Partnering With Parents: Devices and Apps to Support Elementary Children Reading

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ABSTRACT

Contributing to a decade of national research on device ownership and app usage, this study provides evidence of how children from 120 homes across 46 classrooms use apps and portable technology to support their reading development. Parent survey data reveals 99% of children use technology to support reading in the home, primarily on iPad and laptop devices. Apps used most frequently include Istation, YouTube, and PBS Kids Video. To gather parent perceptions and depth of children's technology use, 13 individual interviews were conducted with parents from the same sample. Parents preferred their child read with print books, yet parents allowed their child to use portable technology, in response to their child's interest in technology and general pressure to keep pace with technology skill demands. The finding that nearly all children in this study supported reading skills with portable technology in the home demonstrates the need to foster partnerships between parents and teachers that builds on children's technological knowledge and use to deepen learning between home and school.

KEYWORDS

Elementary Children, Home, iPad, Learning Technology, Mobile Learning, Parents, Perceptions, Reading

INTRODUCTION

Ninety-one percent of homes with elementary-aged children have a portable technology ownership device, such as a smartphone or tablet (Rideout & Katz, 2016). This high rate of technology ownership, combined with the understanding that learning to read begins in the home (Morris et al., 1996) sparks curiosity about whether children may be using portable technology as a tool to support reading development in the home. In this study, portable technology is defined as any device that a child can transport and use to support reading development (e.g., smartphone, tablet, LeapPad).

Children's technology use may differ between home and school environments, indicated by the finding that technology use in the home effects how children approach using technology in the classroom (Murphy, DePasquale, & McNamara, 2003). More recent research of 43 children between four -and -six-years old investigated children's perceptions of the purpose of technology devices, and findings show that half perceived the iPad as a learning tool, compared to one-third who saw the iPhone as an educational device (Eisen & Lilliard, 2016). Because children appear to possess

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conflicting perceptions about the purpose of specific technology devices, the investigation of how children may be using portable technology to support reading development in the home is necessary.

Additional apprehension about reading development is fueled by children's stagnant reading proficiency scores. The 2015 National Assessment for Educational Progress Reading exam reported approximately 36% of fourth-grade students perform at or above the proficient level in reading, consistent with 2013 scores (Nation's Report Card, 2015). In accordance with the U.S. Education Office of Educational Technology brief (2016), which emphasizes advancing educational technology in teacher preparation, teachers need to partner with parents to strategically integrate technology within the home and school. Based on these findings of children's technology perceptions, stagnant reading scores, and the need to advance educational technology in teacher preparation, this study seeks to investigate how children's home use of technology could inform teachers' technological pedagogical knowledge (Mishra & Koehler, 2006) to improve reading instruction. Findings from this study can be leveraged to provide parents and teachers with explicit strategies for supporting reading with specific technology devices and apps.

LITERATURE REVIEW

To date, educational research on children supporting their reading skills with technology apps and devices has been limited, small-scale, exploratory, and qualitative in nature, with foci on classroom use (Hutchison, Beschoner, & Schmidt-Crawford, 2012; Toppel, 2014). Reading and educational technology researchers have called for a broader understanding of the way children support their reading development with portable technology (Burnett, 2009), particularly for the need to inform teachers and parents with appropriate digital reading strategies (Harrison & McTavish, 2016). In response to the exponential growth of portable technology and concerns about how children may be using these tools, this study identified apps and devices elementary children use in the home to support reading development.

NATIONAL INVESTIGATIONS OF TECHNOLOGY OWNERSHIP AND USE IN HOMES WITH CHILDREN

Since the release of smartphones and tablets, there has been exponential growth in the learning apps available on technology devices (Hirsch-Pasek et al., 2015). Despite the extensive availability of learning apps, little research has investigated specific reading apps elementary children use in the home to support their reading development (Burnett, 2009). Most research on children and technology in the home is situated in a national context with foci on ownership (Rideout & Katz, 2016). Nonetheless, the following examination of national studies helps establish a broad understanding of the landscape of children and their access to technology in the home, while the national findings also situate the need for the research investigated in this study.

One study tracked device ownership in homes with children between birth and eight-years-old ($n = 1,463$) from 2011 to 2013, and revealed rapid growth in technology adoption (Rideout, Saphir, Pai, Rudd, & Pritchett, 2013). Rideout and colleagues' (2013) revealed that in 2011, eight percent of homes owned a tablet while 41% had a smartphone in the home. However, by 2013, 40% owned a tablet compared to 63% with smartphones. Findings from the same study also revealed that half of the children were using mobile apps, with parents reporting their children spending equal time using learning and game-related apps. Of the children using apps, parents also relayed that one-third of their children used portable technology for reading. Another national survey, similar to the one just described, included children between two and 10-years old ($n = 1,577$), and in only one year, 55% of homes now reported tablet ownership (Rideout, 2014). The same study found nearly half of children spent between four and five minutes daily reading a book on a technology device.

As mentioned previously, Rideout continued to investigate technology ownership in homes with children to discover that of the nearly 1,200 homes with children between six and nine-years-old, 91% had access to a smartphone or tablet. Of those children, half accessed the Internet to play educational games, followed by just over one-third who researched topics of interest (Rideout & Katz, 2016). These national studies provide evidence that technology ownership has become ubiquitous in homes with children. However, this study makes an important contribution because there is a paucity of research related to how children use educational technology to support reading in the home.

