Digital positioning for inclusive practice in early childhood: The cultural practices surrounding digital tablets in family homes

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Abstract

Digital tablets are now commonplace among families, in many schools and in a growing number of early childhood centres. Digital tablets have become normalised as part of everyday family life in many homes. But what do they afford for preschool-aged children, especially children who are visually impaired? This paper examines how iPads provide a conceptually inclusive tool for learning about the world. In the case study of one child with albinism, the conditions for supporting development through the use of an iPad were digitally documented and analysed. It was found that the social practices in the home afforded a level of digital positioning that demonstrated the significance of a dialectical reading of child and environment. In drawing upon cultural-historical concepts, this paper presents an inclusive framework for understanding the use of iPads in everyday family practices, and a better reading of digitally oriented social practices that arise as part of the pedagogy of families who use iPads.

Keywords: Early childhood, tablet technology, cultural-historical, iPad, inclusion.

Digital technologies have been deemed a ‘significant tool’ for supporting student learning (Nash, 2012), especially in the area of inclusion (Jowett, Moore, & Anderson, 2012). Field research on the use of iPads has ‘showed extensive affordances [of iPads] as a learning tool’, where ‘portability and fit-for-task suitability’ were most evident (Nash, 2012). However, technologies in the area of inclusion has had a shaky history,
with Shamir and Margalit (2011) suggesting that children’s abilities are positioned in
deficit and accentuated and made more visible when children use digital tools. They
state, “in our technology-saturated environments, given children’s vast involvement
with various aspects of technology, educational research cannot ignore the presence and
potential impacts” of these technologies (p. 281). Vygotsky (1993) argued that
traditionally “We dwell on the ‘nuggets’ of ill health rather than the ‘mountains’ of
health” (p. 68). In line with this, this paper reports on the social and pedagogical
practices associated with using digital tools within the context of a study of one child
with visual impairment living in Australia where an iPad was being used at home. This
paper begins with a brief review of the literature focused on the use of digital tablets in
early childhood, followed by a theoretical discussion of inclusion, the study design and
the findings. Terms specific to the studies reviewed (e.g. iPad or digital tablets) are used
in this paper. It is argued that an iPad, as mediated through family, affords a high
level of inclusion for the case study child reported in this paper.

**Digital tablets for early childhood**

One of the unique pedagogical features of preschools is the use of play for framing the
learning experiences of young children. In this context it has been argued by Edwards
(2013) that studies into digital play have shown that research is predominantly focused
on describing play with digital tools (see Kafai, 2006; Verenikina & Kervin, 2011), how
technological toys are used (see Bergen, 2012; Silvern, 2006), and the nature of the
unique play-based situation in which digital play takes place, but in the context of the
historical and cultural needs of communities (see Fleer, 2011; Stephen, McPake,
Plowman, & Berch-Heyman, 2008).

The research into the use of digital tablets in early childhood has traditionally been
positioned as a dualism where problems and benefits are pitched against each other (see,
Melhuish & Falloon, 2010; Plowman, McPake, & Stephen, 2010; Yelland, 2011),
suggesting that there might be long-term problems for children, despite the fact that
very little longitudinal research has been done (Bittman, Rutherford, Brown, &
Unsworth, 2011). This research also puts forward a case for a strong link between
digital learning objects and learning outcomes of children (see Falloon, 2012; 2013).
Unfortunately, much of the research that is presented in these dualistic arguments tends to focus on the software, software that is usually out of date by the time the article is published (Fleer, 2013).

Research also tends to concentrate upon how technological tools and software are supportive of specific curriculum outcomes (Gonzalez & Fryer, 2013; Nash, 2012), such as literacy (see Black, 2010; Wohlwend, 2010), numeracy (Jowett, Moore, & Anderson, 2012) or the arts (Terrini, 2011). Some research has also focused on the use of iPads specifically for children with special needs (Jowett, Moore, & Anderson, 2012; Shamir & Margalit, 2011), particularly as video modelling tools for carers (e.g., Moore, Anderson, Freccase, Deppeler, Furlonger, & Didden, 2013), and explorations of how young children experience and play online (Black, 2010; Marsh, 2010).

