Digital technologies, children's learning and the affective dimensions of family relationships in the home

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This chapter considers how children's use of digital technologies at home shapes family relationships, notably those of parents and young children growing up in Minority World families, typically characterised by an increasing access to and prevalence of digital technologies in their everyday lives. The chapter reviews literature on digital technologies in the context of the family, with a particular focus on touchscreen technologies. It uses a number of examples to illustrate the wider implications of technology use on family dynamics. It offers an exploration of how the physical design of touchscreens, and in particular the different touch points through which the device can be accessed simultaneously or sequentially by different individuals, can influence the affective flows between children and different individuals in the family (parents, grandparents) as they interact together. The review of previous research into affective dimensions of technology use at home is theoretically guided by Goffman's (1972) consideration of participation frameworks and ecological huddles, as well as by the more recent insights of Goodwin (2006) as to how affect plays out through embodied interaction in the context of the family. Vygotsky's (1967, 1978) notion of socio-cultural learning and the contextual nature of learning are used as a framework in the review of studies focused on child's learning and adult-child interaction with touchscreens. The chapter provides insights into the learning opportunities of touchscreens in the context of the family in relation to two key affordances of touchscreens: touch manipulation and personalisation. It considers the verbal as well as nonverbal modes of communication in examples of interaction occurring around touchscreens in the home. Recommendations for future research are provided along with the suggestion that children's learning and the affect flows which emerge in interactions involving digital technologies, reflect the nature of the technologies' affordances situated in the wider sociotechnical context in which interactions are unfolding.

Keywords: touchscreens, affordances, tablets, affect, affect flows, family, intergenerational relationships, home

Introduction

Within less than a decade, young children's access to digital technologies has exponentially increased. This has implications for a number of areas in a child's life, including family dynamics and family relationships. National survey data show that tablets and iPads are the key device used by children aged 0-8 growing up in UK, USA, Europe, Canada and Australia, countries collectively referred to as the Minority World (e.g., Bergström & Höglund, 2014 in Sweden; Book Trust, 2016 in the UK and Madden, Lenhart, Cortesi, & Gasser, 2013, in the USA). Our chapter focuses on children growing up in the Minority World and will therefore foreground the use of tablets and iPads, acknowledging that these devices are part of the wider technology landscape that includes smartphones, Leapsters, Kindles, digital cameras, digitised toys, and television. The chapter covers selected research evidence on tablets in the context of family relationships, and provides an overview of theoretical frameworks that can help us to interpret this evidence. Two examples of interaction from the authors' own empirical research provide a snapshot of the currently complex research and practice landscape concerning touchscreens' use in the home.

The growing prevalence of digital technologies in children's lives and in particular the growing importance of touchscreens in the dynamics of family life, have been documented by a number of national surveys, anecdotal evidence and detailed case studies conducted in children's homes. However, given the relatively short existence of touchscreens on the market and in family life, rigorous research and longitudinal studies are as yet, not available. In this chapter, we review the currently available evidence regarding the use of touchscreens in families of young children aged 2-8 years. We include large survey-based studies providing a broader basis of understanding general patterns of use, as well as small case studies, providing a granular look at the interaction patterns between young children and their caregivers. We draw on data from US and UK families, as reported in Anglo-American research journals, offering suggestions for how research can develop in the future. The purpose of the chapter is to assist students, researchers and scholars interested in finding innovative and pertinent work in this area relating to the complex relationships between children, family and new technologies.

Since early 2010s , family lives have been marked by an increased availability and affordability of touchscreens, prior to which technologies tended to be located in a static position. Tablets are different from PCs and televisions in a variety of ways, but most notably

in their personalisation possibilities, touch manipulation and the mobility and flexibility they offer in the software they make available (through 'apps'). Regulating children's time spent with these devices has become an important task for parents/ caregivers who often find it difficult to optimise their children's engagement with digital and non-digital resources (Book Trust, 2015). There is growing evidence of intergenerational tension in relation to the use of tablets within families (Steiner-Adair & Barker, 2013) and behavioural issues arising when children's and adults' perspectives on the frequency and duration of their use differ (Holloway, Green & Livingstone, 2013). Another tension relates to the quality of children's apps, which, although advertised as "educational", are often of little educational value. Indeed, Vaala et al. (2014) reviewed 50 most popular paid and free apps in the education sections of iTunes, Google Play, and Amazon apps, rated them in terms of the quality of their learning content, and found that language- and literacy-focused apps are among the most popular for young children. These, however, typically target basic reading skills, such as phonological awareness and letter knowledge, but not higher-order reading skills which build the content knowledge and vocabulary required to understand complex topics.

