Chapter 2: A diversity of digital smartness: A case study of children's uses of Information and Communication Technology in an early childhood education setting

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Abstract

Information and Communication Technology is regarded as playing an ever-increasing role in the lives of people, which includes young children. The role of ICT in early childhood educational services in Aotearoa New Zealand is still being argued by teachers despite policy expectations that endorse and support its integration into practice. This chapter draws upon a small qualitative case study involving young children and their uses of ICT in one early childhood setting. It identifies and examines the diversity of ways that children, and other people involved in their lives, might use ICT as a means of initiating, facilitating and supporting learning. We define this as digital smartness. A socio-cultural perspective is used to recognise and examine this notion of children's digital smartness. ICT and learning is examined in terms of the social and cultural contexts of the young children with particular focus on the influences of family/whānau and the early childhood education setting. We examine how the digital smartness of children can be understood and affirmed in early childhood settings. We identify the Bourdieuian construct of habitus as a valid perspective to informing and meeting obligations of a more coherent teacher pedagogy of ICT. We contend that certain factors need to be in place to welcome the diversity of children's digital habitus into early childhood education settings that affirm the digital smartness of children learning and living in the 21st century.

Keywords: early childhood education (ECE), digital habitus, information communication technology (ICT), pedagogy, sociocultural theory

Introduction

In young children's lives it is now recognised that a wide range of new technologies are shaping their interactions and learning, with ICT forming an integral part of their increasingly diverse and multi-modal literacy environment (Ministry of Education, 2009; Plowman, McPake, & Stephen, 2008; Selwyn & Facer, 2007). This exposure to, and learning through, ICT by young children has been influenced by the impact ICT is having on popular culture and how it features as part of many young children's daily lives (Somekh, 2007; Plowman et al., 2008). It is also recognised that the affordances of digital technologies are enabling a move towards children being knowledge creators rather than just knowledge consumers in the digital world (Falloon, 2013). This means that today's generation of young children are increasingly likely to use digital technologies in diverse and creative ways for

communication and information. This generational distinction is leading to the development of some different dispositions, skills and expectations of learning in young children that may differ to ones held by some adults in their lives (Hatherly, 2010; Selwyn & Facer, 2007; Zevenbergen, 2007).

In this chapter we consider how the expectations and the cultural practices of children in the use of ICT are met in one particular early childhood service and what the implications might be for teachers and their pedagogy. In the context of this chapter we propose that these expectations, skills and cultural practices of children can be viewed and termed as their digital smartness. What is also of interest is the diversity of each child's digital smartness and how it is influenced by the type of learner the child is and their sociocultural practices.

We consider the potential dissonance between the digital smartness of children and teachers in the use of ICT in early childhood education (ECE) settings. The function of the chapter is to identify, through a small case study, not only how diverse the digital smartness of children can be but also how children's digital smartness can contrast with and contradict some of the adults' (predominantly teachers') digital smartness in the early childhood setting. We contend that the concept of digital smartness of children can be usefully understood and portrayed through the Bourdieuian construct of habitus.

The chapter begins by contextualising early childhood services in Aotearoa New Zealand with a focus on the national early childhood curriculum, Te Whāriki (Ministry of Education [MoE], 1996), and ICT policy initiatives in early childhood education. We explore the concepts of habitus and digital habitus before outlining the research methodology and discussing the findings of our small-scale case study.

Early childhood education in Aotearoa/New Zealand

In Aotearoa New Zealand there is a diverse range of early childhood education and care services catering for the age ranges of 0–school age years (Merry, 2007). The services, including Te Kohanga Reo (Māori tikanga [customs and practices] and Te Reo Māori [language] immersion centres), Tagata Pasifika (Pacific Island centres), Playcentres (parent/whānau run services) and public, community, or privately run kindergartens and early childhood education and care centres, all exist under the auspices of the Ministry of Education (Stover, 2010). Although not a compulsory education sector all services are brought together under the mandatory implementation of the early childhood national curriculum, *Te Whāriki* (MoE, 1996).