CHILDREN READING WITH TECHNOLOGY IN THE HOME

The role of parents and their choice to support and facilitate technology use in the home is a critical component to children's academic success. Parents are their child's first teacher (Morris, Taylor, Knight, & Wasson, 1996) and parents perceive supporting their child academically is an integral part of their parental role (Hara & Burke, 1998; Hoover-Dempsey & Sandler, 1995). Because parents provide academic support and perceive themselves as a component to their child's academic success, research on parents and children reading together with technology in the home informs the need for this study.

Since the parent is first to begin teaching their child to read, acknowledging how children and their parents interact with different text mediums when reading together may inform digital reading strategies. Research on children reading with portable technology has compared the experiences of reading electronic and print text. Studies have noted similar differences in how parents and children engage in dialogue reading different types of texts (Korat & Or, 2010; Parish-Morris et al., 2013). For example, when reading electronic text, parents exhibited more behavior utterances related to their child paying attention to the story rather than the electronic features. But when parents and children read print text, parents exhibited greater utterances and inquiries related to the story. Parents' behavior utterances while children read digital texts included, "stop pressing the buttons and listen to the story" (Parish-Morris et al., 2013, p. 203) and, "do you wanna play a game or do you wanna hear a story?" (p. 211). When reading electronic media, children led the discourse initiatives and spent more time reading the electronic text (Parish-Morris et al., 2013). Children's attitudes show a greater interest in reading digital texts, evidenced by children's expansive remarks reading electronic books, engagement with its interactive features, and increased time spent reading digital text.

A case study between a mother and young daughter reading with an app called Our Story on the iPad showed the closeness and interactive nature of the reading exchange, with the parent and child huddled closely around the iPad together. The researchers observed that "the child was physically manipulating the iPad, listening to the recorded mother's voice while pointing with her finger to figures depicted in the picture and immediately responding to her mother's question" (Kucirkova, Messer, Sheehy, & Flewitt, 2013, p. 119). A larger-scale study of 57 preschool aged children who used tablets in the home to support their reading and writing development revealed that children's app use was positively associated with their knowledge of print (Neumann, 2016). Interestingly, Neumann (2016) did not find a connection between children's frequency of reading on tablets and children's emergent literacy skills. However, in Neumann and Neumann's (2017) review of research on preschool children's use of touchscreen tablets at home and in preschool foster emergent literacy, the authors concluded that evidence is accumulating to support early childhood children's use of tablets for emergent writing and letter knowledge. Considering that tablets show promise as a reading support tool, emergent themes included "the quality of emergent literacy apps and how parents can effectively manage children's use of tablets to best support emergent literacy development" (Neumann and Neumann, 2017, p. 213).

Collectively, the research on children and parents reading with various text mediums are critical to help understand the role of the parent when children read with portable technology. With an understanding of how children perceive and use technology to support reading and how parents

support digital reading in the home, parents and teachers can may be able to form partnerships that build on students' existing technological knowledge and interests.

COLLABORATIVE PARTNERSHIPS BETWEEN PARENTS AND TEACHERS TO INTEGRATE TECHNOLOGY

As portable technology ownership in homes with children steadily rises, parents and teachers need to work together to examine how children use portable technology in the home to support reading development using apps from the classroom. Of the models for parental involvement in education, Hornby (2011) is a proponent of the partnership model. Under the partnership model of parental involvement, teaching professionals are educational experts while parents are experts on their children, but the two work together to “share expertise and control to provide the optimum education for children” (p. 30). Others caution this model must be deliberate and intentional, evidenced by research that has shown that parents, teachers, and children view the school and home learning contexts as distinctly separate spaces (Grant, 2011).

Housed within the 2016 National Educational Technology Plan, the Office of Educational Technology recommends four guiding principles teachers should consider when integrating educational technology:

1. Active use of technology to enable learning and teaching through creation, production, and problem solving;
2. Build sustainable, program-wide systems of professional learning for higher education instructors;
3. Ensure pre-service teachers' experiences with educational technology are program-deep and program-wide;
4. Align efforts with research-based standards, frameworks, and credentials recognized across the field (p. 9).

Adhering to these four guiding principles, the goal of integrating technology is to construct learning in new ways that would not otherwise be possible with traditional forms of technology. These principles also emphasize that technology should be integrated and accepted by a wider and broader community. Technology acceptance research in educational contexts have shown acceptance is often closely connected with an individual's readiness (Inan & Lowther, 2010), perceived usefulness (Teo, 2009), and professional training support (Vannatta & Nancy, 2004).

THEORETICAL FRAMEWORK

The fourth guiding principle from the 2016 National Educational Technology Plan emphasizes the need to align technology integration efforts with research-based frameworks, such as the Technological Pedagogical Content Knowledge (TPACK). The theoretical framework that is most informative to the design of this study is TPACK (Mishra & Koehler, 2006). The TPACK framework examines content, pedagogical, and technology knowledge, as well as its intersections: content knowledge; pedagogical knowledge; pedagogical content knowledge; technology knowledge; technological content knowledge; technological pedagogical knowledge. For example, content knowledge is “knowledge about the actual subject matter that is to be learned or taught (p. 1026). Meanwhile, pedagogical knowledge is “deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims (p. 1026).” The intersection of pedagogical content knowledge “includes knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching (p. 1027).”

The TPACK framework describes quality teaching with technology as one which, requires an understanding of the representation of concepts using technologies pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones (Mishra & Koehler, 2006, p. 1029).

