

REFLECTIONS ON THE READY TO LEARN INITIATIVE 2010 TO 2015

How a Federal Program in Partnership with
Public Media Supported Young Children's Equitable
Learning During a Time of Great Change



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INTRODUCTION

Between 1994 and 2015, the federal Ready To Learn Program administered by the U.S. Department of Education made a substantial investment in public media intended for children and families, especially those living in communities with high concentrations of poverty.

Although this Initiative has been administered structurally as a traditional federal program—awarding five-year grants to PBS, the Corporation for Public Broadcasting (CPB), and, in recent years, other broadcast recipients—functionally, it has been much more than that. What started as a plan to use public television programming to promote young children’s school readiness, following the then-dominant one-to-many broadcast model, evolved into a multi-layered venture reflecting changes in technology, media, and the learning sciences.

By 2015, the Initiative included the following:

- **Transmedia production and distribution:** big- and small-screen videos featuring original narratives and characters coordinated with mobile apps and online games to promote learning
- **Community engagement tools:** locally tailored outreach, with caregiver and educator resources meant to support families experiencing educational uncertainty
- **An independent program of research:** rapid-response formative research and rigorous efficacy studies, including randomized controlled trials adhering to What Works Clearinghouse standards

No period in the Ready To Learn Program’s history experienced more demonstrable change than the last five-year grant cycle, 2010–2015. During this time, there was growing social and economic inequality; for example, a greater number of children, many of them English language learners, were living in poverty than when the Initiative began two decades earlier.

There also was unprecedented innovation in the ways that families engaged with digital technologies. For instance, touch screens, such as those on smartphones and tablets, did not exist when the recent grant was getting underway. By 2015, they had found their way into many parents’ pockets and students’ backpacks.

As attention-grabbing as the technological change was, the Ready To Learn Program continued to focus on two essentials. First, it prioritized high-quality, highly visible multi-media productions, and related resources and services available in nearly all American households. Second, it stayed focused on the needs of children living in low-income households, who are as capable as their peers but who lack reliable access to educational supports associated with school achievement that are commonplace in middle- and high-income households. It is the pairing of these two—national reach and a focus on supporting our nation’s most vulnerable young children—that makes the Ready To Learn Program worthy of greater attention as a model for educational media and community engagement.

WHY THIS PAPER NOW

Education Development Center, Inc. (EDC), and SRI International served jointly as the summative evaluation partner to CPB and PBS during the 2010–2015 grant period. Our research team saw how the children’s media landscape shifted during those five years and were formally responsible for studying its new contours. Although much of our research was concerned with questions of efficacy—how well, and in what ways, the content and resources supported children’s learning—an essential dimension of our role was to communicate what we discovered about this enterprise to the field of early learning practitioners committed to using digital media to support young children’s healthy development. This capstone paper is an extension of that role.

CPB asked us to reflect on its work and, more importantly, to have others do so as well.

In spring 2015, as the grant period was coming to a close, CPB invited us to share our reflections on the state of children’s media in general and on the Ready To Learn Initiative in particular. We carry an insider-outsider status—our not-for-profit organizations are independent of the public media system, yet our Ready To Learn research is funded through the CPB-PBS cooperative agreement administered by the U.S. Department of Education’s Office of Innovation and Improvement, all of which necessitates a “critical friend” relationship. Not wanting the five years of effort, discovery, accomplishment, and learning to get lost in the work that followed it, CPB asked us to reflect on its work and, more importantly, to have others do so as well. We conducted interviews with 26 prominent children’s media researchers, producers, and thought leaders within the public and educational media spheres. (See the Appendix for a list of interviewees.)

Not surprisingly, the interviews were far-ranging in some cases, but they all centered on four overarching questions:

- What has changed in the field of children’s media since the Initiative began in 2010?
- What have we learned about children’s media?
- What is the state of children’s media today?
- What is next for the field of public media and children’s content?

Many of the media professionals we interviewed were directly involved in the CPB-PBS Ready To Learn Initiative over the previous five years. Most are engaged with thinking about the roles that media can play within the public sphere, and how they personally can advance the cause of equity in the lives of young children by enriching their learning experiences in and out of formal learning environments. Note: as insightful as this set of interviewees was, we are sure there are other individuals whose work in this field is compatible and valuable whom we did not interview.

In addition to the interviews, we conducted a review of scholarly articles and public reports focused on children’s media and learning published since 2010. The children’s media field expanded and matured between 2010 and 2015, and the output of many organizations and federal and state agencies concerned with early learning grew during that time. Our review was not exhaustive, but we did seek to reflect the increased level of activity around children’s educational media.

What follows is a thematic distillation of the interviews and document review through our research partner filter. Our aim is to retrace the ground covered by the CPB-PBS Ready To Learn Initiative over the past half decade, all the while placing it in the wider topography of educational media. We call out areas of valuable movement, from the standpoint of what we know about young children’s needs, as well as places where more growth is possible.

EDUCATIONAL MEDIA'S NEW PROMISE



“One of the things that I find most interesting about today’s apps is that they’re touchable—they fit very young fingers and the cognitive skills of really young children.”

SANDRA CALVERT, GEORGETOWN UNIVERSITY

The years between 2010 and 2015 were a dynamic time for American families’ engagement with educational media. Media devices took new forms, became more personalized, encouraged greater social connection, and delivered a staggering number of content choices. Although the April 2010 issue of *Wired Magazine* predicted the tablet revolution (Levy, 2010), the broad adoption and use of smartphones and tablets was not widely anticipated. In fact, a 2009 Nielsen Report, titled *Youth and Media: Television and Beyond* (Nielsen Company, 2009), emphasized the potential of video-on-demand and DVR technologies—but not touchscreen mobile technologies—in its analysis of the future of media and the educational media landscape.

The 2010 Ready To Learn grant application that CPB and PBS submitted to the Department of Education did not include tablets in its core content production and outreach plans, because those devices simply were not that important at the time. Over the next few years, public media leaders, like everyone else, had to accommodate the changing reality of mobile technology. Fortunately, while the initial CPB-PBS Ready To Learn proposal did not anticipate the new tablet technology, it did anticipate a shift to a wider range of devices and the idea of transmedia. While this term did not have much traction or recognition at the time, it set the expectation that children and other target audiences would not only be sitting in front of TV monitors or computer screens, but could also take advantage of having access to content in multiple ways.