Tablets and iPads: key features

Tablets are portable, light-weight touchscreen devices which can run a number of applications (so called "apps"). Publicly available sales data show that between 2010-2016, the top 5 tablet makers have been Apple Inc (iPads), Samsung Electronics Co (Galaxy tablets), Amazon Inc (Kindle Fire), AsuTek Computer Inc., (Transformer line) and Bernes & Noble Inc. (Nook Tablet). With children under the age of eight years, the iPad and Galaxy tablets are most popular, mostly because they have the widest range of educational apps downloadable (www.techradar.com). For simplicity, this chapter refers to tablets and iPads in this review with two collective terms "tablets" and "touchscreens".

Tablets have some key characteristics that are different from previous technologies: they are accessible through touch, they are light-weight and portable, and can be adjusted to an individual's needs and preferences. In addition, downloadable apps actively involve the player in deciding the activities they wish to engage with through the tablet. We refer to these features as "touch manipulation" and "personalisation" for simplicity, but also to keep this review comprehensively focused on the design features of tablets (touch) as well as their usability (personalisation). We also highlight that when compared to previous children's

media (see Kucirkova, 2013), these two features are particularly distinctive and developed in the use of touchscreens.

Touch manipulation

Touch is a central feature enabling children and their family members to effectively participate in a touchscreen-mediated activity. Tablets prioritise the use of touch for manipulation, enabling users to engage with the screen using their finger or a stylo pen. Functionality in games, digital books and activities (e.g. taking pictures) is enabled through particular touch actions, such as tapping, swiping and dragging. The possibility to manipulate devices via touch enhances children's emotional engagement with digital books (Kucirkova, Littleton & Cremin, 2016) and can facilitate access and engagement among children with physical difficulties (e.g., children with cerebral palsy, spina bifida or multiple sclerosis) who find it difficult to manipulate other mainstream technologies (Kucirkova, Messer, Critten & Harwood, 2014; Flewitt, Kucirkova & Messer, 2014). Flewitt, Kucirkova & Messer (2014) showed how gesture-based interactions and sensory experiences of touch can enable young learners with moderate to complex physical and/or cognitive disability to engage in fun, independent and inclusive classroom-based literacy activities. Crescenzi, Jewitt, & Price (2014) examined children's touch repertoires in seven nursery-aged children in a London nursery. By comparing these children's finger painting on paper and on the iPad (with three painting apps: Doodle Buddy app, Coloring Zoo, Fingerpaint Magic), the researchers found the following dimensions of touch to be different between the tablet and paper conditions: tap, press, straight stroke, circular stroke and scratch, as well as particular qualities of the touch, including direction, scale/size, speed of touch, duration and pressure. These findings will be important for future research investigating the role of touch in parent-child interactions with touchscreens at home.

Personalisation

Personalisation is one way of encouraging the active interaction of both parent and child with the tablet. Personalisation is often subsumed in the definition of interactivity, aka features which enable children's active participation in manipulating the device. While interactivity can simply involve tapping a hotspot to set in motion a story character, personalisation provides a deeper level of interactivity. For instance with digital books, parents or children can personalise their stories by inserting their own personal data into them (e.g. adding a picture, voice-over or text). Indeed, the difference between basic e-books (available on

desktop PCs and laptops) and digital interactive books available on iPad, is that the latter is often personalisable and can thereby offer personalised reading experiences (Kucirkova, 2013). Unlike simple e-books, digital books accessible on tablets allow seamless, fast and easy personalisation in textual, visual and audio representation.

The ergonomic features of tablets –the prioritisation of touch for manipulation, the lightweight and portable nature of the device and the capacity for personalisation have all fed into the growth in their appeal to young children. This growing interest has been demonstrated through national and large-scale surveys of tablet use among children, reviewed next.

Children's use of touchscreens at home: how often and how much

Ofcom, UK's independent regulator and competition authority for the communications industries, carries out annual surveys to map the national use of a range of media. In 2015, the results showed that the proportion of three to four-year-old children who use a tablet has risen to over half (53%) from 39% in 2014, and 75% for five to fifteen-year olds (up from 64% in 2014). The increased use of tablets by UK children is documented across all age groups, but the biggest rise has been among 5-7 year olds. Ofcom (2015) has also noted an increased ownership of tablets by young children, reporting that 15% (compared to 11% in 2014) of 3-4-year-olds and 40 % (compared to 34% in 2014) of 5-15s own their own tablet. Children use tablets for a variety of activities, including going online, playing games, watching TV or reading digital books (Ofcom, 2015).

