Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources

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

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INTRODUCTION

Leaders of the CPB-PBS *Ready To Learn* Initiative understand the important role parents and caregivers play in ensuring young children's healthy development and academic learning. In order for young children, especially those living in traditionally underserved communities, to succeed at school and thrive outside of the classroom, educational involvement by the adults who care for them is essential (e.g., Fan & Chen, 2001; Reynolds & Shlafer, 2010). Therefore, like other respected public media programs that seek to support and educate families and their young children, *Ready To Learn* has made parents and home experiences an integral part of its work from the very beginning. This is true at the production and design levels, is evident as a core element of distribution and outreach, and also holds for research. If we are to understand the contribution transmedia can make to children's academic success, then we must study and better understand what parents do, think, and believe when it comes to their children's use of technology and media.

The research reported in the Parents and Caregivers Study (Parents Study) builds on work that Education Development Center, Inc. (EDC), and SRI International (SRI) began in Year 1 of the Ready To Learn Initiative through the Context Studies (Education Development Center & SRI International, 2011) and have continued through Year 2 with the Preschool Pilot Study of PBS KIDS Transmedia Mathematics Content (Education Development Center & SRI International, 2012), infusing technology and transmedia into early childhood classrooms. The purpose of the Parents Study, especially when paired with the Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment (Education Development Center & SRI International, 2012), is to make sense of what we are learning about transmedia in the classroom by considering and exploring connections to technology and media use at home. This research is a formal part of the summative evaluation of CPB-PBS *Ready To Learn Initiative* conducted by the EDC and SRI.

As we discuss in detail below, respondents to our parent survey and our focus group participants provided insight into and explanation of technology and media use in homes with young children. In particular, we learned that parents associate technology—and some devices more than others—with potential for learning. We also discovered the varied and sometimes conflicting roles parents play when monitoring, limiting, or supporting technology use at home. Likewise, we attempted to uncover what it means for parents to find an experience with technology beneficial for learning and how they decide which activities are best for learning. These findings are only the beginning in understanding the truly complex and dynamic experience of families using technology and media at home, and how that use relates to in-school learning experiences. We look to our recently completed Home Study (Education Development Center & SRI International, 2012) to answer more questions and to our forthcoming preschool Randomized Controlled Trial (Preschool RCT) to continue to understand the role of technology and transmedia in the home, and school lives, of young children and their families.

RESEARCH APPROACH

The CPB-PBS *Ready To Learn* Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources (Parents Study) was an extension of the work conducted in preschool classrooms as part of the *Ready To Learn* 2012 Preschool Pilot Study of PBS KIDS Transmedia Mathematics Content (Preschool Pilot). The Preschool Pilot enrolled 16 preschool classrooms in a pilot study of a PBS KIDS transmedia-rich mathematics curriculum supplement and a comparison mathematics curriculum supplement. Teachers in both conditions were asked to enact the 10-week supplements covering four specific areas of preschool mathematics— counting, recognizing number and subitizing, recognizing and composing shapes, and patterning. The teachers in the transmedia-rich condition incorporated PBS KIDS transmedia in the form of videos and digital games on interactive whiteboards and laptop computers, along with hands-on mathematics activities. Teachers in the comparison condition used only hands-on mathematics activities.

Specifically, the Parents Study provided an opportunity to interpret findings from our Preschool Pilot considering the context of and relationship to how parents use media and technology in the home. We also explored parents' perspective on using transmedia and technology in the classroom for early mathematics and literacy learning. Via a paper-and-pencil survey, we asked parents to share (1) their goals for and involvement in their children's literacy and mathematics learning, (2) their attitudes toward reading and mathematics, and (3) their attitudes toward and use of technology and media to support children's learning at home. A small number of parents also expanded on their feedback during focus groups.

To understand the information parents provided on technology use, as well as the reasoning behind the decisions parents make regarding technology use in general and for learning in particular, we looked to recent reports, both survey and in-depth analyses, to guide our research approach and the development of our instruments (e.g., Levine, Steyer, & Henry, 2008; Takeuchi, 2011; Chiong, 2009), drawing on the methods and findings from several reports from the Joan Ganz Cooney Center at Sesame Workshop. The 2008 Growing Up Digital work (Levine et al., 2008) explored parents' beliefs and attitudes toward the use of

technology and media in general and its potential educational value in regard to their children's learning—influencing the design of our survey to tap parents' nuanced attitudes and beliefs regarding specific types of technology used in the home, including potential educational benefits. Additionally, the Families Matter report (Takeuchi, 2011) identified the variability in parents' beliefs about the importance of media for educational success and the factors influencing that variability. We used findings from these reports and subsequent recommendations for additional research to craft survey questions and focus group protocols that would allow parents to express beliefs regarding all types of technology, including those such as iPads that were not available when the Family Matters research was conducted. Finally, intergenerational uses of technology and its impact on learning (Chiong, 2009) reminded us of the importance of exploring not only what types of technology and media families are using, but social groupings in which they are using it.

We also wanted to explore the role children played in how media and technology were used at home. Increasingly, children have their own laptops, handheld gaming devices, and even iPads, putting choices about when and what to play in their hands. Findings from recent ethnographic research on children's media use (Ito, 2008) identified the role child-driven choices play in the use of media in technology at home, and influenced the way we crafted questions directed at parents, thus assuring we provided them with relevant and realistic choices regarding technology use and decisionmaking at home.

Perhaps most important to our research approach was the 2011 Common Sense Media report on the use of media by children ages 0 to 8 (Rideout, Saphir, & Bozdech, 2011). These findings highlight the increasing prevalence of technology in the lives of even the youngest children, including the newest technology of iPhones and iPads; however, this research used random-digit dialing, among other methods, to contact the widest breadth of families, and combined families in a nonstandard classification of low-income (less than $30,000 a year). We wanted to build on this work by collecting similar data on families, but we also wanted to better contextualize our findings in the lives and realities of participating families—those who had children enrolled in preschool centers serving predominately low-income families in culturally and ethnically diverse neighborhoods. With that purpose in mind, our focus group sessions allowed us to expand even further on context, with a small group of parents elaborating on their uses of technology at home—including what influences their decisions when it comes to transmedia and technology use with their young children.

The 2011 Needs Assessment conducted by WestEd (McCarthy et al., 2011) provided examples of appropriate language to use with parents when referring to new and often times unfamiliar technology. The design and execution of their survey items and focus group proceedings helped guide the current work in tone, direction, and specificity. Finally, we drew on our own work with teachers and parents to develop user-friendly, relevant, and informative surveys and focus

group protocols. Specifically, existing protocols generated as part of prior joint work in media integration and early literacy (Penuel et al., 2009) were reviewed to identify questioning formats and content that would resonate with parents. Additionally, work with preschool teachers during our 2011 Context study (Education Development Center & SRI International, 2011) informed our decision to demonstrate some of the transmedia we would be referring to at the beginning of focus groups so that all participating members would be familiar with the content and types of transmedia discussed.

In extending our work even further, information gained from the Study of Preschool Parents and Caregivers Use of Technology and PBS KIDS Transmedia Resources was used to launch the CPB-PBS *Ready To Learn* Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment (Education Development Center & SRI International, 2012) where we spent an extended amount of time working with families in homes to gain an even better understanding of what transmedia and technology use at home to support learning might look like. The Home Study, in combination with findings from the Parents Study, will allow us to explore the role home media and technology use may play in relation to in-school settings of transmedia and technology use for mathematics and literacy learning during the 2013 Preschool Randomized Controlled Trial (Preschool RCT).

RESEARCH QUESTIONS

Three research questions guided the work of the survey portion of our Parents Study, with an additional four questions guiding the work of the focus groups. The overarching goal of surveying parents and asking them to participate in focus groups was to learn about the use of technology and digital media to support mathematics and literacy learning in homes with young children, as well as the logistical factors and attitudes that influenced technology use by families.

Specifically, we surveyed parents in order to explore the following:

1. How do parents make use of technology and digital media in the home to support their children's mathematics and literacy learning?

2. What types of supports are necessary for parents to make technology and digital media used in the home more beneficial for their children's mathematics and literacy learning?

3. What are parents' beliefs and attitudes about the role of technology and digital media in their children's mathematics and literacy learning?

Building on the questions addressed by the survey, we sought answers to questions about nuanced uses of technology and media to support learning during our focus groups. We were interested in parents' reactions to the idea of using transmedia and technology in preschool classrooms for mathematics instruction as well as to the actual transmedia used by teachers in classrooms in the PBS KIDS transmedia-rich mathematics curriculum supplement condition of the Preschool Pilot. We also invited parents to participate in focus groups because we wanted to probe what, if any, connections there were between our 2012 Preschool Pilot Study of PBS KIDS Transmedia Mathematics Content and home experiences. Specifically, we explored the following questions:

1. What types of discussion, if any, do parents have with children about the use of digital media and technology in the classrooms participating in the *Ready To Learn* Preschool Pilot?

2. Do parents believe that the technology and digital media used in classrooms as part of the *Ready To Learn* Preschool Pilot affects how their children are learning mathematics and literacy?

3. How do parents support or extend the mathematics and literacy instruction taking place in Preschool Pilot intervention classrooms at home? If they do not support mathematics and literacy learning, what gets in their way?

4. What are parents' reactions to the PBS KIDS transmedia developed as part of *Ready To Learn*?

RESEARCH METHODS

PARENT SURVEY

When designing the instruments for this study, we first started with the above research questions, as well as existing surveys and reports that have focused on children and media (e.g., Takeuchi, 2011; Chiong, 2009; Rideout et al., 2011). Our aim in referencing these materials was to understand similar ground covered by organizations concerned with children and media/technology, both to complement and build upon their findings. In our survey development, we use an iterative process: the survey team created items, study leaders and members of the larger CPB-PBS *Ready To Learn* evaluation team reviewed the items, and then the survey team revised items. Each of the survey items and the survey as a whole went through several rounds of iteration to develop a final instrument that followed best practices, pinpointed the questions that we were most interested in answering, and was relevant to the parents in our sample, many of whom we expected would be unfamiliar with survey research and represent a variety of linguistic and cultural backgrounds.

The final product, a paper-based survey that we estimate took 15 to 30 minutes to complete, focused on parents and their children's media and technology use for educational purposes (see the "Appendix: Parent Survey" for a copy of the English version survey we distributed to parents):

- Parents' use of technology and media to support children's mathematics and literacy learning
- What supports parents felt they needed to make these tools more beneficial
- Parents' beliefs and attitudes towards the use of media and technology to support mathematics and literacy learning
- Parents' attitudes and perceptions toward technology and media as an educational resource for their children

While the parent survey was distributed only to parents and caregivers with children enrolled in preschool centers participating in the CPB-PBS *Ready To Learn* Preschool Pilot Study (Education Development Center & SRI International, 2012), the survey questions targeted responses regarding all children in the home between 2 to 8 years of age. We asked parents to report separately on children ages 2 to 5 and ages 6 to 8, theorizing that the use of technology by children and parents' decisionmaking might be different for preschool and school-aged children. Due to the large number of parents at these centers for whom English is not a native language, surveys were translated and back-translated by educational researchers and made available in Spanish and Chinese in addition to English. We distributed each survey with a sealable envelope, and teachers were asked to keep returned surveys in an even larger envelope that professional development personnel (who were assisting teachers in implementing the mathematics curriculum supplements as part of the Preschool Pilot Study) periodically collected during their classroom visits. Teachers in all of the participating classrooms (two or more at each Preschool Pilot Study center) were given several weeks after the initial distribution to collect their parents' surveys.

Parents received a $20 gift card to a drug or grocery store for completing the parent survey. To receive this incentive, parents were asked to include their mailing address on the returned survey. In the case of parents who did not wish to submit their mailing address, they were offered the option of having their gift card delivered to their child's preschool classroom instead.

FOCUS GROUPS

We developed the focus group protocol in a fashion similar to the parent survey: we developed items beginning with our research questions and questions that arose from the above literature and then used an iterative process to review and refine items and the overall protocol. The goal of the focus groups was to complement and supplement the parent survey; as such, items were written either to ask new questions or to delve more deeply into topics touched on only briefly in the survey.

