

2012 Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment

A REPORT TO THE
CPB-PBS *READY TO LEARN INITIATIVE*



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CONTENTS

INTRODUCTION	1
RESEARCH APPROACH	2
FINDINGS	12
FUTURE CONSIDERATIONS	34
REFERENCES	37
APPENDICES	A-1

INTRODUCTION

The 2012 Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment (Home Study) is an important part of the multiyear summative evaluation by Education Development Center, Inc. (EDC), and SRI International (SRI) of the CPB-PBS *Ready To Learn* Initiative. The evaluation is focused on documenting and, whenever possible, measuring the impact of transmedia mathematics and literacy resources on learning for children from low-income families in preschool, community, or home settings. The Home Study is an extension and expansion on the *Ready To Learn* Parents and Caregivers Study (Parent Study), which explored the use of technology and media at home through surveys and focus groups.

The study responds to a need to deeply understand family patterns of media and technology use at home—a need recognized by the U.S. Department of Education, the Corporation for Public Broadcasting (CPB), PBS, and the summative evaluation research team. This Home Study extends the survey and focus group analyses produced in our Parent Study by analyzing first-hand information on the ways in which *Ready To Learn* families adopt, use, and report benefitting from technology and *PBS KIDS* Transmedia in their homes.

This work has been critical to the larger *Ready To Learn* for two reasons. First, empirical studies of how *Ready To Learn* families engage with media and technology resources in this unique environment can be a great help in informing design and development of PBS KIDS transmedia resources that support learning at home. Second, we will use these findings in deciding which data we collect from families and incorporate into our analyses during 2013 Prekindergarten Randomized Controlled Trial (PreK RCT)—a multisite evaluation of a transmedia-rich math curriculum supplement in early childhood classrooms.

RESEARCH APPROACH

The Home Study provided an opportunity to explore how parents and families make home use of technology and transmedia—television programs, online interactive games on a computer, and online interactive games and applications (apps) on the iPad. The Home Study also made it possible for us to gather information about how children 2- to 8-years-old and their families’ perceive and make use of *PBS KIDS* resources (and other media and transmedia resources) for learning at home.

The Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources (Education Development Center & SRI International, 2012) provided a broad view of families’ use of technology and media at home and parents’ attitudes and beliefs about technology and learning. The Home Study has allowed EDC and SRI to expand on these findings and explore in depth, with a small number of families, actual transmedia and technology use at home for early math and literacy learning. We had two goals in mind when conducting this work. The first, theoretical, was to provide new, grounded knowledge about media and technology in the home environments of low-income families. The second was to identify factors in the home environment (like playing online games together, or viewing PBS KIDS videos) that we could gather information about and include in our analysis during the 2013 Preschool Randomized control trial (Preschool RCT).

The current work extends the work of our own [Ready To Learn Context Studies](#) (Education Development Center & SRI International, 2011) and Parent Study (Education Development Center & SRI International, 2012), but also builds upon the large-scale survey efforts that attempted to characterize technology and media adoption and use patterns for low-income and minority communities in the United States. In particular, these interview and observational data provide a complement to the work of Common Sense Media (Levine, Steyer, & Henry, 2008; Rideout, Saphir, & Bozdech, 2011) and the Pew Research Foundation (Wellman, Smith, Wells, & Kennedym, 2008). In electing to work through observations and interviews in homes, we also

are building on the work of researchers who have conducted in-depth, ethnographic field work that focused on instances of video game play and television viewing in family homes (Stevens, Satwicz, & McCarthy, 2008; Dugan, Stevens, and Mehus, 2010).

Because our work combines interview techniques with a focus on low-income families, the design and conduct of the CPB-PBS *Ready To Learn* Home study is most closely related to two studies conducted by SRI researchers on behalf of One Economy Corporation. The first, a study of families participating in the Digital Communities project (Michalchik et al., 2006) described how participating families used low-cost computers, Internet access, and online content provided by the program, and the AT&T AccessAll Initiative (House et al., 2010) in which Habitat for Humanity families received similar technologies. This work used interviews and observations in families' houses to provide a rich, detailed picture of how families use, value, and understand media and technology, especially for learning and education.

RESEARCH QUESTIONS

We organized the Home study around five research questions. The first three questions focus on the use of media, transmedia, and technology by families at home. The fourth question examines how families make use of new resources (iPad and laptop computer) that are introduced to the home.

1. How are *Ready To Learn* families using media and transmedia resources to support play and learning at home?
2. What motivates *Ready To Learn* families to use media and transmedia resources at home?
3. Which of these activities might be supportive of early math and literacy learning?
4. In what ways do families use new transmedia resources that are introduced into the home?

Our fifth question aimed to identify practices or beliefs of families regarding transmedia and technology use in the home that might relate to classroom learning we will study in the 2013 *Ready To Learn* Preschool Randomized Controlled Trial Study (Preschool RCT). The question we strove to answer was as follows:

5. What factors would be advantageous for EDC/SRI to measure and include in quantitative modeling during the Y3 2012 Preschool RCT?

SAMPLE SELECTION

A total of 14 families participated in the Home Study (7 on the east coast, 7 on the west coast). We used strategic sampling methods to maximize participation and diversity within in our sample. For the east coast, participating families had children enrolled in classrooms enacting the PBS KIDS transmedia-rich math curriculum supplement of the Preschool pilot. Because the Preschool pilot began and ended earlier on the east coast, it was possible to engage families from these centers prior to the end of school. On the west coast, because the Preschool pilot began later, it was not possible to begin the Home Study and related experiences with Preschool pilot families without comprising the Preschool pilot (by providing a subset of families with additional experiences). Thus, on the west coast families were drawn from a center with similar demographics to centers participating in the Preschool pilot study.

Some demographics on the 14 participating families are below. Of note, prior to enrolling in the Home Study, technology use was common to all participating families on the east coast but not all families on the west coast.

On the east coast, demographics were as follows:

- Families had children enrolled at three different centers enacting the PBS KIDS transmedia-rich math curriculum supplement.
- Two families out of seven had other children ages 2 to 8-years in their home (in addition to the child enrolled in the participating PreK center).
- All seven families had Internet access at home, and six out of seven had wireless networks in place prior to the start of the study.
- All seven families had computers in their homes prior to participating in the study.
- Six families out of seven said they used technology every day prior to the study.
- All seven families participated in the interviews in English.

On the west coast, demographics were as follows:

- Four families out of seven had other children ages 2- to 8- years in their home (in addition to the child enrolled in the participating PK center).
- Three families had Internet access at home, and only one had an existing wireless network.
- Three families had computers in their homes prior to participating in the study.
- Four families out of seven said they used technology every day prior to the study.
- Two families participated in the interviews in English; five families participated in Spanish.

As referenced above, two slightly different recruiting methods were used on the east and west coasts to ensure the most representative sample of parents for the home study. Eligibility requirements for participation on each coast are described below.

On the east coast, parents were eligible to participate in the home study if they met the following criteria:

- They had a child enrolled in a classroom enacting the PBS KIDS transmedia-rich math curriculum supplement.
- They completed a parent survey and indicated they were interested in participating in additional research.
- They were proficient in conversational English.
- They did NOT participate in a focus group (as part of the Parent Survey and Focus Group Study).
- They were available to attend a parent kick-off informational event or another one-on-one meeting to be introduced to the study.

On the west coast, parents were eligible to participate in the Home Study if they met the following criteria:

- They had a child enrolled in one of two classrooms at the center selected for Home Study participation.
- They returned a form stating they were interested in participating in the home study.
- They were proficient in conversational English or Spanish.
- They were available to attend a parent kick-off informational event or another one-on-one meeting to be introduced to the study.

On both coasts we attempted to enroll families that represented a range of technology use and comfort. On the east coast, researchers called eligible families enrolled in the study on a rolling basis until seven families agreed to participate. On the west coast, eligible families were stratified based on language(s) spoken in the home, whether the family had a home computer, and whether the family had home Internet access. To ensure fairness, we then used a lottery system to rank families, then called them, in order, until seven families agreed to participate.

Thirteen of the 14 families enrolled completed the 8-week experience of the home study. One family on the east coast completed only 5 weeks of the study before participating in their final interview and ending their participation in the study.