SMART PHONES, SMARTER CHILDREN

Early on in the grant period, smartphones became a must-own device for many adults. While the 2012 Pew Research Center Internet & American Life Project’s annual survey tracking ownership of smartphones revealed considerable economic variation— in 2012, 68% of families with household incomes above \$75,000 had a smartphone, vs. 35% of families with household incomes less than \$35,000—the trend was significantly upward for all income levels (Rainie, 2012). Once adults became dependent on unlimited contact with family, friends, sources of information and entertainment, and work via smartphones, this expectation often trickled down to children who also acquired their own devices or who borrowed and shared them with parents or older siblings. Established content producers and up-and-coming media entrepreneurs alike began focusing on a growing

market: young children. In fact, early learning apps for toddlers and preschoolers saw faster growth than any other category. An analysis by the Joan Ganz Cooney Center (Shuler, Levine, & Ree, 2012) indicated that three out of four apps in the education category of the iTunes store were targeting preschoolers and elementary school-age children. On further reflection, it's not so surprising the gestural nature of touchscreens—swiping, rolling, tapping, and drumming fingers—seems tailor-made for small hands and inquisitive minds. As Dr. Sandra Calvert, a researcher and educator at Georgetown University, noted, “One of the

The often-repeated but rarely achieved promise of “anytime, anywhere” learning was becoming a reality.

things that I find most interesting about today's apps is that they're touchable—they fit very young fingers and the cognitive skills of really young children. Children can access information and interact in ways that were much harder to do with a traditional computer and mouse, where you had to coordinate your hand with a screen.” Changes in form—most notably, touchscreens—fundamentally changed the degree to which children were able to interact with digital technologies and the developmental appropriateness of doing so.

During this period, the often-repeated but rarely achieved promise of “anytime, anywhere” learning was becoming a reality with mobile devices. Although television remained the most ubiquitous educational medium, especially for families living in underserved communities, survey research for Common Sense Media by Rideout and Saphir (2011, 2013) documented a dramatic increase in access to, and use of, mobile media technologies. Next-generation educational media had the potential to connect families and schools, bridging formal and informal learning experiences. By 2015, earlier lines of research focusing on the relationship between gesture and comprehension (see, for example, Tversky, 2015) had led to new lines of inquiry and product development (Ginsburg, Jamalian, & Creighan, in press), such as the toys and apps made by the companies Dragonbox and Tiggly.

SHIFTING PUBLIC OPINION ABOUT MEDIA FOR YOUNG CHILDREN

It wasn't simply that digital technologies became available during this time: there were now more and greater expectations about how they could be used in the service of learning. In addition to developers looking to cash in by creating the next big kid app, stalwarts of children's development were focusing more on the thoughtful use of these new educational resources. The joint position statement issued by the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center in 2012 helped shift the public conversation around the use of digital media and technology with young children from one of protection to one of possibility. That statement, released two years into the Ready To Learn grant cycle, underscored the use of digital resources to “support and extend traditional

[learning] materials in valuable ways” (NAEYC & Fred Rogers Center, 2012, p. 7), to enhance—rather than replace—active, engaging, hands-on experiences, to promote social interactions, and to expand children's access to high-quality content. The statement likewise called out how characters, discipline-specific content, and strong narratives could serve as resources for conversation and as catalysts for additional learning experiences across home, school, and community settings.

It's not whether or not children should be exposed to media, it's that we should be creating quality media for children.

Narrative, characters, and content delivered across multiple platforms was the transmedia recipe that CPB-PBS followed, especially as the grant picked up momentum by its third year. Although transmedia had been emphasized in the federal solicitation, and references to it were common, it wasn't until producers turned to developing new properties that transmedia became something other than an aspiration. With PEG+CAT (2013) and ODD SQUAD (2014), two new PBS KIDS properties, there was a coordinated use of digital games and videos involving familiar characters, settings, and narrative themes across different media formats from the outset, rather than after broadcast episodes were developed. As we explore in greater detail below, the intention was to support children's learning; on the surface, however, transmedia was seen by many as a gateway to more screens in young children's lives.

For more than a decade, the American Academy of Pediatrics (1999; also Certain & Kahn, 2002), had urged parents and caregivers to strictly limit exposure to screen-based media of all kinds, especially for children under two. However, many of our interviewees were more nuanced in their thinking about how and when to introduce young children to digital devices, and placed an emphasis on what children could be doing with those devices, rather than whether they should be using them. As Bill Isler, Chief Executive Officer of the Fred Rogers Company, explained, “To me, it's not whether or not children should be exposed to media, it's that we should be creating quality media for children so that those parents who want to take advantage of it can make decisions based on quality and developmental appropriateness.”

Although engaging with media is still not encouraged for very young children, the latest policy statement from the American Academy of Pediatrics (Brown, Shifrin & Hill, 2015), issued in the final year of the Ready To Learn grant, emphasizes that media can be a resource when adults and children co-play, and acknowledges the potentially positive impacts on pro-social behaviors and the potential of educational media to support children's learning of numbers, letters, empathy, racial and ethnic tolerance, and a variety of interpersonal skills.

THE RISE OF “DEVELOPMENTALLY APPROPRIATE”



“The important thing is how that content was produced, how it was curated, how it was sequenced, and how it was mediated.”

MICHAEL FRAGALE, CPB

It was during the last five years that the qualifier developmentally appropriate became a mainstay of children’s media conversations, and educational became a must-use descriptor of products meant to appeal to families. Certainly these terms existed prior to 2010, but they began carrying their developmental psychology and learning sciences meanings with greater frequency.

Noting how this period saw substantial change among media developers, not only in the words they used to describe their productions but also in their process for making digital experiences, Dr. Betsy McCarthy, Senior Research Associate at WestEd, explained:

There are a lot of fun games that may or may not be developmentally appropriate, may or may not be educationally and pedagogically grounded in what we know from research. Now, over the past five years, there’s been a growing awareness from developers that games aren’t going to be effective in supporting learning if learning science is not taken into account in the pedagogy, instruction, and sequencing of the games. I think there is a lot of opportunity there.

While some references to children’s development were hollow—nothing more than a label employed by marketers—a shared understanding has emerged over the last half decade of what it is to attend to a child’s developing mind, body, and capacities in relation to media use.

QUALITY, CONTINGENCY, CONNECTION

In a saturated marketplace with a dizzying array of available options, making informed decisions about children’s engagement with high-quality media products often proved challenging for parents and caregivers. Dr. Seeta Pai, former Vice President of Research for Common Sense Media (which emerged over the last several years

as a go-to resource for identifying appropriate content for many parents and educators), was clear about the lack of quality: “A very small percentage, between 3 and 5%, of resources, whether videos or books, meets our highest quality standards. It’s not like quality is going down, or everything is rising up. It’s that good resources are getting really good, and there’s a lot of really well-intentioned, but ill-informed, stuff.” By 2015, high-quality educational resources, including those produced with Ready To Learn funding, were available and attracting sizeable audiences, but were not the norm.