We designed the resulting protocol to guide a focus group, led by two evaluation team members and lasting approximately 90 minutes, and to allow parents to share the following:

- Their views on the use of technology and transmedia in the classroom to support learning
- How they extend or support classroom learning for their children
- Their reactions to the PBS KIDS transmedia developed as part of the *Ready To Learn* Initiative

We asked parents to frame their responses both to PBS KIDS digital games developed as part of the CPB-PBS *Ready To Learn* Initiative and to technology and transmedia in general, with regard not only to those children enrolled in the Preschool Pilot but also all children in their household ages 2 to 8.

To ensure parents participating in our focus groups were familiar with the types of transmedia we would discuss during the group, we brought laptops and MiFi devices to the focus groups so that parents could play the PBS KIDS games themselves. We selected three games (*The Cat in the Hat's Huff-Puff-A-Tron, Sid the Science Kid's Crystals Rule*, and *Curious George's Bunny Ride*) to show samples from a variety of suites that were appropriate for both older and younger children and that had, according to Preschool Pilot study coaches, been popular with children in the Preschool Pilot classrooms. We hoped because they had been popular with the children, parents might have already seen these particular games in the classroom or at home and thus might have more to say about them than if they were seeing them for the first time at the focus group.

As a thank-you for participation, all focus group parents received either a $75 grocery store gift card or prepaid bankcard.

SAMPLE

Parents and caregivers who completed the survey and participated in focus groups were recruited from centers participating in our Preschool Pilot (Education Development Center & SRI International, 2012). Parents from all 16 centers participating in the Preschool Pilot returned surveys, and we recruited a subset of those parents to participate further in focus groups. Specifics on the sample of our parent survey and focus groups are provided below.
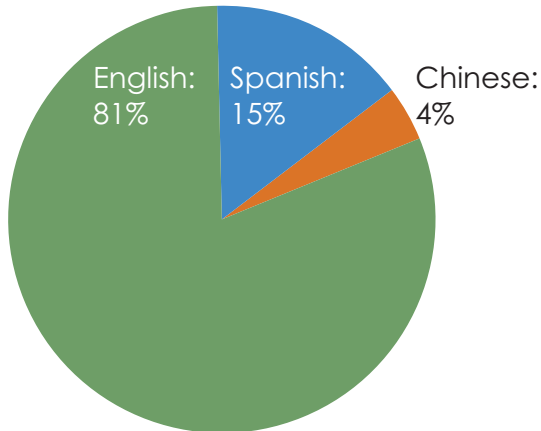
PARENT SURVEY

Parents were eligible to complete the survey if the following applied:

- They had a child enrolled in one of the classrooms enacting the PBS KIDS transmedia-rich or comparison mathematics curriculum supplements as part of our Preschool Pilot study or they had a child enrolled in another classroom that served primarily 4- to 5-year-old children in a center participating in the Preschool Pilot. In the event of multiple classrooms serving 4- to 5-year-olds, the classroom participating in the Preschool Pilot and up to two other classrooms were eligible for participation in the survey study.

- They read English, Spanish, or Chinese, the three languages into which we translated the survey. Parents who read other languages were given the opportunity to return the survey in one of the three languages above if they had the means to complete it.

Of the 381 surveys parents returned, we included 234 in the final sample after cleaning the data and accounting for discrepancies.[6] Below is an overview of survey respondents' demographics:
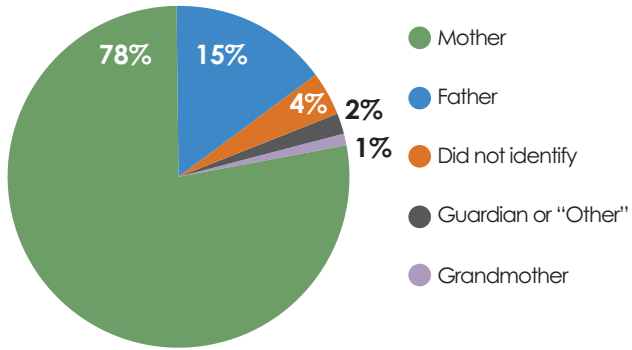
Language of the survey:

English: 81%
Spanish: 15%
Chinese: 4%

Self-identified race/ethnicity of respondents (respondents checked all that applied):

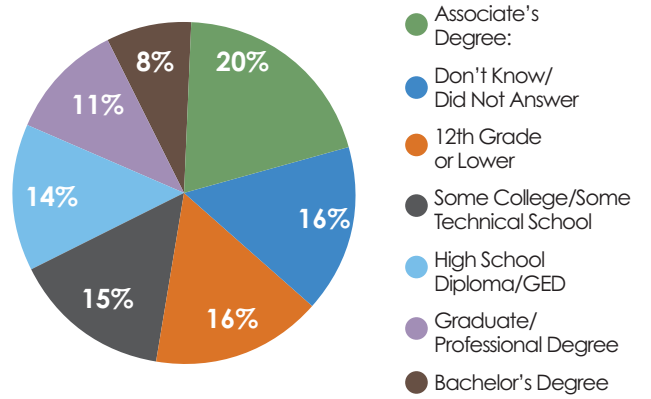Asian: 29%
Black: 25%
White: 9%
Other: 14%

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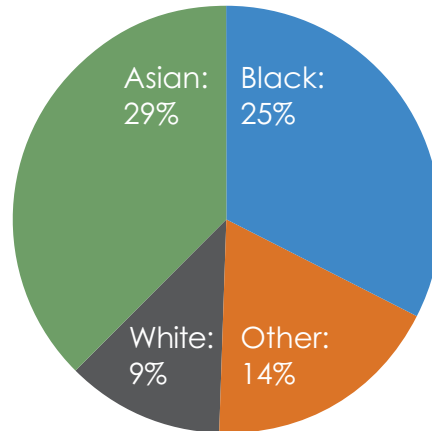
6 When we inspected the data collected using the parent survey, we noted that some parents provided contradictory responses throughout the survey. For example, some parents indicated they did not use technology; however, they also provided answers to questions addressing the ways in which they used technology. Because we obtained a much higher response rate from parents than anticipated (expected n = 180—200, actual n = 381), we elected the most conservative approach—excluding surveys with contradictory responses. Therefore, results reflect findings from analysis conducted with the final dataset—the dataset including only those parents who completed the survey consistently; however, we note that there were no significant differences on demographics for the entire sample of returned parent surveys (n = 381) and the sample used in analysis (n = 234). We will modify the survey design to avoid this issue during the Preschool RCT.
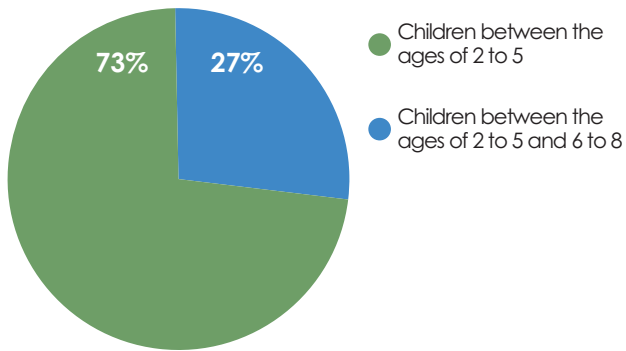
Relationship of respondent to child in preschool classroom:

- **78%** Mother
- **15%** Father
- **4%** Did not identify
- **2%** Guardian or "Other"
- **1%** Grandmother

Educational attainment of respondent:

- **20%** Associate's Degree:
- **16%** Don't Know/ Did Not Answer
- **16%** 12th Grade or Lower
- **15%** Some College/Some Technical School
- **14%** High School Diploma/GED
- **11%** Graduate/ Professional Degree
- **8%** Bachelor's Degree

Reported ages of young children in the home:

- **73%** Children between the ages of 2 to 5
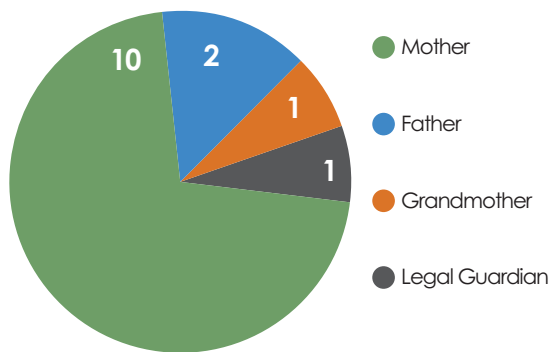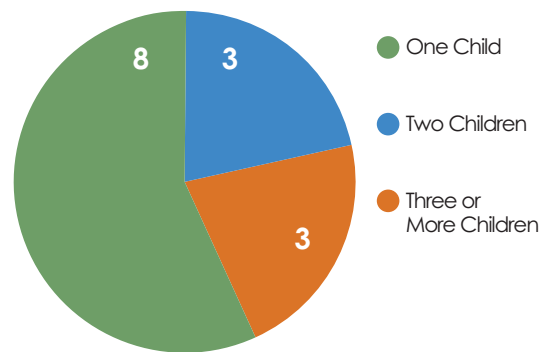- **27%** Children between the ages of 2 to 5 and 6 to 8

FOCUS GROUP

We recruited parents for four focus groups from the pool of parents who returned surveys to classrooms enacting the PBS KIDS transmedia-rich mathematics curriculum supplement as part of the Preschool Pilot. In some instances teachers helped identify parents to recruit into the focus groups, while other parents were recruited because they expressed a desire to be included in further research on their returned surveys.

Six parents participated in the two focus groups conducted on the east coast and 8 parents participated in two focus groups conducted on the west coast, for a total of 14 parents. We conducted three focus groups in English and one focus group in Spanish. All but two focus group participants were female. Below is an overview of focus group participants' demographics:[7]
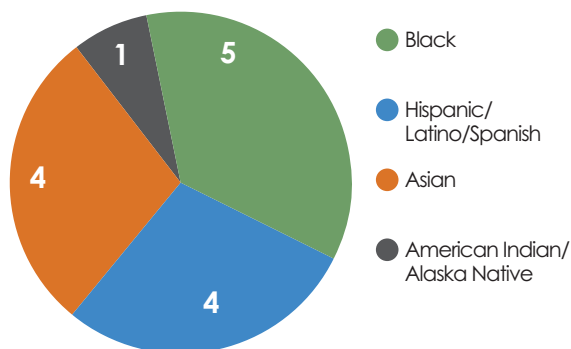
Relationship of focus group participant to child in preschool classroom:

10 — Mother
2 — Father
1 — Grandmother
1 — Legal Guardian

Number of children between the ages of 2 to 8 years old in the home:

8 — One Child
3 — Two Children
3 — Three or More Children

Self-identified race/ethnicity of focus group participants:

5 — Black
4 — Hispanic/Latino/Spanish
4 — Asian
1 — American Indian/Alaska Native

Language spoken at home (other languages were Spanish, Chinese, and Farsi):

7 — English only
6 — English and another language
1 — Another language only
American Indian/Alaska Native

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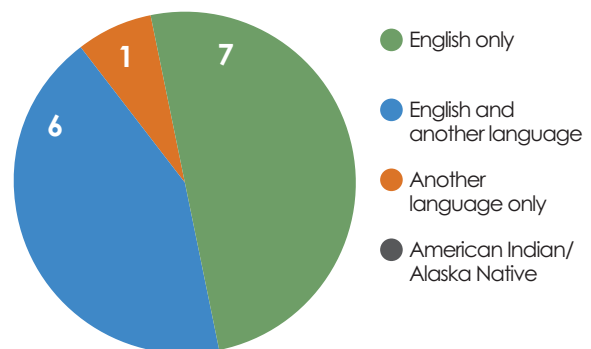
7 Whole numbers, instead of percentages, are used to represent participant demographics due to the small sample size.

LIMITATIONS

PARENT SURVEY

The paper-and-pencil nature of the survey allowed us to reach a large number of families in a short amount of time; however, the survey items were all self-report, asking parents to reflect on decisions they made in the past or selecting from a pregenerated list for their reasoning for those decisions. This factor prevented us from applying any independent verification of responses to the data.

Additionally, despite the large number of surveys returned, because parents for the survey study were recruited only from centers participating in the Preschool Pilot, the sample may not be representative of the overall population of children and families enrolled in preschool education settings or even those participating in the Preschool Pilot. Although these centers do represent a variety of families seeking preschool education, they were not randomly selected and instead represent centers that were interested in implementing early mathematics interventions and/or were willing to integrate technology in their classrooms. Additionally, within these centers, we were able to offer paper-and-pencil surveys only in English, Spanish, and Chinese, potentially excluding from our work families who speak other languages.