RESEARCH METHODS

Knowing we would have a variety of families enrolled in our study, we wanted to provide all participants the best chance to feel comfortable using technology and PBS KIDS transmedia resources. Toward these ends, we recommended an 8-week set of experiences for families that we hoped would encourage them to explore a broad range of PBS KIDS transmedia on multiple platforms. Experiences included the necessary technology, Internet access where needed, to fully participate in the designed experience as well as an introduction to the study and technology, two in-home interviews, checklists, and telephone check-ins (See [Appendices](#) for full versions of these materials). Table 1 describes the timing and activities of the study.

We provided recruited families with a 3-hour parent kick-off informational event prior to the start of the study. During this event, we introduced the relevant research staff, described the study, and provided an orientation to the technology and the PBS KIDS transmedia.

During the parent kick-off informational event parents received the following:

- 1 folder of paper information
 - A checklist of activities and PBS KIDS transmedia for children 2- to 6-years old to explore and reflect on during the eight weeks of the study
 - A list of suggested PBS KIDS transmedia for children older than 6-years-old
 - Contact information for research staff
- 1 laptop computer pre-loaded with links to the online games, activities and videos referenced on the checklist
 - An external mouse
- 1 iPad
- \$40 in iTunes credit
 - To purchase the apps referenced on the checklist
 - To purchase additional educational apps

Table 1: Home Study Research Activities by Week

Research Activity	Duration	Timing
Parent kick-off informational event	1 week	Week 1
Receive technology (including Internet/wireless Internet access)	1 week	Week 1
Complete Weekly Checklist	8 weeks	Week 1–Week 8
Telephone Check-ins	8 weeks	Week 1–Week 8
Home Interview #1	2 weeks	Week 1–Week 2
Home Interview #2	4 weeks	Week 6–Week 9
Remove one piece of technology (and any installed Internet access)	2 weeks	Week 8–Week 9

During the kick-off event, we reviewed the goals of the study and what was being asked of parents and families. We also introduced parents to the technology and provided time for parents to try out the laptop and iPad. We assisted parents in redeeming the iTunes gift card and downloading the apps referenced on the checklist. During the kick-off event, we also scheduled our first home interviews with families, and for families who needed Internet access or wireless routers, we scheduled time to install the necessary devices so they would have seamless access to transmedia. Throughout the course of the study, we provided parents full technical support for both their devices (laptop and iPad) and their Internet access.

The majority of the information we report on below comes from the two in-person interviews that took place within 2 weeks of families receiving their technology and in their final weeks of participation in the study. These interviews were the principal modes of data collection for the Home Study; however, in order to support families in their use of the technology and the PBS KIDS transmedia, we collected additional data, by asking families to reflect on their technology and transmedia use via checklists, and through weekly telephone check-ins.

HOME INTERVIEWS

We visited families twice in their home during the course of the study and conducted semistructured interviews lasting between 1 hour and 1.5 hours in English and Spanish, based on family preference. Our aim was to provide families the opportunity to reflect on any and all of their experiences with technology and the PBS KIDS transmedia, especially for learning. The protocols for these interviews were based on those used in SRI’s AT&T AccessAll Initiative (House et al., 2010) but were significantly revised to align with research questions and the

resources we were offering families to tailor items specifically to their experiences in the study. Research staff reviewed draft interview protocols for clarity and relevance, using an iterative process to create final items best suited to our research questions and goals. (Final protocols are included in [Appendix A. Interview Protocol](#).) We trained all staff conducting interviews on the methods and goals of data collection for the home interviews.

We held the first home interview between two days and two weeks of families attending the parent kick-off informational event and receiving their technology. The second interview took place during weeks six through nine of the families' participation in the study. We encouraged all members of the family to participate and, during both interviews, we asked families to show us some things they were doing with the technology and answer some questions in a “show and tell” format. We hoped this method would help us to better understand how families were using the technology and transmedia resources.

Questions addressed during the first interview included the following:

- How were families using the new technologies and the PBS KIDS transmedia from the study?
- Did families use technology together, and, if so, what did that look like?
- What were some of the challenges families were facing with technology/use of technology for learning?
- Did families feel that children can learn/were learning from technology? How?
- What were some stories of what that learning looks like from parents

Questions addressed during the second interview included the following:

- How were families' experiences in the study different from or similar to their previous experiences? Has the study changed their thoughts or practices?
- What were the families most and least liked PBS KIDS games/apps/websites?
- How did the parents feel about use of technology in school—in particular, the PBS KIDS transmedia? What thoughts did parents have about a home-school connection with the PBS KIDS transmedia?
- What were the families' plans for future use of technology in general and the transmedia in particular?

We conducted all interviews on the east coast in English. On the west coast, we conducted interviews with two families in English and five in Spanish. During interviews parents were asked to reflect on the questions as they related to all children in their home aged 2- to 8-years-old. All home interviews were audio recorded and later transcribed. Parents received a \$75 bank gift card at the conclusion of each home interview to thank them for their participation in the research.

At the conclusion of the home study, families were allowed to keep one of the devices they received at the beginning of the study, either the laptop computer or the iPad, and returned the other device to the research team at the conclusion of the study. On the east coast, the one family that required wireless Internet access was allowed to keep the installed wireless router. On the west coast, we removed 3G wireless Internet access installed during the study and also allowed one family to keep a router installed for the project.

CHECKLISTS

We created a weekly checklist of activities and PBS KIDS transmedia for children and parents to engage with each of the 8 weeks of the study in order to create an experience that was structured enough for families to get involved with the RTL resources on PBS KIDS Lab but open enough for families to explore on their own. The first and eighth weeks of the study, we encouraged families to explore the various PBS websites in general and the PBS KIDS Lab website in particular. In weeks two through seven of the study, we suggested one online game, one iPad application, one video, and one hands-on activity for families loosely centered on an early childhood math or literacy topic—such as counting or letter identification. ([Appendix D. Weekly Activity Checklist](#) contains the specific properties suggested to families.) The two iPad apps or games marked with “***” indicate games that were in Beta form during the Home Study. Although we asked parents specifically for feedback on these two apps/games, few were able to play them, and those who did provided little feedback on them.

We asked parents and children to note how long they engaged with each activity or PBS KIDS transmedia resource and to provide brief feedback; for example, we asked whether a game was fun, interesting, confusing, boring, and/or educational. These questions sought to help parents remember their experiences during phone and in-person interviews. We encouraged parents to report on these experiences with all children in their home aged 2- to 8-years-old. We distributed checklists in paper form at the parent kick-off informational event and collected the checklists from families at the end of the study.

TELEPHONE CHECK-INS

Each week we called families via telephone to check in and see how families were doing with the technology and the PBS KIDS transmedia. We attempted to call families each of the eight weeks of the home study; we were successful in reaching families between three and seven times, reaching families an average of five times throughout the experience. These calls lasted between five and twenty-five minutes. During calls, researchers reminded parents to use the checklist provided at the parent kick-off informational event and provided any needed support for technical problems families were having. Additionally, families were asked to share any stories they had related to the PBS KIDS transmedia or the technology for all children aged 2- to 8-years-old in their home. Information gathered during these telephone conversations and any other contact we had with families, for instance when parents called us for information or assistance, were recorded in an Excel file.

LIMITATIONS

We devoted careful thought and considerable effort to the development of the research design and materials used in this study and believe that our rigorous and systematic approach to working with families has produced findings that are useful to a range of audiences; however, there are several limitations of the work that prevent us from generalizing our findings to a broader population of families, including other families living in low-income homes.

In particular, our sample was small, consisting of just 14 families across both the east and west coasts. Although these families represented a range of technology and media use, their small number prevented us from identifying consistent trends or patterns across large groups of respondents. Additionally, we had only limited interactions with families centered around two 1-hour interviews with researchers. These interviews provided rich information or snapshots of families' technology and media use, but did not speak to broader use or changes in use over an extended period of time.

