International Perspectives on
Early Childhood Education and Development 22

Susan J. Danby
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Digital Childhoods

Technologies and Children's Everyday Lives

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International Perspectives on Early Childhood Education and Development

Volume 22

Early childhood education in many countries has been built upon a strong tradition of a materially rich and active play-based pedagogy and environment. Yet what has become visible within the profession, is, essentially a Western view of childhood, preschool education and school education.

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Foreword

Digital technology is not an issue that springs immediately to mind when one thinks about early childhood. Understandably, the first 8 years are a stage of life that largely escapes the hype and mania that tends to accompany 'new' technology. Yet digital technologies and digital systems are now a significant part of the lives of young children and those who live/work with them. Therefore, this is a topic that is growing in importance for anyone seeking to make sense of contemporary childhood.

Even before they have ever swiped a screen or prodded a keyboard, most infants (in industrialised countries) are already living profoundly digital lives. This is an era when ultrasound scans are routinely shared on social media by expectant parents. Similarly, various data profiles and online accounts will have been set up well in advance of a baby's birth. Thus, the cliché of millennial children being 'born digital' might perhaps be updated to 'preborn digital' (Leaver 2015).

Thereafter, young children's dealings with significant others – from close family members to health, education and welfare authorities – are increasingly mediated through digital technologies. At the same time, a variety of digital products and applications are on offer to support play, learning and other developmental processes. For all these reasons, it is important to pay close attention to the part that the digital now plays in childhood.

Yet this is not as straightforward as it might appear. So before readers progress through the chapters of this book, here are a few opening observations that might be of use. First is the need to remain mindful of the inherently social nature of digital technology. Digital technology is *not* an autonomous force that leads to changes beyond our control or comprehension. Instead, it is helpful to conceptualise digital technologies as being *socially shaped***.** From this perspective, the nature and form of any device or application is subject to continual interactions and 'negotiations' with the social, economic, political and cultural contexts that it is embedded within.

Approaching digital technology in sociotechnical terms, therefore, allows us to question the many factors that influence the design, development, production, implementation and 'end use' of technology. It also prompts us to look beyond simplistic descriptions of digital technology somehow having inherent 'effects' or 'impacts'. Put bluntly, one can only make full sense of digital childhood by paying attention to the social arrangements and organisational forms in which technology use is situated.

This latter point highlights the importance of *context* in any discussion of digital technology. As will be evident throughout this book, there are no 'one size fits all' explanations of what technology 'is' or what technology 'does'. Instead, the specific activities and practices that children undertake with digital technologies are embedded within a variety of different contexts. These can include institutions (e.g. households, families and pre-school classrooms), social structures (e.g. intersections between race, gender and social class) and cultures (e.g. neighbourhood and national cultures). As such, there is much more to young children's engagements with digital technology than the device or application being used.

Indeed, early childhood constitutes a very specific context within which digital technology use takes place. Infants and young children are distinctive technology 'users' in a number of ways – from their limited physical capabilities to nascent emotional and cognitive development. Moreover, it is important to remember that young children are subject to very distinctive institutional conditions. For example, young families and pre-school households are markedly different domestic settings to those experienced by older children and young people. Similarly, child-care crèches and early years' classrooms are very different educational settings in comparison to primary or secondary classrooms. At the same time, the legal conditions surrounding young children also have specific implications for how digital technologies are used.

For all these reasons, then, exploring digital technology and early childhood is highly complex but also highly rewarding. On one hand, this is something that researchers working in the area of early childhood can approach with a degree of confidence. For example, it could be argued that researchers working in this area have been well ahead of the curve in addressing key aspects of recent technological innovation. Studies of young children have long made sense of interactions *with* digital technologies that are not primarily keyboard- and text-based, but instead based around touch, gesture and visual content. These now dominant ways of interacting with smartphones and tablets across the life course are well familiar to early childhood researchers.

Moreover, early childhood research has a rich history of exploring issues of interaction *around* devices. Rather than engaging with digital technologies as solitary 'individual users', young children often cooperate and collaborate with others.

Most recently, early childhood has also been one of the first areas where the much-anticipated 'Internet of Things' has actually come to fruition. Internet-enabled 'smart' toys are now a burgeoning market for brands ranging from Barbie to LEGO. This has meant that early childhood researchers are now leading the way in investigating the millions of devices that now constitute the worldwide 'Internet of Toys' (Holloway and Green 2016).

