

The influence of children's gender and age on children's use of digital media at home

Abstract

This study is the first to systematically investigate the influence of child gender and age, on parents' perceptions of UK children's digital media use at home. It provides an in-depth exploration of how children's age and gender influence the balance between children's use of digital and non-digital media at home. The data draw on 709 parents' responses to an open-ended question asked in the context of a national survey investigating the digital reading habits of children, conducted in 2015. Parents' responses were analysed using content and thematic analysis, which yielded eight main categories, collapsed into three major themes: control, child's healthy development and diversity of experiences. Quantitative analyses evidenced that more parents of boys were concerned about the health implications of their children's digital media use and this was a concern especially for parents of the youngest (0-2-year old) children. More parents of 6-8-year olds cited the appeal of technology as the main reason for the perceived imbalance in their children's engagement with digital media. The study provides a more secure understanding of the factors that influence parental perceptions of their children's digital media use at home, which has implications for policy-makers, digital designers and early years professionals.

Children's use of technologies has been historically accompanied by two rhetorics: one highlighting the transformative power of technologies, with some scholars pointing to the ways in which new technologies can positively affect children's learning (e.g., Somekh & Mavers, 2003), reading practices (e.g., Kress, 2003) and social relations (e.g., Bailenson & Beall, 2006), and another highlighting the belief that digital technologies can be detrimental to children's social development and their everyday social interactions, with a potential 'digital addiction' among children (House, 2015 quoted in Daily Mail, 2015). These contrasting narratives are indicative of some of the debates and discourses that inform parents' views and beliefs concerning children's use of digital media at home.

The benefits associated with the use of these devices for young children have often been framed according to the binary of digital versus non-digital engagement. However, the pivotal concern is not whether children should spend more time with digital or non-digital devices, but rather, how to ensure a judicious balance between children's digital and non-digital experiences (Guernsey & Levine, 2015). In this study, we therefore focus on an in-depth analysis of parents' responses to an open-ended question of *balance* (rather than use of either digital or non-digital media) in relation to their children's use of media at home.

This study draws upon data from a national survey of parents of 0-8-year olds, commissioned by the literacy charity Book Trust, fully available from: <http://www.booktrust.org.uk/news-and-blogs/news/1371>. Our analysis was partly funded by the literacy charity and partly by The Open University and focused on children's use of digital media at home. It focused on the question: 'Are there any challenges to ensuring there is a balance between your child's engagement with digital activities (e.g. watching TV, using a computer, tablet, smartphone, e-reader or games console) and their engagement with other non-digital media (e.g. reading print books, paper text-making resources)?' There were

both pragmatic and theoretical reasons for the choice of this question for further analysis. The pragmatic reason was that this question elicited rich and extensive answers from the parents and we were keen to understand these through in-depth analyses. There was also a more theoretical reason for focusing on this question: based on previous literature and our own work in this area, we were keen to examine, in detail, what parents think about the balance in their children's use of media at home. Parents answered the question either online using the online version of the survey or via telephone, and their answers indicated various and rich strategies to achieve a balance, as well as parents' concerns and challenges regarding not achieving the balance. We analysed these parental responses in detail, exploring the role that children's age and gender play in parents' perceptions. The article begins by describing the rationale for the study and the focus on the child's gender and age, followed by an outline of the survey data this study draws on. Our approach incorporates in both quantitative and qualitative elements and we present the results of statistical analyses as well as thematic analysis. The Discussion focuses on the main themes in the data and their implications for policy-makers, educators and developers of children's media. We use the terms media and technology (or digital media and technologies) interchangeably in this article, with both terms referring to the various devices available to young children including TV, computer, tablet, smartphone, e-reader or a games console.