Although these interviews took place in the home and followed a semistructured protocol allowing families to discuss experiences relevant to them during the study, they required parents to think retrospectively about their experiences, sometimes weeks after they occurred. These interviews relied on self-reported information from families and children on their use of and experiences with the PBS KIDS transmedia and technology during the home study. Moreover, the separation in time between the interviews and the introduction to the media and technology might have obscured families' initial reactions (including excitement and/ or confusion) and, as a result, information about the "novelty effect" of the laptops and iPads are not captured in the

study's findings. Similarly, because we lack browsing history and application download history data, we are unable to precisely quantify families' reported use of the technology and PBS KIDS transmedia throughout the study.

In addition, because this study was focused on the use and incorporation of the PBS KIDS transmedia and technology, we did not collect any direct learning outcomes from children or families during the course of the study. Thus we do not have any data to explore the claims of learning or gains in skills reported on by families. Finally, only families who were English- or Spanish-proficient were included in the home study.

DATA ANALYSIS

Four researchers read the qualitative data from interviews with families. They developed a set of eight codes, with ten subcodes, based on the research questions and on initial reading of the data. We catalogued data according to these codes and then wrote analytic memos and findings based on the coded data. We also referred to interviewers' summaries of the phone calls they had with families throughout the study; these data were not coded but used to confirm findings and provide additional sources of stories about how families were using technology.

To analyze the checklists completed by families during the study, we hand-entered the data and computed descriptive statistics using spreadsheet software. While we received checklists back from all seven east coast families, we received only one checklist from west coast families. As noted, the west coast and east coast samples had some differences, and interviewers emphasized or deemphasized filling out the checklist based on what they felt would work best to keep families engaged in the study. For many of the west coast families, the checklist seemed to be more of a hindrance to participation than an encouragement. At least in some cases, we believe that parents' literacy levels made it difficult to complete the checklist. In other cases, parents' lack of familiarity with technology meant that they did not always know or understand what their children were doing with the study-provided laptop and iPad, making it difficult for them to complete the checklist. Interviewers focused on conducting verbal methods of maintaining study participation—weekly phone calls—and did not require that they complete checklists. Findings that are based on checklist data should be interpreted with understanding that these data do not represent the full sample.

Because the number of observations and interviews was limited, no analysis software was deemed necessary when conducting the analysis for this study.

FINDINGS

At the beginning of our study, we talked to families about what technology they owned and what parent and child patterns of use looked like. We found that while some families have lots of technology in the home, others have very little. Parents and children alike make a lot of use of technology. Watching television is still a primary use, but families also get online, spending time watching videos and playing games. While parents want their children to get something educational out of their technology time and believed in the power of technology for learning, there were few examples of ways they ensured educational use of media.

During the study, families were provided with a laptop and iPad, along with suggestions of PBS KIDS resources to explore during the study. Families made extensive use of the technology and generally had positive feedback on the PBS KIDS resources they used. Parents suggested that with the addition of the two devices, technology-use patterns shifted to some degree, with children spending less time watching television and more time playing online games or apps. Parents, too, had more time with technology, with more devices to go around, and in some cases, parents reported more interaction with their children around technology use. These interactions, though, remained largely superficial, suggesting that parents need more guidance in this area. Also challenging for parents is maintaining balance in children's technology use. They want to harness its power for learning, but they are concerned about overuse and have difficulty maintaining limits on its use during their busy days. Below, we describe what we observed and what families reported about how technology fits into their lives.

FAMILY TECHNOLOGY OWNERSHIP PRIOR TO THE STUDY

There was a wide variety of access to technology among the low-income families that participated in this study, from those who had little technology in the home and little previous exposure to technology, to those who owned a wide array of devices. Table 2 below shows the distribution of technology present in the home prior to the study.

Table 2. Technologies in the Home Prior to Study

Family	TV/ Cable	DVD	DVR	Desktop/ Laptop	Internet	Game Console	Smart Phone	Tablet/ eReader
1 West	●	●		●	●	●	●	
2 West	●	●					●	
3 West	●	●					●●	
4 West	●			●		●		
5 West	●	●					●●	
6 West	●	●		●	●	●		
7 West	●	●		●				
1 East	●	●●	●	●●	●	●●●●	●●	●●
2 East	●	●		●●	●		●	
3 East	●	●		●	●		●●	●●●
4 East	●	●	●	●●●●	●	●●	●●●●	●●
5 East	●	●	●	●	●	●	●	
6 East	●			●	●			
7 East	●	●		●	●		●●	●

Generally, families in the west-coast half of our sample had few recently released technology devices in the home and little experience using technology, while the east-coast sample tended to have a large variety of technology in the home and most members of the families were comfortable using the various devices they owned. The west-coast families typically had one old computer in the home, often inherited and shared with other family members, with whom they often shared living quarters. Only some had smart phones or gaming systems. By contrast, the east-coast families had computers, smart phones, gaming systems, and even tablets in some cases. Though home technologies varied considerably, several trends in media ownership emerged across the 14 families' experiences prior to the study.

- **Cable and broadcast television and DVD players dominated.** We found that that TVs, DVD players, and cable television were common equipment in these homes. All families had television sets, many had access to cable, and many owned a DVD player.
- **Laptops/desktop computers, most with some level of Internet connectivity, were relatively common; however, Internet connections were not typically high-speed nor were the computers often newer models.** The east-coast families were much more likely to own a computer, sometimes multiple computers, compared to the west-coast families who typically were using older model computers without Internet access, or with very slow connectivity.
- **The majority of families in this study owned at least one smart phone with a data plan.** In fact, two of the east-coast families owned multiple smart phones, and, in the case of many east-coast families, owned more than one. Some west-coast families that owned smart phones were not consistently taking advantage of the phone's Internet capabilities.
- **Technology that supports game play, including not only gaming consoles, systems, and handhelds, but also tablet computers and smart phone game apps, was present in many of the families' homes.** On the east coast, tablets were present in four homes, perhaps reflecting an emerging trend amongst low-income families.
- **In rare cases, family members used technology belonging to others.** For example, one parent mentioned using a mother-in-law's Nook and another described her child's occasional use of a neighbor's game-enabled phone.

USE OF TECHNOLOGY AND MEDIA PRIOR TO THE STUDY

We found strong common trends across families in their reported use of technology prior to the study. Table 3 shows household technology and media use habits among participating parents and children.

PARENTS

The parents who used technology regularly before participating in the study, used it for a wide variety of purposes: entertainment (e.g., watching videos/movies, listening to music), communication (often geographically distant relatives), finding information (e.g., recipes, translation services, maps), work, banking/bills, learning English, taking pictures, searching for jobs, and searching for homes for sale. The following trends emerged across the 14 families.

- **Parents used technology and media for entertainment.** Parents reported frequently using technology for entertainment purposes, such as watching TV programs, movies, or short-form videos on YouTube; listening to music; and playing games on various devices.
- **Communicating and socializing were strong drivers of technology and media use.** Parents used technologies to connect with others; for example, Skype for calls with relatives, Facebook, texting, e-mails, and phone calls were common across families' use of technology.
- **Information-seeking uses of technology were somewhat popular.** Families also used technology to obtain information. Study parents reported that they did some web browsing, though our data indicated that at least some parents in our study were not highly adept at navigating the Internet to acquire specific information, nor was news consumption a driver of their technology usage. One family described how it used YouTube to solve whatever problem came up: "It's better to see it. They'll teach you everything. We solve it on YouTube—fixing cars, doing magic tricks." The mother added that she looks on YouTube for makeup tutorials and cooking tips. This family was more of a stand-out than a representative among participating families.

