

Digital Play

Abstract

This chapter takes a critical look at the nature of young children's digital play and the conditions with influence this play when they engage with resources ranging from desk-top computers to leisure technologies, portable devices, games consoles and technology-augmented toys and learning resources. The debate about the appropriateness of play with digital resources for young children is reviewed as is the evidence on the extent of digital play and the influence of the context in which it occurs. Contemporary assumptions that all children are keen users of digital resources and that digital play is a distinctive form of play are examined and future developments in digital technologies are discussed. Gaps in research evidence are identified and alternative theoretical perspectives considered.

Key words

Children birth to eight, digital play, technologies, toys, home

Introduction

This chapter is about engagement with digital toys and technologies during children's early years. Driven by belief in the power of play to support learning and development and the conviction of parents and policymakers that competencies with digital technologies will be necessary to ensure future employability and economic effectiveness, play with technologies has become an integral part of educational provision for young children in developed nations. Preschool settings have been equipped to support children's learning about and through digital technologies and curriculum and pedagogical guidance developed for their use in preschool settings (e.g. Learning and Teaching Scotland, 2003; NAEYC, 2012). Furthermore, the positive value placed on early learning coupled with the belief in the potential of digital technologies to enhance learning has fuelled the market in educational interactive toys for play at home.

Despite the apparent popularity of digital technologies and the availability of digital resources at home and in educational settings, play with these technologies is a contested activity. While parents and children increasingly encounter and interact with digital technology across all aspects of their daily lives the debate between those who favour and those who oppose young children engaging in digital play is in danger of reaching stalemate. The purpose in this chapter is not to take sides or search for definitive answers about outcomes or impact. Instead, the aim is to consider what is known about children's play with digital technologies and technological toys at home and in their educational settings.

Given the range of digital resources for play, leisure activities, communication, education and work which children encounter in their everyday lives any exploration of digital play must go beyond screen-based technologies such as desktop computers, laptops and tablets where the interface is through a keyboard, mouse or touch screen. Products such as the Wii and games consoles use a television display and may use a motion-sensing interface. Digital cameras, mobile phones and leisure technologies such as interactive television and DVDs are also features of young children's technological experience in the developed world at the beginning of the 21st century. Before they begin school children may encounter email, shopping online, webcams, Skype conversations and

internet searching as well as toys that simulate appliances such as mobile phones and cash registers or educational resources such as reading devices and responsive globes. For the youngest children there are technology-augmented toys with lights, sound, motion and programmed interactions.

Defining play is a challenge that has defied a definitive solution but it becomes particularly complex in the context of digital play as it can range from games with pre-defined rules, through competition against a virtual partner to employing a simulated technology in an imaginative play setting. All of these activities are referred to by adults and children as play and it is this broad, activity-orientated understanding of digital play that is adopted here. The concern in this chapter is with 'what is played' and in what circumstances by children aged from birth to eight-years old, with an emphasis on the years before children start formal schooling.

We begin by looking at the popular debate about digital play before moving on to survey empirical evidence about the nature of digital play. Contemporary understandings of digital play are then discussed and we conclude with a consideration of future developments.

The Digital Play Debate

Early reviews of empirical evidence about young children's encounters with digital technologies in educational settings have pointed to varied and patchy evidence about use and impact and to the tendency for research to be concentrated on the practices of children and their educators in educational settings (e.g. Bolstad, 2004; Stephen and Plowman, 2002). Nevertheless, there is a general recognition in the literature that, digital technologies are at least a 'benign addition' (Cuban, 2001) and at best a supplement to existing practices that can contribute to children's learning and to their motivation to learn. In contrast to this measured response a highly polarised debate has developed in the media around engagement with digital technologies for 0- to 8-year-olds at home and in preschool and school. On the one hand there are claims that anxieties are fuelled by moral panic and nostalgia and assertions that being a competent user of digital media will be an essential prerequisite for success in the 21st century, while on the other there are concerns about the developmental dangers associated with the early use of screen-based technologies.