Melhuish and Falloon (2010) have concluded that there appears to be enough overall evidence to support the view that digital tools can effectively support young children’s learning, and that an iPad “may offer an exciting platform for consuming and creating content in a collaborative, interactive way” (p. 1). It is the latter which is of interest to the focus of this paper.

Whilst these studies are important for gaining insights into the affordances of software and digital tablets for curriculum learning in early childhood education, what has been missing from this research are insights into the social practices in families which create the conditions for these outcomes. What we know about digital tool use in homes is that parents believe their children pick up technological skills by themselves and “underestimate their own role in supporting learning”. They miss “the extent to which learning with technology is culturally transmitted within the family” (Plowman, McPake, & Stephen, 2008, p. 303). The expansive longitudinal national study of Plowman, McPake and Stephen (2008), with their focused small-scale analyses, have shown that young children are discerning users of digital tools and “that there was no evidence that ICT dominated the preferences of children” (p. 111), despite “evidence of some parental disquiet about the role of technology in children’s lives” (p. 63). Plowman, McPake and Stephen (2010) noted that although there is an increasing number of technological devices available to children as found in their survey of 346
families and 24 case study research, there was no increased use of technologies over time in the home. However, more needs to be understood about the pedagogical and social practices surrounding the use of digital tablets in the home for children generally, but specifically for children with visual impairment.

The term pedagogy is used in this paper to refer to the specific family practices surrounding the introduction and effective use of iPads for supporting learning. This mirrors how one might use this term in the context of education in settings such as preschools and schools.

**Conceptualising inclusion in the context of the use of iPads**

Even though technologies have been used in inclusive education for a long time (Maor, Currie, & Drewry, 2011), there are relatively few studies that have focused on the use of iPads for preschool-aged children with visual impairment. Shamir and Margalit (2011) argue that in the context of special educational needs there is a blossoming amount of activity in the use of technologies, but a “dearth in the theoretical knowledge and empirical databases required to assess the significance of these innovations in terms of learners’ unique characteristics and educators’ specific teaching goals” (p. 279). It is suggested by them that “new technologies and their software as tools for enhancing the performance of special educational needs students” play an important mediating role during learning. Whilst the effectiveness of technologies for enhancing learning in inclusive education settings is noted (van Dijken, Bus, & de Jong, 2011), particularly in kindergarten settings (Shamir, Korat, & Shlafer, 2011), iPads have also provided virtual environments for meal preparation for children with cerebral palsy (Kirshner, Weiss, & Tirosh, 2011), for children with autism spectrum disorder working in virtual environments generally (Parson & Cobb, 2011), and specifically in the teaching of numeracy (Jowett, Moore, & Anderson, 2012), in learning to write one’s own name (Moore, Anderson, Treccase, Deppeler, Furlonger, & Didden, 2013), self-help skills (Shrestha, Anderson and Moore, 2013) and toilet training (Yun Qi Lee, Anderson, & Moore, 2013). Eden and Bezer (2011) have examined three-dimensional and two-dimensional intervention programmes in a virtual reality context for mediating the needs of children with an intellectual disability.
Taken together these studies provide some evidence for the use of iPads, for supporting inclusive practices in homes. What is known is that iPads act as valuable tools, but more needs to be understood about the social practices surrounding the use of iPads to support everyday life at home.

**An cultural-historical perspective of inclusion**

In examining the general literature on inclusive practices, it is noted that a cultural-historical reading of inclusion sees all children with abilities, rather than disabilities (Underwood, Valeo, & Wood, 2012). In this conceptualisation, all children bring to their activities their particular social situation of development and unique characteristics (Bozhovich, 2009), shaped by biological and social situations (Daniels & Hedegaard, 2011). That is, a cultural-historical view of development does not focus on the idea of predicted ages and stages of development (maturational perspective), but rather examines the relationship of the child to his or her social and material environment. What is prevalent in the literature is the notion of a “best fit curriculum” (Brown & Moore 2011; Grace, Llewellyn, Wedgwood, Fenech, & McConnell 2008) for supporting children’s social situation of development (Bozhovich, 2009). The concept of the social situation of development specifically foregrounds how the same social and material environment is experienced differently, because of what a specific child brings to that situation. This concept is central for conceptualising children’s development where digital tablets are part of the social and material conditions for development. By focusing on the broad range of developmental pathways, rather than by conceptualising children to be with or without abilities, a more inclusive view of children is foregrounded. Vygotsky (1993) argued that “we must not forget that, above all, it is necessary to educate a child not as a blind child but as a child. Otherwise, to educate a child as a blind or a deaf child means to nurture blindness and deafness; it means that the pedagogy of children with [vision impairment] will become a defective pedagogy” (p. 83; original emphasis).