FOCUS GROUPS

Although we attempted to recruit families with varied experience with media and technology as well as with a variety of different-aged children at home, participants in our focus groups may not be representative of families with young children in general or even of those attending the centers participating in our Preschool Pilot. Specifically, focus group parents were drawn only from classrooms enacting the PBS KIDS transmedia-rich mathematics curriculum supplement. This was a strategic move to further discussion by increasing the likelihood that parents would have experience or exposure to the transmedia and technology being used in the classroom, but in the process we excluded parents from the other mathematics curriculum supplement condition (the comparison group).

Additionally, some parents were recruited for focus groups if they indicated on the parent survey that they were interested in being contacted for additional research—creating a potential self-selecting bias. Also, teachers assisted with identifying and recruiting some parents for the focus groups, creating a potential bias in contacted parents created by teacher intervention in the recruiting process. Finally, we were able to hold focus groups only in English and in Spanish, potentially excluding from our work families who speak other languages.

DATA ANALYSIS

PARENT SURVEY

The data gathered using the parent survey were scanned, cleaned, and verified for accuracy (e.g., scanned entries were spot checked against paper copy surveys to ensure accuracy, and any information that had not been recognized via scanning was hand entered). We then coded individual items into numerical codes as necessary and conducted quantitative analysis using STATA.[8] We calculated the percentages of yes/no responses for each of the questions and subquestions. Then we conducted further examination of responses by calculating percentages of responses to specific questions based on responses to other questions. For questions that allowed open-ended responses, we conducted qualitative analysis, coding the set of responses for each survey question on an as-needed basis.[9]

FOCUS GROUPS

To analyze focus group data, two researchers began with the research questions and the focus group protocols as a guide to create a list of initial categories or codes of findings when reading notes from the focus group. These initial codes—a total of 15 altogether—were used to identify common themes, threads of conversation, and attitudes and beliefs from the transcripts of the four focus groups. Upon the review of transcripts, researchers combined some codes and added others to best capture the richness of the data, resulting in a total of 17 different coded categories of focus group data. We then divided the codes into four categories, with each researcher focusing on two categories, and reread all of the transcripts for a second time, identifying supporting data for the existing codes using the software Dedoose.[10] Once transcripts were thoroughly mined for data, analytic memos were written for each of the 17 codes or combination of codes, organizing the findings into categories across all focus groups. The analytic memos were reviewed and revised by the researcher, working closely with the data and the overall summative evaluation team for clarity and consistency. The final analytic memos served as the basis for the findings reported on below.

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8 Available at http://www.stata.com.

9 In most cases, the open-ended responses were largely repetitive of the information gathered through parents' yes/no responses. For a few questions, open-ended responses provided new information or useful explanation of yes/no responses. For those questions, a researcher coded and analyzed the responses.

10 Available at http://www.dedoose.com.

FINDINGS

Parents in our sample overwhelmingly believed that technology was an important part of their children's education and were comfortable with their children using technology from a very young age, both at home and in the classroom. Respondents to our parent survey and in our focus groups provided their children with access to a wide variety of devices, ranging from commonly adopted technologies such as television to new tools like iPads, and were supportive of efforts to integrate technology into early-childhood classrooms. At the same time, parents had concerns about children encountering inappropriate content or sacrificing other learning opportunities, such as outside play or time with friends, for time with technology. They therefore tried to limit their children's time with technology and the types of content they use to those that are safe or educational, but they recognized that the demands on their own time make it challenging to enforce limits consistently. Additionally, we saw little evidence that parents had the information they felt they needed to make informed decisions about what constitutes an educational experience with technology.

The conflicting priorities parents held meant they played a wide variety of sometimes conflicting roles in their homes when it comes to their children and technology use. Parents were the providers of technology, they were experimenting with how to use technology themselves, and they were monitors of their children's technology use. They were their children's "life coaches," trying to ensure they have balanced lives that include technology, and they were learning supporters, trying to guarantee that their children's technology experiences are, for the most part, learning-focused. Yet they were also busy parents who do not have time to supervise every minute of play, and who trusted their children's technology skills and the websites or television programs they have selected to be appropriate.

In this section, we explore these and other findings related to parents' views on children's use of digital media and technology, both in the home and in the classroom. We divide our findings by (1) those related to the prevalence and perceived educational benefits of technology and digital media use at home and in school, (2) routines around technology and digital media use at home, and (3) supports and barriers to technology use at home. Where these findings differ by age group—2- to-5-year-olds or 6- to-8-year-olds—we note the differences in the text; otherwise findings are inclusive of all children ages 2- to 8-years-old parents were asked to report on.[6]

PREVALENCE AND PERCEIVED EDUCATIONAL BENEFITS OF TECHNOLOGY AND DIGITAL MEDIA AT HOME AND IN SCHOOL
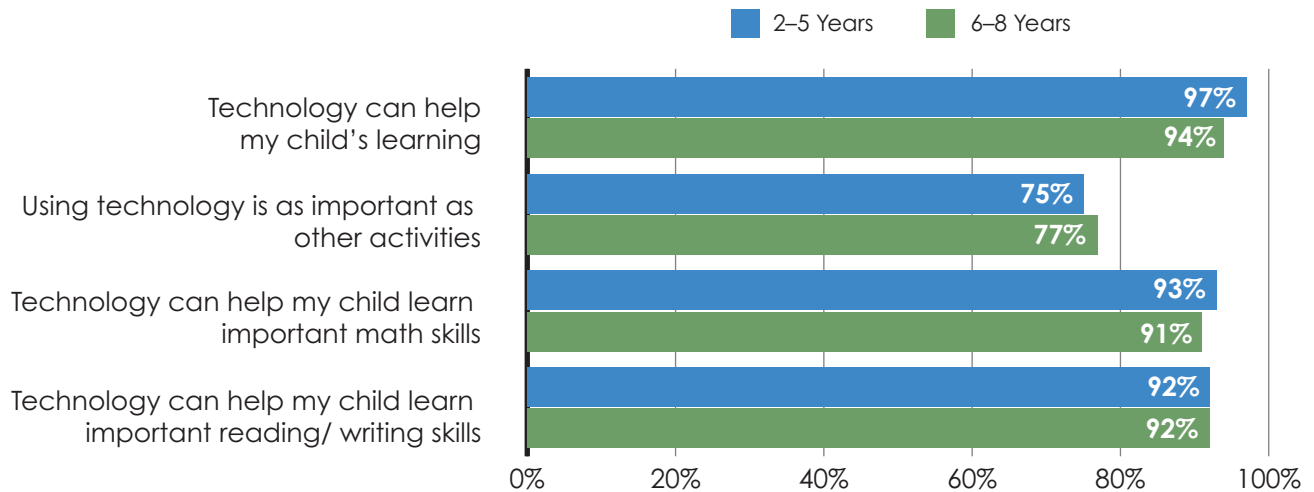
Parents believed that technology is a powerful support for learning, and saw technology skills as a necessary part of their child's 21st-century education.

Overwhelmingly, parents endorsed the potential of technology to help their children learn and viewed learning how to use technology as an essential skill for a citizen of the 21st century. Consistent with findings reported in the Joan Ganz Cooney Center's Growing Up Digital report (Levine et al., 2008), nearly all of our survey respondents agreed that technology could help their child's learning in general, and that it could foster mathematics, reading, and writing skills in particular. Approximately three-quarters of parents surveyed felt technology was as important for learning mathematics, reading, and writing skills as activities such as reading books or doing homework. With parents valuing technology's role as much as traditional academic activities, it is critical that children and families have access to high-quality tools—from media to software to Internet access—that truly support early learning.

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6 Because the sample sizes for 2- to 5-year-olds and 6- to 8-year-olds were so different, we were unable to do significance testing between these two groups.

Figure 1. Parents' beliefs about technology and learning: Percentages of parents who agreed with statements regarding the role of technology for learning for their 2- to 5-year-olds and 6- to 8-year-olds

Legend: ■ 2–5 Years ■ 6–8 Years

Statement	2–5 Years	6–8 Years
Technology can help my child's learning	97%	94%
Using technology is as important as other activities	75%	77%
Technology can help my child learn important math skills	93%	91%
Technology can help my child learn important reading/ writing skills	92%	92%

Parents who participated in focus groups also expressed the belief that technology can be beneficial for learning and practicing academic content and skills. Although parents generally did not articulate specific instances of learning supported by technology, several parents identified early literacy and mathematics skills they felt benefited from the use of technology for their own child. Specifically, parents mentioned the following:

- Knowledge of the alphabet
- Spelling
- Vocabulary
- Number recognition
- Counting
- Identifying shapes
- Identifying colors

In addition to academic skills, several parents said technology was useful for learning English as a second language and for improving fine motor skills (through the use of a mouse and keyboard).

Many parents also noted the importance of being comfortable with digital tools and being able to make the most of them given technology's prominence in the world today and for the future. Several parents said they felt today's children were advanced compared to what they were like at that age, thanks to access to technology. Parents also felt that there are higher expectations now for what children in

preschool should learn, compared with the past. One important expectation is to be comfortable and familiar with a variety of technologies, even at a very early age. One parent remarked:

> I think technology is going to revolutionize how we learn, how we do everyday things…Our preschoolers are sharper than us nowadays…We didn't have the resources that they have now. I think it's awesome...Had we had those resources, we [would] be…at least 10 years ahead of where we are now.

Another parent summed up the sentiment of many with the comment: "Technology is the future so it's very important that [children] just get used to learning how to use it and doing different things with different technologies."

Parents supported use of technology in the classroom, within limits.

Parents in our focus groups unanimously agreed that having technology at school is crucial for academic success. As noted above, they wanted their children to know how to use technology tools so they can be successful in the future. Specifically, focus group parents expressed generally positive attitudes toward the PBS KIDS transmedia-rich mathematics curriculum supplement that was part of our Preschool Pilot study and, in particular, they were pleased with the presence of interactive whiteboards (IWBs) and laptops in the classroom. Several parents felt the presence of the IWBs and laptops was an "exclusive" learning opportunity for their child, something not every preschool was able to provide for children.

Parents noted in particular the interactivity and child-friendliness of the devices in the classrooms, saying they believed these features contributed to children's engagement with the content and ability to stay focused on the device for extended periods. One parent reported her child's view of the IWB: "There's a big iPhone. It's magnificent. I can draw and they can show [movies] like a theater, or I can play a game." Another parent identified the independence that technology can provide, by stating about the IWB: "[The kids] get more excited, like, 'I can do this for myself. I don't need help.' It's kind of fun and neat for them to get to control on their own."

A few parents in our focus groups drew connections between their child's transmedia-rich classroom experiences through the Preschool Pilot and what they believed was increased learning. For example, one parent said, "[My daughter is] more interested in numbers." Another felt her child was noticing shapes more outside the classroom because of what she was doing in the classroom, while two other parents said they thought their children's addition skills were improving. As the Preschool Pilot did not include an explicit home-school connection, most parents were not aware of the purpose of the Preschool Pilot beyond the provision of technology. Likewise, few parents could identify the content of what children and teachers were doing as part of the Preschool Pilot, or articulate ways in which they expanded learning begun with the Preschool Pilot.

Parents agreed that although technology is good for learning in school, the amount of time that children spend with technology should be limited to allow time for other types of learning. One group of parents decided approximately 1 to 1.5 hours per day was the proper amount of time for children to use technology in school. Other parents offered lower limits, with one suggesting 30 minutes a day was enough, while another parent believed one trip to the computer lab each week was appropriate. Parents did not articulate the factors contributing to these decided time limits.

Although television and computers were the most commonly used technologies, many children had access to a variety of digital devices within their homes.

The so-called "digital divide" is real, but narrowing, as more and more children growing up in traditionally underresourced communities are living in homes peppered with digital devices. Children of the parents we surveyed and who participated in focus groups used a wide variety of technologies for a wide variety of purposes outside of traditional school settings. Parents we surveyed reported televisions and computers as the most used technologies, concurring with findings from Common Sense Media's Zero to Eight report (Rideout et al., 2011). Also reported as often used were DVD or VHS players, the Internet, and digital educational toys.