Anxieties about technology use in the early years typically focus on three main areas of negative impact: health and well-being; cognition and brain development; and social and cultural competencies. There are concerns that screen-based technology is used as a form of unsupervised babysitting which denies children adult company, along with anxieties about 'addiction', physical inactivity, passivity and lack of verbal and social development as well as fears about internet safety. There are doubts too about the developmental appropriateness of computer-based or virtual learning experiences as opposed to traditional, 'hands-on' activities (see for instance, Haughland, 2000; Alliance for Childhood, 2004; Palmer, 2006). The American Academy of Pediatrics (2011) argues that there is no evidence that children's learning is facilitated by educational media and concludes that children under two years old should not watch television or engage with other screen-based media. Elsewhere questions have been raised about the neurological impact on young children of spending time using digital toys and technologies (Howard-Jones, 2011) while the role that these new resources play in the marketization of education raises a different set of socially relevant issues (Selwyn, 2011).

Those with more positive perspectives on technology argue for benefits for children's cognitive development and learning and for their social and cultural awareness and participation. These arguments tend to be forward-facing, concentrating on ways of enhancing the learning of particular skills such as phonological awareness or mathematical concepts, the collaborative learning skills needed in a knowledge economy (Yelland et al, 2008) and the integration of the competencies with technologies which children develop at home into their formal learning settings (Parette et al, 2010; McPake et al, 2012). Others suggest that the extent of digital technologies in family homes means that everyday practices have moved beyond the pro and anti digital play debate. A UNESCO report (Kalaš, 2010, p 16) states that 'it is not necessary any more to prove that ICT matters in early childhood education. New digital technologies have entered every aspect of our reality, including families and lives of young people'.

From the perspective of researchers considering children's play with digital technologies two aspects of the debate are striking. The first is that on both sides of the argument the concern is largely with what may enhance or inhibit development rather than with the kinds of play afforded or the ways in which digital resources are incorporated into play and family life. Technology is currently associated more with educational than play value but belief in 'learning through play' in the early years has led to a burgeoning literature which attempts to validate children's play with computer games by claiming that they are educational. Furthermore, educational value is frequently used as a marketing device for digital toys with claims about accelerating progress in learning to read, write and use numbers. However, learning toys are often based on mundane educational tasks disguised as entertainment. The so-called interactivity may well provide some initial motivation for learning but the research evidence suggests that it rarely continues beyond the first few encounters and may even get in the way of the educational potential. Digital interactivity alone does not guarantee either an educational or a playful encounter.

The second striking feature is the narrow focus on screen-based technologies in general, and computers in particular, where the user is positioned as static and the activity is entirely virtual. This is all the more surprising given the greater availability of resources which do not depend on an interface with a traditional television or computer screen or where, as with the Wii, the activity is relayed through a screen but controlled by the child's physical actions. By moving the adult or child player to be at some distance from the screen, the Nintendo Wii, Microsoft Kinect and similar motion-control user interfaces, were designed in part to assuage the fears of those who believe that digital play leads to a lack of physical activity or social interaction as they invite group play and a higher level of movement than associated with video games and computers.

Play with digital technologies has been criticised as constraining creativity but Bolstad (2004) argues that digital technologies can be employed to support creative play and expression, not only through the selective and supported use of computer games, but also through employing digital cameras, programmable toys, or walkie-talkies for a range of play activities. Technological pets, toys that simulate programmable domestic appliances and mobile telephones all afford play that is different in kind from the 'traditional' computer game. In educational settings the more open-ended programmable toys, such as Beebots and some forms of Lego, dispense with a screen altogether, enabling children to try 'what if' scenarios and to develop computational thinking. Engaging with digital technologies at home is perhaps more likely to involve creative or imaginative uses, for instance, as families compose digital scrapbooks or children download pictures of favourite

characters to use as they act out stories. The increasing accessibility, particularly at home, of tablet computers and smartphones is leading to a resurgence in the use of screen-based technologies but features such as the touch screen and easy portability, can solve some of the operational problems observed when children play on desktop computers.

Surveying the Evidence on Digital Play

Researching the extent of digital play

In light of the intense debate described above it is surprising that there has not been more research on the role of digital technologies in the lives of children in the early years. In particular, there is a lack of academic writing about the digital experiences of children younger than three years of age, although there is anecdotal evidence and journalistic comment on the advantages, dangers and inevitability of digital play for the youngest children in newspaper article and blogs. One exception is the work of Bergen et al (2010). Working with a toy manufacturer, they examined the impact of technological augmentation on the ways in which children aged from 7- 28 months and their parents interacted with the toys. They concluded that there was initial support for the idea that the technologically-enhanced toys they studied promoted what they categorise as 'exploration, practice play, social game play and humor expression' (Bergen et al, 2010, p 15).