Table 3. Snapshots of Family's Technology Prior to the Study

Family	Language	Equipment	Illustrative Usage
1 West Mom Dad Boy (5) Boy (5)	Spanish	TV, DVD, Computer, Internet, Game Console, Smart Phone	Mom recently took a computer class as part of an adult ESL program and learned to use Internet, e-mail, and word processing for the first time. Since then, she used Google/ Yahoo, found recipes, looked at maps, and used Word/ Excel. The children played on Wii, watched TV, and used the computer a little bit.
2 West Mom Dad Boy (5) Girl (1)	Spanish	TV, DVD, Smart Phone	Parents had not used the computer prior to this study; they mainly used the iPhone for web searches. Parents reported that the son learned his ABCs from playing games on the iPhone. He liked watching PBS KIDS, Discovery Kids, Nick Jr. (Diego), and <i>SpongeBob</i> .
3 West Mom Dad Girl (5) Boy (2)	Spanish	TV, DVD, Smart Phone	Dad used smart phone to listen to music and learn songs, occasionally used the Internet. Mom did not know how to get Internet on the phone. The family did not have cable, so they watched local channels. Children enjoyed watching <i>Dora</i> , <i>Curious George</i> , Univision, and Telemundo.
4 West Mom Dad Boy (23) Boy (4) Girl (4)	Spanish English	TV, Computer, Game Console	Adult-aged son used desktop computer to do college homework. Twins were not allowed to use the computer because parents feared they might break it, and the priority was for the older son to be able to use it for homework. Parents occasionally watched TV or older movies. Children liked watching <i>Tom & Jerry</i> , PBS, and YouTube videos.
5 West Mom Dad Girl (5) Girl (2) Infant	English	TV, DVD, Smart Phone	The parents decided to turn everything off and get outside more to lose weight. Sometimes they would download movies or use the grandmother's Nook. Children played games on their electronic kid's toys. Before turning off cable, they watched Disney, Nick, <i>iCarly</i> , and <i>SpongeBob</i> .
6 West Mom Dad Boy (5)	English Tagalog	TV, DVD, Computer, Internet, Game Console, Smart Phone	Parents used Yahoo Messenger and Skype to talk with family in the Philippines; they used YouTube to search for information. The family watched Filipino TV, which was helping the children learn Tagalog. Children also watched Disney, Nick Jr., and PBS KIDS.
7 West Mom Dad Boy (5) Boy (3)	Spanish	TV, DVD, Computer	Parents did not use the computer or any other technology in the home. They had not heard of PBS KIDS nor used the resources prior to the study. Children used the computer to play music that already had been downloaded; no Internet connection. Children liked watching <i>Tom & Jerry</i> , <i>Imagination Playground</i> , and <i>Animal Kingdom</i> on TV.

Table 3. Snapshots of Family’s Technology Prior to the Study (Continued)

Family	Language	Equipment	Illustrative Usage
1 East Mom Dad Boy (9) Girl (7) Girl (4) Boy (1)	Spanish English	TV, DVD, DVR, Computer, Internet, Game Console, Smart Phone, Tablet/ eReader	Parents used all their technology extensively. Mom learned to use the computer through her job at Time Warner; since then, she used it for her schoolwork. Both parents used the computer, phones, and other technology for web browsing, watching movies, playing games, doing e-mail, and paying bills. The oldest son used the MacBook for school research projects and reading. All children used their parents' gadgets for watching videos and playing games. Although the parents did not watch much TV, the children liked watching Nick, Nick Jr., and Cartoon Network.
2 East Mom Boy (9) Girl (4)	Spanish English	TV, DVD, Computer, Internet, Smart Phone	Children used the computer to play math games, listen to music, watch Netflix, and surf the Internet (Google). The older son used the desktop for school projects. Children enjoyed watching movies and cartoons on TV, especially on Disney, Nick Jr., and Disney Jr.; they also sometimes watched <i>Extreme Makeover</i> with their mom.
3 East Mom Dad Girl (4)	Spanish English	TV, DVD, Computer, Internet, Smart Phone, Tablet/ eReader	Parents both used the computer regularly for work and browsing the web; the mom also used it for schoolwork. The parents watched the news on TV. Sometimes the mom read to the daughter on the Nook.
4 East Mom Dad Boy (4)	Spanish English	TV, DVD, DVR, Computer, Internet, Game Console, Smart Phone, Tablet/ eReader	Parents used the laptops, desktop, and tablet computers for work, socializing (Facebook), and browsing the web; they used their iPhones for video chat, text, and general communication. The son used the computer about two times per week to watch movies and play on the Nick Jr., Disney, and PBS KIDS websites; he used the iPhone to watch <i>Thomas</i> videos on YouTube and to play games. The family watched TV regularly; son liked Sprout, PBS KIDS, Nick Jr., and Disney Jr.
5 East Mom Girl (4)	English	TV, DVD, DVR, Computer, Internet, Game Console, Smart Phone	Before the study, mom had the daughter using ABCMouse (a website) for “homework.” The daughter liked doing “puzzle-solving type videos and games” on the computer and the iPad. On TV, the daughter watched only Disney and Nickelodeon.

Table 3. Snapshots of Family's Technology Prior to the Study (Continued)

Family	Language	Equipment	Illustrative Usage
6 East Mom Girl (9) Girl (7) Boy (4)	English	TV, Computer, Internet	Parents did not use the computer very much; mom only used it to check e-mail and Facebook. The older daughter used the computer for homework, cooking games, and PBS KIDS' "Cyber Chase." The younger daughter and son played on PBS KIDS and Nick Jr. Mom turned on Channel Thirteen in the mornings so the children could watch the morning shows while getting ready for school.
7 East Mom Dad Girl (4)	English Spanish	TV, DVD, Computer, Internet, Smart Phone, Tablet/ eReader	Parents used their iPhones and the iPad regularly for calls, e-mail, web browsing, work, and Netflix. Daughter used the computer and iPad regularly too. Parents encouraged daughter to watch PBS KIDS, but she preferred Nick.

CHILDREN

Though children's use of media and technology varied from household to household, the following trends emerged.

- **Entertainment was king.** Parents' reports show that the main driver of their children's technology use is entertainment, including watching videos and TV and listening to music. Children typically watched the following channels: PBS, Nickelodeon and Nick Jr., and Disney. Children also watched videos via YouTube, on their parents' phones, or on computers. Parent reports on amount of television or screen time children ranged widely; some parents estimated as little as a few hours a week, while others estimated weekend use at 5 or more hours a day. Typically children used the websites that matched the television channels they watched, though as noted, some families had little or no Internet access.
- **Game play was quite popular on all platforms from stand-alone consoles to hand-held devices.** Children played games on gaming systems (both portable and console), desktop computers, laptop computers, smartphones, and tablets. Typically whatever devices parents had, children were allowed to use them. In many cases, they had figured out how to download games with little assistance. Examples of games or apps that children used included one focused on drawing princesses, several car-racing games, and cooking games.
- **Educational uses of media, including using media to support reading and math, were secondary to children's use of technology for entertainment.** Parents wanted their children to learn from their technology use and indicated that their children were learning letters, numbers, vocabulary, and other content from programs they watched and games they played. But in selecting content for children, children sought that which they enjoyed, and parents were primarily concerned about ensuring their children were not exposed to violent or otherwise age-inappropriate content. Some parents noted that older siblings in the home used computers for doing their homework.

FAMILIES' USE OF PBS KIDS CONTENT AND STUDY TECHNOLOGIES

During the study, families used the laptop and iPad not only to explore the *Ready To Learn* PBS KIDS resources we suggested, but also other PBS and non-PBS resources. The educational value of PBS KIDS content pleased parents and children enjoyed playing games like *Sid the Science Kid's Science Fair* and *Martha Speaks' Dog Party*. Parents found their own technology use increased with the addition of two devices to the home, and many reported that their children's technology use was switching away from television viewing and toward online game play. Family technology use, too, shifted, in some complicated and sometimes contradictory ways. Parents reported they found themselves more involved in what their children were doing, asking questions about games and in some cases playing together, yet they also reported that children were adept at using technology, particularly the iPad, with little or no assistance. In this section, we explore these findings in more depth.

Parents called out the overall educational value of PBS KIDS content and activities.

Across the board, parents had positive opinions of PBS content in general and PBS KIDS transmedia suites in particular once the Home Study got underway.¹ In many cases, parents were already familiar with PBS from their own childhoods and said they trust PBS to provide content that is of high quality and educational. Not all families, however, were familiar with PBS prior to the study; in particular, quite a few west-coast families who were relatively new to the United States. After the study, however, these families too gave high ratings to the educational value of the PBS KIDS resources. Parents found that the games addressed a good variety of skills and had the right level of challenge; one parent also noted liking that the games are progressive and get continually more difficult. One mother said she liked PBS KIDS because her son had books with the same characters. "PBS is learning all the time," said one parent.