To support TPACK, this study also acknowledges how ecological systems theory (Bronfenbrenner, 1979) influences technology use between school and home. Ecological systems theory ascertains that child development occurs within the contexts and connections of family, classroom, and community. This implies parent decisions are shaped by connections that occur among home and school environments. This theory has been successfully applied to other educational research to conceptualize how children's reading develops in response to their exposure to various settings (Aikens & Barbarin, 2008; Rauh, Parker, Garfinkel, Perry, & Andrews, 2003).

Ecological systems theory contains five layers: microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1979). Bronfenbrenner describes the layers in the following ways:

1. Microsystem refers to an individual's immediate setting, the home or classroom;
2. Mesosystem encompasses interconnections among settings, the relationship between school and home on children's reading development in the classroom;
3. Exosystem is an environment that indirectly affects a person without their presence;
4. Macrosystem applies to an individual's culture, beliefs, and ideologies as collectively formed from the microsystem, mesosystem, and exosystem;
5. Chronosystem refers to the evaluation of change over time in the characteristics of a person and surrounding environment.

This study focuses on the intersection of the microsystem and mesosystem because it examines parent and teacher decisions, and the influence of these decisions on children's reading development in the home. The TPACK framework portrays the complexities facing effective technology integration, and, together with ecological systems theory, the combination provides a clearer framework to help bridge children's home and school uses of educational technology.

RESEARCH QUESTION

Guided by TPACK (Mishra & Koehler, 2006) and ecological systems theory (Bronfenbrenner, 1979), the following research question was addressed:

What portable technology devices and apps do K-5 elementary children use to support reading development in the home?

METHOD

Research Design and Context of the Study

The purpose of this study was to reveal how specific technology devices and apps were being used by elementary children to support reading in the home. Using an explanatory research design (Creswell, 2013), this study began with a parent survey to inquire about children's technology access and use for reading in the home. Survey responses ($n = 120$) were limited to one parent per household, and each parent reported on only their youngest elementary aged-child. Following survey analysis, a sample of

parents ($n = 13$) who were also survey respondents were individually interviewed to inquire in-depth about their child's technology use in the home.

Parent participants were from a sample of 46 kindergarten through fifth -grade elementary classrooms at two schools located in the southeastern region of the United States. School one contained a 35% minority school representation compared to 52% at school two (minority was defined in each School Improvement Plan as other than Caucasian). School one, a charter school, operated under the public-school district and was a choice school for parents to send their children. School two, a developmental research school associated with a flagship university with demographics representative of the state where the school is located, required parents apply to enroll their child; acceptance was based on gender, race/ethnic origin, family income, exceptional student status, and academic achievement.

Participant recruitment materials included emails and a printed flyer. The researcher sent an email requesting each of the 46 teachers send the email to parents to have parents complete the survey about their child's technology use. Teachers were also provided with a paper-based flyer in the shape and design of an iPad, which contained the same survey link for parents to complete electronically in Qualtrics. At the end of the survey, 37 parents at school one and 25 parents at school two volunteered to participate in an individual interview. Interview participants were carefully selected between the two schools to equally represent number of parents, equal child gender representation, mirror the study's demographics, and choose parents with varying intentions to adopt portable technology.

Survey (Table 1) respondents were primarily female (81%), Caucasian (69%), and had obtained a Bachelors' degree or higher (69%). Socio-economic status was measured by the indicator free or reduced lunch (19%). Children represented by the parents were primarily boys (57%) and between grades K-2 (65%). To identify technology devices and applications children use in the home to support reading development, survey responses were analyzed descriptively (means, frequencies, standard deviations).

Of the 13 parent interview participants (Table 2), seven were parents of children in school one and six were from school two. Parents were primarily female (92%), Caucasian (62%), between 35 and 44 years-old (46%), nearly half received free/reduced lunch (38%), and held a bachelor's degree or higher (69%). Regarding the children, parents reported on their son (54%) and their child was between kindergarten and second-grade (54%).

Survey Development and Analysis

To determine which technology devices and apps to include on the survey, the researcher inquired with 10 parents of elementary children and 10 elementary teachers to identify apps being used. The researcher also conducted a thorough web search to locate available devices and most frequently downloaded reading apps, visiting sites such as Common Sense Media and Reading Rockets.

The survey began by asking if parents permitted their child to use portable technology to learn to read in the home (yes/no). If they responded no, parents provided an open-ended response to explain their reasoning. If parents responded yes, they were asked about their child's technology ownership and use. One survey question asked parents to select all the technology devices children used in the home to support reading development, while another asked the parent to select all the technology apps their child used in the home to support reading development. For each of these questions, optional response items were provided so parents had an opportunity to list all devices and apps used by their child. Parents also responded to demographic questions about themselves and their child. A final, optional, open-ended item allowed parents to share any other information about their child using portable technology in the home.

