s) everywhere (at home, at school, at restaurants, etc.)? Do you say how long, when or where your child can use their device/s or play games? If so, why?
23. Are you currently employing any methods to reduce your child's time engaging with digital technologies? Eg. search history or software installed on the device/s your child uses to block inappropriate content.
24. What are the main limitations you face in being able to monitor their technology use? Eg. Limitations of time, space, energy and finance (Livingstone et al., 2015).

25. Do you have family rules around digital technology use? If there are rules who created the rules?
26. Did you discuss, negotiate them? Does your child follow them? What happens if they do not follow the rules?
27. Do you talk to XX to try to guide how they go online or what they might do online?
28. Are there particular things you encourage XX to do or explore online?
29. Would you like them to do more of something online?
30. Do you sometimes sit with your child/ren while they go online? Or just stay nearby to keep an eye on what they do online? If so, why? Do they use these devices on their own or are you present when they want to use it?
31. Are there activities that you and your child do together online? Why (do you perform these activities together (and not others)?
32. If relevant, do you limit their application downloads? Do they have to seek your permission before downloading anything onto a device?
33. Does your child/ has your child ever spent any real money on app upgrades or downloads either intentionally or unintentionally?
34. When your child goes to a friend's house/ playdates/ have access to digital devices that aren't yours/ their own, are you aware of what they access? How do you learn what they're accessing when away from your home and supervision?

Parent concerns
35. Do you think any technologies are particularly "positive" or "negative" for your children? Which ones? Why?
36. Are you worried in any ways about your children`s experiences with new (online) technologies (e.g. children spending too much time, fear of your child being contacted by strangers, etc.)? Why?
37. How important do you think are digital technologies for your children?
38. How important are digital technologies for you? And for family life?
39. Do you think that your children`s use of digital technologies interfere in any way (positive and/or negative) with family life? (E.g. family interaction is decreasing).
40. Do you feel that family parenthood is helped or influenced or affected in any ways by the use of digital technologies at home? How?
41. Do you feel that your child benefits from using any of these technologies? Which ones? Why?
42. Do you have any worries or concerns about your child using these technologies? Or about the use of digital technologies at home? If you do, what do you do about it? What are the main worries associated with online activity? (Eg. spending too long on one activity, staring at the screen, behaving badly when the device is taken away, etc.).

Personal experience with online safety
43. How many hours per day do you use digital technologies?
44. Have you yourself ever been confronted with something inappropriate? What did you do?
45. Has anyone in your family experienced a positive/ exciting/ enlightening situation online? What happened?
46. Has anyone in your family experienced a difficult/ unpleasant situation online? What happened?

If there's time:

47. Most parents will download learning apps e.g. spelling and reading focused apps, as the child approaches school age. Has the type of app you download for your child changed over time?

48. Parent media use is a strong predictor of child media habits (Jago et al. 2012). Parents and caregivers play an important role in modelling optimal behaviours for their children in general, including when it comes to the consumption and use of media. Do you see yourself as a role model for your child's technology use?

Appendix J
Interview Question Schedule: Child Questions

Children are little aware of what internet is, what 'online' means, what risks they can encounter or the benefits they can gain. Children see digital technology as fun and source of entertainment. Talking about these devices and observing children interact with them is also a great opportunity to find out about the child's perceptions of digital technologies.

The questions asked will be determined by the activity the child is engaging with.

1. What can you show me? Observe/ listen to what a child is able to do on different devices. Prompt the child to show you what he/she can do on X device.
2. What are you watching?
3. What can you do?
4. Does mummy or daddy ever tell you have to stop doing something?
5. Does your teacher help you?
6. Does your mummy or dad or sister or brother help you?
7. Are you good at it?

Appendix K

Observation Schedule: Types of behaviours expected to be exhibited by children and educators engaging with digital technologies in their education context.

Child's Behaviour	Type
Physical movement	Breathing hard / strenuous activity Eg. playing a dance step game on an electronic dance mat, jumping, skipping, climbing
Fine motor skills	Pinching, dragging, pointing on device
	Scrolling through different screens
	Moving according to activity requirements
Sitting/ sedentary	No movement for longer than a minute
Posture	Lies on stomach
	Crawling/ moving
	Sitting- legs straight out
	Standing- bench or low table
Vision	Device closer than arm's length to eyes
Emotion	Happy/ satisfied
	Disappointed
	Frustrated (Eg. tantrums or reluctance to join other activities)
	Other emotion
On the device	Turns device on/ off
	Pop ups. Child presses 'x' to close the pop up
	Identifies certain icons (Apps, Google etc.)
	Manages activities/ transitions between activities
	Selects specific games / apps
	Finds pictures/ videos/ information on device
Interaction with peers	Social conversation with peer re. the activity on the device, or the device itself
	Social interaction with peer separate to digital technology
	Physical contact with peer
	Instructs a peer on how to do activity
	Follows directions of peer
	Demonstrates activity to peers
	Multimodal representation E.g. Talks and uses pictures to share ideas, acting out in offline play what was seen or experienced on the digital device etc.
External resources	Uses materials Eg. If children are coding, they are using multiple items to complete the task Drawing the sequence of an experience Sequencing photos Re-telling coding actions/story
Other skills	Decomposes (breaks down) the steps needed to solve a problem into a precise sequence of instructions
Educator's Behaviour	**Type**

	Outlines time allowed/ remaining on device
	Allows children to have agency with digital device
	Helps plan when the child can return to the activity if not cooperative at end of designated time
	Distraction technique- educator uses device as an attempt made to distract the child from their feelings
	Educator conversation with the child Eg. Talking with the child about respectful interactions with other people including avoiding name calling and teasing, promoting turn taking
	Demonstration of activity
	Asks child to explain what they are doing. Learning conversations. Child's ideas and voice is heard.
	Uses guiding questions to scaffold children's play/learning with a digital technology