Vygotsky (1993) suggested that “the task is not so much the education of … children [with visual impairment] as it is the reeducation of the sighted” (p. 86), and hence there is the need to put “an end to understandings of diversity dependent on medical,
Bottcher (2010) conceptualises a cultural-historical view of inclusion as the “dynamic understanding of the child and the environment as dialectically interdependent” (p. 5). Here the term dialectical suggests that it is not possible to think of a child in isolation of the social and material environment, because the social and material environment shapes the child, whilst at the same time the child is shaping the social and material environment. Hence, it is not just the child or the iPad that should be studied, but rather it should be the whole social and material environment in which the child and the iPad are interacting. In this reading, it becomes possible to examine the mediating support that is provided by adults to children in the full knowledge of the zone of proximal development (Vygotsky, 1997) of the specific child. Children participate with the support of other more capable peers or adults at levels above what they may do independently with the iPad. This also means that children engage in a form of imitation (Vygotsky, 1997) of what is representative of that which is within their zone of proximal development already. Vygotsky had a specific definition for imitation, where a level of supported understanding of the situation was possible in the act of imitation, but only where the ideal forms are already present in the child’s environment. The relations between the ideal form and the child’s real form of development become important dimensions of understanding the social and material environment where the iPad is being used by families (Vygotsky, 1994).

Understanding the social practices in families is central for knowing how iPads support, or otherwise, inclusive learning and development in the early years.

**Study design**

The study reported in this paper sought to examine the social and material conditions for learning that goes beyond the specific characteristics of the learner and what they bring, and focuses on the social interactions with others within particular material environments where iPads are used as part of family practices. The study sought to specifically examine:

What kinds of family practices surround the use of iPads in the home to support inclusive practices within everyday learning and development?
In order to answer these research question a naturalistic study was designed in order to capture the everyday practices at home. Observations were digitally recorded over a three-week period. The details of the study design follow.

**Participants**

This paper concentrates upon one child, Li Lei, and his family. Li Lei is aged 4.1 years and has a condition known as albinism. This is a congenital disorder characterised by a lack of pigments in the skin, hair and eyes, which causes visual impairment. There is a need for great care when exposed to the sun. Li Lei is of Chinese heritage. He was adopted as a baby. An extraordinarily high level of mathematical competency was noted in the everyday practices of Li Lei. It is beyond the scope of this paper to discuss his exceptional mathematical skills and competence.

**Procedure**

Video observations: Li Lei was observed within a preschool and at home over a three-week period constituting 74 hours of video observations made by a team of research assistants. Of the 74 hours of video data, 19 hours of video observations were directly related to Li Lei in the preschool setting, and 9.7 hours of video observations were made of Li Lei in his home over seven separate visits. Two researchers, each with a digital video camera gathered data. One camera followed Li Lei around the home, whilst a second camera took stills of everyday family practices. Of the 9.7 hours of video observations made in the family home, the family recorded 3.6 hours of video data over three days when the researchers were not there. Only the data gathered in the family home by the researchers and the family is presented in this paper.

Video interviews: Interviews were conducted with the parents of Li Lei in the family home in the context of the general data gathering of everyday practices.