Although Ready To Learn products, including those developed between 2010 and 2015, have a foundation of research evidence, parents do not necessarily have ready access to, nor do they make use of, research findings—and the same is true of early learning educators. The last five-year cycle made it clear that parents and other adults caring for children need better guidance regarding how to sort through the ever-expanding number of children’s media offerings. Dr. Roberta Golinkoff, Director of the Child’s Play, Learning & Development Lab at the University of Delaware, put it this way: “Criteria that may help parents identify appropriate media experiences for children may include whether it is meaningful and engaging, as opposed to distracting, whether it supports social interaction, and whether children are actively involved.” Early learning centers, too, had an unmet need for educational media selection criteria, despite a growing willingness to experiment with mobile technologies and content supportive of curricular goals.

Educational benefits are possible when media experiences are thoughtfully integrated into early learning experiences for young children from educationally disadvantaged populations.

Interviewees had different ways of describing what they termed key considerations of developmentally appropriate media, just as researchers and organizations offered their own lists of criteria. For example, New America's Lisa Guernsey (2012) refurbished and popularized an older idea that emphasized a "Three C's" approach (context, content, and the child), and Kathy Hirsh-Pasek and colleagues put forward a learning sciences framework in their influential article "Putting Education in 'Educational' Apps" (2015). Despite differences in naming conventions, there was general consensus that identifying whether a media experience is developmentally appropriate involved the following:

- The match between content and child's cognitive and emotional resources
- The context in which the child's media experience unfolds
- The opportunities the experience offers for rich social interactions
- Engaging and interactive features that enhance children's learning

During the 2010–2015 grant cycle, expert opinion and contemporary research continued to converge, encouraging parents, caregivers, and educators to approach media as another learning resource, and to base their decisions about media use on evidence regarding the promise and potential benefits, rather than on ungrounded advocacy. In particular, some experts (e.g., Daugherty, Dossani, Johnson, & Wright, 2014) began calling for a reexamination of "screen time" as a primary measure of children's exposure to media, arguing instead for a more sensitive metric that captures "developmentally appropriate technology use" to guide decisions about young children's media experience. Unfortunately, even by 2015, very few educational media products and services were being evaluated for their appropriateness or educational efficacy.

The 2010–2015 Ready To Learn Program requirements included provisions to ensure that PBS KIDS content funded through the grant was subjected to rigorous and independent evaluation. This expectation signaled to developers and designers that formal learning outcomes were an expected end goal for content developed through the grant, and that researchers would measure the impact of Ready To Learn content on children's learning through a range of studies. Major impact studies, some of them conducted by our research team, found that educational benefits are possible when media experiences are thoughtfully integrated into early learning experiences for young children from educationally disadvantaged populations (Pasnik & Llorente, 2013; Pasnik, Moorthy, Llorente, & Hupert, 2015; Penuel et al., 2012). This research helped to lay the groundwork for studying how digital media use affects children's and adults' learning in classrooms and homes. However, this work was not well-known among parents, teachers, and others making decisions about educational media choices, and did little to guide these adults in their efforts to ensure children's exposure to high-quality app content. Along these same lines, Dr. Dylan Arena, Co-founder and Chief Learning Scientist at Kidaptive, noted:

None of the app stores does a good job of surfacing content on the basis of the kinds of things that we, as researchers, would want. Like, does it work? Does it support good theories of learning? There's potential to change that. My colleagues at Kidaptive and I have spoken to all three of the major app stores about ways that they could elevate options and objectively be shopping the applications that have been shown to be efficacious, so that you could, if you're a parent, say, "Look, this \$3.00 [app] seems to have much better learning outcomes than this free one, so maybe I'll fork over the \$3.00."

People very much want to think that they can give their kid an advantage with something they buy.

Parents, caregivers, and educators see themselves as playing an important role when it comes to selecting technologies and media experiences that will benefit the children in their care. Moreover, parents' and educators' enthusiasm matches what research shows: that integrating media and technology can increase children's motivation to learn and their engagement with content (Wartella, Blackwell, Lauricella, & Robb, 2013). Dr. Georgene Troseth, Associate Professor at Vanderbilt University, explained, "I think people very much want to think that they can give their kid an advantage with something they buy, and I kind of doubt that's going to change. But I think giving parents the service of some way of figuring out what's good quality is really, really important."

Interactivity, the extent to which an educational resource can respond contingently to children's actions, is a word that was heavily used by media producers since the early 1990s but was more fully realized in post-2010 productions. This was a significant advance for media designed for preschoolers and those slightly older. Not only are young children "captivated by contingency" (Lee, 2015), but seeing something happen or

change as a direct result of their behavior opens up a powerful moment in which learning can take place. This can be seen in studies, such as one done by Roseberry and colleagues (Roseberry, Hirsh-Pasek, & Golinkoff, 2014) that demonstrated the important role that social contingency in a digital environment can play in young children's language learning.

Parasocial relationships—those meaningful connections that children form with media characters (Richert, Robb, & Smith, 2011)—and the affordances of these relationships for learning also had the chance to deepen as a result of the transmedia produced between 2010 and 2015. When the media experience promotes parasocial relationships between children and familiar, trustworthy media characters—such as Curious George in a video series and Curious George in a set of interactive games—and the media design incorporates interactions between children and media characters (e.g., when the character pauses for a reply and then behaves as if the child has replied), it is likely to positively influence the extent to which children learn from media (Gola, Richards, Lauricella, & Calvert, 2013). Similarly, in our PEG+CAT Home Study, we found that familiar, beloved characters were able to model learning and problem-solving behavior for children, such as how to constructively express frustration and work to define a challenging situation as a problem to be solved (Pasnik, Moorthy, et al., 2015).

GAME CHANGER: MEDIATION

Arguably, the most important developmental consideration is the extent to which the media are designed to catalyze (rather than replace) social interaction with other people. Young children are in a unique position regarding digital content; their access is typically guided by adults who oversee viewing and access to devices, and their time with digital media is influenced by the expectations and beliefs of parents and caregivers (Hupert, Pasnik, Moorthy, & Llorente, in press). Co-engagement research during the grant period, including work on co-viewing and joint engagement with media (e.g., Strouse, O'Doherty, & Troseth, 2013; Takeuchi & Stevens, 2011), showed that the potential for children's learning is enhanced when children and caring adults participate in media experiences together, so that the parent, caregiver, or educator is on hand to scaffold the learning by asking and answering

Alongside a continued commitment to carefully considered and constructed content, public media leaders significantly developed their thinking about mediation during the grant period.

questions and providing feedback about what is happening onscreen. The last several years contributed to the growing body of empirical evidence suggesting that, when it comes to educational media, there is real value to adults and children playing, viewing, and exploring together (McCarthy, Li, & Tiu, 2012; Pasnik, Moorthy, et al., 2015). Parents, teachers, and other caring adults are ideally positioned to help young children make sense and take advantage of full episodes of broadcast programs, shorter video clips, online games, tablet-based apps, and printable hands-on activities.