Parents reported usage differences based on the age of children. Greater usage was reported for 2- to 5-year-olds than 6- to 8-year-olds for digital educational toys and smartphones. Parents reported greater usage by 6- to 8-year-olds than 2- to 5-year-olds for computers or laptops, the Internet, and console gaming devices. It is unclear from our data why these differences in usage exist; however, information discussed in detail below suggests that the ability to monitor use while on these devices and the amount of content available that parents deem as age-appropriate for these devices might be of some influence. Figure 2 provides more detailed information on technologies used by children in the home.
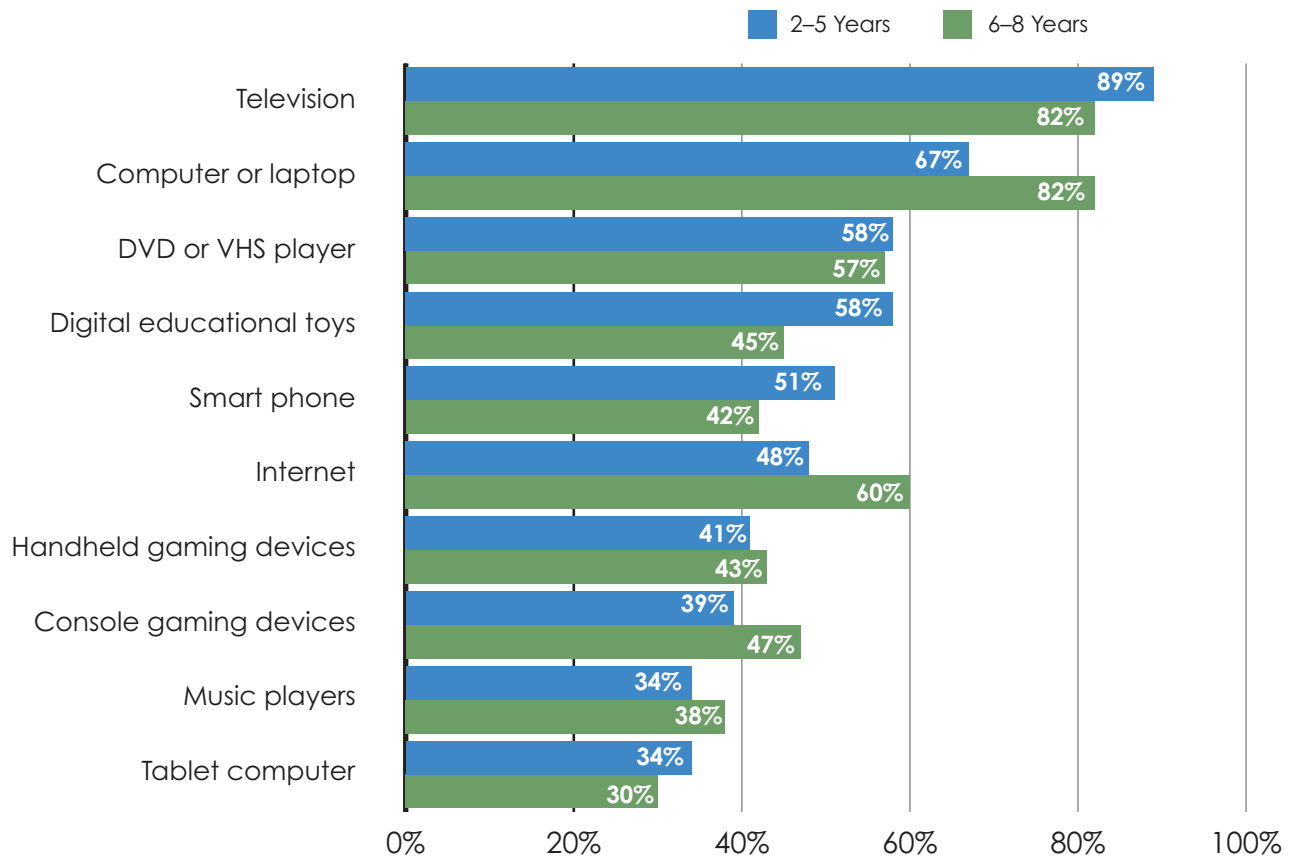
Focus group parents similarly reported not only having a lot of technology in the home, but that their young children had regular access to these devices.

Devices named by parents in our focus groups as being in homes and accessible to young children included the following:

- Computers (laptop, desktop, Macbook, Windows netbook)
- Gaming devices (Wii, Playstation, Xbox)
- Portable devices (smartphones, iPod/iPod Touch, iPad, Kindle)
- Internet connections
- Television

Along with these intergenerational technologies, some families also reported owning specific learning technology toys for children, such as Vtech and LeapFrog products.

Figure 2. Children's use of digital devices: Percentages of parents who reported their 2- to 5-year olds and 6- to 8-year-olds using digital devices
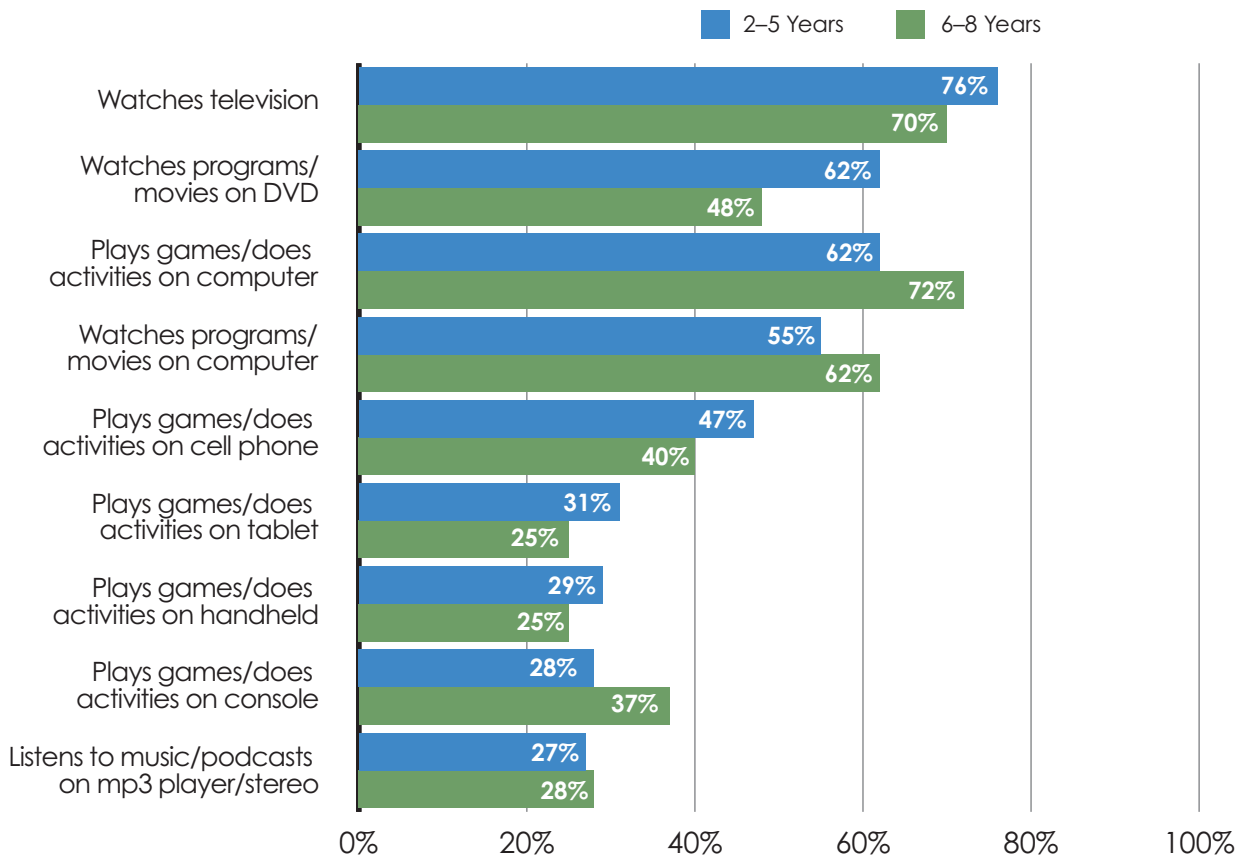
Legend: ■ 2–5 Years ■ 6–8 Years

Device	2–5 Years	6–8 Years
Television	89%	82%
Computer or laptop	67%	82%
DVD or VHS player	58%	57%
Digital educational toys	58%	45%
Smart phone	51%	42%
Internet	48%	60%
Handheld gaming devices	41%	43%
Console gaming devices	39%	47%
Music players	34%	38%
Tablet computer	34%	30%

Parents tended to associate specific media platforms with learning, often pairing a device's form with its potential to be educational.
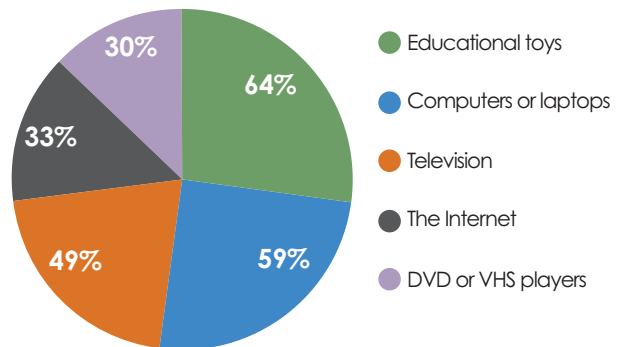
Parents' responses to survey questions about the activities their child engages in with technology and the types of technology their child uses for learning suggest that they associate particular types of technology with learning more so than others. Specifically, the majority of surveyed parents said they believed that watching programs on television, tape, DVD, or the computer helps their child to learn mathematics, reading, or writing. Most parents also indicated that playing games or doing activities on a computer helps with learning, particularly for older children.

Listening to music or playing games on a handheld or console gaming device were less frequently endorsed as helping with learning. Also of note, only about a quarter of parents reported that playing games or doing activities on a tablet device helps their child learn mathematics, reading, or writing. Fourteen parents wrote in responses noting use of devices not listed in the survey—most commonly, use of digital toys such as the LeapPad. Very few of the parents we surveyed reported that their child does not use technology outside of school for learning. See Figure 3 for more detail.
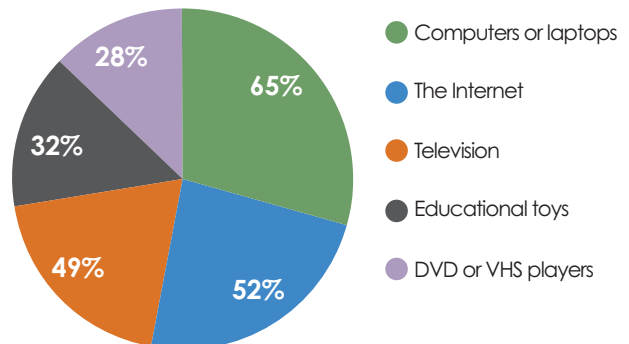
Figure 3. Percentages of parents who identified behaviors with technology as beneficial for learning for their 2- to 5-year-olds and 6- to 8-year-olds

Legend: ■ 2–5 Years ■ 6–8 Years

Behavior	2–5 Years	6–8 Years
Watches television	76%	70%
Watches programs/movies on DVD	62%	48%
Plays games/does activities on computer	62%	72%
Watches programs/movies on computer	55%	62%
Plays games/does activities on cell phone	47%	40%
Plays games/does activities on tablet	31%	25%
Plays games/does activities on handheld	29%	25%
Plays games/does activities on console	28%	37%
Listens to music/podcasts on mp3 player/stereo	27%	28%

We also asked parents we surveyed to rank which technologies they felt were best for teaching their child mathematics, reading, or writing outside of school. For 2- to 5-year-olds, parents rated the top five technologies (in order) for teaching as follows:

Pie chart (2- to 5-year-olds):
- Educational toys 64%
- Computers or laptops 59%
- Television 49%
- The Internet 33%
- DVD or VHS players 30%

For 6- to 8-year-olds, parents selected the same five technologies as their top five, but the order varied slightly as follows:

Pie chart (6- to 8-year-olds):
- Computers or laptops 65%
- The Internet 52%
- Television 49%
- Educational toys 32%
- DVD or VHS players 28%

Less often ranked as beneficial were tablets, smartphones, handheld and console gaming devices, and music players (see Figure 4). Devices like tablets and smartphones may be ranked lower because fewer families own them and less content, including free content, is available on these devices compared to a computer using the Internet. As availability increases and as applications for children proliferate, parents' views may change.