Te Whāriki has been strongly shaped by Aotearoa New Zealand's past and its aspirations for the country's future. It recognises the unique bicultural nature of Aotearoa New Zealand (Māori and European heritages) and the diversity of the early childhood sector (Reedy, 2003). *Te Whāriki*, a woven mat in Te Reo Māori, is a metaphor which represents a place for all to stand and embraces the diversity, programmes and philosophies of early childhood education and care services (Lee, Carr, Soutar, & Mitchell, 2013). The overarching aspiration of the curriculum for children is

> to grow up as confident and competent communicators, healthy in mind body and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society. (MoE, 1996. p, 9)

The curriculum is underpinned by a socio-cultural framework that takes a holistic view of both learning and the learner recognising that patterns of learning and development are fluid (MoE, 1996).

The key premise is that children learn through responsive, reciprocal relationships with people, places and things in, and from, their own social and cultural contexts (MoE, 1996). In this context social situations are viewed as rich places for learning where children will use the intellectual tools of their community (Rogoff, 1990, 2003). For many of today's young children such tools and practices include ICT (Bolstad, 2004; MoE, 2005).

ICT can be defined as electronic or digital equipment that allows information to be gathered or communication to take place (MoE, 2005). This broad definition of ICT has been extended to now include identified affordances of many of the contemporary ICT tools and programmes. For example, ICT is being recognised more and more as supporting exploration, documenting and communicating learning episodes and enabling critical questioning and inquiry by children (Archard, 2013;MoE, 2009). This includes how children explore their worlds and make meaning of things that are of interest to them (Archard, 2013; MoE, 2009). ICT is also affording opportunities and discoveries for collaborative teaching and learning and can suit individual children and their own unique ways of being as learners (Archard, 2013; Hatherly, 2009).

In early childhood education in Aotearoa New Zealand, the term ICT extends to including tools such as digital cameras, the internet, video cameras, telecommunication tools, programmes and many other electronic or digital devices and resources (Bolstad, 2004). The range and diversity of these tools, along with their availability and targeting to young children and early childhood services, continues to grow. New technologies continue to evolve, bringing advances such as greater portability of devices along with reduced costs that make them accessible to more people. This is taking place within the rapidly growing applications (apps) market, which offers a broad range of programmes with educational and entertainment uses aimed at young children and the early childhood services they attend (Falloon, 2013; Hatherly, 2010; Hatherly & Chapman, 2013). It is of interest that the range of tools and resources available for children further endorses the focus of early childhood education ICT policy, which rejects the notion that ICT is simply "children using computers" (MoE, 2005, p. 2) in predominantly drill and skill exercises. Instead it is about a range of ICTs that are accessible and can be chosen and used by children and teachers for meaningful purposes. This includes ICT contributing to the sociocultural features of teaching and learning such as co-constructing, scaffolding and episodes of sustained shared thinking (Archard, 2013; Hatherly, 2009; Siraj-Blatchford, Sylva, Muttock, Gilden, & Bell, 2002). Such practices define educational activity as relational and collaborative between children, their peers and teachers.

Indeed, the significance of socio-cultural understanding of learning has also been specifically identified in the Aotearoa New Zealand early childhood education ICT policy, *Foundations for Discovery* (MoE, 2005). This policy document was developed to provide a framework to support and guide the implementation of ICT in early childhood settings. It states that "in New Zealand , our lives are increasingly influenced by information and communication technologies (ICT) which support, facilitate and shape the things that people do and the lives that we lead" (p. 2).

Foundations for Discovery supports the notion that pedagogy could, and should, "enhance learning opportunities through the meaningful use of ICT" (MoE, 2009, p. 2). This policy acknowledges that children will be reflecting on their own learning and communicating to others about it (MoE, 2005). It recognises ICT as playing a role in enabling children to "broaden their horizons by exploring the wider world" (MoE, 2009, p. 2).