Although ostensibly referring to 'playing with computers', much of the available literature is concerned with experiences in educational settings and adopts a narrow interpretation of both digital resources and learning, typically being concerned with measuring the impact of the use of computers or other devices on the acquisition of specified skills and knowledge. A focus on using computers and the outcomes for aspects of learning more directly associated with the school agenda tells us little about the ways in which preschool children interact with or play with digital technologies, although Vangsnes et al (2012) have alerted us to the tension between the ways in which teachers tried to involve 5-year-olds in pedagogical interactions around a computer game and the children's focus on the game as a competitive play episode with friends.

Surveys of children's play with digital technologies beyond educational settings often use estimates of screen time as the measure of engagement. Vanderwater et al (2007) found that, contrary to the guidance offered by the American Academy of Pediatrics (AAP), 62 per cent of nought- to two-year olds had watched some television on the target day although screen time estimates for the majority of three- to six-year olds did fall within AAP guidelines. Rideout's (2011) survey of parents of children aged zero to eight in the USA found that although 12 per cent of two- to four-year olds used a computer every day, and another 24 per cent at least once per week, television remained their dominant form of screen exposure with 73 per cent viewing at least once each day. The headline figures from these surveys are often drawn upon in studies which raise concerns about digital play for young children. But there are limitations to this evidence which usually depends on parental recall, is limited to exposure to a specified range of screen-based technologies and often relates to a particular cultural context.

Two studies of Scottish children's everyday experiences with digital technologies at home offer evidence about the place of digital play in the lives of young children (Plowman et al, 2012). There was no evidence that play with digital media dominated the lives of three- to five-year olds. On the

contrary, children choose, and parents prefer, variation and balance between play with digital technologies and toys and traditional toys. Each family sought to ensure what they considered to be a suitable mix of physically active and imaginative play both indoors and outside. Televisions, computers with internet access and mobile phones were ubiquitous features of their homes but, regardless of family income, each home also contained large numbers of traditional toys. The proportion of the playthings that could be categorised as technological ranged from a maximum of 33 per cent in one household to much nearer 10 per cent in others and in most of the homes traditional toys outnumbered those with technological features by three to one. Vanderwater et al (2007) explored whether spending time with screen-based media reduced the time that children under six years old in the USA spent in more traditional pursuits and concluded that 'contrary to popular belief' there was no relationship between time spent viewing and time reading or in outdoor play. The implication of findings such as these from Plowman et al and Vanderwater is that digital play adds to the play pursuits available to young children rather than displacing whole areas of activity.

Digital play in context

Focusing on how much time preschool children typically spend with digital technologies or their rate of progress in learning particular concepts tells us little about the nature of their digital play. For instance, just as older children have been found to use more than one form of technology at a time so young children often play with traditional toys, perhaps building a train track or constructing with Lego while glancing occasionally at the television screen. Oakes (2009) argues that media effects studies typically fail to take account of the context in which technologies are being used and Vandewater and Lee (2009) have criticised the focus on measures of use rather than analysis of content. Exploring children's play with digital technologies demands attention to the context in which the engagement occurs, the form of activity, its place in young children's play repertoires and the conditions which promote sustained and meaningful encounters.

Local cultural expectations, perspectives and values influence children's actions and opportunities at home no less than in institutional settings. For instance, Ljung-Djärf et al. (2005) characterised the approach of early years educational settings to the introduction of digital technologies as protective, supportive or guiding and described how the behaviours of practitioners in these different environments influenced children's experiences. At a more micro-level Ljung-Djärf (2008) found differences in the social environment in which three- to six- year olds engaged with computers in their educational settings. She identified three social and relational positions which shaped children's actions: resource owner, participant and spectator.

As they examined play with toys and technologies at home, Stephen et al (2013) identified four dimensions of family life which make a difference to children's digital play. Parents' attitudes towards digital technologies and playthings, their ideas about how children learn and their role in this process and patterns of family interactions and practices were influential as were individual differences between children. They were discriminating users of technologies who had distinct preferences amongst the digital resources and games available to them and were able to make judgments about their own performance (Stephen et al., 2008). As with traditional play, gender makes a difference to digital play. Although there was no clear difference between girls and boys in the proportion of their toys that were technological Stephen (2011) found evidence of gender

differences in the nature of the digital playthings which children owned and in the branded characters which they favoured.