To improve face and content validity, six cognitive interviews (a process where survey questions are read aloud) were conducted with parents from a similar context to those included in this study's sample (Desimone & Le Floch, (2004). Five expert reviewers in educational technology, reading, and methodology also reviewed each item for its clarity and comprehensiveness. Cognitive interviews and

Table 1. Survey demographics of parents and their children (*n* = 120)

Demographics	Percentage
Parent Gender	
Female	81.00%
Child Gender	
Female	42.59%
Child Grade	
K	18.33%
1	31.67%
2	15%
3	15.83%
4	5.83%
5	13.33%
First-born child	34.26%
Race	
African-American	10.19%
Asian/Pacific Islander	3.70%
Caucasian/Non-Hispanic	68.52%
Hispanic	12.96%
Multi-ethnic	4.63%
Age Range	
25-34	13.89%
35-44	64.81%
45-54	19.44%
65+	1.85%
Education	
High school diploma/GED	3.70%
Some college	15.74%
Associates	12.96%
Bachelor's	29.63%
Some graduate work	7.41%
Master's	22.22%
Doctoral	7.41%
Other	0.93%
SES	
Free/reduced lunch	19.44%
Technology Adoption Decision-Maker	
Primary	37.00%
Joint	62.96%

Table 2. Interview demographics of parents and their children (*n* = 13)

Demographics	Percentage
Female	92.31%
Child Gender	
Female	46.15%
Child Grade	
K	15.38%
1	38.46%
3	23.08%
4	15.38%
5	7.70%
First-born child	30.77%
Race	
African-American	15.38%
Caucasian/Non-Hispanic	61.54%
Hispanic	23.08%
Age Range	
25-34	38.46%
35-44	46.15%
45-54	15.38%
Education	
Some college	15.38%
Associates	15.38%
Bachelor's	38.46%
Some graduate work	15.38%
Master's	15.38%
SES	
Free/reduced lunch	38.46%
Technology Adoption Decision-Maker	
Primary	53.85%
Joint	46.15%

expert review resulted in retaining questions of pertinence to the purpose of the study, re-wording questions to minimize confusion, and maintaining consistency in the use of language used among the questions. Survey data were analyzed to obtain descriptive statistics: frequencies, means, and standard deviations.

Interview Protocol Development and Analysis

Following the survey, 13 individual parent interviews were held with parents who were also survey respondents. While the surveys provided data on which technology apps and devices children were using in the home, the intention of the interviews were to gather an in-depth examination of parent perceptions regarding their child's portable technology use in the home. For example, the individual

interviews allowed the researcher to ask parents how they believed their child felt about using certain devices and apps for reading and how the child's usage differed from one device to another.

To develop intentional interview questions that informed the items on the survey, individual interview protocols were designed in accordance with Patton's (1990) semi-structured interview protocol. Because questions were intended to reveal data about children's use of technology devices and apps to support reading development in the home, the interview began by asking parents how they helped their child read in the home. Other questions inquired about how the child preferred to read in the home, with inquiries about which devices and apps the child favored to support their reading development.

Due to the explanatory research design, interview data was analyzed using a deductive approach to thematic analysis (Braun & Clarke, 2006). This data analysis approach identifies, analyzes, and reports patterns within the data, interpreting specific aspects of the research focus. Six phases of thematic analysis were followed in a recursive manner: become familiar with the data; generate initial codes; search for themes; review themes; define and name themes; produce the report. Following transcription of each interview, the entire dataset was read without making any markings to help comprehend the data presented by each interview participant. Then, the dataset was searched for patterns of meaning specific to children's use of technology devices and apps. The following question guided the acknowledgement of patterns within this deductive thematic analysis approach: "What is the overall story the different themes reveal about the topic?" (Braun & Clarke, 2006, p. 24). Adherence to this process helped determine technology devices and apps used by children in the home to support reading development. To obtain a member-check, one other educational researcher followed the same guidelines of Braun and Clarke's (2006) analysis to read through interview data, where 90% agreement was reached.

RESULTS

Results from this study are organized according to the technology devices children use for reading and the technology apps children use for reading. Data is first presented from the parent survey, including parent responses to the open-ended survey-item, "Please share more about how your child uses portable technology applications to learn to read," which received a response from about one-fourth of parent respondents. Then, data from the individual parent interviews are provided.

Technology Devices Children Use for Reading

Prior to requesting data on the devices and apps children use to support reading in the home, parents were asked whether they permitted their child to use technology to support reading in the home. Of the 120 survey responses, 119 parents (99%) reported their child used portable technology to support reading in the home. iPad was the most used device (63%), followed by laptop (50%), iPhone (26%), Android smartphone (23%), and Amazon Kindle (22%, Table 3).

Parents provided additional information on the survey about their child's use of technology devices to read in the home. With regard to devices, "he uses a tablet almost daily for 20 mins to complete home reading assignments," "she downloads free books from the public library and reads them on her iPad," "he also uses an iPad at school in his class," and "my kids both use Kindle with the whispersync capabilities in Audible."

In response to using devices for reading, parents provided examples of how the devices helped their child with their exceptional learning differences. For one parent, "he uses his tablet at times for moments when he has his meltdowns. He's Autistic." Another mom who limits technology use said, "my son has used technology in the past to assist with ONLY his double vision which we seen a specialist to assist with the Convergence insufficiency. In which was technology was only 10% of his daily activities for therapy." Others mentioned they were following the school's request because "my children only use the laptop for Istation because that is one of their homework assignments." Similarly,

Table 3. Portable technology devices (to support reading development)

Device	Total Response (<i>n</i> = 120)
iPad	63%
Laptop	50%
iPhone	26%
Android smartphone	23%
Amazon Kindle	22%
Galaxy Tab	16%
LeapPad	12%
iPod	9%
Portable DVD Player	4%
Google Chrome	2%
Netbook	2%
eReader (other than Kindle)	1%

a parent noted, “it’s imperative for my son to utilize a tablet for education. My only complaint is that our typing alphabet isn’t the same as handwriting which can confuse him at times.”