**Analysis**

The central concepts used in the study were the social situation of development (Bozhovich, 2009; Vygotsky, 1998), the zone of proximal development (Vygotsky, 1997), imitation (Vygotsky, 1997), and the relations between the ideal and the real (Vygotsky, 1994) as discussed previously (see also Table 1). Raw video data and
interview files were put into iMovie as projects. All projects were examined in relation to these concepts, and these categories were used to edit the data into clips. A three-level approach to analysis was undertaken (Hedegaard & Fleer, 2008) where clips were: 1) examined as individual everyday representations of the concept in action, 2) categorised as situated practices and what that afforded for inclusion, and 3) examined for themes across video clips.

Findings

This section begins with examples of the family practices that were commonly noted in the home that featured the use of iPads. Specifically, the family practices were studied in relation to how tablet technology was framed to take account of Li Lei’s unique characteristic and to support and advance his overall development.

Li Lei at home

Introduced below is an example taken from a series of 10 single visit video recordings where the iPad was featured.

Li Lei is at home with his mother and father. He is seated at a child-sized table, writing in a notebook as he listens to his sound machine (name used by the family to refer to a digital recorder). His mother suggests to Li Lei “Li Lei, you may wish to record from the sound machine and put it on your iPad”. Li Lei takes the iPad and goes to sit on the sofa to begin creating. His mother moves a selection of cushions so that they comfortably support Li Lei’s neck when studying closely the screen of the iPad (see Figure 1 below). As the mother guides Li Lei onto the cushions, she explains to the researchers: “We always try and make sure that his neck is not completely compromised because of his vision” (Video Observation Day 10).
Li Lei has on the iPad GarageBand app which allows him to record and create musical compositions. Li Lei is examining the tracks that have already been recorded. The father points to a track on the iPad and suggests he play that. Li Lei responds by saying “I have to hear this track first”. Li Lei switches off all the instruments on the iPad and just highlights one track so that he can listen to that. After listening to the single track, Li Lei continually moves between tracks, listening to each for short bursts. His father asks him to play the guitar track. Li Lei says, “That track doesn’t begin until the 19\textsuperscript{th} bar”. The father says “Can you move the cursor” pointing to the 19\textsuperscript{th} bar “so you can now play it”. As it plays, the father explains to the researcher that the guitar tracks were created by Li Lei. The father and Li Lei continue to work together with the iPad, but with the father only makings suggestions, and Li Lei either accepting or rejecting these. Li Lei skilfully records his own voice, his mother’s voice, creates new tracks, retrieves saved tracks, and creates repeats and loops with multiple tracks playing concurrently. Li Lei continues to do this, with his father seated behind him (see Figure 2), so he can view the screen. Although it is the father who makes suggestions, it is Li Lei who uses the iPad to create his own musical recordings (Video Observation Day 10).
Distal guided interactions were noted by Plowman, McPake and Stephen’s (2008) in their research. This is consistent with what can be seen in Figure 1, where the father distally supports Li Lei as he engages with the digital tablet technology. Plowman, McPake and Stephen (2008) state that distal guided interaction in the form of peripheral vision was used by most families “for overseeing safety and ensuring that the children were not getting stuck” (p. 311), but also was noted when children themselves sought help.

Figure 2 Father–child interactions and positioning

Interviews with the father and video observations of interactions in the home indicated that Li Lei had worked together with his father on his computer to learn to use GarageBand (recording studio). Consistent with a series of papers by Plowman, McPake and Stephen (2008) from their multiple analyses of a national study of the use of technology in the home, the father noted that Li Lei had independently transferred his knowledge of this software directly to using it on the iPad, despite the different configuration on the iPad to the father’s computer, as is noted below:

Li Lei says: “I want it to keep on repeating”. The father explains to the researcher that Li Lei just extended the line on the iPad in order to repeat the track. Li Lei says “So now I am making the whole song repeat. I am making it repeat. Repeat!” The father stresses to the
researchers that “He’s worked out how to do that by himself. I have not shown him how to use that. He has used the application on the desktop computer. But it does not work the same way. It does the same things as mine, but he has seen me working on the desktop, and I have shown him how to use it, and when he got it for the iPad, everything is formatted differently, even though it does all of the same things. What he is doing there I can’t actually do. I have to sit down and work it out. He has worked out how to copy and paste, he has worked out how to find all the samples, how to record, there are things that he can do that I can’t do on my desktop. He has worked it out for himself. He has virtually taught himself.” (Video Observation Day 10).