This tendency is mirrored in the USA, Australia and Canada. For example, in the USA, the Pew Research Centre found that almost half (45 %) of Americans own a tablet computer and that the ownership varies depending on education: 62% of college graduates have a tablet, compared with 35% of those with a high school diploma and 19% who have not completed high school. For younger children, Common Sense Media survey in 2013 found that tablet ownership among 0- to 8-year olds is 5 times higher (8% to 40%) than it was in 2011.

In Canada, Media Technology Monitor (2014) reported that more than 42 per cent of Anglophone Canadians own a tablet. An international survey by AVG Technologies, which included Canadian children reported that 40% of Canadian three to five year-olds knew how to navigate a tablet or smartphone, thus indicating that young Canadian children are using touchscreens on a regular basis. In Australia, a national survey recorded similar trends: Roy

Morgan Research's Young Australians Survey found that 53% of children aged 6-13 years own and use a tablet in 2013 (up from 33% in 2012).

Survey data can tell us about overall consumption, ownership and accessibility patterns, as reported by children's parents and caregivers, but they cannot provide insights into how children are using tablets and how families are navigating and negotiating the use of tablets in the home. For that, we need to look at studies where researchers study closely why and how children engage with touchscreens in diverse families.

Children's use of touchscreens at home: the hows and whys

One possible factor associated with tablet use at home is the availability of socio-emotional resources in the home through family relationships. Pempek & McDaniel (2015) analysed data from an online survey of 358 US mothers of 12-48 month old children in relation to children's tablet use at home and the mothers' self-reported well-being. They found that children's tablet use was more frequent in families where mothers reported poorer well-being. Mothers who did not feel well or happy were more likely to allow their children use touchscreens, a phenomenon often reduced to the catchphrase that tablets serve as 'electronic babysitters'. Of course, these findings raise questions about causality; it is unclear whether the use of tablets in the home is a response to negative emotional dynamics and a lack of time and socio-emotional resources on the part of parents, or if tablet use may in fact be contributing to decreases in self-reported well-being.

The perceived phenomenon of using technology to compensate for a lack of human interaction is not new and has been reported with previous media (e.g. in the popularity of television, see Keamey & Gore, 1996). What is new in relation to tablets is the extent to which they offer children an interactive and personalised form of engagement that can potentially offer emotionally rich experiences. While with previous media children's learning was construed as more or less passive, with most tablet educational apps, children are expected to interact with the medium. For instance, they can become authors of the content and take ownership of the experience, or even have a conversation with a story character through the speech recognition software embedded in some apps (e.g., Talking Ben The Dog™). Turkle (2011, 2015) argues that through such new socio-emotional experiences with technology, we may "expect more from the technology and less from each other" (Turkle, 2013, subtitle of the book). What is certain is that through more interactive engagement, children have access to immediate socio-emotional rewards from their technological devices.

For example, through caring for digital pets, children can experience having a positive effect on another creature and the emotional rewards that are associated with this experience.

In the project Family Story Play, trialled by Raffle et al. (2010), researchers explored the new interaction possibilities of children and their grandparents around digital books via skype. The project was designed to "improve communication across generations and over a distance" (p.1583) and involved the use of a paper book, a sensor-enhanced frame, a puppet and videochat. The researchers found that such digital and non-digital scaffolds improved the intergenerational communication between the children and their grandparents and provided a new way of sharing digital books at distance. Building on this, the Kindoma initiative (https://www.indiegogo.com/projects/kindoma-video-calls-for-kids-with-interactivity#/), which is currently in development, highlights the potential of story-sharing between family members who are far away from one another. Kindoma capitalises on the importance of pointing during shared reading, for forging a connection between children and parents/carers sharing a book. Through videochat, a child and a parent (or grandparent or another child connected to the tablet from another tablet) talk to one another through Kindoma and can see in real time where each other is pointing and interact based on the direction of the pointing. Through the creation of this shared reference point, the technology helps to facilitate a secure environment with positive affect, despite the distance between those interacting.

However, although potentially supportive of affective engagement, whether digital interactivity benefits children's learning is a matter for debate. The educational value of interactive engagements around digital books has been closely studied and heavily discussed in research. The interactive nature of the digital stories can disrupt the learning experience meaning that children miss out on the opportunity to learn new concepts (such as new vocabulary for example) embedded in the story. Kirkorian, Choi and Pempek (in press) compared toddlers' learning with interactive and non-interactive videos on iPads and found the former is more conducive to children's learning of new words. This is especially the case with interactive videos that display natural human behaviour and are live-streamed (see Roseberry, Hirsh-Pasek, & Golinkoff, 2014).