Last, parents spoke about their role in permitting their child to use technology devices. One parent perceived technology as a support but was cautious with how their child used the technology. For example, “I think kids’ first introduction to reading should be books and portable technology should be use as an extra resource but not the main one.” Another parent welcomed technology, “I encourage and welcome the use of technology towards the enhancement of my child’s education.” A third expanded on how technology should be included, indicating that “interactivity while learning to read is the very beneficial which is why I feel learning software is so important. As long as we understand portable tech is simply a great tool that enhances interest and motivation to learn.” This parent added, “If a teacher/guardian/parent is not present to offer support and encouragement, portable tech apps are the next best thing.” Meanwhile, one parent who did not advocate for their child using technology for learning, indicated:

It is my job to raise and teach my children not a computers job. A good book and quality one on one time is what kids are missing these days. I think classroom time in school should be like this as well, especially in elementary school.

Parent interview data provides depth to how parents perceive and permit their child to use technology devices. Technology was perceived as a “necessity,” because “everything is based on technology, and now, everything is online, so, it’s kinda like you do have to adapt.” Shared by one dad, his third-grade daughter “uses phones, tablets, all the time, for reading, entertainment, education, everything.”

Although 11 out of 13 parents preferred their child supports their reading development with print texts in the home, every parent who was interviewed permitted their child to read with portable technology devices. Out of the 13 parents, eight children were given their own Kindle eReader. One mother shared, “we just got her a Kindle in October, so she’s just starting to get that library going.” Beneficial features, such as immediate feedback, affirmed the use of technology to help her third-grade daughter read:

I love the digital text in the sense that it's interactive. So not only do they get to read, but they also can go ahead and just evaluate their comprehension, and everything right there immediately, versus with just an actual, physical text, you have to go back to the teacher.

One father shared how his third-grade daughter used portable technology to connect school initiated reading activities to reading in the home. For example, “with the readathon, she’s really understanding the interaction that she can do with the iPad as opposed to reading a book...she’s commenting on her friends and answering questions about the part of the book she’s reading.”

Other parents raved about the usefulness of reading with the LeapPad device. One mother bought her son a LeapPad Explorer when he was about three and a half, and by kindergarten he used LeapPad to practice reading on their daily two-hour commute to school. She explained he “really likes it when it reads it to him word by word and highlights the words. He doesn’t like it when it completely just reads the whole story.” Another parent of a first-grade boy provided details of how her son used the LeapPad for reading:

it's got little books on there that it'll read them completely, tell 'em to highlight the word as it reads or it'll allow them to read the word and it'll kind of just underline each letter as they're supposed to be saying it and then they get to explore the page and turn the pages and move on their own.

Additional reading development opportunities on the LeapPad were shared by a third parent:

he's got like a Spanish little word blocks game that he plays and they do the letters and numbers. Other than that, he plays these games where they teach him the math and the phonics and stuff like that and Paw Patrol, and they play games where they learn the different sounds, like science stuff. He's got a human body one that he likes and a cooking one...there's one little music app on there.

A concern when deciding to purchase technology was children’s safe use of media, yet only two parents commented on how to address this concern. One dad allowed his daughter to access apps using his Apple ID, but with limitations. He revealed, “she doesn’t know my password so she can’t add apps unless I approve.” The Kindle eReader was particularly favored by parents for children’s safe media-use because “what I discovered is that the best parental controls were on the Kindle because I can control content from my computer at home.” The Kindle was referred to as convenient, as one mom stated, “Kindle helps with getting access to different books that we can’t get somewhere else... there were different learning applications that she could do on a tablet.”

Last, parents shared their perceptions about the positive impact technology devices could have if used in educational contexts. Regarding the cost, “textbooks are ridiculously expensive and they’re going to be on tablets. They already are for college kids. I think that it’s not quite there for elementary kids, but it’s coming. And I honestly think that it’s a great idea.” Another parent perceived technology as a time-saving tool to aid academic development in the home:

we don't have time as a society. Two working parents don't have time to sit down and do homework for three hours a day. If the computer can help with an hour of that three hours being academics, I think that in the long run it will make a difference.

Technology Apps Children Use for Reading

The second part of this study’s research question inquired about portable technology apps K-5 elementary children used to support their reading development in the home. Overall, responses show children equally accessed both passive and interactive reading apps. According to survey responses, 42% of children read with Istation, 41% read on Youtube, 36% read on PBS Kids, 30% used Spelling

City, 28% were learning to read with ABC Mouse, and 25% read on the Kindle app. The complete list of devices is viewable in Table 4.

Parents provided additional information on the survey about their child's use of technology apps to read in the home. Data is organized by parents' mentions of vague versus specific identification of apps, followed by parents' expressed concerns. One parent described how their "child began using portable technology to explore letters and letter sounds as a Pre-K student and now uses the devices for exploration and differentiated experiences." A parent indicated that apps "help with reading and phonics," while other children "use the applications for reading, math, and other things," "required homework assignments," and downloading "the educational apps her teacher has suggested." A parent also shared the positive impact of apps, because "I think it's (apps) helped jump start reading for my 1st grader."