Plowman, McPake and Stephen (2008) found in their extensive research of technologies used in the homes of UK families that “parents saw children’s developing competencies as a natural, unmediated process in which learning happened without teaching” (p. 303) and that “the ways in which children’s learning with technology is supported at home are not necessarily visible and that parents frequently underestimate their role” (p. 304). Their cultural-historical study went beyond simply noting the operational use of technologies to determining the intergenerational nature of informal practices that suffuse family activities that go unnoticed in family homes. The capacity of Li Lei to transfer his skills from the desktop to the iPad is indicative of the backdrop of experience he has had in his family with digital technologies. In such a technology rich context where the father has introduced Li Lei to the intricacies of digitally recording, something that is clearly valued in the family, the father’s role has been de-emphasised.

There was a widespread belief that the children were self-taught and that learning happened, in the words of one mother, ‘by default’. A key characteristic of this natural process of ‘just picking it up’ was speed. When provided, tutoring was not a protracted activity in the same way as teaching a child to read, write, complete a jigsaw or ride a bike. Many parents commented on how quickly their children could grasp what they needed to do when confronted with a new family purchase or a present and that it required just a one-off demonstration (‘she took to it straight
away’, ‘they learn really quickly’, ‘you only have to show him once’) (p. 341).

Like Li Lei’s father who indicated that Li Lei worked it out for himself, that he had virtually taught himself, Plowman, McPake and Stephen’s (2008) noted four kinds of beliefs about how children “picked up” learning with technologies:

1. self-taught,
2. trial and error,
3. copying,
4. demonstration.

In Li Lei’s rich technological landscape, and in the example given above, culturally learned ways of interacting with the iPad are noted. In these contexts, the environmental technology provides a shared context, shared talk and terminology, and the creation of “a link between family culture and children’s learning” (Plowman, McPake, & Stephen, 2008, p. 315). Yet what is most evident to families, as was noted in this study and in that of Plowman, McPake and Stephen (2008), was the tendency to focus on, and only recognise, the operational learning of children, even though parents provide many opportunities for learning to take place, which are supervised through “guided interaction in the distal dimension” (p. 315). Not surprisingly, most of the relevant literature in the context of inclusion focuses on the technical operations of using iPads for the life support tasks (Jowett, Moore, & Anderson, 2012; Shamir & Margalit, 2011) or in relation to online experiences of young children (Black, 2010; Marsh, 2010).

The computer specific language gained through using the iPad also featured in Li Lei’s everyday interactions at home. For example, during interviews with the mother and Li Lei, they shared the following:

Mother: What did you say to us the other day? You said you had a fantastic day and you said to me: “Mummy I want to [deliberate pause]…”
Li Lei: Copy and paste this day [they both smile].

Mother: He wanted to copy and paste the day. (Video observation.)

Plowman, McPake and Stephen (2008) also noted that some “parents commented on their children’s use of terminology and reported children using words such as ‘pause’, ‘desktop’ and ‘load’, demonstrating awareness of web addresses on television programmes or asking for a site to be saved in ‘Favourites’” (p. 309). As might be expected, this was a feature of video modelling tools for carers (Moore, Anderson, Treccase, Deppeler, Furlonger, & Didden, 2013) but not necessarily featured in relation to young children with additional needs generally.

Discussion

The idea of a cultural-historical reading of Li Lei’s development is captured in Table 1 through the presentation of examples of the data in relation to the concepts of social situation of development, the concept of imitation, the relations between the real and ideal forms of development, and the concept of the zone of proximal development. Together these constitute an inclusive framework for the cultural development of Li Lei, where the use of the iPad is not a biologically determined feature of Li Lei’s development, but rather a cultural practice that is featured within the social and material environment of Li Lei’s family. Column 1 summarises these concepts, whilst Column 2 shows the everyday practices of the cultural forms of development (Column 3), such as when Li Lei says “I had such a great day, I want to copy and paste the day”. As was discussed in the findings section, the technological way of speaking is a valued family practice, which in this table is shown to be part of the family pedagogy (Column 4).
Table 1. An inclusive framework for understanding the use of iPads in everyday family practices