Children's use of media at home

Studies show that children's experiences of digital media at home are not uniform. The so-called second digital divide (aka "app gap" or "usage gap") relates to the actual usage of technology in families and has been documented in studies investigating the use of ICT in developing and affluent countries (e.g., Arunachalam, 2002), and more recently, by the Joan Ganz Cooney Centre in relation to children's use of tablet apps and touchscreen devices

across the USA (Levine & Guernsey, 2015). The extent to which the use of digital media might vary in children's homes is also emerging from detailed case studies that explore possible differences, such as the presence or absence of adults during children's digital media use (e.g., Barron, Martin, Takeuchi, & Fithian, 2009; O'Hara, 2011; Chaudron et al., 2015); the design features of particular software programmes (e.g., Kucirkova, Messer, Sheehy & Panadero, 2014); and characteristics of play with digital toys and games (McPake, Plowman & Stephen, 2013). In this study, we contribute to the growing knowledge base in this area by investigating in detail parents' perceptions from a variety of families in a systematic way, supported by "The digital reading habits of children" survey data. **Our first research question** was: What influences parents' perceptions concerning their children's balanced digital activities at home? We did not aim to only document parents' perceptions, but sought to also explain the reasons for possible variability in parents' perceptions. For this, we focused on children's age and gender, which are well-established in the international literature as 'key organising principles in social research' (p.272, 1999, Klumb & Baltes, 1999) and which have been reported to influence children's access to technology at home (Livingstone & Helsper, 2007).

Children's age

For children under the age of eight (the age group focused on in this study), digital media use at home is mediated, if not fully controlled, by parents and caregivers. With the advent of intuitively-designed, mobile touch-screens (such as iPads and tablets) throughout the 2010s, the use of technologies has increased significantly among this age group (see Common Sense Media, 2013; 2016; Ofcom, 2015, 2016), which renders parents' views on this particular age group of particular interest to researchers.

Large-scale surveys examining the children's digital media at home provide some information on access and ownership. In the UK, an Economic and Social Research Council-funded project "Tech and Play" (<http://techandplay.org/>) carried out by the University of Sheffield examined technology use in 2,000 families and found that 31% of children under the age of five have their own tablet at home. Drawing on a nationally representative sample, the Ofcom survey (Ofcom, 2014) reported that 71% of 5 to 15-year-olds have access to a tablet device at home in 2014. In the USA, the Zero to Eight survey of nationally representative sample of US parents (Common Sense Media, 2013) reported a five-fold increase in ownership of tablet devices such as iPads, from 8% in 2011 to 40% in 2013 in all families of children aged eight and under. These statistics indicate that there has been a rapid increase in children's ownership and access to digital media, but they do not tell us about parents' views on children's technologies or children's actual usage of digital media at home.

Prior to the advent of touchscreens, Plowman, McPake & Stephen (2008) interviewed 24 families of three- and four-year-old children about their beliefs concerning children's technological competence and reasons why they learn with technologies at home and found that some parents believed technologies were helpful and educationally supportive for young children, while other parents held a contrasting belief. Overall, however, parents did not perceive technologies as a major threat to children's development. The situation may be changing as more technologies are being made available to young children, especially for the younger age group. In the national Ofcom survey (2014) parents of 3-4-year-old children indicated that they are concerned about TV content (22%), online content (18%) and gaming content (15%) for children. In addition to the lack of high or good quality content of digital media for young children (Vaala, Ly & Levine, 2015), there is some emerging research evidence regarding the negative effects of technology for some children (e.g., Montgomery,

2000; Peck, Scharf, DeBoer, 2015). Moreover, the guidance issued by the American Academy of Pediatrics (AAP, 2011, 2015, 2016) warns that some types of media, when used independently by young children, can be harmful and are not developmentally appropriate (e.g., heavily commercialised content and passive use). These factors, together with the increased usage and availability for the young age groups, contribute to parents' views and potential concerns about children's media.

The influence of children's age on parents' views concerning children's use of new technologies has not been explored in research before. Considering the increasing use by all age groups, including the youngest ones, there was thus a pressing need to examine, in a nationally representative sample, whether children's age plays a role in UK parents' perceptions of their children's digital media use. We begin to address this research gap by looking at parents' perceptions of the challenges of their children's digital media use at home rather than merely access and ownership, and complement current research by drawing on a nationally representative sample. In addition, the study aimed to ascertain whether parents' views might be different among parents of young boys and girls.