In all these, early childhood might justifiably consider itself an area in which cutting-edge technology-related research is taking place. On the other hand, however, it is wise not to become *too* complacent. Much early childhood research and writing remains woefully underdeveloped in its methodological and theoretical treatment of the digital. For example, there is a pressing need for more sophisticated empirical approaches in making sense of digital childhood. Clearly, many of the issues already highlighted cannot be understood by studies reliant wholly on non-participant observations and/or interviewing. Instead, new methods are required to properly interrogate the code, data and programmed architecture of the digital aspects of contemporary childhood. This means engaging with the computational social sciences, as well as exploring emerging fields such as digital ethnography and other forms of digital social research (see Marres 2017).

In addition to this is a need to broaden the scope of discourse and debate regarding digital childhood. While not in thrall to digital devices and gadgets, early childhood commentators often appear preoccupied with issues relating to 'the child' and their immediate environs. Instead, some of the most pressing questions that need to be asked of digital technology are macro-level issues of political economy, societal ethics and environmental sustainability. Thus, discussions of digital childhood need to be cognisant (and critical) of the billion-dollar industries that operate in this space, as well as the effect that digital products and practices are having on societal values and ecological systems. These issues and consequences certainly need to be foregrounded in our discussions of digital childhood.

A final challenge is the need to look ahead to upcoming technological developments and innovation. What are the issues that will present themselves in a decade's time when people will struggle to remember back to what an 'iPad' or 'Minecraft' was? What are the issues likely to arise from the emergence of post-digital technologies in society – for example, biotechnology, cognitive technologies and various forms of pharmaceutical technology? This is an area of inquiry that will never stand still.

So, while *Digital Childhoods* marks a great start in addressing some of these issues, this is clearly no time to be complacent. There is much work remaining to be

done in this area. Rather than constituting the final word, this book needs to be seen as the start of a number of long-running (and perhaps difficult) conversations. These are issues and ideas that need to be discussed and developed in early childhood research for many years to come.

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Contents

Chapter 1
Digital Childhoods Across Contexts and Countries

Susan J. Danby, Marilyn Fleer, Christina Davidson, and Maria Hatzigianni

1.1 Introduction

There has been growing interest in how communities engage with and take up digital technologies. For instance, in Australia, approximately 90% of children aged 5–14 years access the Internet (ABS 2014) with 46% of children using mobile devices such as tablets and phones. Across the North American continent and in the EU, there is a similar engagement with digital technologies (Donohue 2015; EU Kids Online 2014). With fast broadband becoming more readily available in many countries, even greater online uptake is expected in the coming years (Livingstone et al. 2011).

What is known is that digital technologies are evident in almost every aspect of children's everyday lives, and these technologies are available at anytime. As Selwyn (2014) stated, many are now "'always on'" (p. 155). Technologies are now so commonplace that it is often taken for granted. Technologies are used to search for information, to communicate, to document and to navigate – plus more. Digital technologies, as they become more accessible and more mobile, are increasingly

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crossing the contexts of home, school, workplace and communities and offering an increasing range of educational and social affordances (EU Kids Online 2014). As a result of this increasing access and the ongoing changes in home, school and work-based practices, it has become increasingly important to take stock of how *digital childhoods* are being socially and virtually constructed. This chapter and those that follow, seeks to bring together the most recent research into young children's experiences with digital technologies, the contexts in which these e-affordances are experienced, and the conceptualisation of how childhood is now being constructed within digital spaces and with digital devices and resources.

1.2 Four Guiding Principles Underpin the Theoretical Framework

Digital technologies are being used in everyday contexts of home and school, and community, and across diverse activities from play to web searching to talking to family members at a distance. With an international readership, the book aims to encourage understandings of diverse practices as children make connections with digital technologies in their everyday experiences.

Four *guiding principles* underpin the framework of the body of work discussed in this book. They are designed for the reader to access major topics at a glance and to showcase the diversity of ideas and theorisations that underpin the chapters of the book. The *guiding principles* are discussed further below and are represented as broad interconnecting ideas as shown in Fig. 1.1. Related to the principles is a representation of the major topics located within the book. There are three major topics, each discussed in a section. In this way, each chapter stands alone in making a specific contribution and, at the same time, makes explicit its connections to the broader topics relevant for discussion of digital technologies in children's everyday lives.