Marsh (2004) drew attention to the opportunities for pleasure and self-expression which encounters with technologies, and television in particular, afforded two- to four- year olds. She found that although watching television was a central feature in the way in which young children spent their time at home it was a far from passive activity. The children talked about what they saw and continued the narrative themes in their imaginative play. Her later study of play in online virtual worlds found a similar integration of digital and traditional play forms (Marsh, 2010). Online the five- to seven- year olds engaged in digital imaginative and role play and games with rules; both forms of play that were also part of their non-digital play repertoire.

Facilitating digital play

Plowman, Stephen and McPake designed a series of studies to go beyond reports of usage to investigate the nature of preschoolers' encounters with digital resources in their educational settings and at home. An initial study suggested that, contrary to expectations, children's encounters with computers and other digital resources in preschool playrooms were often brief and could be unsatisfactory because they could not understand or comply with the instructions for the game, became confused by layers of choices or possibilities, were unable to cope with the cognitive demands of the tasks, lacked operational skills or were distracted by peers (Stephen and Plowman, 2003). In these circumstances playing with the computer appeared to be a less than playful activity and the attractiveness of more traditional options in these richly resourced environments was evident (Plowman and Stephen, 2005).

Stephen and Plowman (2008) found that positive engagement with technologies in the playroom depended on sensitive and responsive support from practitioners which the researchers conceptualised as guided interaction. They found that engaged play with digital technologies was supported by distal activities such as selecting resources in response to children's interests and deploying staff in ways that ensure they can proactively support children as they use technologies. Effective proximal guided interaction was found to be multi-modal, enacted through gesture, expression and touch as well as the spoken word. Physical, verbal and socio-emotional actions guided the children's interactions with the technology, for instance, modelling how to use the toy cash register and card reader, reading instructions in a dialogue box or sitting alongside to give encouragement or share pleasure in the animations.

Stephen and Plowman (forthcoming) went on to explore digital play at home and found that guided interaction from a responsive adult was just as critical there as it was in educational settings. Indeed, parents engaged in the same forms of guided interaction exhibited by educators, including verbal and non-verbal responses and interventions, physical actions and cognitive activities. However, support was needed more often at home than in educational settings in order to manage disappointment or unhappiness with lack of success in digital play with games on the computer, a games console or on the Wii. Three - to five-year olds could become frustrated when competing with other family members or when attempting an inappropriate level of difficulty on a shared resource.

Contemporary considerations

Going beyond 'digital natives'

Contemporary thinking about digital play is ready to challenge established generalisations and ideas that are reaching the status of folk belief, such as the commonly repeated idea that all children are keen users of new technologies to the exclusion of other activities. As the evidence reviewed above suggests, not all of young children's play is digital. The belief that there is a natural bond between children and technology is reflected in the widespread use of the term 'digital natives'. According to Prensky (2001), those who have grown up with technology are the digital natives. Although originally coined to refer to college students, the term is now applied to children of all ages. They are contrasted with the so-called digital immigrants, such as their parents and teachers, who have adopted technology later in life. This description is initially convincing as some children do have a facility for technology and some adults can feel overwhelmed, but many children of this age do not behave as 'digital natives'. Their early exposures to digital play, whether with computer games, the Wii or with interactive learning toys, can be characterized by timidity or disinterest. This may be a consequence of design or personal preference or competencies: interaction does not come as naturally as the term 'digital natives' suggests for children aged three or four who are faced with an unfamiliar website or game and have not yet learnt the conventions of interface design.

Is digital play distinctive?

Defining the characteristics of digital play remains elusive. Throughout this chapter play with digital technologies has been thought of from an activity perspective which focuses on play, including play with digital technologies, as a cultural practice mediated through the physical, cognitive, social and emotional environments in which children are growing up. Furthermore, it is important to note that the play possibilities afforded by digital technologies vary with the target user. An interactive toy which produces sounds and lights may be an opportunity for playful exploration for a one-year old child but is unlikely to be part of the play of a four-year old for whom engaging in play in a virtual world may be equally inappropriate. Within the context of an educational environment, with its discourse of purposeful play and play as the medium for learning, digital technologies have been thought of as an educational tool by educators, policymakers and researchers. But there are other discourses about play which assume alternative purposes and value positions. Digital play may be thought of as a way of keeping children entertained, having fun, collaborating with others or competing. However, children's play with digital technologies involves them in many of the same cognitive operations they encounter with traditional toys at home and in preschool. In digital games they match, sort, categorise, count and manage quantity. They can practise phonics and encounter other literacy skills as they navigate menus and screen displays and watch films and listen to audio-stories. Play with digital technologies may be less likely to extend children's physical capacities than traditional play activities but the evidence suggests that three- to five-year olds continue to seek out and enjoy gross motor play.