Children's gender

Gender is a common line of investigation in technology-related research, with known differences for engagement style and frequency and duration of use of digital media among boys and girls (McFarlane, 2000; McFarlane et al., 2002). Gender differences are more pronounced and are typically studied for older age groups in relation to digital games (e.g., Nietfeld, Shores & Hoffman, 2014) and social media engagement (e.g., Suchert, Hanewinkel, Isensee, & Läuft Study Group, 2015). However, a national survey carried out by Ofcom in 2014 in the UK showed that there are some gender differences in media use even at a very young age: 30% of boys aged 3-4 years use a handheld/portable games player, compared to

21% girls aged 3-4 years. Also, boys aged 5-7 years are almost twice as likely as girls to say they regularly use a games console/ player (29% vs. 17%). Child's gender is an important factor not only in relation to access to technology, but also in respect of the nature of engagement with a specific device. In relation to tablets, for example, a national survey commissioned by The National Literacy Trust in 2014 found that tablet technologies (such as iPads) are of particular interest to boys (aged 3-5 years). When compared to print resources, there is a difference in how these devices influence children's learning and understanding of text. Reich, Muskat, Campbell & Cannata (2015) compared how three to five-year old pre-schoolers respond to a story presented either in an iPad or print format. They found a main effect of age and gender, with older girls scoring higher on story comprehension overall. Interestingly, more boys were less able to put the story in the correct order after being read the story on the iPad rather than the print book. The implications of this research for our study are that children's gender might play a role in a number of subtle ways related to technology-use at home, which are typically reported, and often determined, by the parent or other main caregiver living with the child. Our second research question therefore was: Does the child's age and gender play a role in parents' perceptions of their child's balanced digital activities at home?

Methodology

Study participants

The survey 'National survey of parents' practices and perceptions of their children's reading for pleasure with print and digital books' was run online and by telephone with overall 625 UK fathers and 886 mothers of children aged between 0-8 years. The research was approved by the Ethical Committee at The Open University and followed the BERA (2011) Ethical Guidelines throughout the research process, which include the typical ethical parameters of consent, right to withdraw, confidentiality and contact details for additional

information. The survey was a mixture of closed and open-ended questions and this study focuses on one of the five open-ended questions, which was answered by 709 parents of 373 boys and 336 girls. These parents were mostly educated to undergraduate education degree (21%), though there was a spread of highest education qualification achieved, as outlined in Table1 below.

Parents' qualification levels	1	2	3	4	5	6	7	8	9
Percentage	21%	19%	7%	8%	21%	14%	4%	5%	1%

Table1: Parents' qualifications

Legend: 1= GCSE, Standard Grades or equivalent (e.g. BTEC, S/NVQ level 2); 2=A Level, Highers or equivalent (e.g. BTEC, S/NVQ level 3); 3= Certificate of Higher Education or equivalent (e.g. HNC, BTEC, S/NVQ level 4); 4=Diploma of Higher Education or equivalent (e.g. HND/Foundation Degree, BTEC, S/NVQ level 5); 5=Undergraduate Degree or equivalent (e.g. BA, BSc); 6=Postgraduate Qualification; 7= Professional qualifications (e.g. CIMA, ACCA); 8= No formal qualifications; 9= Don't know

Eighty percent of parents reported that English is the main language spoken at home. The ages of the children varied, as outlined in Table2 below.

Table 2: Children's ages in the sample

Child's age	<1	1	2	3	4	5	6	7	8
No of parents	21	41	69	61	71	76	124	118	128

Data analysis

In Phase I, parents' responses were analysed using a content analysis approach, in which we looked for redundant and similar codes (Neuendorf, 2002). Analytical codes were generated inductively, from the data by the first and second author, who reviewed all of the responses, each creating an initial list of codes into which the responses seemed to fit. The authors discussed their analytical codes and created a set of illustrative examples of each. Using these codes, the researchers coded a random selection of data, compared their coding and discussed potential discrepancies. Two new analytical codes were created in this process, so the researchers again checked for consistency in coding between them and identified illustrative examples for each code. The final codes were then used to code the entire sample. The reliability of coding was checked by an independent coder who coded a random selection of 20% of the data-set used for this analysis (142 responses). The inter-rater agreement between the codes assigned by the independent coder and those by the first author was Kappa= 0.768, which is, according to Landis & Koch (1977) and Viera & Garrett (2005), substantial.