Parents also identified specific apps that their children were using. As mentioned previously, one parent permits their child to use Kindle with capabilities in Audible, expanding that the app "highlights the words as the book reads to them. They also use just Audible to listen to audio books rather than reading along." Two other parents shared how their children read electronic books from the library. Four other parents shared unique ways their children are using technology. For example, "my child used Starfall when she was in the 2nd grade to enhance her reading skills." Another watches "PBS & Disney Junior on android phone and uses LeapPad apps for letters, numbers, phonics and learning to read." Reading with technology is also an activity that "she can do in car during commute," accessing

Table 4. Portable technology applications (to support reading development)

App	Total Response (<i>n</i> = 120)
Istation	42%
YouTube	41%
PBS Kids	36%
Spelling City	30%
ABCMouse	28%
Kindle	25%
Accelerated Reader	23%
Starfall	22%
LeapFrog Learning to Read	12%
Sight Words	10%
Read Me Stories	8%
Endless Reader	7%
Hooked on Phonics	6%
Study Island	6%
Endless Alphabet	5%
ScootPad	5%
SuperWHY! The Power to Read	5%
Little Writer	4%
Letter School	4%
Reading Comprehension	3%
Phonics	2%

“Kindle books” on the Kindle app, and the “read to me app.” The last parent shared how their child “reads directions on how to follow gaming.”

Remaining data from parent responses to the open-ended survey item highlight parent concerns. One parent concern addressed how “portable technology applications are great, however, it seems that any application, game, etc. can cause a child to be overstimulated in a manner that does not happen when reading a hard copy book.” Another parent seemed disappointed their child was not using technology, because the child “doesn’t use it to learn to read as much as I like. Would help if I knew of more applications that could be loaded on to her device.” The last concern alludes to the need for improved quality among technology apps:

Unfortunately, the majority of learning software I’ve seen used in public schools are poorly developed and use old technology. These learning applications are poorly developed and use sub-standard graphics. In contrast, entertainment uses top-of-the-line graphics and code which is what kids become accustomed to.

Parent interview data provides additional detail about the specific apps children use to support reading skills. Parents were willing to discuss how their child used technology apps, but sometimes were unable to say exactly which apps were being accessed by their child at a given time. Less awareness of children’s app usage could be because, as one parent mentioned, “kids are so tech savvy now.”

Probing further into children’s use of reading apps during the interviews revealed the use of specific apps were influenced by the child’s interests and requests from the child’s school. Two parents with children in kindergarten and one parent of a first-grade child affirmed the ABCMouse app because of its motivating features. One mom’s kindergarten girl loved how at the end playing the game “it does give you all the, Woo-hoo! You did it. And then she comes to me, I got four tickets instead of three.” Other apps to help children develop reading skills preferred by one kindergarten and two first-grade boys was ABCya, while another kindergarten boy favored Starfall.

Parents also provided insight into their child’s routine use of Kindle and YouTube apps. One parent said his third-grade daughter “picks up her iPad mini or mommy’s or daddy’s iPad and she knows the Kindle app and goes right to it and finds it.” Without parent prompting, the daughter picks up her Kindle and chooses to read a “couple of chapters a night.” One mom helps her son develop his English language skills by using “YouTube a lot, and then I just put in the title of a book that I already might have in the shelf, and then somebody’s already narrating.”

In response to the classroom teacher’s request, six out of seven parents from the same school indicated their child used Istation for about two hours each week to practice reading in the home. One dad reflected how his daughter “loves Istation, so she’ll do an hour to two hours a week at home” to practice her reading skills. Another mom who appeared to be following the school’s request said, “we do what he’s actually supposed to be doing, MobyMax and Istation. He does about 10 minutes of those every day.” The parent who resisted her kindergarten boy using Istation admitted, “I should be having him do a little bit more, I think.” When asked about her perceptions of the iPad, she expressed her opinion, “If you’re on them too long, then your brain melts.”

DISCUSSION

This study provides a magnified view of children reading with portable technology, in support of national reports conducted since 2011 that have shown that nearly all young children today access and use technology in the home (Rideout & Katz, 2016). The goal of this study, to investigate children’s technology use on a local level, sought to better understand how children may be using technology devices to support their reading development. Children perceive the primary purpose of the iPad and iPhone is to provide entertainment (Eisen & Lillard, 2016). To contribute to Eisen and Lillard’s (2016)

findings, this study unveiled whether children use portable technology to support reading development in the home, and revealed specific strategies for children reading with portable technology.

Interestingly, 99% of parents in this study reported their elementary child used portable technology devices and apps to support learning to read in the home. This finding is a substantial increase since Rideout and colleagues' (2013) study, where they reported only 30% of children used handheld technologies for reading. In contrast to Eisen and Lillard's (2016) findings about technology perceptions, this study's high evidences of parents permitting their child to use educational technology in the home to support children's reading development indicates that portable technology may be a literacy tool worthy of additional research.

Addressing the call for research to unveil how children may be reading with portable technology (Burnett, 2009), findings from this study can inform teachers' instructional design for reading. This study provides insightful contributions and may inform appropriate digital reading strategies (Harrison & McTavish, 2016) to support children reading with portable technology in the home. In this study, children were motivated to read by incentive award features found within reading apps, children enjoyed the collaborative nature of blogging in response to their reading, while other parents used technology apps in creative ways to support their child's English language learning. For example, the YouTube app containing highlighted text features read aloud by a primary English speaker helped the child build fluency and language skills. This example was especially interesting because the mother and her child were learning English as a second language. This is one strategy that could be particularly useful to support English Language Learner's language development and reading skills in the classroom.