While interactive videos might be more beneficial than static books, this is not the case with digital books shared by parents and children on touchscreens. In fact, here the effect is reversed. In a meta-analysis, Takacs, Swart & Bus (2015) looked in detail at the specific kinds of interactive features available for enhanced digital books (such as those available for

touchscreens) and simple e-books (those available on PCs) or paper-based books and found that less interactive books are associated with more learning through richer conversations between the parent and the child. When comparing these three different media, multimedia features (which include animated pictures, music, and sound effects) were found to be beneficial for children's story comprehension and expressive vocabulary, while interactive features (such as hotspots, games, and dictionaries) were not.

As well as engaging with fictional content and games through tablets, children use tablets to communicate with their friends. They access social gaming sites (e.g., Club Penguin) as well as social networking sites (including Twitter and Facebook), although these are more relevant for teens and older children (Ólafsson, Livingstone, & Haddon, 2013). Tablets also enable children to engage with family members who are distant, through apps such as Skype and Facetime, that connect people who are geographically separate (e.g. Kelly, 2013).

In addition to documenting how children use tablets in different ways at home, research studies have suggested that tablets are shifting the roles that young children assume in relation to their learning and creativity. For example, there has been a suggestion arising from previous research that tablet use at home enables children to be co-designers and co-constructors of knowledge in ways that they do not typically experience when interacting with other resources and technologies in the home. Wong (2015) and Laidlaw, O'Mara & Wong (2015) looked at the provision of technology, including tablets in six Canadian and four Australian families of 3-5-year olds. The families lived in rural as well as urban areas and the researchers used several ethnographic techniques (participant observations, informal interviews, field notes, and conversations with the children) to ascertain how children's everyday activities with technologies at home were shaping their role in the family. The findings indicated that the iPad allowed children to assume production and design responsibilities from a very young age. The researchers used the example of a young boy, Andrew, who used Youtube instructions to put together Lego in a particular way, but highlighted how his parents encouraged and supported such learning.

How does the use of touchscreens feed into family relationships and how can we theorise the varied engagements and learning benefits children have with touchscreens? Vygotskian perspectives on socially mediated learning and Goodwin's theories of affect and embodied interaction can help us explain and explore the issues of family relationships in relation to children's use of touchscreens (and technology more generally).

Children's use of touchscreens at home: theoretical insights

Vygotsky's approach to learning: valuing the social, cultural and physical context

Vygotsky's theory is widely considered 'the most comprehensive approach to the mechanisms of child development' (Karpov, 2003, p. 138). In his writings, Vygotsky explained several aspects of children's learning and emphasised the importance of social relations that surround and enable the learning experience, as well as physical and cultural tools that are used as part of the learning process. A Vygotskian perspective offers a robust theoretical framework for recognising the contextual nature of learning and the importance of both real human interactions and physical objects in scaffolding children's understanding. In relating this to children's learning through interactions with tablets in the context of the family, it is clear that we need to take into account not only what children access on the device and how this features in their learning, but also how these interactions are part of a wider network of social influences and relationships.

Vygotsky argued that children do not learn in isolation. Rather, there is a web of interconnections between the child, objects and adults, who mediate children's learning. The social aspect of learning has been highlighted by a wealth of research, with a general consensus that 'social relations among people genetically underlie all higher functions and their relationships' (Berk & Winsler, 1995, p.12). To illustrate how young children learn with and from others, Vygotsky introduced the concept of the Zone of Proximal Development (ZPD). The ZPD is the space where children's capacities can be developed, but are not yet functioning fully independently. Through interactions with others, children can carry out the capacities that occupy this space, and over time, they can learn to do things independently.

As well as highlighting the importance of social interactions, Vygotsky (1987) suggested the importance of cultural objects and ideas in children's learning. He conceptualised two types of learning tools: symbolic and concrete learning tools. Symbolic tools are abstract aspects of our thinking and knowledge (e.g. literature and art), while concrete learning tools constitute systems and objects that we use for our thinking and knowledge creation (e.g. clocks; Vygotsky, 1967). Both kinds of tools are crucial in assisting the learning process as they help learners negotiate and process mental concepts (Hausfather, 1996). This principle has later become axiomatic to distributed cognition theories (see e.g. Salomon, 1992; Dillenbourg, 1996) in which knowledge is stored and distributed through a network of objects. From this

perspective, our learning and mathematical thought, for example, cannot be disentangled from the tools that we use to complete mathematical processes (e.g. a calculator or abacus).