In Phase II, statistical analyses were performed on the data that were generated in Phase I. Data did not follow a normal distribution because they were coded in a way that resulted in non-continuous (nominal) variables. For each category of responses, a Pearson Chi-square test was performed to investigate potential gender effects and effects of age which was clustered into age groups. Age and gender of both the child and the interviewed parent were considered.

In Phase III, parents' responses were analysed using thematic analysis. Thematic analysis is a qualitative research methodology that is based on the search for themes that emerge from the data and capture the phenomena in the dataset (Braun & Clarke, 2006). The procedure involves the search for common threads across the dataset, which are then grouped

and summarised under thematic headings. Similar themes are grouped into categories that are labelled with a higher order of abstraction (Guest, MacQueen, & Namey, 2011). To identify the final themes, key words and phrases from the Phase I's analytical codes were generated and a systematic search of all transcripts according to these analytical codes was performed. The themes were represented in the transcribed data visually, along with their relationships to each other and some exemplars illustrating the themes were selected. The codes were manually sorted into meaningful groups and names (labels) were assigned to each group, following a discussion among the authors. Like the data in Phase I, data in Phase III were analysed with the guiding approach of grounded theory (Bryant & Chamaz, 2007), in which analysis is primarily guided by what emerges from the data itself. Using content and thematic analysis together in one study (that is in Phase I and Phase III) enabled us to quantify patterns in parents' responses (content analysis) as well as to group them according to major thematic patterns (thematic analysis). To ensure that the reliability of coding was extensive and systematic, several checks were in place, including search for confirming and disconfirming cases, cross-checking and refining with the third author and independent researcher who participated in the Phase I reliability checks. While content analysis allowed us to study parents' answers in a systematic and quantifiable manner (Krippendorff, 2012), thematic analysis enabled us to identify themes and patterns in parents' responses (Braun & Clarke, 2006). Overall, the use of combined quantitative and qualitative methods of analysis allowed us to triangulate our interpretations and provided greater insights into the data, thus enabling a greater understanding of the underlying patterns in the data (Yoshikawa, Weisner, Kalil & Way, 2008).

Findings

Phase I: Content analysis

The data were first analysed with the aim of finding the common topics parents refer to in their answers to the question: ‘Are there any challenges to ensuring there is a balance between your child's engagement with digital activities (e.g. watching TV, using a computer, tablet, smartphone, e-reader or games console) and their engagement with other non-digital media (e.g. reading print books, paper text-making resources)?’

Table 3 summarizes the main codes identified through content analysis, along with a description of each code, and an illustrative example. The individual codes are listed in the order of highest occurrence in the dataset, expressed in percentages.

Table 3: Main challenges cited by parents/ categories identified through content analysis

Analytic code	Description	Illustrative example
1, Family values, rules and routines (41.75 %)	Answers in which parents indicated that they managed to achieve a balance and cited their family rules and routines as main reason, were grouped in this category.	<i>“Should be a balance between ebook and normal books because the child should be able to read both types of book’ and that ‘you just need to get it right not too much but still give them freedom”.</i>
2, Child engagement (24.60%)	Parental responses in this category felt that the reason they struggle to achieve the balance is something to do with their child. Their answers centered around their child's heightened interest in new technologies, child's preference for new media or child's affinity with/for new	<i>“Children seem to think anything that involves a computer tablet or smartphone is far more exciting than sitting at a table painting and drawing. I worry sometimes whether this will have an adverse effect on</i>