<table>
<thead>
<tr>
<th>Cultural development</th>
<th>Everyday practice</th>
<th>Cultural activity</th>
<th>Family pedagogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPad functions to capture features of everyday life (Bozovich, 2009; Vygotsky, 1998)</td>
<td>Supporting technological language to capture everyday practice: “I had such a great day, I want to copy and paste the day.”</td>
<td>Using iPad features in everyday speech</td>
<td>Valued technological language: Copy and paste metaphor</td>
</tr>
<tr>
<td>Working within the zone of proximal development – adult-child collaboration (Vygotsky, 1997).</td>
<td>Using iPad to download applications. Using cut, paste, copy features. Creating folders.</td>
<td>Functional use of the features of the iPad to perform activities in collaboration with adults or independently</td>
<td>Family cultural practices include distal guidance</td>
</tr>
<tr>
<td>Imitation – within the child’s zone of proximal development (Vygotsky, 1997).</td>
<td>Using Garage Band on the iPad without instruction</td>
<td>Transferring knowledge of Garage Band to iPad</td>
<td>Family cultural practices include having access to and observing applications being used for a real purpose.</td>
</tr>
<tr>
<td>Using real tools. Ideal form in the child’s environment (Vygotsky, 1994).</td>
<td>Recording singing and music, creating own musical production</td>
<td>Using iPad as a tool</td>
<td>Family cultural practices include purposefully using applications</td>
</tr>
</tbody>
</table>

What we learn from the case study summarised in Table 1 as an inclusive framework, is that Li Lei’s visual impairment is no impediment for his use of the iPad. The iPad affords many things for Li Lei, but it is the specific family practices that create the conditions which see Li Lei acting competently with the iPad, and which contribute to his cultural development. For instance, Li Lei’s father’s use of Garage Band on his desktop is also used by Li Lei in an exploratory and purposeful way on his iPad. Vygotsky argued that children imitate those social practices that are valued, but also perform these activities with growing competence when they are supported by others within their zone of proximal development. The family pedagogy provided the ideal
context in which real digital tools could be used for creative and purposeful activity that was valued by the family, and which contributed positively to Li Lei’s overall cultural development.

What we also learn from this case study of one child is that when the focus of attention is on the cultural development of the child, rather than looking at the child’s biology (e.g. visual impairment), it becomes possible to see the significance of iPads for the overall development of children with visual impairment. What Vygotsky (1993) draws to our attention is that difference is often conceived as a disability when in a social situation, where a particular difference, such as visual impairment “leads to a restructuring of the social relationships and to a displacement of all the systems of behavior” that are in existence for children, families and preschool environments (Vygotsky, 1993, p. 63). It is not the actual physical ability of the child that is restricting possibilities, but rather it is how the child is conceptualised within social relations and the material conditions of the environment in which the child is living and learning. This was evident through the distal positioning of the father (Figure 2) who knew that his son could operationally and conceptually work with the iPad and mobile recording studio software. In this study, the positioning of the adults in relation to Li Lei was in relation to a “fit for purpose” approach, but in ways that worked with Li Lei’s visual needs.

Taken together, the digitally oriented social practices of the family demonstrated new forms of family pedagogy that supported the development of Li Lei. The iPad in the context of this family pedagogy contributes immensely to the overall cultural development of Li Lei, and therefore it can be argued that iPads can act as an inclusive tool for the development of children with visual impairment.

Conclusion

What this study has shown is that inclusion was framed through conceptualising social practices in relation to the unique characteristics of Li Lei. The family practices worked directly with Li Lei’s visual needs, but in ways that demonstrated a dynamic understanding of the child and the environmental conditions as dialectically interdependent. In this case example of Li Lei, the digital tablet was introduced and
used by Li Lei in ways that positively afforded his learning and development. The iPad acted as both a platform for learning and creativity, and as an object of social relations within the family. Consequently, it can be argued that the iPad in this case study became an instrument for social practice and for affirming Li Lei’s agency as a child with many abilities.

References


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