App use decisions were influenced by children's interests and by the requests of the school. The importance of providing parents with explicit strategies to help their child read is well supported in literacy research (Faires, Nichols, & Rickelman, 2000; Morrow & Young, 1996; Sénéchal & Young, 2008). Interview data from this study provides evidence that parents are generally willing to support their child's academic development in the home using portable technology, even though parents prefer their child read with print text. Parents' preference to their child reading print books in this study supports prior research (Korat & Or, 2010; Parish-Morris et al., 2013). However, parents in this study admitted they were relieved when their child's teacher requested the use of educational technology to complete homework, because this gave the parent time to accomplish other household tasks. The finding that parents were willing to permit their child to use portable technology as a learning tool in the home despite parents' preference toward learning with print books is a powerful indicator of the role of the teacher to influence and guide children's technological knowledge in home and school contexts. The influential role of the school is one that should not be underestimated, and teachers should carefully and deliberately (Grant, 2011) form a partnership (Hornby, 2011) to collaborate with parents and build on children's technological knowledge both in and outside of the classroom.

Despite parents' conflicting beliefs about children using portable technology, parents in this study also expressed angst toward the time required to locate appropriate apps. However, when the teacher recommended specific apps to parents, parents felt capable and knowledgeable about supporting their child's reading development with apps. Guided by the TPACK (Mishra & Koehler, 2006) framework, teachers can guide parents in making technology integration decisions that could encourage children's use of educational reading apps in the home.

Limitations

Data collection occurred at the micro level among two schools 100 miles apart in the southeastern United States, therefore this study is not necessarily generalizable to other populations. Although this limit in generalizability may exist, the close nature of the researcher's access to interview a portion of the parent survey sample contributed to rich and descriptive findings about children's technology device and app usage. Another potential limitation is social desirability bias, where parents may

have provided responses about their child's app usage in a more positive and educational manner to improve perceptions of themselves as a parent.

Implications

The results of this study demonstrate children are increasingly using technology to support their reading development in the home. This study's findings highlight the need for teachers to build on children's existing technological knowledge by guiding parents in their children's use of portable technology devices and apps in the home. Second, results demonstrate the need for teachers to partner with parents to develop and support media-safe technology use.

Make Connections Between Children's Home and School Technology Use

To facilitate technology integration, the 2016 National Educational Technology Plan can act as a starting point to bridge children's technological knowledge between home and school environments. Efforts of teachers integrating technology with their students should include criteria and methods for technology acceptance and use strategies within the child's home. If technology integration efforts are expected to be adopted school-wide or district-wide, parents and teachers should consider collaborating systematically and purposefully to use technology in creative and innovative ways.

Of relevance to this study and future research is the recent call for research to provide teachers with specific digital reading strategies (Harrison & McTavish, 2016). To reduce confusion regarding the purpose of technology devices (Eisen & Lillard, 2016), teachers should help parents and their children use educational technologies. This could develop relationships that foster a reciprocal understanding of how supporting reading with portable technology in the home instills ideas and practices that directly affects the way children's reading develops in the classroom.

A practical and highly informative strategy to scaffold children's technological knowledge and help teachers make informed decisions about technology integration decisions is to send home a parent survey to inquire about children's home use of technology. As part of the survey, the teacher should request the technology devices and apps children use in the home. Distributing this survey can equip teachers with technology integration strategies unique to each student's personal experiences. Establishing and sharing technology use strategies with parents are foundational to successful technology integration, but safe media use is a critical element of continued technology use.

Media-Safe Education to Facilitate Safe Technology Use

The use of portable technology can be a powerful tool to support children's reading development in the home, yet teachers and parents must foster a technological awareness that is supportive and knowledgeable toward children's safe use of media. Results from this research command attention because schools require students engage in literacy-building activities using portable technology devices in the home. Evidenced in this study, children participated in a digital read-a-thon centered around a collaborative classroom blog. With school's requiring children to use technology as a tool to complete homework, schools need to also provide teachers and parents professional development workshops focused on children's media-safe technology use. These workshops may include sessions that depict how children can safely navigate the Internet, protected by safe searching and monitoring of app use. Schools may consider including educational media-safe resources from organizations such as Common Sense Media, Reading Rockets, and ReadWriteThink to help parents support their children's educational technology use in the home.

CONCLUSION

This research, representative of 120 homes of children from 46 classrooms between two elementary schools, acts as a starting point for understanding how children are increasing consumers of educational technology in the home. The finding that 99% of children in this study supported reading

with technology is important for teachers, particularly so they can foster partnerships with parents to improve learning with digital tools in the home. Requests by the school to support reading in the home with technology and parents' compliance provides early evidence that young children are being primed to become more experienced educational technology users. Children's technology exposure in the home and school requests to use technology within informal spaces demonstrates the importance of parents and educators partnering to expand on children's technological knowledge both in and outside of the classroom.