In some cases, parents felt their children preferred non-PBS resources, like Nickelodeon, Nick Jr., Disney, various car-racing games, and games like Mario. Families where children preferred non-PBS resources reported that the non-PBS resources were more visually appealing (brighter, more colorful), had better stories (more fast-paced), had more music, and provided a "break from learning." Notably, several parents, as well as researchers who observed children play games, saw that children got bored quickly during narration portions of PBS KIDS games.

Parents who felt their children preferred PBS KIDS said their children like the PBS KIDS characters; one parent said her son feels more grown-up using PBS resources than other child-focused networks, which he thinks are for "babies." One parent, who preferred PBS but whose child preferred other

¹ Even those families familiar with PBS prior to the study were not always able to accurately distinguish between PBS and non-PBS apps, games, or suites, a factor that readers should bear in mind when interpreting findings..

resources, said her daughter's interest in PBS KIDS content seemed to have increased since her child's classroom participated in the *Ready To Learn* 2012 Preschool Pilot Study (Education Development Center & SRI International, 2012).

Several families reported that they preferred the PBS KIDS offerings on the laptop to the iPad games, even though overall they preferred the iPad technology. In one family, the child was bored with what was available on the iPad and used the laptop more. In another case, the parent said she found the computer games to be more challenging for her child than the iPad games.

Parents and children had a wide range of responses to individual assets within the PBS KIDS transmedia suites, many of them favorable.

In the course of our interviews with families and via the checklists they submitted, parents and children commented on some of the games they had played and videos they had watched, both PBS and non-PBS.

- ***Sid the Science Kid**** This was a popular suite, particularly among parents. Parents said they liked the math and the puzzle-solving involved in the games. At least one parent, however, noted that despite her efforts, she could not get her son interested in *Sid* games. Regarding the *Crystals Rule* game, which we had asked families to try, one mother said it helped her child learn to count higher, while another noted that her daughter talked to her about the game after playing it. A third wished there were more levels in the game. Regarding *Science Fair*, which we had also asked families to try, several parents noted that their children played this set of games frequently or that the games were favorites. One parent said *Science Fair* had gotten her son more interested in the natural sciences and allowed him to practice counting, measuring, and weighing. A parent also noted that her child enjoyed *Sid's Red Light, Green Light* game.
- ***Dinosaur Train**** was another suite that parents mentioned frequently. In particular, they spoke about the *All Aboard* iPad app, which we had installed for them. Several parents said their children enjoyed the app and that it was a favorite. One said, the game "taught him how to fit the things, he's learning how to fit the different sizes in the right spot." Another said, "With *All Aboard* he's learning to sort, learning shapes, learning to match. He's gotten better at it. He's focused too. I hope it can apply that in school too, you know, with his attention span. It's also helping with his patience. They help him keep on trying, be patient, it will . . . get better." As described above, one boy particularly liked to play in two-player mode with his mother, though he tended to take her turns for her. One family initially complained that the dinosaurs moved too quickly, but by the end of the study liked their speed. One family, though, said the app "[got] boring" and another child was bored with the narration. Also mentioned by one family was *Buddy's Gem Hunt*, which it listed as one of their daughter's favorites.

* PBS KIDS Mathematics Transmedia Suites.

- **Curious George.*** Parents expressed enthusiasm for *Curious George* activities because they felt they helped their children practice counting, and the activities were popular with children as well. One child's older sister mentioned that she thought *Apple Picking* was particular good practice for her younger brother. Several parents commented that their children particularly liked games that had to do with trains, such as *Train Station*. One mother felt the *Curious George* games were intended for children younger than hers. Via the checklist, we asked families to try *Hat Grab* and *Bunny Ride*, both of which parents and children liked.
- **SuperWHY!**** Families spoke highly of *SuperWHY!* games; parents were pleased that they helped their children learn letters, letter sounds, letter recognition, vocabulary, and spelling. One said, "It is teaching him to read and recognize the letters. He's learning to pronounce the words as he sings along with the games. He's learning to speak better." Another liked *SuperWHY!* games because, she said, they continually get more difficult. Regarding *Paint!*, reviews were mixed. Some enjoyed it; others said their child got bored quickly with the app.
- **The Cat in the Hat Knows a Lot About That.*** Families had less to say about this suite. One liked the games because her children have *Cat in the Hat* books as well. One family related to the *Hermit Shell* game because they had previously owned a hermit crab. A few parents felt the *Hermit Shell* game was too easy or did not have enough levels for their child.
- **Martha Speaks.**** Parents and children liked this suite. One mother said she likes that her daughter can learn vocabulary through playing a game and said she has heard her daughter using new words in everyday life. The *Dog Party* app, which we installed on their iPads, was mentioned frequently; several said the games *Chow Time* and *Doggie Dress Up* were favorites.
- **Other Mentions.** Families also mentioned other PBS KIDS programs/suites, including *Barney*, *Caillou*, *Clifford the Big Red Dog*, *Daniel Tiger*, *The Electric Company*, *Fizzy's Lunch Lab*, *Oh Noah!*, *Sesame Street*, *Thomas and Friends*, *Wild Kratts*, and *Word Girl*. *Caillou*, both the show and the games, was particular popular with one family; the mother felt *Caillou* was a good influence and noted that her son played *Caillou* games for extended periods. In contrast, another parent disliked the *Caillou* show, saying her friends told her *Caillou* was too "braggy," and therefore she did not allow her children to watch. One child told us he liked the customization available with *The Electric Company's Prankster Planet* game. *Fizzy's Lunch Lab* was a particular favorite for one family. One mother said *Oh Noah!* was helping with her children's Spanish ability, and a few parents mentioned the popularity of Thomas (and anything train-related) with their children. *Wild Kratts* games and videos were favorites for a few children. One mother said she liked the *Wild Kratts*, particularly the *Going Batty* game, because they present facts, are challenging, require body movement to play, and require the

* PBS KIDS Mathematics Transmedia Suites.

** PBS KIDS Transmedia Suites.

child to follow a lot of directions. Another parent, talking about *Daniel Tiger* videos, said she was pleased with its vocabulary: “[The show] had mostly simple vocabulary, but then there was a big word, they were talking about ‘disappointed,’ a big word. When he dropped his cake, he wasn’t sad or mad, he was ‘disappointed.’”

- **Commercial Media:** Families also used and watched a variety of non-PBS programs, games, videos, and apps during the study. Oft-mentioned were Disney, Disney Junior, Nickelodeon, and Nick Junior. Some other networks and particular programs, games, and apps listed were as follows: *ABC Mouse, ABC Phonics, ABC Tracker, Alvin and the Chipmunks, Animal Kingdom, Australia Kickboxing, Baby TV, Backyardigans, Barbie, Ben 10 Race Against Time, Brave, Bubble Guppies, Cars, Cbeebies, Discovery Kids, Doc Stuffins, Donkey Kong, Dora the Explorer, Dots for Tots Pick Up Sticks, Dragonvale, Escape Bear, Fun Brain, Good Luck Charlie, Hello Kitty, Hot Pursuit, Imagination Playground, Jake’s Never Land, Jessie, Jingo, Little Pim, Magic Piano, Mario/Mario and Luigi, McQueen, Mega Run, Mickey Mouse Clubhouse, Need for Speed, Perry the Platypus, Probe Humans, Road Rally, Scooby Doo, Shake It Up, Sonic the Hedgehog, Spiderman, SpongeBob SquarePants, Stupid Zombies, Subway Surfer, The Suite Life on Deck, Team Umizoomi, Temple Run, Tom and Jerry, Umi Numbers, and Zack and Cody.*

For some parents, technology use increased and they learned about technology during the study.

A number of parents reported that their technology use increased during the study, largely because their children could now use the technology from the study, freeing up other devices for the parents to use. One family also reported being able to use the iPad frequently despite their busy lives (more so than the devices they owned previously), since with the iPad, “You are instantly on and instantly connecting.” Particularly for some of the west-coast families that had little technology access prior to the study, having a laptop and an iPad with Internet connectivity in the home was a marked difference. Though the devices were loaded with child-friendly games, adults found them useful and entertaining as well. One mother said that while she used to occasionally use the Internet on her sister’s computer to play games, use e-mail, watch YouTube videos, search for recipes and other information, and check Facebook, she can now do those things on a daily basis, usually on the iPad while sitting on the sofa or in a comfortable chair.