Alongside a continued commitment to carefully considered and constructed content, public media leaders significantly developed their thinking about mediation during the grant period. Importantly, educational staff at CPB and PBS came to understand over the last five years that simply placing educational media in front of a child at home was no guarantee that he or she would understand or benefit from the educational content. As Michael Fragale, Vice President for Education at CPB, described it, "I think we now understand that no matter where you get your content, no matter what device it is on, the important thing is how that content was produced, how it was curated, how it was sequenced, and how it was mediated." Historically, most producers—whether working within the public media system or commercially—were concerned exclusively with content production, and they designed resources with the assumption that children would encounter them on their own; acknowledging the value of and need for mediation marked an enormous break from established practice.

While some researchers (Vittrup, Snider, Rose, & Rippy, 2014) describe how some children are increasingly using educational media and technology on their own, our interviewees described how parents and caregivers aspire to help their children engage with media in ways that are beneficial and healthy. In fact, many noted the role that media can play as a model for adult interactions with children around specific content; later evaluation studies of Ready To Learn content (McCarthy, Li, Atienza, Sexton, & Tiu, 2013; McCarthy, Li, & Tiu, 2012; McCarthy, Li, Tiu, Atienza, & Sexton, 2015; Pasnik & Llorente, 2013; Pasnik, Llorente, Hupert, & Moorthy, 2015) focused on the two-generational learning potential by capturing learning outcomes for both children and the adults mediating their use of digital content.

Unfortunately, there is a great deal of variation in the extent to which adults are prepared to engage with children before, during, and after media experiences. Adults need access to tools, including models of how to support engagement, in order to effectively take on mentoring and mediating roles in the context of children's media experiences

Though families' home behaviors are variable and idiosyncratic, parents are trying (not always successfully) to model healthy media and technology behaviors.

(McCarthy et al., 2015). Expert interviewees described how they see adults negotiating how and when they engage with technology and media when children are present—but not always doing so in ways that are satisfactory to themselves and that may, at times, interrupt or short-circuit potential beneficial interactions.

Simon and Donohue (2011) describe how parents and caregivers are continuing to work at balancing engagement with digital devices and social companions in the physical world, which only increases in difficulty as mobile devices and digital characters proliferate. Though families' home behaviors are variable and idiosyncratic (Plowman, 2014), according to interviewees, parents are trying (not always successfully) to model healthy media and technology behaviors. Dr. Vikki Katz, Associate Professor at Rutgers University, commented that the mobility of new technology—available wherever parents and children go—creates challenges because "children witness their parents' distractedness when the phone rings or when they're texting. There's definitely a lot of anxiety about how this sort of constant contact with screens is affecting especially very young children."

In 2010, smartphones were primarily in the hands of adults who were affluent. By 2015, these devices were widely adopted by parents across SES levels, leaving nearly everyone contending with distraction and interruption as well as with fast-moving streams of information about every topic imaginable, including parenting. Along the same lines, Dr. Chip Donohue, Director of the Technology in Early Childhood Center at the Erikson Institute, noted, "There are concerns about how adults are using media in front of children. Are we modeling healthy media diets, or are we role-modeling? I'm looking at my phone, don't interrupt me, and let's not have a conversation."

Over the last five years, several organizations developed guidelines for using digital media to support learning among children and families in ways that can contribute to later school readiness and that also can contribute to learning as a family activity. Donohue himself put forward a reasoned set of suggestions, following his battle cry, "Put some DAP [developmentally appropriate practice] in your app"; likewise, drawing from our large-scale Ready To Learn research studies (Pasnik & Llorente, 2013, Pasnik et al, 2015), we compiled a list of recommendations for using digital media to support children's early learning and for encouraging parent mediation.

PUBLIC MEDIA'S COMMITMENT TO SERVE ALL CHILDREN



"The difference with Ready To Learn and public television stations is community engagement."

DANICA PETROSHIUS, PENN HILL GROUP

Public media programming has a storied history of yielding long-term benefits for children at risk of academic failure (Wong, 2015), and the initial goals that CPB and PBS identified for their Ready To Learn Initiative were consistent with their longstanding commitment to equity. In 2010, there was a strong intention to do what the public media system had always done: produce and make freely available high-quality content that was able to support children's learning.

Broadcast media had morphed into transmedia, with content available via portable screens, but content production remained the principal focus. What emerged by the end of the grant period was a more nuanced understanding of what it was to support communities beyond merely supplying content. Media alone could go only so far in helping families overcome significant challenges associated with living in poverty. For instance, the obstacles interviewees cited were persistent and not unique to the past five years: connectivity remained a challenge in low-income neighborhoods; there was limited availability of reliable, sufficient hardware, software, and supportive infrastructure; and resources often were not created in languages other than English.

Interviewees repeatedly identified the need for different kinds of learning experiences, both in and outside of school, that could engage children from traditionally under-resourced communities. They likewise acknowledged the need to recognize English language learners. Jen Rodriguez, Senior Content Manager at PBS, described her work to support Spanish speakers:

There are a lot of parents in the U.S. of low-income children, for example, migrant workers, who want to co-play with their kids and want them to learn and keep speaking Spanish.

Increasingly, we're trying to translate a lot of our content into Spanish. It's been something I've been working really hard with our team on. We do have a lot more content now in Spanish than we did five years ago.

THE NEED TO ENGAGE LOCALLY

Many interviewees described how public media was a powerful catalyst in a broader, community-focused transmedia approach to support children's learning. For some, the commitment stemmed from a belief that media and technology experiences already present in millions of children's lives could be transformed into learning experiences, making children part of growing communities of learners. In an attempt to address the gap between the perceived potential of media and how children's experiences played out in real communities, the CPB-PBS Ready To Learn leadership expanded and refined how it approached local partners, which included public media stations within the system as well as direct-service agencies with which stations already were collaborating. In more than 20 individual communities throughout the

country, Transmedia Demonstration Stations and their community partners strived to build and strengthen community-specific partnerships in order to effectively serve families.

Throughout the course of the grant, from Tacoma, Washington, to Tallahassee, Florida, public media station staff were figuring out what Lee and Barron (2015) described as critically important: targeting the diversity of families with relevant content and modes of distribution in ways that celebrate who they are, rather than separating children who have from children who have less. From conceptualization to implementation, stations and their direct-service partners provided families with experiences that were specific to them, especially toward the end of the grant period. This took the form of parent

Ready To Learn resources allowed [stations] to establish and sustain relationships with families over time, something that was rare in previous years, when hosting single events was common.

workshops, teacher training, and homework support as the Transmedia Demonstration Stations with the most experience on the ground contextualized content for various settings where children and families live and play, such as housing authorities and health clinics.