Figure 4. Parents' rankings of technologies they thought were best for teaching mathematics, reading or writing, for 2- to 5-year-olds and 6- to 8-year-olds
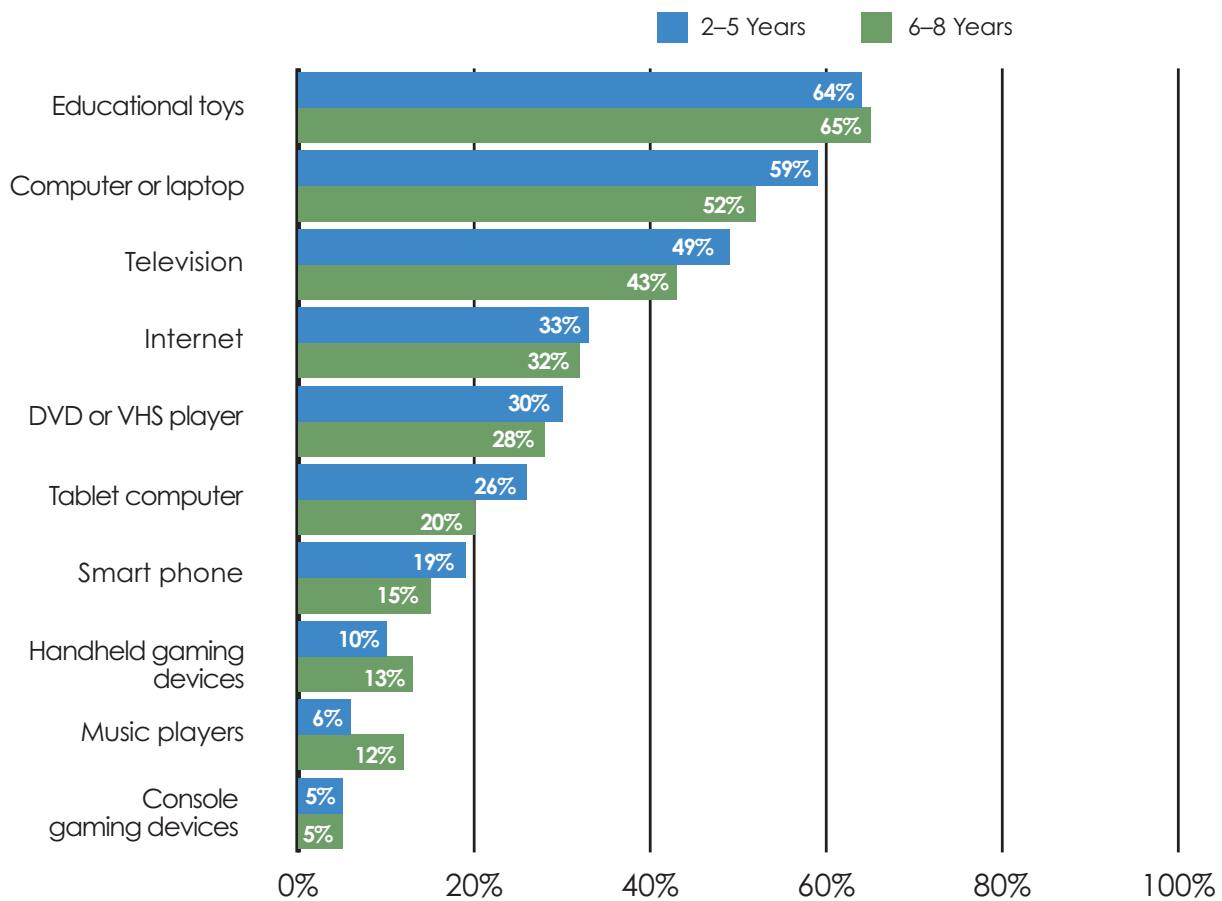

Note: All parents' responses are included in the analysis for this figure—we looked at whether responses were different based on which technologies parents reported that their children used, but saw no significant differences from the survey sample as a whole.

The majority of parents surveyed limited their child's use of technology for learning in some way, similar to findings from other studies (e.g, Takeuchi, 2011). In our survey sample, only 30% of respondents said they did not limit their 2- to 5-year-olds' use of technology while 17% of respondents did not limit their 6- to 8-year-olds' use of technology. As shown in Figure 5 below, an oft-cited reason for limiting a child's technology is that parents think their child already used too much technology. Of note, only a few families (4% of parents of 2- to 5-year-olds and 5% of parents of 6- to 8-year-olds) said they limited technology use because it was not available in the language they speak at home; similarly, few (3% of parents of 2- to 5-year-olds and 5% of parents of 6- to 8-year-olds) limited use because they thought technology did not help their child learn.

Figure 5. Parents' reasons for limiting their 2- to 5-year-olds' and 6- to 8-year-olds' use of technology for learning mathematics, reading, and writing
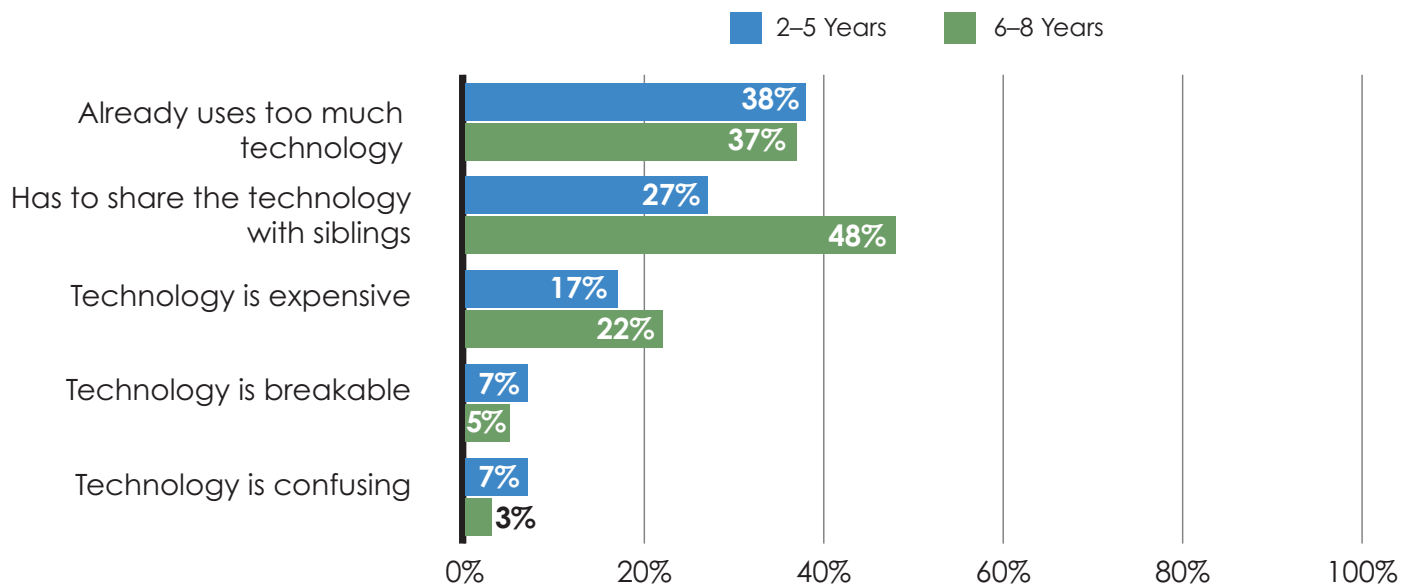
In focus groups and in comments written on surveys, parents explained other ways they limit technology use or further explained the limits they set. Several surveyed parents noted other activities or learning methods they wanted their children to have time for the following:

- "I like to use traditional ways like paper and pencil, blocks, and different objects at home."

- "I want them to explore other ways of learning as well."

- "I think to use manipulatives and things around the house/neighborhood [is] good as well."
- "I…limit the use of technology so my child can read books [and] play outside."

Focus group parents also worried that when their child is using technology, there are other important things he/she is not learning or practicing, consistent with the Cooney Center's finding that parents fear that technology use may interfere with healthy development (Takeuchi, 2011). In particular, focus group parents often mentioned that they wanted their child to spend time outside getting fresh air and exercise, with some citing concerns about childhood obesity.

A few parents were distressed over technology preventing their child from learning basic skills such as the ability to spell (because of "autocorrect" features), holding and using a pencil, and reading an analog clock.

Parents also wanted their child to interact with other people in person to help develop social and communication skills as well as to remain connected to family and friends—all things they felt technology use could interfere with. One parent expressed her concerns by stating:

> I think [technology] helps…on the academic [side]. But as far as interacting with one another, it isolates [people], because when you interact with your…device, it's a personal thing. You're one-on-one [with your device]…They have games where you can [have] partners or a group, but even still, it takes away from [things like], 'Let's sit here and talk about something.'"

The Cooney Center similarly found that parents are skeptical that technology can help children learn to communicate with others (Levine et al., 2008).

Preventing dependence on technology was another reason focus group parents cited as limiting technology use. One focus group parent said, "You don't want to be too [reliant] on technology all the time…Technology can be someone's everything. If they don't have a phone it's like the end of the world." Two surveyed parents noted concerns about children becoming dependent on technology, with one writing in, "[I] want them to understand they can do it without the use of technology—not to feel dependent on it or restricted by it."

Finally, a few parents expressed concerns about the impact of screen usage on children's vision.

Although many parents chose to set limits on their children's media use, these limits varied by family and by the age of the child.

Findings from our focus groups helped provide more context on the types of limits parents set on their children's technology use. For instance, some focus group parents set schedules for when technology use was allowed—on weekends or only after homework is complete—while one parent avoided having to limit use by purposely not purchasing devices (in particular, a handheld gaming device) for her child.

More difficult for parents to articulate was how they limited the total time spent with technology per day. Parents ranged in the time limits they imposed on their child's home use of technology, from half an hour per day to 3 hours per day.[7] However, these parents were not able to say how they decided on these time limits or what factors influenced their decisions.

When it came to monitoring use, not surprisingly, there were some differences in how parents regulated their child's technology use based on the age of the child. A few focus group participants said they have to monitor younger children (toddlers and preschoolers) when using technology, while older children (school-age) are usually self-sufficient. One parent expressed an opposite approach saying her younger children do not know how to leave the safety of the particular website she has selected for them, while she needs to more closely monitor her older children who know how to surf the Internet.

A handful of focus group participants said they did not limit the amount of time their child spends using technology at all. Parents varied in the reasoning they provided for not limiting use, but the three major categories parents described were as follows:

- They were not concerned about the amount of time their child spent with technology because all of their activities were educational (by the parents' [unarticulated] standards).
- Their child did not spend that much time using technology anyway, making time limits unnecessary.
- They have little time available to monitor their child's technology use.

Another way parents limited technology use was by limiting the types of content to which children have access; we discuss this phenomenon in more detail below.

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7 The Kaiser Family Foundation's Generation M2 report (Rideout, Foehr, & Roberts, 2010) showed that children ages 8 to 10 years old used media for, on average, 5.5 hours per day; Common Sense Media's Zero to Eight report shows that under 8-year-olds spend about 3 hours per day with media (Rideout et al., 2011). The Cooney Center's Family Matters report (Takeuchi, 2011) suggests that parents may be unaware of how much media their children consume. The estimates given by parents in our study may well underrepresent the actual amount of media their children consume.

MEDIA ROUTINES AT HOME

Parents gravitated toward television programs, websites, and digital games designed specifically for children by PBS, Nickelodeon, and Disney.

The format of our focus groups allowed us to delve deeper into not only what devices children were using, but what types of content they were experiencing through those devices. Consistent with the Cooney Center's Families Matter Report (Takeuchi, 2011), some focus group parents said they allow their child to watch only shows and play games that are "educational," articulated by one parent as, "I don't allow them to watch anything they can't learn from."

The majority of focus group parents said their child is allowed to access child-appropriate content only from providers they felt particularly safe with, such as PBS and Nick Jr. One parent indicated the Nick Jr. website helped her monitor her child's technology use, saying, "I don't have to worry about anything that's going to pop up, so I don't really always [need to] be over her." Parents also seemed to be influenced by their own positive childhood experiences with PBS; one said she still remembered the theme song for Mister Rogers' Neighborhood.

When asked about specific resources their child uses on digital devices, the three most frequently mentioned sources by parents were (in no particular order):

• PBS/PBS KIDS/Sprout
• Nickelodeon/Nick Jr.
• Disney/Disney Jr.

It is important to note that, although one parent said "All the Juniors," referring to her child's routine of television viewing and Internet play, for the most part parents did not distinguish between different outlets by the same parent company, such as PBS and PBS KIDS or Nickelodeon/Disney and their "junior" sites.