We can conceptualise children's interactions with tablets in the context of social relationships in the home as offering a ZPD to children's learning. When children co-create digital books on the iPad for example, the iPads help them achieve more than they could do independently. Their learning is enabled both through the more knowledgeable others in the home and through what the technology affords. At the same time, if children are merely passively consuming pre-designed digital content without the support of others who would provide appropriate prompts and guiding questions, then children are unlikely to make learning progress within their ZPD.

Kucirkova, Sheehy & Messer (2014) examined the talk between two mother-daughter dyads as they shared a self-created story with an iPad app called Our Story. The researchers used a Vygotskian lens to understand the learning processes facilitated by the iPad app. It was found that in this context, the iPad app became the tool which not only mediated, but also transparently captured the learning process. Thanks to the app's ability for recording and immediately sharing personalized multimedia content, the touchscreen facilitated not only the creation of a final product, but also captured its development in a dynamic way. Although the design of the app facilitated the learning process, the shared dialogue between the mother and the daughter was another essential facet of the learning experience. Without the child-adult interaction, the learning would not have unfolded in the same way or to the same extent. This research offers an example of how a Vygotskian approach can be used to focus our attention on both the technological tools that are available to children and the social interactions that scaffold and support the use of these tools.

Goodwin's theory: Embodied interaction and participation frameworks

A Vygotskian approach to learning suggests that we need to place value and focus attention on the social, cultural and physical interactions that comprise learning processes. In observing learning, this suggests that we need an approach that enables us to analyse how the networked nature of children's learning plays out in specific interactions. Research in the field of conversation analysis enables us to consider social, cultural and physical mediation through visible facets of activity. This is particularly the case when this type of analysis adopts a focus on the multimodality of embodied interaction, that is, the wide range of communicative modes that are drawn into interactions including speech, bodily orientation and posture,

movement, gesture and facial expression. The work of Marjorie Harness Goodwin and Charles Goodwin has been influential in facilitating the links between more abstract theories of how learning occurs and how interactions unfold through the interplay of bodies and affect.

Goodwin (2006) approaches affect as something that 'plays out' through embodied interaction. In a study of everyday family interactions, Goodwin argued that the trajectories of an interaction can lead to 'affective alignments' (p. 516) which are moments of visible togetherness between family members. These affective alignments become visible through how participants organise themselves in relation to each other and the surrounding space. For example, participants who feel affectively aligned to one another are likely to move closer to each other or to use touch gently to affirm each other's presence. On the other hand, affective "disalignment" can occur in moments of family tension and these become familiar through a lack of eye contact, or the use of gesture or touch, which appears to be attempting to control others' involvement in the space. For example, when a parent wants a child to carry out a chore around the house, they may adopt a light and playful verbal tone, but their movement through the space may simultaneously suggest constraint and that the child has little no choice about whether or not to comply.

Stemming from the same theoretical orientation, Goodwin (2007) focused on a father and a daughter during an episode of doing homework together and demonstrated how affective alignments and disalignments were made visible through the organisation of the father's and daughter's body in the space and in relation to the physical presence of the homework. Goodwin describes this organisation of bodies and space as a 'participation framework', building on Goffman's (1972) earlier notion of the 'ecological huddle'. Both ideas refer to how attention can be shared between participants in an interaction and be physically located on a physical entity that relates to the learning that is going on. In other research studies, Goodwin argues that situations of successful learning and apprenticeship typically occur when particular physical tools become the focus of shared attention with eye contact moves between the participants and the object of interest, giving rise to a triangular network of interactions: 'the participants create a public, visible locus of the organisation of shared attention and action' (Goodwin, 2007, p. 58). On the other hand, moments of affective disalignment become visible through the loss of this three-point network, either through the participants disengaging their gaze from the object of importance, or failing to interrupt this gaze with the object with moments of eye contact with the other participant.

The research of Goodwin (2006) and Goodwin (2007) is helpful for making sense of observations of children using tablets in the context of family relationships in the home. It suggests that we can understand these learning processes and interactions by observing and analysing how the bodies of the child and of other family members are organised in the space of the home, and in relation to the technological device. To identify moments of heightened learning potential, we would look for physical indicators (particularly gaze, gesture and body orientation) of interconnectedness between the two participants and the device. To identify moments when learning or positive affect is in jeopardy, we could look for signs of physical disconnection between the participants, or between one of the participants and the device.