The term 'digital play' often refers to a model of play that derives from screen-based computer games and by comparison with the multimodality of traditional toys that afford grasping, throwing, squeaking, blinking and squeezing, or the pretend play supported by household objects, screen-based play may well seem two-dimensional. However, this focus on screen-based activity means that the ways in which children integrate digital and non-digital play can be overlooked. The distinction between digital and embodied play is being eroded by a new generation of technologies

with tangible (i.e. touchable) interfaces facilitating seamless movement between digital and non-digital resources and play narratives. For instance, Stephen et al (2013) observed a four-year-old girl taking an interactive 'talking' dog for a ride in a train made from a cardboard box and children use old computers and non-functioning mobile phones as props for play in imaginary offices, shops and schools.

The presence of digital technologies in the homes and educational settings of young children can be seen to have impact on their lives in three distinct ways, not all of which fit with any traditional definition of play. Firstly, they allow young children to engage, with some support, in particular activities in much the same way as adults. Advances in communication technologies are perhaps the most obvious development here with age being no barrier to talking to relatives on Skype or taking and sending photographs on a mobile phone or tablet computer. Secondly, young children participate in family leisure practices including the use of digital technologies such as watching DVDs and interactive television, playing games on the Wii or using games consoles. But it is a matter of debate whether these leisure pursuits constitute play. None of the families in the home-based studies by Plowman et al referred to watching the television or a DVD as play, for instance. Similarly, Glenn et al (2012) report that although the Canadian children aged seven to nine in their study 'described a vast array of activities as play it became apparent that children rarely included watching television'. Thirdly, digital play resources targeted at the early years market vary in the degree of playfulness and open-ended use which they afford and therefore in the extent to which the activity might be considered to be play. Children in the early years use computer art packages to draw, colour and print out pictures and complete computer activities which often focus on shape, comparing quantities, identifying rhymes and sequencing but few of these games are open-ended and they offer limited scope for playful behaviour.

Developing research and theory

The early years literature is dominated by a concern with learning and development and the place of technologies in the lives of young children does not escape this focus. Much of the research reported on the ways in which children in the early years of primary school (five to eight years old) engage with technology adopts a relatively straightforward positivist approach, investigating and measuring the outcomes of play with novel technologies for specific aspects of learning or development (e.g. Couse and Chen, 2010). The relationship between the development of digital literacy and the contribution which playing with technologies makes to emerging literacy and communication skills has been a particular feature of research endeavours. Plowman et al (2010) found that children learned how to master operational features, extended their knowledge and understanding of the world and supported the development of positive dispositions such as persistence and independence as they played with a range of digital resources at home and in their preschool. However, another form of learning was only evident in the home studies: learning about and changing the nature of participation in the authentic cultural practices of family or community such as communication, shopping and leisure. At home children learned to participate in family narratives and visual records, to communicate by email and mobile phone, shop online and to relax together by playing games on the Wii and watching television.

Verenikina et al (2010) have concluded that there is a considerable gap in knowledge about the ways in which computer games for children in the early years of primary school activities can support

what is described as 'developmental play and higher order thinking in very young children' (p. 156); a reminder of the dearth of evidence-based understanding in this rapidly developing area. There is, too, a growing realisation that children's exposure to digital technologies at home makes a difference to their interest in and motivation to engage with the resources offered in their educational setting. After examining the literature on the relationship between technology and literacy in educational settings for children aged nought to eight years Burnett (2010) argued that more research was needed about children's digital practices at home in order to understand the way in which their digital experiences there influence their meaning-making.