	media.	<i>his ability to learn basic writing skills when he spends his time just pressing key”</i>
3, Technology appeal (10.44%)	These responses indicated that it is mostly due to the technology that they cannot achieve a balance. Their answers included perceptions around technology being superior than other kind of entertainment or learning activities, they described technology as more fun/exciting/appealing and told us about the pull or draw of technology for their children, describing it as ‘too tempting’ or ‘too inviting’.	<i>“My children are happy playing, until the TV goes on...then they would sit in front of it for hours if I let them”</i>
4, Variety of experiences (8.46%)	Responses in this category expressed the desire to limit their children’s digital exposure to ensure they have a variety of experiences. Many parents told us about ways in which they introduce outdoor play and creative making into their children’s routines and emphasised the need for diversity of engagement.	<i>“Difficult to know the correct balance as you want them to be computer literate but also not lose interest in books.”</i>
5, No challenge as no balance necessary (5.92 %)	This category captured the answers of parents who said they could not achieve a balance but did not worry about achieving such balance because the medium of reading, play or learning did not matter to them.	<i>‘I am relaxed. the important thing is my son reads. the source is of lesser importance.’</i>
6, Health implications (3.9%)	Responses in this category voiced their concerns around the health risks associated with unbalanced engagement with digital and non-digital resources. They told us about their concerns around	<i>“Screen time should be limited until we know how it affects young brains”</i>

appropriate screen time and described how difficult it sometimes is to limit it. They also shared their concerns around the impact of use and potential developmental consequences of media use for their children, as key reasons influencing the challenge around balanced media diet.

7, Relational
nature of
engagement
(2.26%)

In this category, parents mostly argued for the importance of meaningful social experiences their child can have in non-digital environments, and how the conflicts in use affect this balance. They voiced their concerns around anti-social behaviour when children spend too much time online and difficulties around maintaining tender and affective parent-child experiences with digital technologies.

“Exposing a child to digital content can be an easy option to keep them quiet. Interacting, preparing activities and going out and doing things takes more time, energy and planning.”

8, Social and
media
pressures
(2.96 %)

This category captures answers that centered on the social pressure experienced by parents when trying to strike a balance between digital and non-digital engagement. Parents told us about the pressure advertising or media, as well as peer pressure when it comes to limit screen time. For the latter, the phrase ‘because it’s cool’ was often used to describe why their children desire to spend time on digital media.

“Media pressure i.e. adverts specifically targeting kids.”

Phase II: Gender and age effects

Child's gender was considered in terms of boys and girls (there was one parent who refused to state their child's gender in either of the categories). Children's ages were clustered in the arbitrary categories of '0-2', '3-5', '6-7' and '8 or older'.

Post-hoc analyses for statistically significant overall differences were performed by calculating z-scores for each cell and comparing them against the critical value of 1.96 which indicates differences beyond chance that correspond to an alpha value of 0.05. However, in order to control for multiple comparisons, z-scores higher than 1.96 were also converted to p-values in order to be compared to a corrected value, adjusted with the Bonferroni correction.

Child's gender was significant for category no 6 (health implications), that is the health reasons which might affect children's balanced use of digital media ($\chi^2(1) = 5.86, p = .015$) with more parents of boys being concerned about this issue and fewer parents of girls. Also, more parents of girls indicated that they managed to get the balance right thanks to the family values and routines established in their family ($\chi^2(1) = 4.38, p = .036$).

When considering children's age, there were close to significant differences for category no3 (technology appeal) with more parents of the oldest children in the sample (eight years and older) being more concerned with this reason affecting children's balanced media use ($\chi^2(3) = 6.50, p = .090$). In addition, children's age was an important factor for parents citing health implications (category no6) as important ($\chi^2(3) = 8.63, p = .035$), with parents of the children's youngest age group (the parents of 0-2 year olds being more concerned with this reason ($z = 2.89, p = .004$)).

Phase III: Thematic analysis

Given that we conducted content analysis in Phase I, the next step was to identify all data that related to the individual analytical categories in an effort to expand them into

themes by merging ideas related to parents' experiences of children's digital activities at home. Categories that were concerned with common themes were merged, resulting into three main themes: Control, Child's healthy development and Variety of experiences.

Theme 1: Control

The theme 'control' captures parents' experiences in which they described their children as being, or not being, in control of how they use technology at home. This theme was defined by four analytic categories: Child engagement, Technology engagement, Media pressure and Family routines. For the child engagement theme, parents described their child to be in control, or at least that their child's preference is the key reason for why it is difficult to strike the balance.