In order for such policy expectations to be integrated into teacher pedagogy two factors need to be understood by teachers. Firstly, children will come with ICT cultural practices, expectations and skills and these need to be recognised and responded to. This will allow children to draw upon and have these skills and expectations affirmed in supporting their own learning through what we regard as their digital smartness. Secondly, teachers must recognise that many of the children they work with will have diversity in this digital smartness, which is introduced and constructed in their family and community practices and has been further shaped by the diversity of the digital world itself (Hatherly & Chapman, 2013; Plowman, McPake, & Stephen, 2008). This construction of digital smartness is unique to the child and is used by them to both meet and reflect their own ways of being as a learner.

As stated earlier the notion of ICT in early childhood education is far more than 'children using computers' and this can be shaped with the interactions between aspects of an effective learning environment. Clark and Grey (2010) define this as a composition of static and dynamic elements. An environment incorporating a varied range of readily available and portable ICT equipment (static elements) for children to use illustrates this. Such environments also include teachers who invite and encourage children to use such equipment to explore and collaborate in individual and shared learning moments (dynamic elements).

This affirms the need for a philosophy, pedagogy and practice that will support its meaningful use by children. Hatherly (2009) indicates that the "teacher's mind" is essential and without a consciousness of what meaningful learning opportunities can come through ICT, "ICTs are no more than jazzy and expensive alternatives to existing resources" (p. 9).

This concurs with the ICT in early childhood education literature, which identifies a focus on ways ICT supports learning and scaffolding techniques (Archard, 2013; Bolstad, 2004; Hatherly, 2009). Bolstad notes that things don't just happen and that "practitioners must be conscious of the kinds of interactions they would like to occur in the context of ICT use and adopt pedagogical strategies to support these" (Bolstad, 2004, p. viii). We identify the Bourdieuian construct of habitus as a useful lens to further understand children's uses of ICT and inform teacher pedagogy.

Habitus and digital habitus as a lens

Habitus is a social construct popularised by Pierre Bourdieu, who theorised it as a person's dispositional approach to particular ways of being and doing in society that are defined by their socio-cultural contexts and experiences . Bourdieu defines habitus as "a durable, transposable system of definitions acquired initially by the young child in the home as a result of the conscious and unconscious practices of her/his family" (Bourdieu & Wacquant, 1992, p. 143).

Zevenbergen (2007) notes that "while Bourdieu's work theorises the construction of a class habitus, the process through which a habitus is realised can be re-appropriated for other forms of habitus" (p. 20). We agree with Zevenbergen (2007) that habitus can be re-appropriated to include digital habitus and represents a useful way of understanding the cultural experiences and expectations of young children in our education systems today. This is because children who have grown up with ICT are confident and responsive users of technology in diverse ways.

Children may have experienced different ways of being and doing in their own family cultural practices and therefore draw from a different set of dispositions. This can create a mismatch of digital habitus that may cause dissonance in the context of early childhood education where the child is the

competent ICT user and the teacher may be the less competent and/or even resistant one (Zevenbergen, 2007). The 21st century child may well have moved past marvelling at what digital technologies can do and instead be using technology in their everyday lives with purpose and meaning. This digital smartness, as we have previously identified, includes exploring and choosing from a wide range of digital materials that may suit or attract them and that fit with their learner identity. Thomson (2002) uses a valuable metaphor of a "virtual school bag" to describe how children bring all the knowledge that they "have already learned at home, with their friends, and in and from the world in which they live" (p. 1) into their educational settings. In this chapter we contend that 21st century children have a 'digital habitus' and this can be viewed and termed as digital smartness, forming a significant part of the content of their virtual school bag. These theoretical perspectives contribute to understandings and findings of the case study conducted.