In the next section, two vignettes from the authors' own research illustrate how a Vygotskian lens and a focus on participation frameworks can enable insights about children's interactions with tablets in the context of family relationships. The vignettes outline moments from an episode of interaction between a three-year-old child and her father at home, as they engaged in a shared activity of taking photographs around the child's grandparents' house using an iPad.

The observations are of the second author's three-year-old niece and her brother (the father). When the study was conducted, the child did not have any siblings. She attended a nursery each weekday until 5pm, when she was collected by her father who would take her home or to her grandparents' house (where this study was carried out). When at home, the child and the father often engaged in shared activities, but explained that they had never tried to take photographs together before. Prior to these episodes, the child had not taken photographs of her own before, while the father saw himself as a competent photographer, who often took photographs on his phone and camera in relaxed social situations.

The observations were made using a handheld video camera across two episodes of interaction. Both episodes occurred on weekday evenings, after the child had finished at nursery and the father had finished work. The video data were transcribed with a focus on various modes of communication in addition to speech. This made it possible to see affective alignments and disalignments according to the suggestions of Goodwin (2006) and Goodwin (2007) about how these visibly manifest. Annotations on the transcript recorded comments as to when these were occurring and what they in turn suggested about the key features of the device and how the social interaction between the child and the father was mediating the learning that occurred during the activity.

Vignette One

The father is holding the iPad and the child is leaning in towards the iPad. The father asks: 'shall we tap it?' and the child replies in a whisper: 'yeh'. The father presses a button on the iPad that flips the camera so that it is looking at them, ready to take a selfie. He says: 'that's me and you, shall we take a photo?'. The child responds again in a whisper: 'yeh'. The father says 'press the button then' and the child presses the button, taking the photograph.

Evidence of affective alignment/disalignment (links to Goodwin's theory)

The vignette above describes a moment of affective alignment, in which there is a successful participation framework constructed between the child, the father and the tablet. The child and the father have a clear shared focus of attention on the iPad and are both physically engaged in interacting with the iPad – the father through holding the device, and the child through touch manipulation. As well as a connection with the iPad, the child and the father sustain a clear connection with each other in this moment. This is demonstrated through the verbal dialogue but also through the father's gaze, which moves back and forth between the iPad and the child.

Figure1 to be inserted about here

Key features of the device

The vignette suggests the importance of touch as a way for children and their family members to establish a locus of shared attention since in this situation, both the child and the father interacted with the iPad through touch. The father invited the child's touch as a way of engaging her actively in the creative task of taking a photograph. Another feature of the device which comes to the fore in this moment is the personalisation potentials of tablets and the apps that they make them available. In the case of photography, taking selfies is an instant way to forge a connection with the device and also to reinforce the social relationships that are occurring around the device. In this case, by taking a photograph of themselves together, the child and the father were strengthening their bond with one another and this was enabled through the device. Although portability is considered in previous research to be a key feature of children's interactions with tablets (see e.g., Hutchinson, Beschorner & Schmidt-Crawford, 2012; Kucirkova, 2014), it is interesting to note that in this situation the father has decided to hold the iPad while encouraging the child to engage through touch. This is partly indicative of the apprenticeship-style interaction that is being engaged in, with the father clearly in control of the device and presenting himself as the 'more knowledgeable other' in

relation to iPad photography. However, other interactions over the course of the observed episode also suggest that this may have been a result of the parent's fear that the child would drop and break the iPad if she was allowed to hold it by herself. This suggests that although we may think about an iPad as portable from an adult's perspective, children may not have the same experience.

Features of the social interaction (links to Vygotsky's theory)

As noted above, the father positions himself in this interaction as 'the more knowledgeable other'. This is clear from the way that he offers prompts and guiding questions as part of the interaction and invites the child's interaction with the device. As the observed episode unfolds, the father increasingly allows the child to interact independently with the tablet. As such, the parent extends the learning within the child's Zone of Proximal Development: The father and his daughter begin the episode by simultaneously manipulating and engaging with the device, but as they progress on their photographic journey of the house, the child is given more autonomy in physically handling and interacting with the device.