Though most parents reported that although they used technology more frequently, the ways they used technology did not change over the course of the study. In contrast, a few parents reported learning how to use technology because of study participation. One parent reported that while it was harder for her to use technology than it was for her son, she had learned to download and search and was using the Internet to look for work. A father reported that his sons were teaching

him how to use the computer. Another study participant was teaching her husband to use the computer, which she had recently learned to use at a computing class; he was, at the beginning of our study, learning to put photos in an album and download applications.

Families reported increased game play (generally on the study-provided iPads and laptops) and, in some cases, less television watching.

As one might expect, providing a laptop computer, iPad, and suggestions on how to use them resulted in some changes in children's and parents' technology use, even in those families that previously had high levels of access to technology. Parents reported that some of the time children had previously spent watching television had been replaced with time playing PBS KIDS games on the iPad and laptop received for the study. Several parents said they were pleased with the switch because they found the PBS KIDS games to be more interactive and therefore believed their children were learning more from game play than television watching. One parent reported that watching programs together was easier with the new technology; his daughter was willing to watch History Channel videos with him on the iPad that she would not have watched on TV.

Children overwhelmingly preferred using iPads to laptops, largely due to ease of use.

In nearly all families, parents reported that their children use the iPad much more than the laptop. The laptop, they said, is harder for children to use; even with the addition of an external mouse, its usability cannot compete with the tablet's touchscreen interface. Children tended to be able to use the iPad on their own, without parent support, a factor which may have added to its appeal to children and certainly was an attractive feature for parents. Even the youngest members of families were able to use the iPad; one family had downloaded a xylophone app that the 1-year-old used, while another family's speech-delayed toddler was able to express her preferences and showcase her abilities on the iPad in ways she had not been able before the family had the tablet.

Portability was another benefit of the iPad: parents reported taking it with them on subway rides and long car rides. One parent, in a telephone interview, said their family had used the iPad to find their daughter's new school, in anticipation of the start of kindergarten. Their daughter proudly navigated, reading the directions out to her parents as they went.

In some families, children extended their learning and made connections to the real world.

Though not common, we saw a few examples of connections built between the real and virtual worlds. For example, one child got excited by *Sid the Science Kid* and wanted a magnifying glass. His parents bought one for him, and he has since been exploring things in the backyard.

Another family planted in the garden like *Caillou* and went to museums on the weekend because of a new interest in dinosaurs from the History Channel (watched via iPad). In this same family, the daughter became engaged with photo-taking and movie-making on the iPad, taking tours of the house and narrating what she saw. Her mother reported that she acted as a director, calling out, “Take one! Take two! Action!” Looking at her iPad, she seemed to have created at least a dozen documentary videos. In these videos, a few of which she carefully selected and shared during the interview, she and her younger sister visited different parts of their house or neighborhood and explained what they were seeing and what the place meant to them.

Some parents said their conversations and social time had become more frequent or rich during the study’s technology experiences.

Some families in the study told us that since participating in the study, they had more conversations during technology activities, or moments when they were engaging with media together. In some cases, the parent initiated the conversations; other times the children were so enthusiastic about what they’d been doing that they wanted to share things with their parents. One parent reported that although they had conversations before, too, the conversations were now more “mature” and the child asked more questions than he did before. One parent said that before the study, she would “let [the children] play the games alone.” Now, she said, she is more conscious of what they are playing and finds they are eager to talk about what they’re doing. Another parent, who similarly did not talk to her daughter about what she was playing before the study, said, “I didn’t think about asking her anything.” Since the study, she says she talks to her daughter while she’s playing the games, prompting conversation with questions like, “What do you like about this game?” Sometimes the mother initiates the conversations and sometimes the daughter does. It is difficult, with our data, to determine what inspired these changes in parent-child interaction. It is possible that the media themselves encouraged conversation; however, it is also important to keep in mind that these families had an orientation session prior to the study, followed by two home visits by researchers and weekly phone calls to check in. In at least some cases, parents seemed to be using the visits and calls as opportunities to find out what they were “supposed” to be doing, and we recommended that they use technology together with their child(ren). These pushes, intended by us to ensure that parents would know the media well enough to opine on it during interviews, may have also changed family interaction patterns.

In several cases, families told us that technology use provided an opportunity for family time, playing games, or watching shows together. One mother said the family sat together more, using the computer and iPad together, since the study began. Another said she liked the PBS KIDS resources because with them, the family spent more time together playing.

Siblings played together, and older siblings often supported their younger siblings' play and learning.

Sibling play—and in some cases, cousin play—was an important dynamic for technology use in many of the households we visited. In one family, the parent said that the older sister will answer questions or take note of what her younger siblings are doing with technology, although she herself does not use it as much as they do. In another family, the parent said in a phone interview that although her sons fight over the iPad at times, they also use it together, with, for example, the older boy teaching the younger one how to play a *Dinosaur Train* game. This parent also talked about her son using technology with his cousins, who showed him how to find and watch videos about their home country. Her son later wanted his parents to watch those videos with him; her husband helped him to search for them. One 9-year-old described the games and apps she thought were good for her younger brother's learning: *Curious George*, in particular *Apple Picking*, and “[*Sid the Science Kid's*] *Crystals Rule* is good for his measurement learning. They will ask him how many paper clips together to get somewhere.” One father said that his son was asking questions about science, dinosaurs in particular. Both dad and the boy's older siblings were getting on the Internet, he reported, to learn more about these topics together with the younger child.

STUDY MEDIA USE AS A REFLECTION OF FAMILY LIFE

As a rule, families in our study expressed a belief in the value of technology for learning. This belief tended to be general; rather than drawing strong associations between particular programs or games and particular skills or content their children are learning, parents instead held onto the notion that technology can help their children and that technology skills will be important for their children's future. Parents were simultaneously concerned about ways technology use may limit their children's healthy development, for example, by leading to sedentary behavior, and they attempted to limit technology use both in time and content. These limits were difficult to maintain in the flow of everyday lives and stand more strongly in theory than in practice. Parents found their roles in their children's technology use varied and sometimes were in conflict: they answered questions and provided technology fixes, often while trying to complete their own household tasks; they observed, trying to know what their children were doing and encourage them; and occasionally, they interacted deeply with children as they played or played along with them. In this section, we explore the sometimes contradictory beliefs and behaviors of families about children's technology use in their daily lives.

Some parents were able to identify specific reasons why their child's new media experiences were beneficial to learning, while others held more general beliefs about the value of technology for learning.

Parents in our study supported the use of technology for learning and believed in its potential to help their children learn. They said technology enables people to quickly find information, helps people understand information, awakens children's curiosity and helps them learn on their own, and is "forgiving" because kids can listen, watch, and play over and over again until they "get" it. One parent said, "I think that [technology] has a lot of educational value in that it covers colors and numbers [such as] which numbers are greater or smaller. [My children] knew it before, but now they get to practice it more." Parents were concerned about some of the possible drawbacks of spending too much time with technology—specifically citing concerns about children not using their memories, not learning to respect books, or becoming addicted to technology—but their belief in its potential outweighed their concerns. Their comfort with use of technology for learning extends to both home and school settings.

All the parents in the study told us that their children were learning as they used the new technologies acquired during the study (including both PBS KIDS and other resources). Parents mentioned the following:

- Literacy skills: reading, letters (upper and lower), words, sentences, vocabulary (names of colors, shapes, fruits, animals), spelling
- Math skills: numbers, counting, measuring, patterns, matching sizes, addition
- Cognitive skills: problem-solving, logical thinking, becoming more observant, imagination expanding, focus/concentration, and longer attention span
- Other skills: English language, Spanish language, speaking more clearly, coloring and painting, motor skills
- Other content: home country and culture, religion

Many of the parents in our sample found it difficult to articulate what made a particular game educational or how they knew their children were learning. A game was educational, one parent said, if it had numbers, letters, colors, or shapes. Parents tended to say their children were learning what they believed the PBS KIDS games were designed to teach—*Curious George* games are good for counting; *SuperWHY!* is good for learning letters and vocabulary—but could not often give examples of what their children had learned, specifically.