The research context

This small case study was titled 'Digital Citizens in Action' and was a collaboration between the authors. At the time of the research we were positioned in different roles in relation to the case study. One of us was a lecturer at the University of Waikato and the other was an early childhood teacher in the setting for the study. Our interest in the topic of ICT originated from conversations and professional development liaisons about the uses of, and practices in, ICT at this early childhood setting. In particular there was a shared interest in how to implement ICT effectively for children's learning and understand and meet the digital socio-cultural expectations and experiences of the 21st century learners at the setting.

Case study setting

The study was undertaken in a privately owned, teacher-led kindergarten for children aged 3.5 years to school age. It was located in an urban setting in a well-established and medium/high socioeconomic suburb of Hamilton, a city with a population of approximately 130,000 (Statistics New Zealand, 2006). There was a teaching team of four qualified early childhood teachers and a roll of 30 children per session. The kindergarten had two sessions per day with each session lasting for three hours. Children attended morning, afternoon or six hour 'all day' sessions.

The kindergarten had a good ICT infrastructure with a range of technologies available to children and teachers. The teachers had access to two desktop computers with Internet availability. Children had access to one desktop computer with Internet availability in the learning environment. Teachers and children had access to a digital camera, Flip video recorder and a digital microscope. The group time space (a designated space for children and teachers to come together for group activities) in the kindergarten had a computer (with Internet access) linked to a large TV screen so that children and teachers could use tools together such as YouTube and Google. The computer and screen also enabled children and teachers to share photographs and other digital information. All computers in the kindergarten were connected to one printer.

Research objectives

This study aimed to explore how children may be drawing on their digital experiences and applying their inculturated expectations of ICT to their own learning, and in what ways. To understand and

analyse children's socio-cultural expectations of ICT it was important to capture the types and use of ICT in the home by the young child and their families. This involved asking parents and whānau about uses of ICT in their, and their children's, lives and gathering information about episodes of learning that include ICT in the early childhood setting and home.

Methodology

A qualitative case study research approach was adopted that had an interpretivist epistemological orientation focusing on "the understanding of the social world through an examination of the interpretation of that world by its participants" (Bryman, 2004, p. 266). Through this investigation, a case study seeks to provide a picture of the richness and depth of a situation and a construction of the reality of the participants' lived experiences within a bounded system (Cohen, Manion, & Morrison, 2000; Cresswell, 2005).

This case study was bounded to 3 children and their families who attended the same early childhood centre during the same period of time. The children are Jack, Jessica and Abigail. It is acknowledged that the participants in this study were from similar high socio-economic backgrounds with access to a range of current ICTs in their home environments. Data was collected by conducting semi-structured interviews with teachers and whānau and the voices of the children are captured in the narrative assessment of Learning Stories (Carr, 2001). Interviews were recorded on an MP3 device and stored. The interviews were then transcribed. Thematic analysis was used to identify patterns within data. What is key, according to Braun and Clarke (2006), is that a theme must *"*capture something important about the data in relation to the research question and represents some level of *patterned* response or meaning within the data set*"* (p. 82). The themes identified include the ways children participating in the project use ICT in their learning, how ICT supports a connectedness for learning and the family/whānau and teachers understanding of the child's uses of ICT at the early childhood setting.

Findings

Three themes emerged from the parent interviews. These were the family cultural practices of ICT in the home and the ways children use digital technologies at home. Secondly how children connected and transferred their digital behaviours between home and centre (digital smartness) and finally how teachers responded to children's digital smartness. The themes are captured and supported in the strong commentary at times by family and whānau.

Children's uses of ICT: A diversity of digital smartness

Jessica's parents said that Jessica (age four) is already a competent, confident user of digital technologies. This is captured in some of the usual daily routines in their household, where Jessica's mother describes some instances that capture Jessica's affordances and uses of digital technologies. The example also demonstrates the accessibility and normality of the use of digital tools in the household as a culturally meaningful practice:

> We have the laptop and computer. They [the children] run around the house a lot of the time with the digital camera. They draw chalk pictures on their driveway and before any

> rain comes they photo their pictures. It is an achievement of theirs and they are proud… Jessica will initiate this ("Mum, we need to photo this) … Jessica has several collections of things (e.g. rubber ducks) and she likes to photo these.