Parents whose answers were included in this category told us, for example, that: *"Mostly kids like attractive and new things" ; "Child prefers to use digital devices rather than paper books, likes to browse and choose different books of her choice to down load" ; "It is hard for my child to understand that he can do something else other then [sic] using the PC."* Parents in the other sub-theme (technology engagement), category seemed to think that the main reason their child wants to spend more time with technology than with other activities is the nature of the technology itself. The agentic role, that is the view that technology makes a difference, was visible in several answers, as illustrated by the examples we present here:

"I think it's easy to give your child a tablet and say get on. They are very use [sic] to this use of technology from school so it is no big deal for the children to continue them at home. Also the touch screen is so child friendly with naturalistic swiping actions so it is no problem that children can learn to use the tablets"

In contrast, parents in the sub-category of family routines were clear that it was them who were in control of their children's engagement with media. These parents frequently mentioned the words 'rules' and 'routines' in their accounts: *'Because we have a routine that we follow.'*; *'I have a set time and my child is happy to stick to house rules'*. Or *'There are challenges, but we have family rules on screen time so my child still chooses other activities such as print books, craft and role play'*.

Lastly, parents were *not* in control of their children's activities when media and peer pressure came to play. One parent summarised the peer pressure faced by their children as follows: *'The phrase "everyone else can" comes to mind'*.

Despite the popular assumption that children's use of technology at home is determined by their parents, our data show that the issue of control needs to be reconsidered. From an educational philosophy theory, the key educational question concerns the agentive identities co-produced when technology is used and the extent to which new media invite agentive role-taking (Thumlert, de Castell & Jenson, 2014). This means that the child is positioned as an active meaning-maker and content producer, not as a passive receiver of information. Parents recognised in their responses that when it comes to the issue of control, the child's knowledge about the technology influences their decision-making. These notions, together with our data, indicate a complex interrelationship between the knowledge and activity mediated by parents, children and the actual technology, which all together are driving the changing practices of children growing up in the 21st century.

Theme 2: Child's healthy development

Child's healthy development emerged as a significant theme across the categories Health and Relational issues. For health issues, parents indicated that they limit their child's

exposure to media or look for other ways to strike the balance mainly because of their concerns around their child's health: answer *'my child is only 1 and hasn't been exposed to interactive media I think this is harmful to his development'*. Parents' answers in this theme also indicated that their experiences of balance in children's digital activities are relational, that is influenced by either their own or joint with the child, relationship. For instance, parents indicated that they often leave their child with digital media so that they can perform the tasks they need to, as illustrated with this quote: *'The ability for me to get domestic jobs done can sometimes mean I will encourage tv watching or use of her tablet'* or *'Its easy to turn on things and leave them to it. i can get other stuff done'* [sic]. On the other hand, there were also parents in this category who told us that the balance is tilted more towards non-digital engagement, again because of their own involvement with the child: *'I'm always with my child he prefers to play on the floor with me than watch tv'*.

Plowman & McPake (2014) outline seven myths about young children and technology and include the myth "Childhood and technology shouldn't mix". The authors conducted more than 50 case studies with 3-4-year-old children and their families and found that there were parents who "worried that cell phones could endanger health and others were concerned that it was easy to become "addicted" to video gaming " (p.27). Our findings confirm this trend, and specify that this is a concern mostly for parents of youngest children (aged 0-2). The theme of "Health & Developmental Impact" of digital media on the youngest children was one of the three main foci of the recent AAP symposium, brought together to refine the practitioner guidelines advising no digital media use for children under the age of two. Panellists stressed that parents take an active role in guiding their children's digital media consumption (AAP, 2015) and that improved parental awareness of high-quality media may encourage changes in the gaming marketplace, building consumer demand for healthier

products. In 2016, AAP specified the age limitation of 18 months: 'For children younger than 18 months, discourage use of screen media other than video-chatting (see Hill et al., 2016).