There has been a welcome extension of the range of theoretical approaches adopted as researchers move beyond attempts to measure specific outcomes to studying the nature of play with digital resources. For instance, employing the Bourdieuan concept of habitus to explore the differences in expectations between children who have grown up in the digital age and their parents, Zevenbergen (2007) identified a distinct digital habitus acquired at home but not yet responded to in educational settings. Actor network theory facilitates the study of the part played by the human and non-human agents in play with digital technologies and has particular value when the object of attention is a material resource or form of software. Similarly, an analysis adopting the intra-active pedagogy developed by Lenz Taguchi (2010) from the work of Deleuze and Guattari will focus on the interaction of children, adults and material resources during digital play episodes and the learning which happens in between these elements.

A socio-cultural theoretical orientation positions digital technologies as a material, social and cultural feature of childhood in the 21st century. The Vygotskian tradition explores the critical role of the more able other in the zone of proximal development and the kind of support required to enable children to make use of the digital tools of their society (Vygotsky, 1978). In addition, it frames exploration of the ways in which play with digital technologies can be expected to foster cultural interpretation and reproduction through imagination in action (Edwards, 2011). Hedegaard (2012) points to the value of taking account of what she conceptualises as children's motives and their social situation in an activity setting. From this perspective children's play with digital technologies depends on their preferences and desires as well as the social, material and cultural environment in which each child is growing and participating. The literature on communities of practice and Rogoff's (2003) conceptualisation of learning as guided participation provide alternative ways of conceptualising children's encounters with technologies at home and in educational settings.

Future developments

While the capacity of digital playthings to extend children's physical and social activities seems limited, it is perhaps in the area of imaginative play that there is the greatest scope for development. The evidence suggests that stimulating imaginative or pretend play or acting as a prop in pretend play is not a current strength of digital resources (e.g. Bergen, 2010), although some children do blend traditional and technological playthings or engage with brand characters or games across digital and non-digital formats. However, there is potential for digital resources to move away from the current reliance on defined and closed game designs to more open-ended and flexible uses that respond to children's changing interests and relate to authentic experiences which they want to reproduce in play. Carr (2000) set out three critical affordances for any technological activity in the early years: transparency, challenge and accessibility. It seems important for the designers of games

and digital resources to collaborate with those whose expertise lies in understanding what children want from play and what playthings can offer them.

As new forms of technology are developed and as the locus of interaction moves to the digitally-enhanced tangibility of the lived environment with sensors and computer chips embedded into a wide range of devices, it will become easier to design materials that children can touch, feel, move around and share; developments which are likely to stimulate the more imaginative, physical, and exploratory aspects of children's play. Products already coming onto the market, for instance, combine virtual and real worlds so that touchable toys use tags to communicate with each other both on and off screen. We are likely to see a continued evolution of toys that build on advances in speech and gesture recognition to adapt to their owners by displaying emotional responses. Augmented reality games use a link between a tablet or smartphone and, typically, a set of interactive figures, with the device providing a screen through which the real world of the living room is viewed with the figures superimposed on it. There will be new developments in social media which will offer alternative forms of communication and access to the perspectives and knowledge of others but the ways in which these advances will impact on opportunities for play remains unclear. As the design of the interface on smartphones and tablet computers becomes more child-friendly, opportunities will emerge for children to create and integrate their own content, such as drawings, photos and video, thus overcoming some of the current concerns about the closed nature of technological products.

Nevertheless, the question posed by Bergen et al (2010) about whether there is an optimum degree of technological augmentation reminds us that knowledge about digital play is in the early stages of development and there is a need to continue to pose critical questions about what is played and the affordances of technologies. While it is foolish to predict the future, the increasing technologisation of play is likely to accelerate different manifestations of play and prompt alternative ways of conceptualizing its role in childhood. The hybrid mix of digital and non-digital, and of real and virtual worlds may shape both the developmental and the cultural nature of play. The tangible nature of some of these technologies and the multimodal nature of the feedback may have some impact on children's movement, cognition and emotions; at the same time, cultural and social change within the family and the wider community will influence not only what children play with but also who they play with, for what purpose and where. It is unlikely that children will cease to play with traditional toys in the foreseeable future. Whether innovative or not, there is still a need for products that promote curiosity, creativity, imagination and learning and this means taking design seriously: both traditional and technological toys may foster or impede the characteristics we consider desirable in young children.