Jessica's mother also explained that Jessica initiates and uses these devices in ways that appear meaningful to her and reflect her interests. In photographing the chalk drawings that will eventually be erased, she is able to document and archive her achievements. This seems to be an important part of her play and learning.

Jessica's use of technologies is widened by her participation and engagement with her family in their everyday ICT uses. For example, she uses Skype to talk, sometimes daily, with her grandmothers, who live in America and England. Jessica's mother describes a particular routine: "The girls speak often on Skype with their nannas in England and America. Nanna [in England] has breakfast with us every morning even though she is 15,000 miles away."

These family cultural practices contribute to Jessica's digital habitus through the process of participating in them. They enable Jessica to see digital technologies as a relational tool and serving a purpose for her family. This is indicated by her mother's comment about the influence ICT has on Jessica, as for Jessica ICT "…brought together people and places that are important to her".

Jack is described by his mother as an "avid inquirer". He seems to have many interests that prompt him to ask questions as he makes sense of his world. During the interview Jack's mother noted that he had a wide repertoire of skills and sources that enabled him to undertake his investigations. For example, he uses books, people and digital technologies for information gathering. These cultural tools and practices are available to him in his home environment as part of family life and appear to co-exist successfully. In terms of access to ICT at home, Jack is able to use the computer whenever he wants. Jack and his father often work together at the computer to find interesting websites. These websites can be educational or recreational. Jack's mother reported that Jack has been confident in using technologies in pursuit of his interests from the age of two and a half, saying that "he could navigate websites [from that age]. He goes into Favourites and just goes around".

Although Jack is an inquirer by nature and, as his mother highlights, initiates the act of research, it is by engaging in the practice of collaboration with his father that Jack adds to his digital habitus by experiencing an affordance of ICT as being a tool for inquiry. Jack also understands that digital technologies can be a source of information for his interests. Jack's mother described the diversity of Jack's interests and commented that he will often be aware of, and wanting to know more about, current issues that he has heard about via the Internet and terrestrial media. She commented, " The things that catch him have included the Pike River Mine disaster, earthquakes and the tsunami [Japan, 2011]. He has a thirst for knowledge on these things."[2]

Abigail shared some similar dispositions towards the use and access of ICT in her home setting. Abigail's mother commented that Abigail enjoyed YouTube clips and would request the use of

[2] These denote the Aotearoa New Zealand and world events current in national and international news during this study—severe earthquakes in NZ and Japan in 2010 and 2011 plus the Pike River Mine disaster in which over 25 miners were killed.

Google with the family to look up many topics that she wanted to find out about. The mother explained: "Often we would click into things that Abigail asked us to look up, sometimes it was a topic she had discovered that day [and] Abigail really likes to look at pictures or drawings of things she wants to know and usually wants to print them off."

Transference of digital smartness between home and centre

The children in the study demonstrated an expectation of continuity and drew upon dispositions from their digital habitus to use ICT in meaningful ways. The following excerpt from a Learning Story[3] (Carr, 2001) demonstrates how Jessica used a camera and USB stick to document and share an ongoing learning experience between kindergarten and home:

> Jessica building a wooden birdhouse at the centre saw her involved right from the start in the design and what she wanted to do with it. Jessica planned to have specific coloured pieces of ribbon attached to the wooden structure. She also declared that she wanted it to go home and to be put in a specific tree in her garden. Sure enough at the end of 'Kindy' Jessica collected up her birdhouse shared it with mum and off she went.
> A couple of days passed until one morning just before the session Jessica bounded in to Kindy with mum. She held in her hand a USB. She called me over and handed it to me. "They are on there" she beamed. "What are?" I asked. "My photos, me and Dad and the birdhouse. We can see them on the computer", she said. So we quickly put the USB in the computer and brought up the wonderful collection of photos of Jessica and her Dad putting up the birdhouse in her garden. She explained what they did and what things they thought about when putting it up (could it be seen, was it high enough?). "Can I show them at mat time?" Jessica asked. "Absolutely what a great idea, shall we print them off then?" I suggested. And at mat time Jessica shared her pictures.