Acknowledging that our social worlds are now saturated by digital technologies means that considerations of digital childhoods embrace the everyday experiences, the everydayness of digital technologies for children, for adults who figure in their lives and for their interactions as these contribute to those experiences. While there is a tendency to talk about young children's use of digital technologies as preparing them for the future (adult) world, what this book seeks to provide is a rich "album" of the many and varied ways that young children are currently experiencing, and constituting, their digital childhoods. This is the first principle that has framed the content and presentation of the research that underpins the book.

The second principle is the consideration of how digital technologies enter into digital childhoods in diverse ways and encompassing a wide range of purposes, not the least because children often use digital technologies for their own purposes. There is a propensity for considerations of young children and digital technologies to focus on the educational benefits of digital technology use for children's learning.

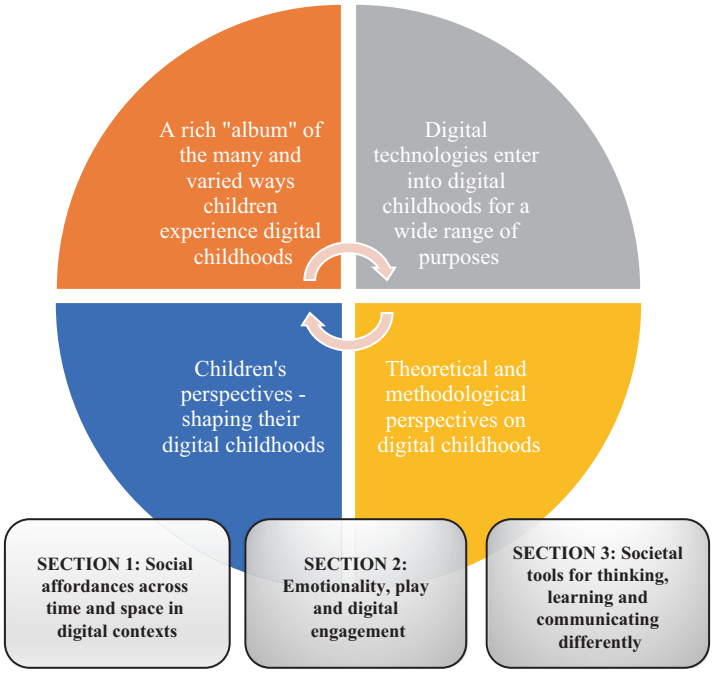

Fig. 1.1 The four guiding principles

This is evidenced in studies of teachers' use of digital technology in classrooms and in the production of guidelines for parents' selection of appropriate technology for children to use. Of course, while important considerations, this book encompasses a broader agenda of taking into account how digital childhoods are embedded through children's agendas and in daily family life where children experience, see and participate in the use of digital technologies as central to the many mundane activities that constitute "doing" everyday life.

The third principle is a strong focus on, and capturing of, children's perspectives to deliberately include work that documents and describes the use of digital technologies through the "eyes", words and actions of children as they produce their social lives across a range of contexts and settings. These activities include communicating with family members at a distance through Skype; engaging with learning activities in preschools through the use of digital technologies, as participants in interventions; and researching that seeks to understand their use of digital technologies.

The fourth principle responds to current critiques of educational technology research that discern limited considerations of theory and methodology and a tension in that field between rigorous research and "speaking to" practitioners (Selwyn 2012). For us, a book that addresses digital childhoods must be founded on theoretical and methodological perspectives that are sound and clearly articulated. The chapters encompass a diversity of theoretical and methodological perspectives, with

each providing a coherent and strong presentation of theoretical and methodological perspectives that have informed their take on a "slice of life" that constitutes digital childhoods. In this way, we seek to strengthen the field of digital technologies and young children, by drawing out the ways in which various theories and methodologies inform the overall "picture" and enrich understandings. This book is not a how-to guide for families, teachers and researchers; instead, the book presents empirical work to inform deeper understandings of the many diverse aspects of digital childhoods and thus is relevant to all adults who engage with children and contribute to their digital childhoods.

Taken together, the four diverse principles operate as a foundation for the context and framework of the book where the depth of discussion that features in each chapter locates itself within theoretical orientations of digital childhoods.

For the ease of the reader, the book is divided into three parts, where each part addresses a major topic within the field of children and digital technologies. The focus of each part is now discussed, along with a brief discussion of the chapters that align with that topic. Of course, the individual chapters could sit across one or more topic parts, and we have chosen to be pragmatic to include them in a part where we think they fit well.