Theme 3: Variety of experiences

The third major theme related to parents' experience of diversity of activities and the need to provide them, as captured by the category 'Variety of experiences'. It wasn't clear why parents think that a diversity of activities is important, but for many, diversity was the 'antidote' to the dominance of digital entertainment, as illustrated by this quote: *'My child wants to use the TV, watch YouTube all the time, if I let her and cries if I turn it off sometimes. TV trumps most activities, so it is better to try to cut down on TV time and distract with other activities.'*

Although for some families diversity of engagement was not a problem *'they've always done lots of different things.'*, most parents in this category felt that it is very difficult to ensure their children get the best of both worlds: *'Planning the day effectively so all activities are covered can be a challenge.'*

For other parents, diversity of experiences was not something they considered especially important. What mattered to them was the educational nature of their children's engagement rather than the kind of platform on which this was achieved. For instance, one parent said: *'As long as he's being educated that's all that matters'*.

Achieving a healthy digital 'diet' is one of the major concerns for parents in the UK and there is no magical formula to realise this - each family follows their own routines and rules. In this respect, AAP (2015) recommends setting limits to all activities which involve digital media use: *'Set limits. Just like in diet, behavior, sleep, and parenting in general. Parenting strategies are the same across various environments, including screen media.'*

Discussion

This study makes an original contribution to the field, through its examination of the influence of children's gender and age on parents' perceptions concerning children's digital media use at home. The research represents a distinctive contribution to the field because it draws on a nationally representative sample and investigates in detail parents' perceptions in relation to their children's media use at home. The findings show that among UK parents, there is a strong sense of the need to ensure a balance in children's digital and non-digital engagements. Although our data are survey-based and relate to parents' perceptions, which may not always correspond to actual practices (see Plowman & McPake, 2013), parents' perceptions of children's media use are the closest predictor of their strategies supporting children's media use at home and children's actual engagement with technology (cf Pajares, 1993). We found that age and gender play a significant role when parents consider the health implications of an appropriate balance in their children's activities. This is particularly the case for parents of the youngest children. Family routines seem to be an effective regulating mechanism, especially for young girls. Thematic analysis showed that the major experiences related to parents' challenges in ensuring balanced digital media diet relate to three key decisive reasons that shape children's use of media at home are: Control, Child's healthy development and Variety of experiences.

Overall, parents thought that the new interactive features of technology influence the balance between their children's digital and non-digital entertainment, but also, that family routines and the children's own preferences, influence which resource is used and when. Although other survey data of parents of older children (6-17-year olds) show that most parents believe technology has a positive effect on their child's future (e.g., Family Online Safety Institute, 2015), this is not the case for younger children, with parents expressing

concern for the youngest children's healthy development when they use digital media. For children aged two and above, it was clear that the technology appeal made it harder for parents to balance their children's engagement with non-digital alternatives. Parents of all children valued diversity and digital media in assisting their children to read and taking part in educational activities.

The findings also indicated some interesting gender dynamics. Namely, for girls, parental mediation of media use at home seemed to be mediated mostly through 'family routines'. For boys, parents were more concerned about the consequences of media use for their health than parents of girls. Onward research is needed to explore whether digital media constitute a distinct context for socialisation of gender as there seem to be gender differences in relation to other activities at home. For example in a national survey of 1,012 parents of children aged 3 to 5 conducted in 2014 by Pearson and the National Literacy Trust, child's gender played a role in children's early literacy practices at home (see Formby, 2014). Parents reported that girls read daily more than boys (75.3% vs. 68.7%) and parents of girls were also more likely to support their daughters in a variety of activities, such as for example talking about a story they read (83.6 % of parents of girls versus 79.4% of parents of boys).