Jessica's mother acknowledged the importance of this process for Jessica by commenting: "The birdhouse learning didn't just stop at the end of kindy. It was something to be treasured by Jessica and brought up, recorded and kept as a memory."

The practice of photography as a tool for documentation is used in the kindergarten setting and, as noted earlier, consequently by Jessica in her home environment where she is able to access and freely use a camera. This is an indication of Jessica's digital habitus being constructed by practice in her early childhood setting as well as in her home. She was able to transfer and add to her digital smartness between settings. Of key interest here also is the dissonance between the digital habitus of Jessica and the teacher. The teacher's suggestion and response of printing off the photographs to show at group time rather than projecting them on the TV screen though the USB stick could be an indication of defaulting to the teacher's own ICT cultural practices and knowledge. Although the goal of presenting and sharing information with others is achieved, it could have been undertaken more effectively by using the TV screen. In this instance it would have been interesting to know how Jessica thought they could share the photographs.

Jack was also able to transfer his digital smartness between home and centre. Jack's mother commented that Jack initiated the request of using Google at home to search for answers and that if he

[3] All Learning Story excerpts are in italics.

is not satisfied, although he doesn't talk much about what happens at kindergarten, he will say, "I'll look on the computer at kindy tomorrow".

This could be an indication of an alignment of ICT cultural practice between home and centre as Jack knows that he can use the same digital technologies with the support of teachers to find out the answers he is seeking. This could be perceived as the digital smartness of Jack and his teachers being compatible and therefore his learning being supported and scaffolded. This extract from the abridged Learning Story endorses this:

> This … was triggered by Jack's wondering of what the 'sticky stuff' was that came out of the tree in the kindergarten garden. After some brief discussion with his peers where several names of what the 'stuff' was, Jack asked the teacher, "but what is it and I wonder where it comes from?" He then added " I know! We could look it up on the computer". Jack and the teacher went off together and researched the question (Jack being quite clear what question he wanted typed into Google). The teacher and Jack read through some information and pictures and he decided what he wanted to keep and print off to share with his family at home.

In this example Jack wanted the information printed off and available in hardcopy. With support from his teacher, he analysed what he felt was relevant from the Google hits and saved it as a tangible artefact to share with his family.

Family/whānau and teacher responsiveness to children's digital smartness

A key word used by teachers in the kindergarten when asked about the use of ICT and the children's expectations of it was the word 'struggle'. Struggle can evoke the feeling of hesitancy and might lead to behaviours of avoidance or even dismissiveness in some. The comments of teachers indicate concerns with change and their ability to keep up with the expectations and knowledge of children. Teacher A, for example, said, "It's changing all the time—I struggle to keep up with it [ICT]", and Teacher B argues, "I think we struggle more to adapt than children do. These children see change as good. Why fight it? Go with it."

However, it was also evident that some teachers were accepting of their own capabilities and understandings and were open to being taught by the children. This seems to be a recognition of their own digital smartness whilst being open to learn from the children different ways of being and doing when using ICT. This pedagogical positioning of openness and collaboration then enables children to bring in their own cultural practices to share in the kindergarten. Teacher C remarked, "I've got to be on my game as a result [of children's knowledge of ICT]. I can be learning a lot from them."