Conclusions

In this chapter we have surveyed the contested nature of children's play with digital technologies and the empirical evidence available about the nature of that play, its outcomes and the conditions in which it is sustained and productive. The studies reviewed suggest that play with digital technologies can be satisfying for children in the early years, although there is little evidence on which to base this conclusion for the youngest children in this age range. Digital play can provide opportunities for entertainment, fun and learning but the experience of any one child will depend on individual motives, adult or peer support and a good match between design and the child's purpose

in the play episode. Contrary to expectations raised in the popular media, there is evidence that digital play does not dominate the lives of nought- to eight- year olds. Research suggests that digital technologies and playthings are just one part of the complex and contingent socio-cultural environment in which children live and learn.

The studies drawn on in this chapter were not designed to provide answers to the questions about potential harm or benefits that bedevil the media debate about young children's use of digital technologies. The focus here has been on understanding the ways in which children engage with digital technologies and playthings. Nevertheless, the findings about the influence of children's preferences and family life and practices on their digital play throw doubt on claims that such play has a universal impact for good or ill. Children's choices, the options provided and encouraged by their families and the presence or absence of a supportive adult all make a difference to what is played.

References

Alliance for Childhood (2004) *Tech Tonic: Towards a new literacy of technology*, College Park, MD: Alliance for Childhood.

American Academy of Pediatrics Council on Communications and Media (2011) Media Use by Children Younger than 2 Years Old. *Pediatrics*, 128, 5: 1040-1045.

Bergen, D., Hutchinson, K., Nolan, J.T. & Weber, D. (2010) Effects of Infant-Parent Play with a Technology-Enhanced Toy: Affordance-Related Actions and Communicative Interactions. *Journal of Research in Childhood Education*. 24, 1: 1-17.

Bolstad, R. (2004) The role and potential of ICT in early childhood education: A review of New Zealand and international literature. Wellington: New Zealand Council for Educational Research.

Burnett, C. (2010) Technology and literacy in early childhood educational settings: A review of research. *Journal of Early Childhood Literacy*. 10,3: 247-270.

Carr, M. (2000) Technological Affordance, Social Practice and Learning Narratives in an Early Childhood Setting. *International Journal of Technology and Design Education*. 10: 61-79.

Couse, L.J. & Chen, D. W. (2010) A Tablet Computer for Young Children? Exploring Its Viability for Early Childhood Education. *Journal of Research on Technology in Education*. 43, 1: 75-98.

Cuban, L. (2001) *Oversold and Underused: Computers in the Classroom*. Cambridge, MA: Harvard University Press.

Edwards, S. (2011) Lessons from 'a really useful engine'™: using Thomas the Tank Engine™ to examine the relationship between play as a leading activity. Imagination and reality in children's contemporary play worlds. *Cambridge Journal of Education*. 41, 2: 195-210.

Glenn N, Knight C, Holt N & Spence J (2012) Meanings of play among children. *Childhood*, published online 28 August 2012. DOI: 10.1177/0907568212454751

Haugland, S. (2000) Early Childhood Classrooms in the 21st Century: Using Computers to Maximise Learning. *Young Children*, 55, 1: 15-30.

- Hedegaard, M. (2012) Analyzing Children's Learning and Development in Everyday Settings from a Cultural-Historical Wholeness Approach. *Mind, Culture and Activity*. 19: 127-138.
- Howard-Jones P (2011). *The impact of digital technologies on human wellbeing: Evidence from the sciences of mind and brain*. Oxford, Nominet Trust.
- Kalaš I (2010) *Recognizing the potential of ICT in early childhood education*. UNESCO Institute for Information Technologies in Education, Moscow.
- Learning and Teaching Scotland. (2003) *Early Learning Forward Thinking: The Policy Framework for ICT in Early Years*. Glasgow: Learning and Teaching Scotland.
- Lenz-Taguchi, H. (2010) *Going Beyond the theory/practice divide in early childhood education*. Abingdon: Routledge.
- Ljung-Djärf, A (2008) The Owner, the Participant and the Spectator: Positions and Positioning in Peer Activity Around the Computer in Pre-School. *Early Years: An International Journal of Research and Development*. 28, 1: 61-72.
- Ljung-Djärf, A., Åberg-Bengtsson, L. & Ottosson, T. (2005) Ways of relating to computer use in pre-school activity. *International Journal of Early Years Education*. 13, 1: 29 – 31.
- Marsh, J. (2010) Young Children's Play in Online virtual Worlds. *Journal of Early Childhood Research*. 8, 1: 23-39.
- Marsh, J. (2004) The techno-literacy practices of young children. *Journal of Early Childhood Research*, 2, 1: 51-66.
- McPake, J., Plowman, L. & Stephen, C. (2012) Pre-school children creating and communicating with digital technologies in the home. *British Journal of Educational Technology*, published on line, 29.05.12.
- National Association for the Education of Young Children (NAEYC). (2012) *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8*. Available at http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf (accessed 24 July 2012).
- Oakes, J. (2009). The effect of media on children: a methodological assessment from a social epidemiologist. *American Behavioral Scientist*, 52, 8: 1136-1151.
- Palmer, S. (2006) *Toxic Childhood: How the modern world is damaging our children and what we can do about it*. London: Orion.
- Parette, H.P., Quesenberry, A.C. & Blum C. (2010) Missing the boat with Technology Usage in Early Childhood Settings: A 21st Century View of Developmentally Appropriate Practice. *Early Childhood Education Journal*, 33: 335-343.
- Prensky, M. (2001) Digital natives, digital immigrants, *On the Horizon* 9 (5) 1-6.
- Plowman L. & Stephen C. (2005) Children, play and computers in pre-school education. *British Journal of Educational Technology*. 36 , 2: 145-158.