While all of these efforts were well-intended, they achieved various levels of success according to CPB and PBS's own metrics. Some of the Transmedia Demonstration Stations, for example, reported that Ready To Learn resources allowed them to establish and sustain relationships with families over time, something that was rare in

previous years, when hosting single events was common. Other stations struggled to convert their Ready To Learn efforts into something lasting, as the promise of free media could not overcome chronic challenges due to poverty. As a creative solution to paid apps available through the Apple iTunes store, PBS developed a mobile learning program and distributed gift codes that allowed families to bypass purchasing. While many station staff said they derived significant value from distributing gift codes and activity sheets in Spanish and English to their community partners, the initial conversion rate was low. According to PBS and CPB staff, the conversation rate improved over time as a result of stations' efforts to improve redemption.

Beyond the specific community engagement work that had been done by local stations, interviewees noted the dual needs for the public media system (1) to create offerings that will attract second-generation immigrants and younger parents, and (2) to support all families as they navigate an oversaturated media environment (Katz & Levine, 2015). Many described public media as playing an important role in supporting parents and creating awareness about how media can support children's learning, but said this community focus could expand further, especially in serving low-income communities. "The difference with Ready To Learn and public television stations is community engagement," noted Danica Petroschius, Principal, Penn Hill Group. "That has always been the thing they [public media] do, that nobody else does. Nickelodeon and others leave it to the media. But you have to get into communities, particularly when you're talking about children. You have to get in there and bring media to the people."

COMMERCIAL COMPETITORS

The near-universal access to free educational resources is a strong foundation on which public media ought to build, especially as commercial entities produce more media that seek to compete with educational media. Elida Laski, Assistant Professor at Boston College, pointed out, "One of the most valued ideas of public media is that it is free to all." Many expressed the need for the public media system to refine its model of service, even further leveraging its nationwide network of stations and increasing efforts to provide rich, targeted, educationally beneficial content through partnerships, rather than competing with media principally designed to entertain. As Dr. Barbara Lovitts, Director of Ready To Learn Research and Evaluation at CPB, described it:

In our Ready To Learn work, we have an educational equity mission and we take that mission very seriously. We do our work with taxpayers' money, and we are conscious of being good stewards of that money. We do a tremendously high return on investment for the public with respect to developing quality content and reaching out to our target audience, and not only do we benefit our target audience, which is low-income children, but we provide those resources to every child in the United States or the world who can potentially access those resources.

I think we had parents who described Sesame Street as eating your broccoli, and Nickelodeon as eating something that's still good for you but not quite as good for you as broccoli.

Interviewees emphasized how public media had earned the trust of many families; its broad reach and its commitment to early learning meant that, for many families, PBS broadcasts are the baseline when it comes to early learning resources for children who are not able to attend preschool. However, by the end of the grant period, families had access to many more options than just a few years before; Amazon Prime, YouTube, Netflix, and Hulu, for instance, which had previously been focused on adult audiences, had earned large followings for their kids' offerings, and the popularity of many lesser-known Kids at Play Interactive (KAPi) and Graphite 2015 award winners was growing. Substantial populations that once relied on public media when engaging with children's media were able to find engaging and relevant, though not necessarily educational, programming elsewhere.

In other words, PBS KIDS could no longer count on children's and families' attention as a certainty. As Dr. Vikki Katz, who has done extensive research within immigrant and lower-income communities, explained, "[Latino] parents still think there's educational benefit to programs that are produced by the more commercial channels. I think we had parents who described Sesame Street as eating your broccoli, and Nickelodeon as eating something that's still good for you but not quite as good for you as broccoli." In 2012, Dr. Katz, along with the National Center for Families and Learning, the Joan Ganz Cooney Center, and the National Council of La Raza, helped form Apprendiendo Juntos Council, a multi-sector group of researchers, practitioners, media producers, and policy experts seeking to identify new models and practical strategies to improve educational outcomes for Hispanic-Latino families through the wise use of digital technologies.

HOW LEARNING OUTSIDE OF SCHOOL CHANGED



"I think, for the kids who are struggling the most, we absolutely have to do a better job with the time outside school."

MICHAEL LEVINE, JOAN GANZ COONEY CENTER

The last five years gave rise to myriad media experiences taking place outside of school—traveling in cars and on public transportation, waiting in lines with parents, and, significantly, in all rooms of children's homes. As CPB's Fragale noted, "There are many more, and easier, ways that are not time-bound or place-bound to access educational media content." Smaller, powerful devices, such as tablets and smartphones, designed for game play, video viewing, and other kinds of activities, shifted expectations about how, when, and where young children engage with learning media outside of formal schooling.

"Because you have mobile platforms," said Kim Berglund, then Director of Development and Research in Early Mathematics at Stanford University, "kids don't have to go home to engage in children's media or be somewhere where there is a TV or a desktop." Consequently, the opportunities that digital media provided for out-of-school learning offered incredible potential for modeling, for leading to a new and more fluid boundary between digital and non-digital experiences, and for reaching underserved communities.

PEG+CAT, has had, to date, 317 million online and mobile streams. Another Ready To Learn program, ODD SQUAD, within a few months had 88 million mobile streams.

ANYTIME, ANYWHERE

Because technologies could be accessed anywhere and any time, by 2015 children were able to engage in physical and outdoor activities, such as counting daily steps and collecting and identifying leaves, via digital tools, making possible meaningful connections between screen-based activities and real-world experiences. As Dr. Pam Johnson, Executive Director of Ready To Learn at CPB, proudly noted, Ready To Learn programming was generating high usage: "PEG+CAT, has had, to date, 317 million online and mobile streams. Another Ready To Learn program, ODD SQUAD, within a few months had 88 million mobile streams." During this same time, several commercial media providers also generated high-volume use, both via video and through app stores. In this way, technology was able to support what Fred Rogers Company's Bill Isler described as a more "fluid line between what kids are learning from digital media and from things that are not digital media."

Media became tools among the many other resources at children's and parents' disposal, with moderation as the watchword for everyone.

Likewise, some interviewees saw the potential for digital media to model social skills for young children via out-of-school media use (Alper, 2011). Michael Levine, Founding Director of the Joan Ganz Cooney Center, explained his vision this way: “Children need more goal-driven but playful learning opportunities. I think for the kids who are struggling the most, we absolutely have to do a better job with the time outside school, and that’s where I think informal educational media has the best potential and has a history of being super useful.”

Other experts called out the potential for digital media to help bridge the divide between indoor experiences with screens and experiences outside. Dr. Kevin Clark, Director, Center for Digital Media, Innovation and Diversity at George Mason University, said, “I think we as researchers know that getting kids and families outside, interacting with their environment and places around them, is huge. It causes parents and kids to talk. It causes parents and kids to do activities together.”