Parents reported their children also watched programs via Netflix and, on occasion, watched other programming including (in no particular order) The Cartoon Network, Adult Swim, Discovery Channel, History Channel, and Animal Planet. Use of Netflix is consistent with the Kaiser Family Foundation's finding that new ways of consuming television are taking hold with children, while use of broadcast declines (Rideout et al., 2010).

Finally, parents mentioned a few digital games by name or by content that their child or children like to play that were not necessarily associated with a larger website or company, including PictionArt, Tetris, Mario, music games, and coloring games.

On our survey, we asked parents to identify the reasons their child started using technology for mathematics, reading, or writing learning outside of school. Over half of parents said they were the ones who decided to introduce technology to their 2- to 5-year-olds and 6- to 8-year-olds for learning purposes. Additionally, parents of 2- to 5-year-olds often reported that children started using technology because they liked the characters in the learning activity. For older children, the most frequent response was that their child was using technology for fun and then found things to help with learning (see Figure 6).

Figure 6. Percentages of parents who agreed with statements regarding how their 2- to 5-year-olds and 6- to 8-year-olds children began using technology for learning
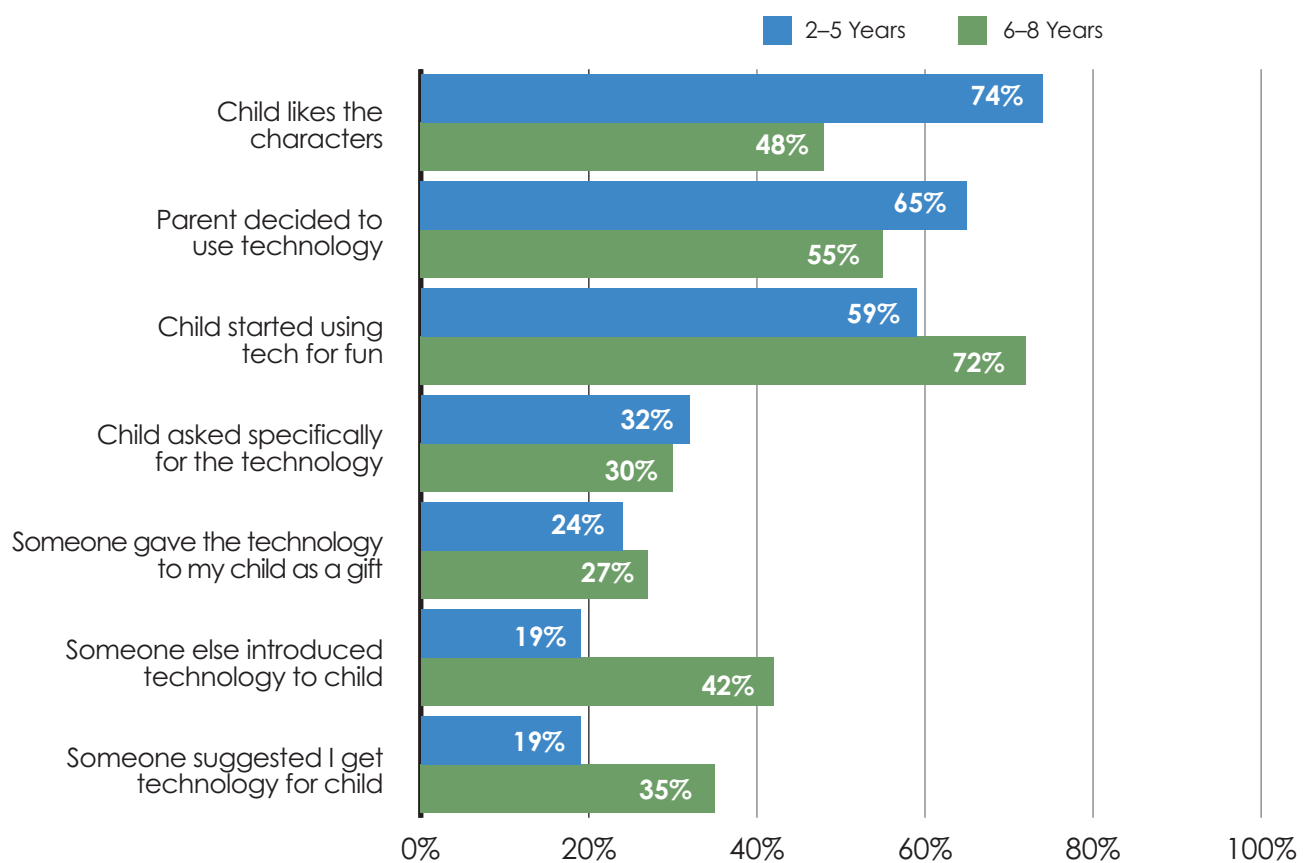
Note: Parents selected all of the reasons that applied.

Technology Buffet: Lana,[8] a mother of five children, said they had computers, smartphones, an iPad, and an iPod at home. Her children watch shows and movies via Netflix, Nickelodeon, Sprout, and Disney Junior, and play games on the Internet, too. "As far as learning, I think they can get a lot of out [of using technology] because it's the world now." She continued, "My son Sam was watching something about whales. He knew what an orca was. It's so easy for them to process everything."

Gaming…with Some Learning: A father, Hector, who noted the family had an iPad, a netbook, a laptop, and an X-Box, characterized his preschool-aged daughter, Brianna's, typical behavior with technology, "She's clicking on like the games, apps, and stuff like that, or trying to play my music or looking through my pictures." He added, "Honestly, it's not educational, but she's on the Nintendo DS a lot with Mario, she plays Mario all day." He said that he believes his daughter "likes [technology], I think, more than like the typical Lego blocks and stuff like that. She likes the digital games, video games more." He believes technology can help with learning counting and building memory, and that "books are not interesting… Digital is a lot better and more interactive nowadays." He was in favor of technology that "sneaks in" the learning, selling it to children as something fun.

Characters Matter: One mother, Diana, described her 5-year-old son, Reggie's, love of action figures, and how that had affected his technology use and learning. "Any [program] that has an action figure" is his favorite program, and she believes "he learned how to spell Spiderman before he learned how to spell his name, because he was so interested. He was like, 'Mommy, that's a S. That's a P.'" She described their family's routines, "The time goes very fast once they get out of school. By the time we get home, get settled, it's like six o'clock already. It's dinner time, bath time, and then we do a little work. And then I try to incorporate a little bit of work before saying, 'Okay, you can watch some of your show and then we have to go over your numbers.'" She added that sometimes they use her phone to practice numbers or the alphabet, because when they do it that way, "He's just thinking he's playing a game." But even so, she tries to read a book every night because she wants "to do a little bit of both"—use technology and use more traditional learning resources.

Technology Shuffle: One mom, Sarah, described her 4-year-old daughter's technology habits: watching shows on PBS in the morning, then watching Nick Jr. in the afternoon and playing Nick Jr. games online. Additionally, she added, "Sometimes Willow just likes to play on her own. She's always in her room drawing now. She thinks she's like a scientist. She always likes to invent different things." Sarah also noted that Willow has gone through different phases with technology preferences, "[Right now] she's really fond of the Kindle. Before that, it was the laptop." She sees technology as constantly providing new challenges to children and allows them to emulate adult behaviors. She believes technology "adds to [children's] educational experience".
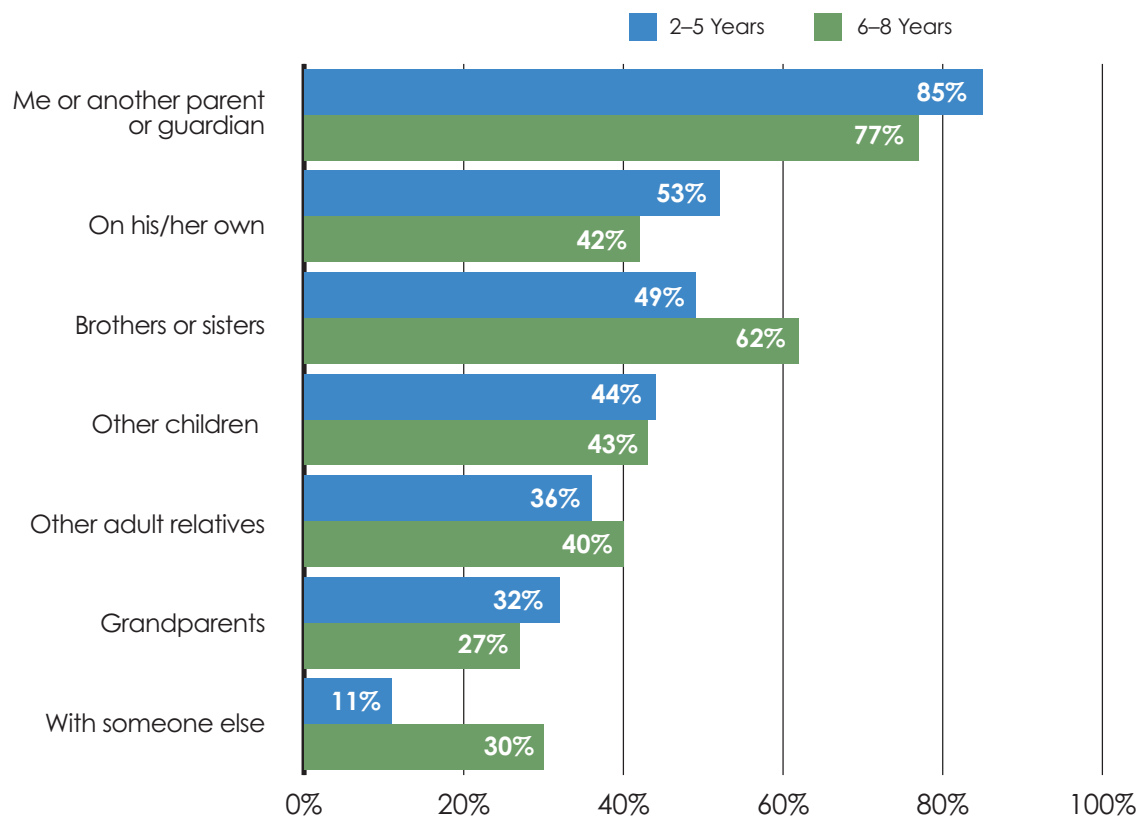
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8   This is a pseudonym, as are all parent names in this report.

The overall consensus from these families was that technology is both fun and educational for their children; however, parents usually had a difficult time describing specifically what constituted an educational experience with technology and what it meant for their child to "learn" from an experience with technology. This difficulty highlights an important area of need for parents: assistance in identifying which experiences are most beneficial for their child and how to evaluate growth and progress, to make smart decisions on behalf of their young learners.

Home technology-infused routines could be social, as digital play was an occasion for children to watch, explore, and play together with their parents and other family members.

Nearly all surveyed parents reported that their child engaged with technology with them or with another parent/guardian. Parents also reported that it was common for their child to use technology with siblings or with other children. For 6- to 8-year-olds, use of technology with "someone else" (like afterschool program or summer camp coordinators, neighbors, librarians, or babysitters) was also somewhat common; however, these interactions were reported less frequently for younger children (2- to 5-year-olds). Over half of our parents reported that their 6- to 8-year-olds use technology on their own, while this number was lower for 2- to 5-year-olds. Figure 7, below, details the social situations in which parents report their child uses technology.

Figure 7. Percentages of parents who agreed with statements regarding with whom their 2- to 5-year-olds and 6- to 8-year-olds use technology

Legend: ■ 2–5 Years   ■ 6–8 Years

	2–5 Years	6–8 Years
Me or another parent or guardian	85%	77%
On his/her own	53%	42%
Brothers or sisters	49%	62%
Other children	44%	43%
Other adult relatives	36%	40%
Grandparents	32%	27%
With someone else	11%	30%

Note: Parents selected all that applied.