- Plowman, L., Stephen, C., & McPake, J. (2010). *Growing Up With Technology: Young Children Learning in a Digital World*. London: Routledge.
- Plowman L., Stevenson O., Stephen C. & McPake J. (2012) Preschool children's learning with technology at home. *Computers & Education* 59 (1) 30-37.
- Rideout, V. (2011) *Zero to eight: Children's media use in America*. San Francisco: Common Sense Media.
- Rogoff, B. (2003) *The Cultural Nature of Human Development*. New York: Oxford University Press.
- Selwyn N. (2011). *Schools and Schooling in the Digital Age*. Abingdon, Oxon: Routledge.
- Stephen, C. (2011) *Playing and Learning with Technologies*. Research Briefing Two for Digital Childhoods, Scottish Universities Insight Institute, May 2011. Available at http://www.strath.ac.uk/media/faculties/hass/research/digitalchildhoods/Digital_Childhoods_Research_Briefing_2.pdf
- Stephen, C. and Plowman, L. (2008) Enhancing Learning with ICT in Preschool. *Early Child Development and Care*, 178, 6: 637-654.
- Stephen, C. & Plowman, L. (2002) *ICT in Pre-School: a 'Benign Addition'?* Dundee: Learning and Teaching Scotland.
- Stephen, C., McPake, J., Plowman, L. and Berch-Heyman, S. (2008) Learning from the Children: Exploring Preschool Children's Encounters with ICT at Home. *Journal of Early Childhood Research*, 6, 2: 99-117.
- Stephen, C., Stevenson, O. & Adey, C. (2013) Young children engaging with technologies at home: the influence of family context. *Journal of Early Childhood Research*. 11:2, 149-164.
- Vandewater, E.A., & S-J. Lee. (2009). Measuring children's media use in the digital age: Issues and challenges. *American Behavioral Scientist*, 52, 8: 1152-1176.
- Vandewater, E.A., Rideout, V.J., Wartella, E.A., Huang, X., Lee, J.H. & Shim, M. (2007) Digital Childhood: Electronic Media and Technology Use Among Infants, Toddlers, and Preschoolers. *Pediatrics*, 119, 5: 1006-1015.
- Vangsnes, V., Økland, N.T. G. & Krumsvik, R. (2012) Computer games in pre-school settings: Didactical challenges when commercial computer games are implemented in kindergartens. *Computers & Education*, 58: 1138 -1148.
- Verenikina, I., Herrington, J., Peterson, R. & Mantei, J. (2010) Computers and Play in Early Childhood: Affordances and Limitations. *Journal of Interactive Learning Research*. 21, 1: 139-159.
- Vygotsky, L S (1978) *Mind in Society*. Cambridge, MA: Harvard University Press.
- Yelland, N. (2008) Curriculum, Pedagogies and Practice with ICT. In N. Yelland (ed.) *Critical Issues in Early Childhood Education*, p 224 – 242, Maidenhead: Open University Press.

Zevenbergen, R. (2007) Digital Natives Come to Preschool: implications for early childhood practice. *Contemporary Issues in Early Childhood*, 8, 1: 19-29.