As detailed above, one limitation was noted by the teacher working with Jessica and her USB stick, and captured in the reflection she wrote about how Jessica might have shared her photos of her birdhouse more effectively:

> It was some time later that morning that I realised that there was no need to print them off and my narrowed suggestion was a rather unnecessary one. The mat time area has a computer and wide screen monitor and that simply transferring the USB to there was much more useful. I reflected on my limitation to realise how transferable and immediate ICT can be and my knowledge and experience of ICT was limiting some practices for

> both me and [the] children. My suggestion was perhaps the only one on offer (in the child's eyes) and forgetting to ask her what we could do with them might well have shut out her more contemporary understandings of ICT.

Despite differences between the digital smartness of children and teachers, teachers could recognise their pedagogical role as co-constructors and scaffolders during the learning process and could determine when and how to support the child. Teacher D, for example, noted that "it's not just ICT creating independence, it also means being able as a teacher to access things with the child and that might require support even though they might initiate it [the inquiry]".

This is also evident in the following Learning Story where Abigail and the teacher embarked on a shared investigation. The teacher scaffolded Abigail into accessing Google to research her inquiry about recycling. However, Abigail then asserted her own expectations of and purpose in using ICT to develop a presentation to share with others. During her sharing of information, which included YouTube clips via a large-screen computer, an unplanned consequence and unexpected connection emerged.

A relatively new family to the centre viewed Abigail's mat time presentation. An excerpt from the Learning Story explains:

Whilst Abigail and the teacher were undertaking the regular 'Kindy' job of putting out the recycling she asked, "How does paper make new things?" The teacher paused and suggested that they might investigate using the computer. Abigail was willing to do this and they investigated using YouTube clips and Google. As the teacher I asked Abigail what questions we should ask 'Google' and I typed them in and shared the written information with her. Abigail however became very keen to share this back at the end mat time in the centre's practice of 'newsflashes' (a time at the mat to share findings and thinkings that may take place during the session). With the teacher they saved some information, pictures and YouTube clips and Abigail planned what she was going to say. Abigail shared her findings as a 'newsflash' and interestingly a new mother to the centre was watching this while waiting to collect her daughter. At the end she shared that 'K's grandmother owned a recycling plant in South Africa and she would contact her to tell her about the interest shared by Abigail. Sure enough a few days later an email arrives with photos of K's grandmother's recycling plant and information about the work of recycling. A great chance for Abigail (and also 'K') to share information and some great photos together with the other children and teachers.

Discussion and conclusion

We started this chapter by wanting to examine the notion of the 21st century child's diverse digital smartness. To do this we drew upon a socio-cultural perspective to examine ICT and learning in the practices and the contexts of the young children's lives, looking particularly across home and the early childhood education setting attended by these children. We also wanted to consider any dissonance between children's digital smartness and that of their teachers' and the setting.

The three children in the study all demonstrated digital smartness that was constructed from participating in cultural ICT practices at home. It was interesting to note that each child had similar access at home to ICT and it was regarded as just a normal and functional part of everyday life. ICT

was used in purposeful, relevant ways by the family and consequently formed part of the child's digital habitus (Bourdieu & Wacquant, 1992).

It would seem from these findings that the diversity of cultural practices influences the diversity of the digitally smart child. It is acknowledged though that the children in this study are immersed and encouraged to explore, play and learn about things in a consistent ICT-rich environment. This is supported by family and home ICT practices that support their digital smartness. The complexity of digital smartness is further extended by the child's own interest as they use ICT to meet their own ways of being and doing (Hatherly, 2009, 2010). This is indicated by Jack, the inquirer, who uses ICT to ask questions and pursue his curiosities; Jessica, the recorder, who documents and archives things that are important for her; and finally Abigail, the reporter, who presents and shares information with others.