But just because children could be untethered from wires and cumbersome peripherals, such as external drives and mice, this did not mean that they were having deeper and longer experiences outdoors. Anytime, anywhere technologies gave children and families the option of sustaining contact with characters and storylines across multiple settings, but, as noted above, concerns about overexposure to screens remained a real issue for many (American Academy of Pediatrics, 2013; Plowman, McPake, & Stephen, 2010). Recent survey research indicates heavy use of media by both parents and young children, and calls into question the value of warnings regarding excessive use for any audience (Vittrup et al., 2014; Zero to Three, 2014). In the end, our interviewees took a nuanced approach to thinking about exposure to screens. Dr. Georgene Troseth suggested that digital tools might be viewed “not as this dreadful thing, but as just another thing that one would hope children spend some time enjoying, playing with, and sometimes it’s educational and sometimes they’re just having a good time.” Media became tools among the many other resources at children’s and parents’ disposal, with moderation as the watchword for everyone.

PARENTS AS MEDIA CURATORS

The constantly available aspect of smartphones changed many children’s experiences over the past five years, but it may have altered parenting roles even more. According to Lisa Guernsey, Director of the Early Education Initiative at the New America Foundation, “There are many opportunities now in our daily lives where a screen is part of how we’re accessing material that we use with our kids. Our task is to help the adults in children’s lives make good choices about how they and their children engage in screen time.” Over the last five years, several organizations interested in the twin themes of children and media held events where new and different parenting responsibilities were widely discussed among other topics; for instance, New America convened Beyond Screen Time: Early Learning and Digital Media in 2014 in Washington, D.C.; the Joan Ganz Cooney Center

Our task is to help the adults in children's lives make good choices about how they and their children engage in screen time.

held the Digital Kids Conference in 2013 in New York City; and the Fred Rogers Center convened a pair of Fred Forward Conferences in 2012 and 2014 in Latrobe and Pittsburgh, Pennsylvania. Likewise, many annual conferences of organizations such as NAEYC, National Head Start, and the National Center on Family Literacy included similarly themed panel discussions, as did their more commercial counterparts Sandbox Summit, Dust or Magic, and Kidscreen. The message: parenting with educational media and media that claimed to be educational was something new to understand.

In the context of widespread availability, interviewees repeatedly raised this issue of the potential for digital media to serve as models for adult engagement with young children. As Lisa Guernsey further explained, “In terms of parent engagement, videos can be positive models for parents—even if it’s in a short, two-minute video telling parents what it can look like to play a little game with your kid about food in the pantry. Those kinds of things can open up new ideas for parents.” Aside from video, text messaging also emerged as a powerful tool for supporting parent learning. For instance, in our PEG+CAT Home Study, parents were extremely receptive to receiving brief messages offering practical information about the use of educational media (Pasnik, Moorthy, et al., 2015).

Wherever children sit with parents or other adults to read, play, or use digital devices, digital media have the potential to bring children and adults together as co-viewers of, and players with, digital content (Takeuchi & Stevens, 2011). Because low-income families own fewer devices and often share them with one another, some media producers, including those designing media experiences through Ready To Learn, recognized that there were more opportunities for and instances of co-engagement with media. The challenge was to turn these instances of joint engagement with media into powerful, often inter-generational, learning experiences as children and parents learn together.

CHANGES TO LEARNING IN SCHOOLS



“Technology in kindergarten and early learning classrooms is becoming more acceptable.”

KEVIN CLARK, GEORGE MASON UNIVERSITY

For decades, educators, especially early educators, have had an ambivalent relationship to technology and digital media (Simon & Donohue, 2011), and the last five years included more of the same. In K–12 education, learning technologies made new promises to overcome inefficiencies, obstacles to access, and even teacher shortages. Conversely, they also consumed substantial portions of education budgets and produced a number of high-profile failures (Pearson in Los Angeles Unified; InBloom in New York City; News Corp’s Amplify).

Many educational technologies either floundered or were successfully taken up in classrooms across the country over the last half decade, e.g. digital whiteboards came (and, in many cases, went); many districts experimented with one-to-one tablet and Chromebook models, while other districts explored online learning and digital supports for instruction; traditional textbook companies struggled mightily as digital and Web-based content delivery grew exponentially; and EdSurge emerged as a go-to resource covering the \$8-billion educational technology industry. In this context, the Ready To Learn professional learning outreach model offered a positive example. As David Lowenstein, Senior Director of PBS’s Ready To Learn Initiative, explained:

Over four years ago, there was a sense that school is the place where digital media dies. You come into the school, the school doors close, and you just have to power everything off. I think over the last four or five years we’re starting to see that change. Partly because of the Ready To Learn-funded teacher professional development work we’ve done with partners like Boston University School of

Education, I think you’re starting to see pockets of innovation and educators and schools that are figuring out ways to utilize the media to augment their lessons and to really improve engagement, and I still think it’s a challenge.

EDUCATIONAL MEDIA GO TO PRESCHOOL

There was significant investment in early learning programs at the national, state, and local levels during the five-year grant period, as educators, policy makers, and politicians gave renewed recognition to the central role that early learning plays in children’s academic and life trajectories. For instance, high-stakes commitments to fund universal pre-K were made in New York City, Florida, Georgia, and Oklahoma, and draft language emphasizing early childhood education that had circulated for years was included in the final version of the Every Student Succeeds Act (United States Congress, 2015). Nevertheless, digital media were not viewed by

most educational leaders as a core component of these early childhood learning efforts. In fact, several interviewees suggested that preschool learning had been virtually untouched by new technologies, believing that this was largely because educators did not have access to the professional development opportunities and supports required to help them make the most of these new tools.

With few exceptions, preschools did not have the technical infrastructure to support digital media at the building or classroom level, even by 2015. In the first two years of the grant, the CPB-PBS Ready To Learn Initiative placed an early bet on content for digital whiteboards, and EDC-SRI fielded a pre-K study in which

Activities integrating educational media into preschool classrooms had to be positioned at the intersection of the familiar and the innovative.

we supplied participating classrooms with these large-screen interactive displays. WestEd likewise had to provide equipment and install routers in order to successfully carry out its research in early learning settings. The belief at that time was that these studies—and PBS more broadly—were “researching and building the future.” While digital whiteboards could be integrated into circle time (a common way that teachers organize whole-class experiences), widespread adoption never materialized in formal early learning centers, and content production shifted to focus on tablet and smartphone apps instead.