We also asked parents to identify, specifically, the ways in which they engage with technology with their child. As shown in Figure 8 below, parents reported a wide variety of ways they used technology with their child. Most prominently, they checked to see that their child was learning. Parents also reported being available to help their child when asked. Very few parents reported not interacting with the technology at all with their child (4% of parents of 2- to 5-year-olds, 3% of parents of 6- to 8-year-olds).
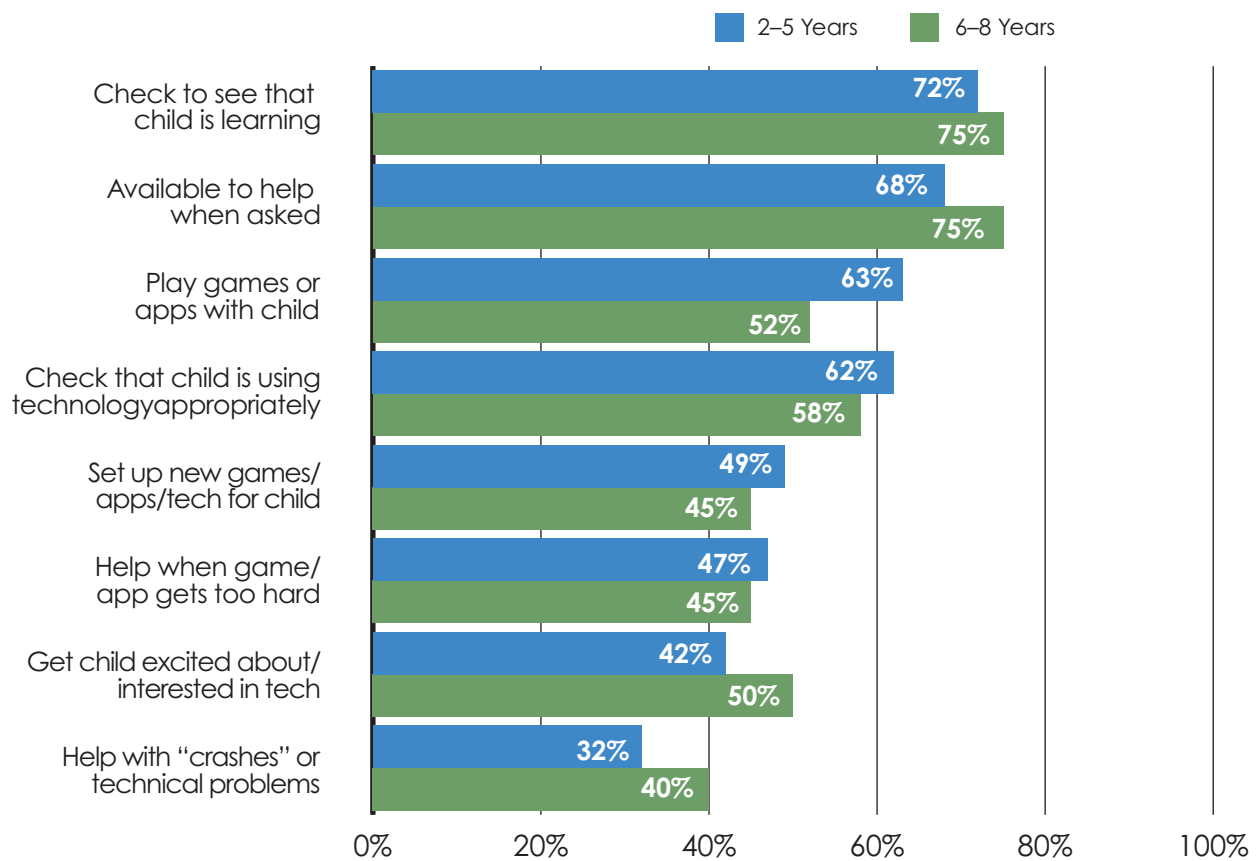
Figure 8: Percentages of parents who agreed with statements regarding their role in helping their 2- to 5-year-olds and 6- to 8-year-olds use technology

Legend: ■ 2–5 Years ■ 6–8 Years

Statement	2–5 Years	6–8 Years
Check to see that child is learning	72%	75%
Available to help when asked	68%	75%
Play games or apps with child	63%	52%
Check that child is using technology appropriately	62%	58%
Set up new games/apps/tech for child	49%	45%
Help when game/app gets too hard	47%	45%
Get child excited about/interested in tech	42%	50%
Help with "crashes" or technical problems	32%	40%

Sometimes parents relied also on older siblings to help younger children with technology. For instance, several focus group parents noted that older siblings often acted as technology teachers to younger siblings. One parent felt her 3-year-old was learning more about technology from his 9-year-old sister than he was from her.

Like survey respondents, focus group members also reported interacting with their children as they used technology, relaying stories of how families used technology to enrich time together. But in some cases, technology use seemed to circumscribe potentially rich family interactions. For instance, one parent described her child's love of cooking, but when asked whether she and her child cooked together, she said no, that her child watches cooking videos on YouTube.

Anecdotes like this suggest parents might benefit from specific suggestions for hands-on activities with their children related to media they are engaging with, to further expand learning and foster rich family interactions.

Parents engaged in a wide variety of roles when it comes to media engagement, from technology provider to monitor to learning supporter.

Expanding on the survey data regarding the ways parents engaged with technology with their children, our focus groups showed that parents assumed many roles when it came to navigating their child's home technology experiences. At times, parental roles looked similar to the roles played by teachers, which we described in a 2011 study.[9] At other times, their roles were unique to the needs and responsibilities of being a parent. Because focus groups were one-time, short interactions with small groups of parents, roles included here should be considered a starting point for further research. Also, as was the case with teacher roles, parents often moved among multiple roles, reflecting children's multilayered needs on any given day.

Tech Provider: As it did with teachers we studied in our 2011 Context Study, technology use often started with parents. But unlike teachers, parents did not describe themselves as playing a troubleshooting, make-sure-the-device-is-working role. A few parents in our sample described themselves as the provider of technology, but as otherwise unneeded by their child who was already tech-savvy.

- One parent said, "I didn't teach my kid [how to use technology]; he's 4 and he figures out how to play games on my phone."
- Another parent said about her son, "He's always on my phone or he's on a laptop, and I'm like, how do you get to this stuff?"

Apprentice: Instead of acting as troubleshooting helpers for their children, a few parents described themselves in a role reversal, in which they were learning about technology from their child.

- One said, "Some things [on the computer] are scary to do. Sometimes you want to download something and I don't know how...sometimes my kid is teaching me more than I'm teaching [him]."

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9 In our 2011 *Ready To Learn* Context Study (Education Development Center & SRI International, 2011), we identified four distinct roles that early childhood teachers took on when using technology in their classrooms: (1) Tech Support, jumpstarting children's media use, addressing technical problems; (2) Pop-up Guide, providing welcome and surprise visits to children's transmedia play; (3) Sherpa, drawing children into and guiding them through rich exchanges with technology; and (4) Creative Director, helping children use technology to generate content or express themselves. .

Monitor: Several parents spoke about their role as a monitor of technology use, making sure their child did not veer away from parent-approved, child-appropriate websites and games, or ensuring that their child did not go over the time limits they had set.

- One parent described sticking to a "strict schedule" after school: "Thirty minutes for computer fun; one hour if it's school-related."

- Another parent noted the need to look over and see what children are doing: "[If] they're just looking at violent YouTube videos or you're not paying attention to the content and something sexual pops up or just something that is not beneficial to the child, then that's bad."

- One parent feared that as her child got older, he would learn to stray from PBS and Leapfrog, which she feels are safe.

Life Balancer: Several parents described a balancing act they play, wanting their child to use technology because it can be educational, but also wanting to make sure they have time for playing outside, participating in sports, and other activities.

- One parent said, "If it's educational games, I want them to have time for that because it'll help them up here [pointing to her head], but I want them to be active and do sports too…It's good to stay current and hip, but at the same time play catch with your son and do hopscotch with your daughter."

Free-Ranger: Often, parents said they let children use technology with little supervision. They said they trusted their children to remain within bounds, and noted that, with busy lives, it is difficult to watch every moment that a child is using technology. Some parents described playing both a monitoring role and allowing children to use technology with less parental direction depending on the situation.

- One parent said about her daughter, "She's a fast learner. She can do things on her own so even when she's on the computer I trust her and she knows what she's not supposed to do."

- One parent described downloading all the free apps in the children's section of the app store and then allowing his daughter to "freely pick whatever works best for her."

Parents admitted that they weren't always watching, but did not think their children were wandering from the sites and games they approved. One parent said, "My 3-year-old knows how to work the iPod… I don't need to sit there with my 5-year-old…He does what he does, he goes where he wants to go, and he knows what he wants to do. They go on Netflix; they go on the Disney Junior website. He knows what he's doing, you know, so I don't have to worry."

CLOSE-UP OF ACTIVE ENGAGEMENT

One focus group participant described the ways she supports learning through technology for her children:

> [One child] will come in [and say], "Look, Sid's on," or [his sister will] come in and is just like, "So and so is on." So we make it kind of like a family thing; as they're watching, I'll test their memory, more so the older one than the little one. So I'll ask her, what does she think about the situation? What would she do? What part does she like about it? What does she not like about it? I always question her so that it's not just she's just glued to the TV. She's thinking and then, when she's on her own, I get near her in the room. She maybe draws something about what she saw or, if she can keep her brother's attention, then she becomes the teacher. She's reenacting what she's seeing and what she learns.

Beyond just watching together, she would also relate viewed content to everyday activities and sometimes even take outings specifically related to content viewed on television:

> I try to incorporate whatever she has learned on the computer or whatever she's seen on the TV out into real life. […] So when we're out somewhere, even if we're shopping or we may go to the park or to the zoo or whatever, and something might jog in my head and I'm like, "Remember when we were watching such and such and we saw…" and at that point it becomes monotonous because then she replays the entire [episode]…I always try to interact it with our daily life outside of the home. It doesn't make her one-dimensional. She can see what she's seeing on TV or what she's done in school, how it relates to anything else outside.

Learning Booster: As noted above, most survey respondents indicated that they took a role in making sure their child is learning while using technology. In focus groups, however, parent responses indicated that there are many real-life barriers to this practice. Though focus group participants expressed a desire to support their children's learning with technology in a more hands-on way, as teachers did in limited ways in the "pop-up guide" role and more elaborate ways as "sherpas" and "creative directors," only a few parents were able to articulate ways in which they try to guide their child's learning with technology.

A few parents characterized their role with regard to their child's technology use as an intermediary, making sure that learning was happening. In some cases, parents reported doing chores or other work while their child was working with the technology, but remaining nearby to answer questions if and when the child asked. A few parents reported engaging more actively, sitting with their child during the activity, and doing the activity jointly, such as playing online games or activities, and doing creative apps such as taking pictures and making collages. A few felt that, compared to school, where teachers are working with many children at once, parents have an opportunity to work with their children one-on-one, helping them with technology and boosting the learning in the experience.
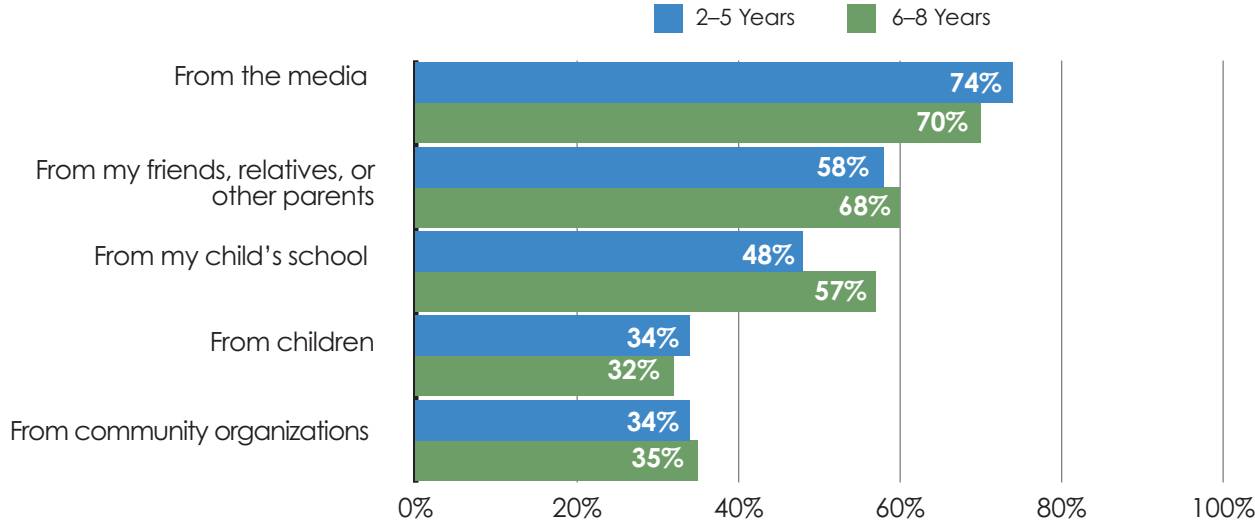
- One parent described teaching children the alphabet of his native language with technology, but noted that the children were learning more from him than from the computer.