Vignette Two

The child is holding the tablet and pointing the camera at a bag in the hallway. The father stands back and asks 'what is it?'. The child responds ('Mona's bag') but is already walking away and re-positioning the camera ready to take another photograph, this time of the telephone on the hallway floor. The father asks the question 'what's down there?' and then follows this quickly with a directive statement: 'wait to take it'. The father walks towards the front room and holds the door handle. He says to the child 'shall we go in the front room?' but she does not respond. Instead, the child repositions the camera, still focusing on the telephone on the hallway floor and takes several more photographs of this object. The father laughs while watching his daughter and repeats his prompt: 'shall we go in the front room and see what we can see?'. He begins to open the door to the front room. His gaze continues to rest on the child, while she is looking only at the iPad screen and continuing to take photographs of the objects in her immediate vicinity.

Figure2 to be inserted about here

Evidence of affective alignment/disalignment (links to Goodwin's theory)

The vignette above describes a moment of affective disalignment, in which the participation framework between the child, the father and the tablet breaks down. The child and the father begin their journey through the house with a shared attention (as shown in the previous vignette), but as the child grows in confidence and independence in her interactions with the tablet, the joint focus is lost. This can be seen through the way that the father's prompts and questions are almost completely ignored by the child. The father is indicating through his body movement a desire to move in a particular direction as part of the photographic exploration, with the child's body orientation and positioning of the tablet are in a different direction and follow a distinct pace. The father's gaze rests solidly on the child, while the child's gaze rests entirely on the device. As a result, there is a rupture in the three-way interconnectedness described by Goodwin as a successful participation framework (see figure below). While the connection between the child and the device is effective (shown through grey arrows), the connection between the father and the device is no longer established (shown through red arrows). While the father is interested in the child's activity, the interest is not shared by the child who is engaged in independent exploration.

Figure3 to be inserted about here

Key features of the device

As with the first vignette, this moment suggests the importance of touch in enabling family members to develop a focus for shared attention and establish an effective participation framework. Without the father's simultaneous touch, he is no longer physically involved in the activity of taking photographs and this creates a situation in which the child pursues the task independently without engaging with her father. The child and the father appear to have different ideas about what constitutes an interesting photograph in this context. While the father is keen to move forward in the photographic exploration, the child remains interested in the objects in the hallway and in the visual effects that she can create through carefully repositioning herself in relation to these objects. The dissonance between the father and the child in this respect relates to the personalisation feature of tablets, which enables the primary user (in this case, the child) to engage with content that she can directly change and play with. The possibility to create contents of her choice is of particular interest to the child and might be of less interest to others surrounding or involved in the interaction.

Features of the social interaction (links to Vygotsky's theory)

By this point of the observed episode, the father is no longer constructed as 'the more knowledgeable other'. He supported the child at the beginning of the episode with her initial experiences of taking photographs and has then stood back to enable her to try out this experience for herself. While he scaffolds the interaction by offering prompts and questions designed to help her to take 'better' photographs (e.g. 'wait to take it', 'stand still before you take it', 'don't go too close') these are largely ignored by the child, who pursues her own interests and ideas. On the one hand, we could construct this as an example of the child learning through independent practice; on the other hand, we could suggest that the child is no longer in the ZPD as a result of the rupture in a connection between herself and the more knowledgeable other of her father.

Conclusion

This chapter has examined the ways in which children's use of digital technologies can shape family relationships and feed into unfolding interactions in the home, with a particular focus on touchscreens and their use in Minority World families in the UK and USA. Examples from larger quantitative studies as well as vignettes from the authors' own work were used to explore how these technologies can play a role in the affective dynamics in the family, as well as children's learning and cognitive growth. Goodwin's (2006) and Vygotsky's (1967, 1978) seminal theories shaped the interpretation of studies reviewed in the chapter and framed our analysis of interactions in relation to the key affordances of touchscreens (touch manipulation and personalisation). The review is constrained by the type of technology reviewed (tablets and iPads), children's age (0-8 years) and the fact that the children participating in the studies grew up in the Minority World. It is therefore not an exhaustive review but illustrates the range of family issues related to children's use of digital technologies. This last section provides recommendations for future research and practice in this area.

Recommendations for research

The chapter concurs with the view that 'childhood is a hybrid of both culture and nature. It demands multi- and interdisciplinary analysis and the creation of a theoretical language that can merge these different concerns' (James & Prout, 2015, p. xiii). The content of this chapter creates some of the "theoretical language" necessary for understanding the impact

touchscreens can have on family dynamics. For the authors' own research, a theoretical "amalgam" of Goodwin and Vygotsky enabled the authors draw conclusions from a variety of research studies and build conclusions concerning the diverse ways in which touchscreens impact on a child's experience and interactions in the family.