This study lays the foundations for future work designed to examine how different parents' characteristics influence children's use of digital media at home. There is some indication that parents' gender does not significantly influence UK parents' perceptions in this regard. Livingstone (2007) explored data from the *Young People, New Media* survey of 1300 children and their parents and the *UK Children Go Online* project surveyed 1500 children and their parents in relation to parents' responses following the introduction of the Internet into home. Although focused on teenagers and older children (the youngest group in the *Young People, New Media* project were 6-8 year old children), Livingstone (2007) found

that ‘mothers and fathers tell a similar story about their regulatory activities’ (p.931). In an US sample, however, parent’s gender was a significant predictor of the type of media used by their children, with mothers reporting the co-use of books and fathers co-use of video games with their children (Connell, Lauricella & Wartella, 2015). It might be that culture plays a significant role in these patterns because Shin & Li (2016) examined the responses from 557 parents of primary school children in Singapore and found that children’s use of media is determined more by the idiosyncratic parent-child interaction patterns than parents’ or child’s demographic factors. These patterns have been also noted in qualitative studies examining children’s media use and parents’ views, which pointed to the dynamic and sometimes contradictory, parents’ mediation of children’s media use (e.g., Zaman, Nouwen, Vanattenhoven, De Ferrerre, & Van Looy, 2016; Radesky et al., in press). These recent studies, together with the results reported here, show that new media do indeed imply ‘qualitative changes in family functioning’ (Carvalho, Francisco, & Relvas, 2015, p.99), they are changes that are evident in parents’ attitudes and understandings. In particular, our findings have implications for how we give detailed and more targeted recommendations to parents of young children and we therefore frame the results in terms of the practical implications for policy-makers, technology designers and professionals.

Study implications

For policy-makers we recommend that they are mindful of the tension between guidelines versus prescriptions for parents in relation to their children’s media use and look for ways that make the most of the complementary nature of digital and non-digital resources. Considering the varied reasons cited for balanced engagement, we recommend policy-makers collaborate with schools, reading and literacy charities and parent groups to generate rich contextual examples and varied use-case scenarios that can be shared with parents to raise

awareness about the important and varied role media play in children's everyday lives. Our study also found that when it comes to the health implications of using digital media, parents of young boys are more concerned than parents of young girls, with the latter achieving a better balance in children's digital media use at home. Policy-makers often consider children's gender (notably in the case of young boys) to be a justification for children's increased use of digital media (see e.g., National Literacy Trust in the UK). We are not aware of a research study published in a reputable journal that would show that young boys are negatively affected by digital media use more than young girls. In light of our findings, we recommend that policy-makers take into account children's gender and provide context-sensitive forms of guidance that reduce parents' concerns, with support for establishing family routines that might mitigate against children's unbalanced use of digital and non-digital media.

For digital designers, our data indicate that parents want to support children with age-appropriate digital resources, and this applies to non-digital resources, too, as one parent indicated: *'Children seem to want to use adult things, I want to encourage age appropriate non technological toys.'* Given that parents are the primary gatekeepers when it comes to the provision, availability and accessibility of digital technologies for children at home, we recommend that digital designers do not focus on product development only, but also on supporting parents to develop their awareness of the advanced functions of digital technologies and their possible advantages over non-digital media. In addition to ensuring that their products do not expose children to inappropriate content, it is also necessary that digital designers work together with educational researchers and psychologists to develop age-appropriate digital media.

Lastly, for teachers and educational professionals, the study indicated that parents are aware of several reasons for why technology might be good or bad but would welcome practical support with changing technology associated with children's learning. The theme *Variety of experiences* is especially salient here, given that teachers can provide tips and recommendations for parents on various kinds of activities and types of digital media relevant for their children's learning, connect them to educational resources and curriculum-related guidance.

In conclusion, there are different and various reasons why parents might not always achieve a balanced media diet for their children and these are influenced differently by children's age and gender. This study provides evidence and highlights the need for a degree of contextual sensitivity in relation to parents' anxieties concerning their children's use of digital media.

Statements on Open Data, Ethics and Conflicts of Interest

The data are available from the funder of the project, Book Trust. Book Trust is a registered charity, Charity number 313343, G8 Battersea Studios 80 Silverthorne Road Battersea London SW8 3HE. Book Trust funded the survey and The Open University funded additional analyses conducted as part of this study.

The research was approved by the Ethical Committee at the Open University and followed the BERA (2011) Ethical Guidelines throughout the research process, which include the usual ethical parameters of consent, right to withdraw, confidentiality and contact details for additional information.

The authors have no conflict of interest.

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