1.2.1 Part I: Social Affordances Across Time and Space in Digital Contexts

Perhaps the most important shift in perspectives on young children's use of digital technologies has encompassed understanding the importance of the social. Early fears about the "lone" child user have gradually been replaced by knowledge of the ways the social figures prominently in enabling young children's digital activity; in particular, digital technology use promotes social interaction rather than hindering it (Plowman and McPake 2013). Further, children are increasingly able to access digital technologies that afford "the possibility of new forms of dialogue and communication" (Conole and Dyke 2004, p. 117). These support and enable children's social interaction and social lives in diverse ways and challenge us to look closely at how digital childhoods are shaped by, and shape, particular contexts.

Social interaction increasingly has been foregrounded as an important reason that children's digital technology use should be understood as beneficial. Early on, some studies discerned the importance of social interaction as a consequence of computer technology use in classrooms (e.g. Muller and Perlmutter 1985), and numerous studies have established the importance of interactions with young children particularly during use of eBooks (e.g. De Jong and Bus 2002; Hoffman and Paciga 2014; Shamir and Korat 2007, 2008; Smith 2001), playing with apps (Danby et al. 2013), web searching (Spink et al. 2010) and digital games (Davidson 2010; Sjöblom and Aronsson 2012). However, little is known about how social interactions are actually accomplished when children engage with digital technology.

What is new in this volume is work that considers how social interaction during digital technology use accomplishes aspects of family life. For example, Busch (Chap. 2, this volume) describes and explicates the interaction methods and procedures that family members draw on during intergenerational Skype sessions and how they assemble social orders. Powerfully, a young child is shown to use interactional resources at certain points to avoid family members visible on the screen and to continue his own activity offline. This focus emphasises the doing of the social when digital technology is involved.

How families do family life now encompasses considerations of the digital – even if considerations result in little or no use by children. Roos and Olin-Scheller (Chap. 4, this volume) address digital participation by children in a rural Swedish community and show how many family members, including children, actively work to minimise use of digital technology in their homes. This chapter challenges conceptions of children as digital natives but also suggests questions about adults' perceptions of their children's daily lives. Digital technology is viewed as potentially disrupting safe rural childhoods, when clearly within the community some children are experiencing significant exclusion, both offline and online.

Fleer (Chap. 3, this volume) addresses how everyday digital table technology is part of a young child's social system at home. In particular, family members were shown to engage with their child through a pedagogy that encompasses time and space in relation to person. The family's development of a conceptualisation of the world shows how they recruited digital technology in their interactions with their son in order to understand a world that was not easily visible to him. What is new in Fleer's work is the emphasis on how everyday technologies in their own right are part of the child's social system and social relations; in this case, promoting inclusive practices across preschool and home environments is framed by the concepts developed by the boy and family members accessing digital technology.

For some children, digital technology use is encompassed within the regular, almost daily shift, between home and preschool or home and school. Differences across the contexts (Yamada-Rice 2010; Wohlwend 2010) make a case for how institutional contexts, in particular, can change so that digital experiences are more consistent with those experienced at home. Davidson et al. (Chap. 5, this volume) emphasise how young children encompass the varied ways that they encounter the use of digital technologies. What is new is the emphasis on the ways that social interaction constitutes a young child's everyday use of the same digital activity differently in his home and preschool contexts.

Understanding the everydayness of digital technology use in children's lives should not be taken to signal sameness, however. That is, what may be considered to be usual and mundane varies. Roos and Olin-Scheller (Chap. 4, this volume) show how paying bills and viewing YouTube by some families in a rural community may be contrasted with web searching in a preschool or home or developing a young child's conceptual understandings through a music app at home. What is common across these practices is the ways that digital technology is domesticated for particular purposes by people in ways that take account of their own circumstances. What

is new are the ways that people's social interactions, including those of children, constitute the everydayness of digital technology use.