It is recommended that future research pursues a theoretically rich goal of merging insights from socio-cultural and individual approaches in understanding the effects of touchscreens, and technologies more widely in children's lives. While this chapter focuses on some classic theorists, there are several contemporary writers who could be more widely used to theorise children's use of touchscreens at home. For instance, Vanderbeck (2008) reminds us of the different interpretations of children's emotions within research and theory and similarly, contemporary developmental theories (e.g., Overton & Lerner, 2014) show how a child's characteristics and the environment they grow up in influence each other. Taken together, they highlight the fact that different theories put forward particular forms of knowledge and these, in turn, frame our interpretation of research findings in a given area. Theoretical richness, mixed methodologies and interdisciplinary research are important for all areas of research, but for a new area of research, such as the use of touchscreens with young children, they are essential.

Recommendations for practice

A child's holistic development (that is their affective, as well as social, aesthetic and cognitive development) is an important area of study, and is crucial for practice and policy-relevant work concerning touchscreens and young children. This chapter considers research from a range of disciplinary perspectives (including sociology, anthropology, ethnomethodology, the arts, psychology and education) and the insights they have to offer in understanding children's holistic development. Awareness of research from a diverse range of disciplines can facilitate practitioners' and parents' decision-making around the use of touchscreens with their children in the different contexts they work in.

The use of technologies with children, particularly young children under the age of two, has historically been framed as a polarised discourse, with, on the one hand, some organisations (e.g., American Academy of Pediatrics) recommending an outright ban on passive screen time for infants and, on the other hand, other organisations (e.g., Fred Roger's Centre) encouraging parents' joint viewing and co-use of technologies with their children regardless of age. The goal of this chapter was not to resolve or support one or the other side of the

debate. Rather, the aim was to exemplify the interplay of factors that feed into touchscreens' use in families and that influence the complex parenting decisions caregivers and parents need to make in the 21st century.

To conclude, it is important to emphasise that for children growing up in the 21st century in the Minority World, tablets are not only a common feature of everyday childhoods, but also an opportunity to experience learning, art and entertainment with their friends and families. It is in the context of these dynamics and their relationship to the child, that we need to build the knowledge and our practice base concerning their optimal use.

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Figures

Figure1

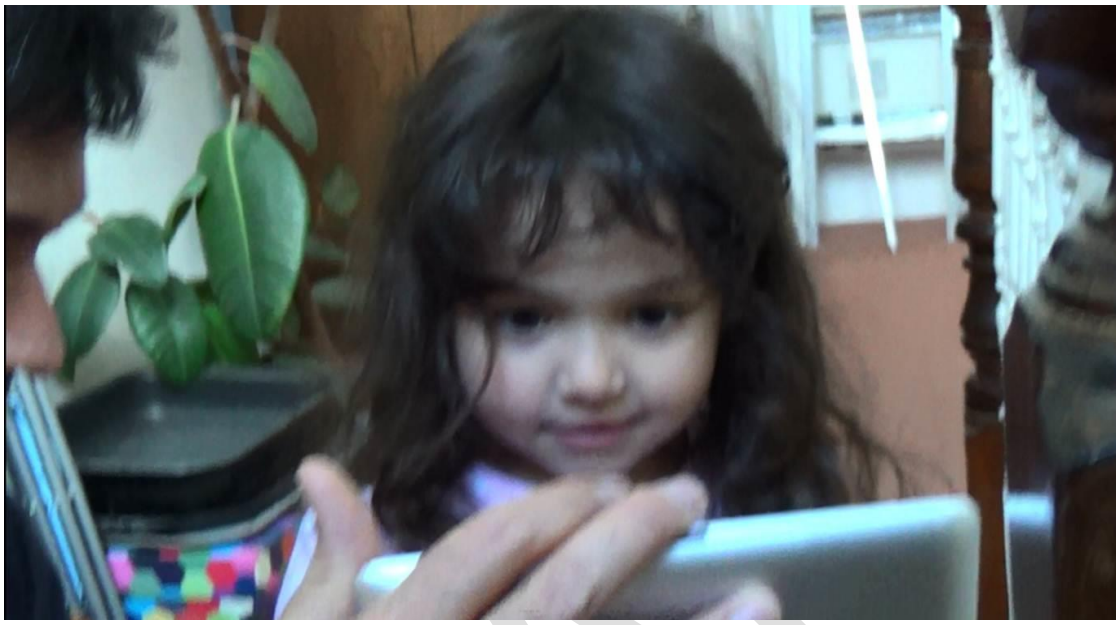

Figure2

Figure3