REFERENCES

- Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology, 100*(2), 235–251. doi:10.1037/0022-0663.100.2.235
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. doi:10.1191/1478088706qp063oa
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1994). Ecological models of human development. In M. Gauvain & M. Cole (Eds.), *Readings on the development of children* (2nd ed., pp. 37–43). New York, NY: W.H. Freeman.
- Burnett, C. (2009). Research into literacy and technology in primary classrooms: An exploration of understandings generated by recent studies. *Journal of Research in Reading, 32*(1), 22–37. doi:10.1111/j.1467-9817.2008.01379.x
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- Desimone, L. M., & Le Floch, K. C. (2004). Are we asking the right questions? Using cognitive interviews to improve surveys in education research. *Educational Evaluation and Policy Analysis, 26*(1), 1–22. doi:10.3102/01623737026001001
- Eisen, S., & Lillard, A. S. (2016). Young children's thinking about touchscreens versus other media in the US. *Journal of Children and Media*. doi:10.1080/17482798.2016.1254095
- Faires, J., Nichols, W. D., & Rickelman, R. J. (2000). Effects of parental involvement in developing competent readers in first grade. *Reading Psychology, 21*(3), 195–215. doi:10.1080/02702710050144340
- Grant, L. (2011). I'm a completely different person at home: Using digital technologies to connect learning between home and school. *Journal of Computer Assisted Learning, 27*(4), 292–302. doi:10.1111/j.1365-2729.2011.00433.x
- Hara, S. R., & Burke, D. J. (1998). Parent involvement: The key to improved student achievement. *School Community Journal, 8*(2), 9–19.
- Harrison, E., & McTavish, M. (2016). i'Babies: Infants' and toddlers' emergent language and literacy in a digital culture of iDevices. *Journal of Early Childhood Literacy, 17*(2), 1–26. doi:10.1177/1468798416653175
- Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in "educational" apps: Lessons from the science of learning. *Psychological Science in the Public Interest, 16*(1), 3–34. doi:10.1177/1529100615569721 PMID:25985468
- Hoover-Dempsey, K., & Sandler, H. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record, 97*(2), 310–331.
- Hornby, G. (2011). *Parental involvement in childhood education: Building effective school-family partnerships*. New York, NY: Springer Science & Business Media. doi:10.1007/978-1-4419-8379-4
- Hutchison, A., Beschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15–23. doi:10.1002/TRTR.01090
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development, 58*(2), 137–154. doi:10.1007/s11423-009-9132-y
- Korat, O., & Or, T. (2010). How new technology influences parent—child interaction: The case of e-book reading. *First Language, 30*(2), 139–154. doi:10.1177/0142723709359242
- Kucirkova, N., Messer, D., Sheehy, K., & Flewitt, R. (2013). Sharing personalised stories on iPads: A close look at one parent—child interaction. *Literacy, 47*(3), 115–122. doi:10.1111/lit.12003
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. doi:10.1111/j.1467-9620.2006.00684.x

- Morris, V., Taylor, S., Knight, J., & Wasson, R. (1996). Preparing teachers to reach out to families and communities. *Action in Teacher Education*, 18(1), 10–22. doi:10.1080/01626620.1996.10462818
- Morrow, L. M., & Young, J. (1996). Parent, teacher, and child participation in a collaborative family literacy program: The effects on attitude, motivation, and literacy achievement. *Reading Research Report*, 64, 1–21.
- Murphy, K., DePasquale, R., & McNamara, E. (2003). Meaningful connections: Using technology in primary classrooms. *Young Children*, 58(6), 12–18.
- Nation's Report Card. (2015). Percentage of fourth-grade students at or above proficient not significantly different compared to 2013. Retrieved from https://www.nationsreportcard.gov/reading_math_2015/#reading/acl?grade=4
- Neumann, M. M. (2016). Young children's use of touch screen tablets for writing and reading at home: Relationships with emergent literacy. *Computers & Education*, 97, 61–68. doi:10.1016/j.compedu.2016.02.013
- Neumann, M. M., & Neumann, D. L. (2017). The use of touch-screen tablets at home and pre-school to foster emergent literacy. *Journal of Early Childhood Literacy*, 17(2), 203–220. doi:10.1177/1468798415619773
- Parish-Morris, J., Mahajan, N., Hirsh-Pasek, K., Golinkoff, R. M., & Collins, M. F. (2013). Once upon a time: Parent-child dialogue and storybook reading in the electronic era. *Mind, Brain and Education: the Official Journal of the International Mind, Brain, and Education Society*, 7(3), 200–211. doi:10.1111/mbe.12028
- Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Rauh, V. A., Parker, F. L., Garfinkel, R. S., Perry, J., & Andrews, H. F. (2003). Biological, social, and community influences on third-grade reading levels of minority head start children: A multilevel approach. *Journal of Community Psychology*, 31(3), 255–278. doi:10.1002/jcop.10049
- Rideout, V. (2014). *Learning at home: Families educational media use in America*. New York, NY: The Joan Ganz Cooney Center.
- Rideout, V., & Katz, V. S. (2016). *Opportunity for all? Technology and learning in lower-income families*. New York, NY: The Joan Ganz Cooney Center.
- Rideout, V., Saphir, M., Pai, S., Rudd, A., & Pritchett, J. (2013). *Zero to eight: Children's media use in America in 2013*. Common Sense Media.
- Sénéchal, M., & Young, L. (2008). The effect of family literacy interventions on children's acquisition of reading from kindergarten to grade 3: A meta-analytic review. *Review of Educational Research*, 78(4), 880–907. doi:10.3102/0034654308320319
- Teo, T. (2009). Modelling technology acceptance in education: A study of pre-service teachers. *Computers & Education*, 52(2), 302–312. doi:10.1016/j.compedu.2008.08.006
- Toppel, K. (2014). Accelerating learning: Making the most of iPads in kindergarten. *IRA E-ssentials*. doi:10.1598/e-ssentials.8047
- U.S. Department of Education Office of Educational Technology. (2016). Advancing educational technology in teacher preparation: Policy brief. Retrieved from <http://tech.ed.gov/files/2016/12/Ed-Tech-in-Teacher-Preparation-Brief.pdf>
- Vannatta, R. A., & Nancy, F. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education*, 36(3), 253–271. doi:10.1080/15391523.2004.10782415

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