Chapters in this part have much to say about the ways that social phenomena are socially organised across time and space during and through digital technology use. They remind that "social phenomena do not exist by themselves. Collective phenomena emerge through the work of participants, extend as far as the actors carry them, and last as long as they keep them up" (Venturini and Latour 2010, para. 6). We see this in the Skype interactions (Busch, Chap. 2, this volume) where a young child works interactionally to encompass his mother's interactions in his home, his grandparents' interactions with each other and with his mother and himself. Through this interaction in the call, the child's previous experiences must be brought into the present and produced offline and online through the Skype call. Fleer (Chap. 3, this volume) considers how supportive interactions in the home flow onto those that occur in the preschool, while Davidson et al. (Chap. 5, this volume) argue the need for children's competencies to be understood as socially produced across contexts of home and preschool. The consideration of digital participation in a rural community in Sweden shows how parents, educators and children collaboratively organise their social selves offline and online over time in ways that are consistent with their perspectives on their rural life and their attitudes to the influence of digital technologies in their lives.

Together, the chapters in this part contribute to understandings of how spaces are "continually constructed" (Burnett 2013, p. 192) through interaction. Contributions of chapters also highlight that we still have much to learn about the numerous and complex ways that this is done by children with each other or in concert with adults during digital technology use.

Taken together, the chapters in Part I point to new directions and the new needs associated with digital childhoods. These topics included:

- Accomplishing the location of the digital in the fabric of family life
- Doing everydayness of digital technology use across varying contexts
- Interactional organisation of social phenomena across time and space using digital technology

1.2.2 Part II: Digital Play and Engagement

Part II centres on emotionality in the context of play and digital engagement. A lot is known about the use of apps and digital devices across a broad range of contexts (Ernest et al. 2014; O'Hara 2011; Verenikina and Kervin 2011; Zevenbergen and Logan 2008; Verenikina et al. 2016). However, where researchers have examined the value of tangibles (embodied interaction, tangible manipulation and physical mediation of digital data, see Abele et al. 2012), little is known about how these technologies create, support or negate (Verenikina et al. 2010) the conditions for children's play. In fact, we know a relatively small amount about the nature of

children's digital play in the contexts of the home (Kervin et al., Chap. 8, this volume) and the preschool or school (Wohlwend, et al., Chap. 10, this volume). What has emerged and noted in this volume is a stretched zone between what might be called digital play and digital learning. For example, educators using digital media and tangibles during preservice education and in the field with children have pushed against print-centric worldviews of learning literacy (Wohlwend, et al., Chaps. 10, this volume). Conceptions of what is making, hacking and remixing emerge as popular media toys are hacked (e.g. cutting, sewing, crafting, etc.) and reconstituted in the development of new play narratives in digital puppetry. Similarly, Fridberg and Redfors (Chap. 7, this volume) also foreground these stretched zones, but in contexts of playful representations of real-life science phenomena. Digital animations capture scientific phenomena and make conscious to children new ways of interpreting, reflecting and playing with everyday life events in digital format. This is in line with other studies that draw attention to how the creation of digital animations helps children to model their conceptual understandings (Fleer and Hoban 2012). What is new is the need for reimagining and re-theorising these symbiotic relations, because tangibles and digital tools are coming together in early childhood contexts and teacher education courses in completely new ways. Studies such as that of Wohlwend et al. (Chap. 10, this volume) and Fridberg et al. (Chap. 7, this volume) exemplify the need for new ways of thinking about children's experiences, new ways of conceptualising early education and new theorisation of what is digital play and learning in early childhood settings.

As a fast-paced changing context, digital play is continually moving ahead of research into this area. Despite this, we know from the broader research that children's engagement with digital devices can make a positive contribution to children's capacity to imagine (Singer and Singer 2006), to support interactions where gestures and interface design (tap, drag-and-drop, slide, pinch, spread, spin/rotate and flick) on touch screen applications are used (Aziz 2013) and support creative expressions in play (Verenikina and Kervin 2011), because a variety of modes are now available for making new meaning (Kjallander and Moiian 2014). Yet many worry about what might be the impact of digital technologies on children's learning and development.

Some authors have sought to disrupt what they believe is a technologically deterministic perspective that has recently emerged in discussions about digital childhoods (Gibbons 2015, p. 119). Determinisms have focused on the belief that "technological society is here to stay, so we just have to get on with making the best of it"; or "digital literacies are a new source of inequity, and so all children must have the same opportunities to develop such literacies"; and also "the child needs to be protected from the addictive nature of new media in order to engage with their natural world" (Gibbons 2015, p. 119). This perspective has played out strongly in the context of families.