- One parent said that while her child uses technology, "[I ask] stuff like, 'What are you doing?', 'What is that?', 'How much is this?' [We'll sit] side-by-side, you know, trying to figure stuff out together. Even though I might know it, I'll [ask], what is that, what are you doing?"

- One focus group participant described particularly rich family interactions around technology. She used the technology as a jumping-off point for a variety of other activities and learning opportunities. While watching, she would talk with children about what they were viewing, and, when they were not watching, she would relate what they had seen on TV or the computer to events in their everyday lives. (See sidebar for more detail.) Although this type of in-depth interaction was rarely mentioned by any other focus group or survey participant, it represents the types of interactions that are possible when technology is used in an active, didactic interaction with parents.

SUPPORTS AND BARRIERS TO TECHNOLOGY USE

Parents looked to the media, other adults, and their child's school for information when making decisions about children's technology use at home.

Parents responding to our survey most often reported that they obtained information about technology and learning from the media. Parents also reported receiving information about technology for their child from other adults such as friends, relatives, or other parents. For parents of 6- to 8-year-olds, their child's school was also an oft-cited source of information. Parents who wrote in survey responses noted searching for games and apps on their devices, reading reviews in the device's app store, and browsing in bookstores for software. These findings suggest that media and marketing play a large role in the decisions parents make regarding technology use for children; as such, care and responsibility should be taken when distributing information to families via television, magazines, newspapers, and the Internet. Figure 9, below, provides more detail on sources of information parents use to find out about technology and learning.

Figure 9. Percentages of parents who agreed with statements regarding where they got information about technology for learning for their 2- to 5-year-olds and 6- to 8-year-olds

Legend: ■ 2–5 Years ■ 6–8 Years

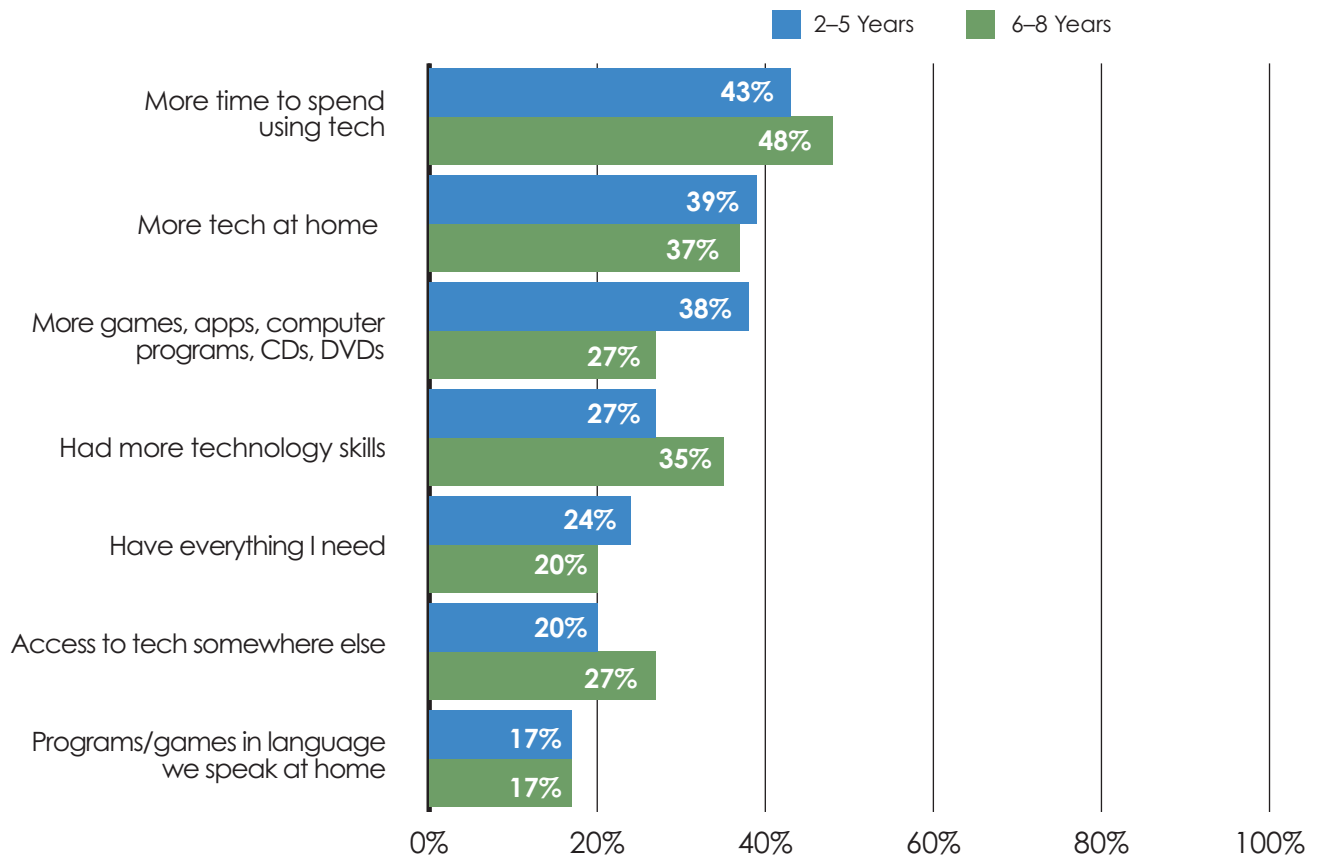| Source	2–5 Years	6–8 Years
From the media	74%	70%
From my friends, relatives, or other parents	58%	68%
From my child's school	48%	57%
From children	34%	32%
From community organizations	34%	35%

In focus groups, parents cited teachers as a source of information, as well as friends, other parents, online resources, and the library. Parents lauded the amazing powers of Google and YouTube for providing answers to all sorts of questions. Others saw Facebook as a valuable research tool, saying they could pose a question on Facebook and easily solicit advice from many friends at once. A couple of the focus group parents noted that their local library had computers for children to use, loaded with learning activities and educational games.

Parents had a growing appetite for educational technological resources and would have liked to have had more time to use them with their children.

When asked what other resources would make it easier for them to use technology to help their child's learning, the most endorsed response for parents of both 2- to 5-v and 6- to 8-year-olds, was more time to spend using technology with their child. Parents of 2- to 5-year-olds also reported that they needed more technology and more games and applications; while for their 6- to 8-year-olds they needed more technology and more technology skills. One parent wrote in an additional response,"[I am wishing for] a faster way/channel for us to know what kind of technology/product is most suitable/helpful for kids"—echoing the suggestions above regarding careful and deliberate distribution of information to parents regarding how to evaluate and select appropriate and beneficial technology and media for their young learners. About one-fifth of parents surveyed said they had everything they needed. Figure 10, below, displays the needs of parents to help their child use technology for learning.

Figure 10. Percentages of parents who agreed with statements regarding where they needed to use technology more for learning with their 2- to 5-year-olds and 6- to 8-year-olds

Legend: ■ 2–5 Years ■ 6–8 Years

Statement	2–5 Years	6–8 Years
More time to spend using tech	43%	48%
More tech at home	39%	37%
More games, apps, computer programs, CDs, DVDs	38%	27%
Had more technology skills	27%	35%
Have everything I need	24%	20%
Access to tech somewhere else	20%	27%
Programs/games in language we speak at home	17%	17%

Focus group participants indicated similar barriers to using technology with their children: time, money, and knowledge/skills. A number of parents wanted to spend more time with their children using technology, but their busy schedules do not allow them to support their child's interactions with technology as much as they might like.

- One working parent who was also going to school said, "I don't put as much time into it as I should. I do 101 things in a day. It's hard to juggle two kids, my professional life, and home. I also am going to school."

A few parents noted that they had found websites or online games that looked like they might be really valuable for their children, but that they could not afford these fee-based resources.

Finally, some parents acknowledged that they do not always have the knowledge or skills to answer their children's questions.

- One parent said, "I'm still trying to figure things out on my phone. And [my son just says], 'Oh, Mommy, no, it's like this.'"

Not surprisingly, although devices are becoming more prevalent in all kinds of homes, including those of the traditionally underresourced families included in our focus groups, parents also expressed a desire for a variety of resources: a faster computer, a Kindle or other e-reader, a LeapPad, and interactive whiteboards for classrooms, among others.

- One parent said she would like, "anything that will help my child to learn better, that will make the teacher more efficient."

FUTURE CONSIDERATIONS

Growing out of the findings of our research, below is a set of considerations for those responsible for the public media system and those who study it, as well as the children and families it seeks to serve.

CPB, PBS, AND PRODUCERS

In supporting programs and initiatives designed to benefit parents and caregivers, we recommend decisionmakers within the public media system seek to do the following.

- Remember that while many low-income families are using broadband connectivity and emerging digital technologies such as tablets and smartphones, the "digital divide" is real for other families who have not adopted these technologies and may not be on a path to doing so anytime soon.

- Continue to commit to deeply held, noncommercial values and continue to provide parents with support in distinguishing between commercial and public media resources, especially as the media landscape becomes increasingly cluttered and the mechanisms parents use to find their way and select media proliferate. PBS resources have occupied a special place in the hearts and minds of parents and are identified with putting education and children's well-being first.

- Use PBS KIDS transmedia to connect parents with teachers and children's home selves with their school selves. The specifics of classroom learning remain elusive for many parents, but PBS KIDS characters, games, and videos provide concrete hooks into educational experiences. Leading with the crossover appeal of transmedia and describing the learning that the suites support in easy-to-follow language is a way to help children move fluidly between home and school.

- Support parents as they establish new routines involving new digital content and devices. Messages and concrete guidance about limiting media use as well as making the most of digital tools will resonate with parents who are apprehensive about technology and its tendency to takeover other activities, but want to take advantage of its potential benefits for their children.

- Acknowledge and help parents navigate the multiple roles tied to technology and media that they enact weekly (if not daily). Single-identity approaches to parents will not go far, given how dynamic home life can be. From PBS Parents to the Progress Tracker to PBS KIDS productions themselves, parents can be addressed for what they are: responders to many family needs, often at the same time.

- Build on the trust and positive regard created through decades of creating and broadcasting uniquely educational programs featuring special characters, by creating games and curated transmedia experiences that likewise are distinct in their high educational and production value.

- Consider how learning resources themselves, and the emerging Progress Tracker tool, can provide parents with information that is desired and helpful. This approach may include helping parents understand what important learning is happening in a given resource or experience ("Learning shapes is an important part of early mathematics") and creating and sharing the most salient information about that learning ("Maria worked hard to learn new numbers by playing Curious George games").

- Consider the design and progression of new transmedia suites—designing experiences that follow a development progression through related skills, supporting children and their families as children's skills advance.

- Continue to work on games that support and require peer interaction—in the form of game and mouse sharing—to address parents' concerns over the isolation of digital games and to capitalize on peer-to-peer learning prevalent in so many early childhood settings.

RESEARCHERS

As much as the researchers who conducted this study and its companion, the Context Study of the Use of Technology and PBS KIDS Transmedia in the Home Environment (Education Development Center & SRI International, 2012), want them to be useful to the *Ready To Learn* community, they are a mere snapshot of parents' thoughts and perceptions of digital media. There is much still to learn and discover. While groups like the Joan Ganz Cooney Center, Kaiser Family Foundation, Common Sense Media, and Pew Internet & Family Life are likely to continue conducting the work of large-scale surveys and broad scans, and ethnographers and university-based research institutes will strive to delve more deeply into fine-grained studies of home life, below are considerations for research likely to be directly relevant to CPB-PBS *Ready To Learn Initiative* and the U.S. Department of Education:

- Expand what is known about the types or patterns of media/technology-centered interactions that are taking place within and across families, and how these interactions may support learning and healthy development.

- Seek to understand better what motivates parents and children to jointly engage with media and technology at home, focusing especially on ideas about the ways that fun or playful educational activities are traveling home from school, other community settings, or social networks.

- Identify what ingredients are necessary for families to engage in rich, educational interactions while using media. In particular, it would be useful to understand the role played by access and availability of technology, and what part is played by human know-how and attitudes of family members.

- Explore and develop ways to better converse with parents about the decisions they make regarding technology, while providing parents with better tools and language to convey their technology use as well as their desires and concerns.

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