Apart from the large-scale trends shaping pre-K–12 education, interviewees called out the potential for digital media to support children’s learning in preschool–grade 2 classrooms. Echoing the NAEYC-Fred Rogers Center joint statement, as well as early drafts of the revised National Educational Technology Plan later released by the Office of Educational Technology, our interviewees viewed in-school learning as a place where digital media were well-suited to support and enhance the ways in which young children develop content knowledge and acquire new skills. Interviewees emphasized how digital media were providing innovative experiences within classroom settings by modeling best practices for both children and educators. Digital formats—which combine video, audio, and the ability to control playback and pacing—lend themselves to modeling social, emotional, and interactive behaviors for children, as well as instructional activities, such as questioning and demonstrating persistence.

Research provides examples of effective integration of digital media in a range of educational settings, and researchers suggest that with appropriate professional development and supports, digital media can play a role in supporting learning among preschool and elementary school learners (Barron et al., 2011; Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013; Parette, Quesenberry, & Blum, 2010). Our own research, and that of CPB-PBS Ready To Learn research partner WestEd, during this period found that videos and online games could be valuable resources for children’s early mathematics learning as well as teachers’ confidence with mathematics and teaching with technology. But in order for this to be the case, activities integrating educational media into preschool classrooms had to be positioned at the intersection of the familiar and the innovative, that is, as hybrid innovations (Pasnik & Llorente, 2013). For example, arranging their classrooms into learning centers

was something most teachers easily recognized; having children play digital games in pairs in a learning center made up of laptops was something new for most teachers.

I think that kindergarten and first grade teachers are particularly seeing the results of this kind of digital inequity.

At the same time, there is concern regarding the ways in which skill-based tasks have infiltrated early learning environments, and whether the emphasis on educational digital media might tilt too far in this direction, when young children should be provided with experiences that support play and exploration (Carlsson-Paige, McLaughlin, & Almon, 2015).

In addition to formal studies that investigated the promise of educational media, there were pockets of innovation and exploration in preschools and early learning programs over the past five years. Some educators embraced digital media and began to use them to support children’s learning (Daugherty et al., 2014; McManis & Gunnewig, 2012; Simon & Donohue, 2011). Similarly, as Dr. Kevin Clark explained, “Technology in kindergarten and early learning classrooms is becoming more acceptable, and in some cases more of the norm, whereas five years ago, people were saying, ‘Keep these devices away from kids.’ The willingness to accept technology is different from where it was five years ago.”

ECONOMIC DISPARITIES START EARLY

To the extent that experimenting with educational media occurred in early learning settings over the last five years, it was a reflection of the decentralized nature of formal schooling in the United States, which meant that it often happened because individual administrators, teachers, or parents wanted it to happen. Among interviewees, there was a sense that some innovation and integration of technology was being pushed into and across learning environments by families who are economically advantaged and whose children arrive in early learning classrooms with a larger and more developed set of skills for making use of technology and media.

Interviewees noted that families accustomed to using media in their home lives were demanding that digital tools be brought into classrooms, and this demand was causing a trickle-down effect for the integration of digital media into a broad range of early learning environments, including those with fewer resources. Peter Pizzolongo, former Associate Executive Director of the NAEYC, described how educators are now encountering big differences in children who arrive at their classrooms, with more economically advantaged children having had very high quality early experiences using digital media, while children from lower-income families arrive with fewer experiences and less developed skills. He concluded, “I think that kindergarten and first grade teachers are particularly seeing the results of this kind of digital inequity.” We suspect that the disparities seen by teachers reflected a range of differences experienced by children in lower- vs. middle- or upper-income families, including access to Web-based content exclusively on mobile devices, limited or very slow streaming speeds, and interrupted access due to usage limits or the cut-off of services because families are not always able to pay mobile charges on a regular basis.

WHAT EDUCATIONAL MEDIA CAN BRING BEYOND 2015



"It may be that what needs to happen is a new burst of structural creativity."

EVA BAKER, UCLA'S NATIONAL CENTER FOR RESEARCH ON EVALUATION, STANDARDS, AND STUDENT TESTING

The federal money put toward the CPB-PBS Ready To Learn Initiative—\$72 million between 2010 and 2015—was an investment in production and community engagement over five specific years, and also in the future of educational media. Digital media, and technology more broadly, had a substantial impact on children's experiences of the world, and there is every reason to believe that a significant level of impact will continue in the years to come.

But—and this is a crucial qualifier—the size of that impact is directly tied to a commitment to equity. In this context, many interviewees pressed for the need to be bold when thinking about innovation, to be inclusive and informed when defining efforts to reach a broad audience, and to build on what public media offers, including the opportunity to do things differently and without the pressure of commercial interests influencing how and what is developed. Having sifted through the predictions and priorities called out by our interviewees, below is our summary of areas where greater collective attention will be needed beginning in 2016.

Meaningful innovation will come from a better understanding of the languages and cultures, along with the media and technology habits, of families across the country. Families are a diverse group, and many families require additional supports to move young children toward readiness to participate and succeed in formal learning experiences. Categorizing some as low-income families, as happens with great frequency, obscures the differences that exist within a group in terms of income, home language(s), and technology adoption/use

patterns. It is essential that new innovations in content and technology be grounded in empirical research about the ways that various communities and cultures are engaging with educational media and technology, and how media can catalyze families' existing routines to support children's healthy development.

Adult support will be a major catalyst for children's playful learning. The children's media community must focus on the adults in children's lives, not as gatekeepers (as too often occurs), but as social, emotional, cultural, and cognitive supports. As Michael Levine noted, this is the case "whether it's the teachers and the caregiver, or whether it's the librarians or educators who are forming a circle of caring, they want more powerful tools themselves to take the time that they've got with those kids and make it more meaningful." New knowledge will help all stakeholders better understand what the features of a quality media-rich educational environment are for all children.

Families will become partners in the making of new public educational media. Educational media will support an increasing number of

children and adults in engaging with media content as makers and re-mixers, rather than solely as viewers or consumers. As Dr. Kevin Clark explained:

CPB and PBS's charter is really focusing on traditionally underserved populations. I think, up until this point, the approach has been, "We will create content for you. We will create the content. We will deliver it to you because we know how to make this stuff." The system, though, has huge outreach potential. They're in all of these cities and all of these communities. What if they began to set up or find a way to get those communities more involved in creating the content, or creating mechanisms to support people in those communities who want to create content? Homegrown, or grassroots, and similar to the independent film movement. What if public media did an independent children's content movement? They're in these communities, and no one else has the reach that public media has.

Story and character will define next-generation educational media.

Similarly, text messages and social media networks will be valuable tools for establishing, cultivating, and sustaining meaningful relationships between and among families, media producers, and those offering community support.

Personalization will succeed only if it embraces the social nature of educational media. Educational media will be at their most potent when they promote and enhance social interaction. Learning experiences become deeper by providing children with modeling, guidance, constructive feedback, and opportunities for playful challenge, rather than a careful accounting of performance determined by a narrow set of assessments.