Families create new zones of possibilities because of what digital tools allow and where new conditions for children's development (Vygotsky 1998) are created for children (see Chaudron et al., Chap. 9, this volume). Families and teachers worry about choices of applications for children because they have no guidance on what is

valuable or not for their children's development (see Kervin et al., Chap. 8, this volume). What has tended to dominate in the context of digital play and digital learning has been the negative dimensions of digital technologies (e.g. American Academy of Pediatrics 2011; Healy 2000) (see also Olin-Scheller and Roos, Chap. 4, this volume). Most of this research raises concerns about screen time (see Ernest et al. 2014; Kervin, et al., Chap. 8, this volume), the reduced opportunities for social interaction and development (see O'Hara 2011) and the reductions in children's physical activity (see Plowman et al. 2008).

More recently, though, research is now showing some of the benefits of digital play, and the American Paediatric Association has recently revisited their guidelines to reflect a more flexible approach to digital play and the valuable role of parents and others in developing language and social skills (American Paediatric Association 2016). Walker, Danby and Hatzigianni (Chap. 6, this volume) show through their longitudinal study of Australian children that digital play of up to 240 min per week is associated with better scores in literacy and mathematics thinking of children aged 10 and 11 years. This evidence is groundbreaking for the field because it is the first longitudinal study done of a population at a national level. What they also found was that lower levels of play (120 mins) did not show achievement gains – this is in direct contrast with the literature that has negated the effect of digital tools. But in line with screen time concerns, Walker, Danby and Hatzigianni noted that higher levels of play (421 mins) were shown to raise problems for children's cognitive self-regulation, academic performance and emotional development. What is new for the field is the strong evidence for digital play, with evidenced-based guidance on the amount of screen time that affords the best outcomes for children's emotional and cognitive development.

It is through a better theorisation of what now constitutes digital play and digital learning that the zone of concerns around how children are positioned in digital contexts can be better understood. For instance, Chaudron et al. (Chap. 9, this volume) and Kervin et al. (Chap. 8, this volume) each found that although families generally were positively predisposed to their children using technologies, they either did not feel confident or did not have the knowledge needed, for the selection of high-quality apps and websites to support their children's home use of technologies. Chaudron et al. (Chap. 9, this volume) found that, although families felt they had created conditions to keep children safe, and to monitor or restrict access through passwords, many children either did not understand the changed conditions or they had sufficient technical competence to bypass the technological restrictions imposed. What was new was how children's competence to access and use the digital technologies went beyond what families expected, and as such limited safeguards for safe access resulted.

The theoretical concept of motives (Hedegaard 2002, 2012, 2014) draws attention to how societies, communities and the institution of the family or preschool/school orient children to new practices, such as digital technologies. The rules of engagement with technologies in the home were captured by Chaudron et al. (Chap. 9, this volume) in their seven country study of how families generate rules on access and the use of digital technologies for 6–8-year-olds. The rules of engagement with

the technologies featured time, places and situations. Families adopted a range of approaches to mediate children's use of the technologies. Further, Kervin et al. (Chap. 8, this volume) also noted children's motivation towards digital technologies where variability in children's responses to technologies was noted, such as interest dwindling over time, self-regulation of use by children or an intensely time absorbed orientation. What is new here is the nature and diversity of the orientation of children to digital technologies. How families orient their children and engage or restrict access to digital technologies has until now not been fully explored on an international front. The study by Chaudron et al. (Chap. 9, this volume) represents a new line of inquiry, and the outcomes contribute to better understanding how families involve themselves, engage and restrict children's digital access.

Taken together, the chapters in Part II point to new directions and the new needs associated with digital childhood. The themes that are discussed include:

- Stretched zone between what might be called digital play and digital learning
- The need for reimagining and re-theorising the symbiotic relations between digital play and digital learning
- Strong evidence to support digital play, with guidance on the amount of screen time which affords the best outcomes for children's emotional and cognitive development
- Diversity of orientations to digital technologies by families internationally, who orient their children and engage and motivate them towards digital technologies in particular ways

1.2.3 Part III: Societal Tools for Thinking, Learning and Communicating Differently

The third part of the book concentrates on the use of new technologies as societal tools to enhance thinking, learning and communicating in new, alternative ways. Different types of technologies and transformations in institutional perspectives are being shown to facilitate and enhance children's learning and thinking. Consistent with the progress in cognitive sciences, moving away from information processing theories to a sociocultural approach with an emphasis on "situational, institutional and cultural" contexts (McGuiness 1993, p. 313), learning and thinking are not considered personal, internal, mental actions any more. They are rather "activities with objects and situations", emphasising cooperation with peers and interactions with people in achieving the "awakening of learning" (Vygotsky 1978, p. 90).