In a few cases, parents were clearer about what their children were learning. One parent said, "I see [my daughter] now understanding [more]. Before, [she would be] following the 'C', but she didn't get that it was a letter. Now it's more like, 'I understand. Now I understand the 'C' is a

letter that comes after 'B' and is used for making words.” Another parent said that the computer games her daughter played gave her constant feedback, and through repetition, her daughter was learning new words. One mother reported in a telephone interview that her daughter played games in which she had to count fruits and vegetables and place numbered fruits in order. She said her daughter loved the games, was improving her counting in English, and was proud of herself. Similarly, another family, in which the parents were native Spanish speakers, said that playing PBS KIDS’ *Oh Noah* online games was helping their children’s Spanish. Sitting together during an interview, the family watched the video/game *A Whale Tale*, laughing when the whale swallowed the boat with Noah and Señor Rodriguez. At some point in the video, Señor Rodriguez says something in Spanish that Noah doesn’t understand, and he responds, “No comprendo.” The family laughed, and the mother said that sometimes the children now say, “No comprendo” to her when she speaks in Spanish. Another mother said that she sees her daughter relating things to one another, noticing shapes and naming them, using a larger vocabulary, and speaking in longer sentences. Another parent said her child prior to the study could only count to 20 but now can count to 40.

A few parents described other indicators of learning, saying they knew their child was learning because the child appeared to be engaged, talked to them about the activities he/she was doing, asked questions about the game or the content, answered parents’ questions, or could do something he or she could not do before. One mother said she knew her son was learning because he would tell her about the activities he had done with the technology; in contrast, when she asked about his school day, he would just talk about lunch and nap. A few parents mentioned that their children sang along with the games and videos; one said her daughter sang the songs even when they were not using the iPad or laptop, which she took as a sign of learning.

Some parents reported that their children learned social skills, such as sharing or how to treat your friends. Some said that their children were learning how to use technology: for example, how to use the keyboard or navigating the computer. In one case, the child actually learned to use a computer for the first time through the study.

Despite their educational associations with technology, some parents voiced concern that it could hamper their children’s natural healthy development.

A number of parents said they believed that technology makes people lazy because it does a lot of the work for the child or adult, as with mental math skills or spelling. Two parents reported that their child’s social skills have been hampered because they are just sitting and looking at the technology, rather than interacting with people. One of those parents similarly said that sitting so much hindered motor skills development. Finally, another parent expressed concern that children who use too much technology have no respect for books.

Most study families limited their children’s technology use in some way—whether by capping the time spent using technology and/or monitoring the content with which they engage. Parents wanted their children to lead balanced lives that include technology, but also include time spent in active, outdoor play or with family. They also were concerned with children damaging their vision from looking at screens too long or gaining weight from too much sedentary activity. One family noted they had recently turned off the Internet to save money, lose weight, and spend more time on local trails. Another mentioned that her child was gaining weight, which she attributed to too much time watching television. In response, she instituted limits and made more outings to the park.

In a few cases, we saw parents replacing traditional resources with technology. One parent, for example, talked about downloading a letter-practice app for her kindergartener: “For us, there’s no pens or pencils or markers to get all over the place. She gets lots of practice and it doesn’t make a mess.” Another said her daughter was no longer interested in board games or card games now that she had the PBS KIDS resources. Parents did not indicate whether they felt that this shift toward more time with digital resources might influence children’s development in particular ways, but did report some advantages, like a less messy house.

Parents’ approaches to their children’s technology use stemmed from their broader notions of childrearing and the multiple demands of maintaining a household.

Parents take on a variety of different roles and behave in different ways to support, limit, monitor, encourage, and guide their children’s media and technology experiences. In our Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources (Education Development Center & SRI International, 2012), we examined the roles parents played with regard to their children’s technology use, based primarily on reports from four focus groups. We identified seven roles: **tech provider** (handing the child the parent’s own iPhone, for example), **apprentice** (learning about technology from the child), **monitor** (ensuring that children stick to parent-approved content and time limits), **life coach** (balancing children’s technology use with other activities), **learning booster** (supporting or encouraging educational experiences with media and technology), and **free-ranger** (allowing children to use technology while largely unsupervised).

These role characterizations may imply that parents play only one part at a time, while in the complicated realities of life, parents employ a variety of strategies toward moderating their children’s technology use and behave at times in ways that seem contradictory—for example wanting children not to use the iPad for extended periods, but appreciating that dinner gets made more easily while children are occupied with digital games. In this study, with richer data from interactions in family’s homes, we examine more deeply parents’ behaviors with regard to their children’s technology use. Below is a list of the actions and dispositions the parents in our study commonly took.

Answering questions and keeping play going, sometimes at a distance while tending to a household chore or competing need.

Parents commonly said that their children did not need much help with technology, particularly with the iPad. Nevertheless, they frequently sat with their child or with the child on their lap during technology use, interacting primarily to answer questions. At other times, parents were engaged in some other task or activity—and often quite appreciative of the chance to get something done—but were available to answer questions as they arose. These questions, in many cases, related to technical difficulties or issues of how to play the game. One mother extolled the virtues of *Caillou's* house-building game: “He’ll play [*Caillou*] a long time, for 20 minutes. Enough time for me to clean the bathroom!” But she noted that she also provided technical assistance when needed: “He’ll press the wrong side of the track pad, so the settings menu comes up, and then he’ll be stuck.” Another parent said that the first time her child played a game, she sat with her to answer her questions and make sure she understood the game. After that, though, the girl played on her own.

Offering gentle encouragement and expressing interest, usually as a sideline observer.

Parents often watched their children playing, wanting to know what they were doing and encouraging the child’s enjoyment of learning-focused games. One mother said she and her husband liked to sit with their son while he uses the iPad, not because he needed their help but because they wanted to spend time with him and see what he was doing. We observed another parent and child playing an app together: when *Dinosaur Train All Aboard* was mentioned during the interview, the child overheard and rocketed in from the living room to sit on his mother’s lap and play. He chose the two-player option, saying “Two players! I want you to do it first. We race.” His mother said, “He loves it when we play together.” When she reached around him to take her turn, her son excitedly started playing for both of them, placing dinosaurs from his side and hers. At the end of each level, he declared, “I won!” or “You lose!” even though he was effectively playing both sides of the game at the same time. This co-play might have been an opportunity for the parent to engage with her child’s learning, but in this case, she appeared to be simply a supportive presence for her son.

Actively participating and co-constructing game-play and other technology-rich experiences.

Examples of deep interaction around technology were uncommon. Some parents talked with their children about the games they were playing and asked what was happening; two parents said that if they saw their child struggling with something, they would have them repeat that round or level before moving on. In one case, the parents reported that they sat with their son daily to play on the technology together because they enjoyed doing that and wanted to “do learning with him.” One parent said that engaging with the PBS KIDS resources has allowed her to see what areas her daughter needs more help in, which she was unaware of before the study. In another family, we witnessed the mother and child playing a *Caillou* game together in which players furnish different rooms of a house. His mother worked with him on the game,

asking questions and encouraging her son to think about appropriate furniture for different types of rooms, keeping him focused on the task and providing technical support. She said, “We talk about what strategies there are, what to pay attention to, what to do; don’t just bang, bang, bang on everything. You have to do it in the right way, in the house, you have to put the right stuff, [put in the] kitchen what goes in the kitchen.”

Parents expressed a need to limit children’s media experience, primarily out of concern that they would be exposed to inappropriate and/or violent content.²

Parents limited the content their children consumed in different ways. Some reported that what their children did with technology had to be educational; others wanted to be sure the content was child-appropriate. For example, parents mentioned that content should be nonviolent, free from bad language, and free from behaviors or attitudes they do not want their children to copy. At least one family seemed simply not to limit content at all; researchers observed the child using content that featured one or more of the undesirable features mentioned by other parents.

To determine appropriateness of content for their children, parents reported that they read app descriptions prior to downloading. One parent said she plays apps herself before she allows her daughter to play them. Some parents reported that they observed as their children used technology to see what they were doing. Other families vetted content initially, but did not monitor their children’s ongoing use. These parents either said their children did not know how to navigate away from the pages or apps parents had chosen for them, or trusted their children to use only content they had approved.