The families in this study displayed different ICT cultural practices as they have different ways of being and doing. For example, Jessica's family used Skype as a relational and staying connected tool as it was the usual way of communicating with overseas family. Jack, on the other hand, explored the Internet with his father from a very young age to find information about the world around them and reinforced his inquiry and collaborative learner identity. In Abigail the attraction of visuals about topics of interest are supported in her ICT use. This is a valuable display of the features of these children's learning styles and what they value as they go about discovering and exploring things that interest them. ICT has contributed to this display.

It is apparent from the findings that children can, and expect to be able to, transfer their digital smartness across settings, in this case between home and centre. For example, when Jessica brought her photographs on a USB stick to share with others in the kindergarten and when Jack asked to print off his research to take home with him or when he intended to find out answers on the computer at the centre when they were not available at home. This transferability of learning across settings that is supported by ICT is another aspect of what we consider to be digital smartness.

One important question is how do others respond to the expectations of children and displays of their learner identity through ICT. In this case study it concerned, in particular, both families and teachers in the early childhood setting. The findings of our study captures some hesitancy from teachers as they recognise their differences to the children's sociocultural ICT practices and seek to keep in touch with them. What would seem to be important to recognise in this chapter is that this setting was ICT rich in terms of equipment and that the teachers were seeking to make sense of ICT practices to support effective learning and teaching. Yet despite this, still a sense of uncertainty prevailed to some extent (Hatherly, 2009; Somekh, 2007). Our recent experiences in early childhood education settings also suggest that the attitudes and knowledge of some teachers is an issue when children introduce the topic of ICT. Our examples indicate that even if a teacher is open and responsive to a child's digital smartness, there may be a slight mismatch of digital smartness between the digital immigrant and digital native (Zevenbergen, 2007). This was evident in the case of the teacher printing photographs to show at mat time rather than uploading them onto a computer for viewing on a large screen. Finally, it was clear that some teachers were able to identify their pedagogical space and role in supporting the learning of a child but were then receptive for the child to draw on their own digital smartness and contribute to their learning instance (Bolstad, 2004; Siraj-Blatchford & Whitebread, 2003). For example, when the teacher suggested to Abigail that they use

Google to find some information, then supported Abigail's suggestion that she presented the information via PowerPoint.

Our findings indicate the importance of teacher pedagogy and early childhood settings aligning themselves to the cultural practices and expectations of children and embracing their digital smartness. The implications for preservice teacher education providers and ongoing professional development are significant to support informed teacher pedagogy. Literature on early childhood education and the implementation of ICT practices continues to see a patchiness of consistent pedagogy (Hatherly, 2010; Hatherly & Chapman, 2013). In our study the requirement to be responsive to children and their ICT smartness was identified by some teachers. This was not aligned to any policy or pedagogical practice, though, and we speculate that such may be the case in many early childhood services. As a result what may well prevail or be cemented in teacher attitudes and practice is an ad hoc appreciation of ICT and of children's digital smartness. Such a response undermines elements of sociocultural practices mandated by the curriculum itself.

We contend that viewing the construct of digital smartness of children through the Bourdieuian lens of digital habitus can contribute to a more effective recognition of and response to ICT in early childhood education (Zevenbergen, 2007). It can contribute to professional development and effective pedagogical understandings. It reaffirms the understandings and meaning of ICT by children as being constructed by cultural practices and applied in ways that reflect the child as an individual and competent learner. As such, it endorses the aspirations and the features of *Te Whāriki* (MoE, 1996) itself.

Effective pedagogical understandings can dispel the fears and hesitancies that accompany some teachers' views about ICT and its place within early childhood education. As Hatherly (2009) and Somekh (2007) assert, there continue to be the doubters who may be struggling to understand and enjoy the shifting patterns of learning and teaching that ICT creates and support. This is critical as we must ensure that it is not just the "ICT-for-learning champions" (Hatherly, 2010, p. 94) that are promoting and responding to the digital habitus of many young children. All teachers need to invite children's digital smartness in the educational setting and enable them to unpack their virtual school bags (Thomson, 2002).

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