Children carry fertile collections of everyday social and cultural experiences, and in these collections experiences with the widespread technological media are also included (Plowman et al. 2010; Robinson and Sebba 2010). In this part, children are seen as active members of their society, and the interplay between technologies gives them the power to co-construct meanings, extend and reflect on their thinking and communicate dynamically. Children are seen as competent with the new tools,

whatever form they may have, tablets, smartphones, electronic games or even applications of augmented reality (Han et al. 2015; Yannier et al. 2016). In line with research in this field, children from a very young age see the tools as part of their world, and they use them to communicate with others, to understand social roles and to enhance their sense of belonging to this digital world (Geist 2012; O'Connor and Fotakopoulou 2016). The creation of their own "digital narratives" in an Australian kindergarten project by Garvis (Chap. 12, this volume) and the mastery of a young girl's pretend telephone interactions (Scriven et al., Chap. 17, this volume) show how technology plays a significant role in helping children understand the complexity of their social worlds. Children are adapting to new social realities, by increasingly mastering their technical skills (e.g. the use of tablets or accessing online videos) and by making links and new meanings of a combination of tools. The interplay of technologies makes possible ways to empower children and offer opportunities for leadership and agency in learning (Hatzigianni and Margetts 2012; Palaiologou 2016). Such opportunities to engage with open-ended, constructive tools are proposed by Highfield et al. (Chap. 11, this volume) who offer vignettes on how young children take control of their learning and how their parents become co-learners beside them. These chapters underline the importance of holistic development for children. It is as if children work inside a circle, the circle of technology, where their thoughts, knowledge, social skills and feelings are interconnected and valued so that the whole child is benefited.

Although changes in in institutional practices and in education in particular generally have been slow (Cuban 2001), the advent and widespread use of mobile, portable technologies is altering everyday practices (Enonbun 2010; Karsenti and Fievez 2013; Shippee and Keengwe 2014). Pedagogic shifts are explicitly valuing the wide choice of communication tools and a collaborative approach to empower educators and children (McLean 2013; Dryden 2014). Woods and Doyle (Chap. 14, this volume) show how collaboration and pedagogy work to move from print to a combination of print and digital literacies in an Australian kindergarten class (5–6 years). Similarly, new possibilities for creative engagement and enhancement of aesthetic perception are explored under the integration of technology in teaching Visual Arts by Kalamatianou and Hatzigianni in a Greek primary school (Chap. 13, this volume). Creativity plays a pivotal role in learning and is tightly linked to problem solving and decision making and is more peer based and collectivistic when technology is integrated. However, creative uses of technology are scarce in schools even though gains from such use are well-documented (Craft 2012; Fabricatore and López 2013; Hatzigianni et al. 2016).

The value of digital games for children's development and learning offers new instruments of play to "constitute a new, innovative field" (Méndez and Del Moral 2015, p. 212). Nikiforidou (Chap. 16, this volume) shows play-based learning within digital game-based learning in early childhood education. This chapter offers rich insights for educators on how to carefully conceptualise and plan the use of video games by taking into consideration the design and the content of the games.

The use of digital tools brings fundamental changes in children's language development too. Adults use language to enhance children's knowledge in direct and

indirect ways, and there is an array of digital tools to support this task (Dryden 2014; Goouch and Lambirth 2010). When difficulties arise in oral communication and in language development, technology can assist. A team of renowned researchers in the field (Wren et al., Chap. 15, this volume) show how the use of technology has the potential to support children's speech, language and communication skills. Their approach is innovative in proposing a synergy between the digital tool and the social environment, pivotal for capitalising on the potential of technology.

Taken together, the chapters in Part III point to new directions and the new needs associated with digital childhood. The themes that are discussed include:

- How the expectations of learning are changing with the use of technology. Knowledge is less instrumental, linear and hierarchically organised. Knowledge becomes fluid and open to interpretations, new meanings are negotiated and new challenges are strategically managed by children themselves.
- Nurturing a holistic image of the child, to embrace a construction of the child as competent, flexible, multidimensional and multifunctional.

1.3 Conclusion

This book is an international publication that presents a diversity of chapters where different theoretical approaches and a broad range of countries are represented. Each author's work stands alone and also stands within the broader body of international work on digital childhoods. The concept of digital childhood represents what is happening now and also propels new thinking about children's digital lives.