Additionally, several parents mentioned cost as a limitation. These parents do not want to or cannot afford expensive technologies, and are concerned about wasting money because their children get bored so quickly with individual games.

² Screen time limits are a difficult topic to discuss with parents, and one on which they may not have reported entirely accurately. Parents are aware of the zeitgeist, which says that television and screens in general are bad for children. One mother, for example, told us that she did not like to ask other parents for advice about which shows or games to allow her child to watch or use because the general perception is that technology is bad for children.

Many parents limited the amount of time their children used electronic media but these limits were usually loose and aspirational rather than fixed and followed.

Most families in our study did not have specific screen time limits, instead allowing the flow of daily lives, routines like bedtime, and their own busyness to dictate the times when they said it was time to turn off the TV or laptop and the times when they allowed play or viewing to continue for extended periods. Families ranged in the total amount of time they believed their children spent using technology or watching television each day, ranging from about 30 minutes to 3 hours per day, and what they said their limit was did not always match descriptions of daily activities—generally, descriptions indicated more use than stated limits.³ Some families had parameters like only allowing television or more technology use on weekends, or only allowing technology use after homework was completed. One parent talked about limiting screen-time to an hour a day, but felt the degree to which she had to enforce this limit depended on the activity the children were doing. With television, she said because there is limited children’s programming available (they do not have cable) and her children are rambunctious, “I don’t tell them when to stop, they decide when to stop.” But with certain digital games, she has to intervene to end play or they would play all day.

In practice, then, parents often resembled the “free-ranger” role described previously, allowing much technology use to happen with little supervision. Though in an ideal world, their children would use technology only for limited times and educational purposes, in reality, dinner needs to get on the table and busy parents take the opportunity technology provides for entertaining their children. In a sense, “Go play with your iPad” seemed to become a 21st century version of “Go play on your own.” With the understanding that such play would be safe, and that it could benefit them in some way. In some cases, parents became true bystanders to their children’s technology use. For example, in at least one case, limited English proficiency made it difficult for the parent to be actively involved with the children’s technology use. In another case, parents were confident their daughter did not need support in using technology; she is “very bright and doesn’t need me—she learns fine alone,” according to her mom. Another parent said she likes it when her daughter uses the iPad because it is “a break” for her; she does not need to facilitate her play. One parent, in a telephone interview, noted that her children had been using the iPad constantly, but she had not been paying much attention and did not know what they were doing.

³ We know from the Kaiser Family Foundation’s (Rideout, Foehr, & Roberts, 2010) research that children ages 8-10 years old spend nearly five and a half hours using media (television, music, computers, or video games) in a typical day. While our study focuses on a younger population, the figures from KFF and other research suggest that parents may underestimate how much time their children use media.

Some families adjusted technology limits during the study, often because they were more comfortable with technology use during summer or because they believed the study resources to be educational.

To some degree, parents' limits on screen time seem to have changed during the study. A few families mentioned that their rules were relaxed during the summer, but that when school (and homework) started up again, they would again enforce limits on television and game play. Others mentioned that they either did not limit children's use of the study-provided technologies or at least imposed fewer limits than they had on other technologies. One parent said that her children usually watched an hour of television in the morning, but now they were probably in front of screens for an additional hour each day with the study laptop and iPad. Another parent felt that study technologies made it easier for her daughter to get around limits she had set; when she denied television, she found that her daughter started watching cartoons on the iPad. Another parent seemed to have grown more concerned with the educational content of her children's viewing time during the study; she no longer allows them to watch a particular, noneducational program, saying that "some shows cannot make [children] smarter."

FUTURE CONSIDERATIONS

As with much of this CPB-PBS *Ready To Learn* report, this section is best read as a compliment to the concluding section of the Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources. There as here, we provide a set of recommendations for specific stakeholder groups based on the data we collected from participating families as well as our own understanding of thoughtful design and integration of digital media and portable communications devices into informal settings.

This study confirms results from other work, showing that although the digital divide persists, low-income families are increasingly using new forms of technology, in addition to television, for entertainment, communication, and information-seeking. Children in particular often use the websites and apps associated with their favorite television programs and characters, making the *Ready To Learn* push to create transmedia timely. Often children are using technology on their own, particularly when they have access to easy-to-use devices like iPads.

Families in this study firmly believed that technology could be beneficial and educational for their children, but they were also concerned with its potential to interfere with other important aspects of childhood—active, outdoor play, for example. Parents try to impose limits and remain, if not involved, at least aware of what their children are doing when they are using technology. But the realities of busy lives and the ease of using devices like tablets and smartphones away from parents' gaze, make it difficult for them to keep up. Families like those in our study need support to use technology in ways that are appropriate, educational, and balanced. In this section, we make recommendations for CPB, PBS and producers along these lines. We also make recommendations for further research to better inform us of what families currently do with technology and what supports would help them best.

RECOMMENDATIONS FOR CPB, PBS, AND PRODUCERS

There is much that CPB, PBS, and the producers of PBS KIDS educational transmedia can do with the goal of helping families to use technology resources well.

- Continue to keep in mind that children commonly consume content with little oversight, making it essential for PBS to preserve its reputation as a provider of age-appropriate, engaging content for children and families. Parents count on public media to be educational and safe, appreciating bright lines separating it from the commercial, the crass, and/or the careless.
- Design for low-income households where parents may have had fewer experiences navigating information and educational resources for themselves as well as for their children. This approach will be especially important in the development of the PBS KIDS parent app and PBS KIDS progress tracker, which may be tempted to start from design conventions that make assumptions based on middle-class parenting norms. Appropriate design for this target audience will involve much more than lower-level text literacy; it also takes scaffolding parents' understanding of the learning goals associated with particular transmedia, the ways parents can support their children's learning, how parents can assess whether learning is happening, and whether particular transmedia are appropriate for their child, and what to do if they are not.
- Talk directly to parents via the parent app and within PBS KIDS Lab, asking what they know about their children's learning with technology and what they might like to discover themselves.
- Embed ideas for nondigital but related activities into digital games, offering activities that will give children and parents pathways to go from playing Sid the Science Kid, for example, to trying a kitchen science experiment just like Sid did.
- Create more and better apps for devices like the iPad and Android tablets but remain aware that the digital divide still exists and keeps such content from reaching a segment of the population. The divide is not just about access to hardware, such as smartphone ownership; it is also about Internet connectivity.
- Consider embedding tips for parents into games, helping them support their children's learning with better questions. For those parents inclined to act as supportive observers, give them a way into interacting with children during play. In this study, we did very little in the way of encouraging conversation, other than occasionally to say to parents, "Hey, talk to your children about what they are doing on these devices," and yet parents reported more conversation. Brief, well-timed reminders can go a long way.

- Use short-form videos to model scaffolding for parents who are unfamiliar with what it looks like to use conversation and co-play to build on children's play and exploration. Many parents may have a general supportive attitude but are less clear about what they can do to further children's learning, especially with tools they are just getting to know themselves.
- Create more educational games that parents and children, and sibling pairs and/or groups, can play together.
- Educate parents on appropriate amounts of screen time and how to achieve these amounts, keeping in mind the realities of daily life for families with young children. For example, encourage parents not to replace traditional learning resources—like crayons and blocks—with technology time. Also, help parents and children learn to self-regulate screen time, perhaps letting families opt for a pop-up timer that tracks overall session play and turn-taking mini-sessions.

RECOMMENDATIONS FOR RESEARCHERS

Studies like this one, which look in-depth at a small sample of families, complement larger-scale studies like Common Sense Media's *Zero to Eight* study. However, there remain holes in our knowledge.

- Explore how notions of “shared” and “personal” media play out in typically under-resourced households and how these notions influence the learning opportunities children do and do not typically have. Determine what the following terms might mean in low-income households: “borrowed” devices, “hands-off” devices, “turn-taking” devices, and “gathering-around” devices.
- Identify supports parents and caregivers need to make use of resources initially designed for children's use but lend themselves to new family routines and group interaction.
- Continue to study play patterns that have young children moving in and out of collaboration with one another and solo play. Determine how children's culture gets constructed and passed down from older siblings to younger ones and what the learning opportunities are for both.

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Principal Investigators

Shelley Pasnik

sp@edc.org

Carlin Llorente

carlin.llorente@sri.com

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