The conceptualisation of digital childhood frames knowledge construction in relation to personal, institutional and societal perspectives (Hedegaard 2012). This conceptual frame speaks directly into research, policy and practice. The constructions of the child and childhood within this book give voice and agency to children, families, policymakers and to the community at large. Rather than a deterministic perspective, the authors of the various chapters show how children contribute to, and shape, the contexts in which they interact digitally.

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Part I
Social Affordances Across Time and Space in Digital Contexts

Chapter 2
How Families Use Video Communication Technologies During Intergenerational Skype Sessions

Gillian Busch

2.1 Introduction

With increasing access to home computers and the affordability of Web cameras, video calling is becoming a more common practice adopted by families to maintain familial relationships between children and their grandparents. Research confirms that family members are employing the use of such technologies, which require the deployment of a range of interactional practices in response to the contingencies afforded by the technology. This chapter contributes understandings about the interaction methods and procedures family members draw on during intergenerational Skype sessions and how social orders are assembled.

For extended families separated by geographical distance, technologies such as Skype are often replacing audio-only technology to maintain and facilitate family relationships (Ames et al. 2010; Raffle et al. 2010) and appealing to families as very young children find audio-only conversations more difficult (Ballagas et al. 2009). The take-up of video communication technologies occurs within a context of families becoming increasingly mobile and separated by geographical distance. While the relocation of families has led to grandparents increasingly being separated from their children and grandchildren, grandparents want to continue relationships with their grandchildren and to see them "grow up" (Judge et al. 2011, p. 1).

Researchers have identified a number of advantages for the use of videoconferencing technologies between family members. First, the development and affordability of videoconferencing technologies for use within family contexts means that family members, including young children, have access to a visual on the screen. The visual capacity of the technology enables children to "show their ideas" (Follmer et al. 2010, p. 3398) and affords them the opportunity for expression

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through multimodal interaction including gaze and gesture. This sharing of activities has the potential to contribute to sustained conversation (Vutborg et al. 2010). Second, videoconferencing technologies support the development of closer relationships between grandchildren and grandparents living apart. Researchers note that familial relationships between grandparents and grandchildren contribute to the well-being of all members (Moffatt et al. 2013), with some grandparents reporting that grandchildren who seemed shy when they visited appeared less shy when communicating over distance (Vutborg et al. 2010).

While generally viewed as positive within the literature, some technical challenges associated with using Skype have been reported, including distortions or poor picture quality (Kelly 2013; Rintel 2013), connection problems (Kelly 2013), and the design of the technology limiting what can be seen by interactants. Usually in Skype or FaceTime interactions, only the head or upper torso is visible as a kind of "talking head" (Odour et al. 2013, p. 1). While designers have worked to make modifications that afford users greater flexibility in how Skype is used, the technology is "made at home in the world that has whatever organization it already has" (Sacks 1995, p. 549) with, for example, families simply moving laptops/iPads devices to enable interaction that includes more than a head and upper torso (Kelly 2013).

Existing practices adopted by families with young children using video communication technologies have been examined (Judge and Neustaedter 2010; Kelly 2013), though there is a paucity of research that adopts an ethnomethodological approach to examine interactions involving grandparents and grandchildren. Previous research has suggested that Skype interactions are often prearranged, rather than impromptu, with callers checking the recipient's availability prior to the call using their Skype availability status and text or email messages (Judge and Neustaedter 2010). In some instances, the video call may stay open for an entire day. One family reported that they routinely connected during breakfast on a Saturday morning because the grandparents loved watching the grandchildren eat breakfast acting a little like a "fly on the wall" (Judge and Neustaedter 2010, p. 657). When using Skype some families adopted strategies to ensure aspects of their privacy were maintained, which required the altering of the angle of the camera to capture only that which the person is happy to have captured.

An ethnographic study of how grandparents in the United Kingdom used video-supported technology to maintain contact with their grandchildren living in Australia highlighted a number of key findings pertaining to family Skype activity (Kelly 2013). First, "adults scaffolded" children's use of Skype, and, second, the child exercised their agency to involve the grandparents in her play (Kelly 2013, p. 6). There remains, however, a paucity of fine-grained research that adopts an ethnomethodological approach (Garfinkel 1984) to examine how family members accomplish interaction between grandparents and grandchildren using video communication technologies, such as Skype, and how the interactions with distant family members contribute to children's social worlds.