Making connections to learning that is physical and outdoors will be essential. New digital tools and devices, such as wearables, will bring new and different possibilities of bridging the divide between real and digital experiences. Sara DeWitt, Vice President of PBS KIDS Digital, described the enthusiasm she and her team have for cameras and other technologies that help to get kids up and moving, to get them engaged outside through interacting with digital media. DeWitt said:

I think there are real opportunities to explore some non-sedentary ways of learning with media, which is kind of a new thing. Then, also, getting kids to engage outside—that's certainly some of the new content we're working on right now. Can you use the media to help encourage outdoor exploration and play, where you actually are rewarded in whatever game you are playing by going out and running around for a little while and collecting things or observing things?

Likewise, Jeremy Roberts, Senior Director, Learning Technologies, at PBS KIDS Digital, noted how emerging technologies can "tackle the transfer problem so that the digital component can have a reasonable chance of helping the kids do something awesome in the real world, that's based on some learning that started online."

Educational media innovations that focus on storytelling, character, and new forms of play will create powerful learning opportunities across content areas. Innovations in educational media need not be the product of technological developments only; story and character will define next-generation educational media. "Television

is one of the most dynamic and most important resources for Ready To Learn and for children's media because of the story," explained Dr. Sandra Calvert. "The really engaging stories and the characters that are very involving for children can take them across to other platforms." Likewise, Eva Baker, Co-director of the National Center for

I think we have massive amounts of people who are making things for children's minds but have spent very little time in the learning sciences.

Research on Evaluation, Standards, and Student Testing at UCLA, said, "I think the integration of multiple forms of media around the same story or core sets of learning is what's so powerful. My thought would be breaking open that whole concept of narrative; all of the technology will follow it. It may be that what needs to happen is a new burst of structural creativity, not just creativity and finding innovative content of a structured manner."

Delivery systems will continue to morph and multiply, which will place an even greater emphasis on the characteristics that contribute to high-quality media experiences. "We are still often fixated on the hardware," noted Lisa Guernsey. "We're not getting to the level of evaluating a feature within a certain app that might provide a more quality experience than another feature. It feels like we're just at the tip of the iceberg in terms of really starting to understand how to evaluate quality." Or, as PBS's Jeremy Roberts explained, "I see the acknowledgement that different media modes are maybe as important as platform when it comes to affordances. I think people are thinking less about TV and more about long-form video and what the importance is there, versus short-form video."

Media producers who rely on educators and learning scientists will be more effective at creating captivating media that also support learning. As systems of production and distribution continue to evolve, media producers will seek ways to distinguish their offerings. Design teams that include creative talent (animators and game designers) as well as those steeped in instructional design, formative research, child development, content expertise, and learning science will become more common. Given the maturity of these fields and their willingness to work together, the pairing will be powerful. Frances Judd, creator of Mrs. Judd's Games, explained, "I think we have massive amounts of people who are making things for children's minds but have spent very little time in the learning sciences. So, one could see a huge percentage of [content] on the children's section of the iPad store or at the app store or the educational section that is no better or worse than swiping through a parent's smartphone iGallery, or photo gallery. No better, no worse. Bringing together a broader range of educators to inform game design could change this kind of experience for children and their families."

With all of these areas of potential change, the challenge for the children's media community, which draws on educators, producers, designers, engagement experts, technologists, researchers, funders, and policy makers, will be to avoid the trap of recreating or reinforcing old inequities. The hope is that, together, this community will leverage contemporary media to create genuinely new and better learning opportunities for all children and their families.

REFERENCES

Alper, M. (2011). Developmentally appropriate new media literacies: Supporting cultural competencies and social skills in early childhood education. *Journal of Early Childhood Literacy*, 13(2), 175–196.

American Academy of Pediatrics. (1999, August). Policy statement: Media Education. Committee on Public Education. *Pediatrics*, 104(2), 341–343.

American Academy of Pediatrics. (2013, November). Policy statement: Children, adolescents, and the media. Council on Communications and Media. *Pediatrics*, 132(5). doi:10.1542/peds.2013-2656

Brown, A., Shifrin, D. L., & Hill, D. L. (2015). Beyond ‘turn it off’: How to advise families on media use. *American Academy of Pediatrics News*, 36(10).

Barron, B., Cayton-Hodges, G., Bofferding, L., Copple, C., Darling-Hammond, L., & Levine, M. (2011). *Take a Giant Step: A Blueprint for Teaching Children in a Digital Age*. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop.

Blackwell, C. K., Lauricella, A. R., Wartella, E., Robb, M., & Schomburg, R. (2013). Adoption and use of technology in early education: The interplay of extrinsic barriers and teacher attitudes. *Computers & Education*, 69, 310–319.

Carlsson-Paige, N., McLaughlin, G. B., & Almon, J. W. (2015). *Reading instruction in kindergarten: Little to gain and much to lose*. New York, NY, & Jamaica Plain, MA: Alliance for Childhood & Defending the Early Years.

Certain, L. K., & Kahn, R. S. (2002). Prevalence, correlates, and trajectory of television viewing among infants and toddlers. *Pediatrics*, 109(4), 634–642.

Daugherty, L., Dossani, R., Johnson, E. E., & Wright, C. (2014). *Moving beyond screen time: Redefining developmentally appropriate technology use in early education*. Washington, DC: RAND Corporation.

Fred Rogers Center for Early Learning and Children’s Media at Saint Vincent College. (2012). *A framework for quality in digital media for children: Considerations for parents, educators, and media creators*. Latrobe, PA: Author.

Ginsburg, H., Jamalian, A., & Creighan, S. (in press). Cognitive guidelines for the design and evaluation of early mathematics software: The example of MathemAntics. In L. English & J. Mulligan (Eds.), *Reconceptualising early mathematics learning* (pp. 83–120). New York, NY: Springer.

Gola, A. A., Richards, M. N., Lauricella, A. R., & Calvert, S. L. (2013). Building meaningful parasocial relationships between toddlers and media characters to teach early mathematical skills. *Media Psychology*, 16(4), 390–411.

Guernsey, L. (2012). *Screen time: How electronic media—from baby videos to educational software—affects your young child*. New York, NY: Basic Books.

Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in “educational” apps: Lessons from the science of learning. *Psychological Science in the Public Interest*, 16(1), 3–34.

Hupert, N., Pasnik, S., Moorthy, S., & Llorente, C. (in press). What can we learn from children’s math learning at home? A close look at a CPB-PBS Ready To Learn Initiative research study. In C. Donohue (Ed.), *Family Engagement in the Digital Age: Early Childhood Educators as Media Mentors*. New York, NY: Routledge Press.

Katz, V. S., & Levine, M. H. (2015). *Connecting to learn: Promoting digital equity for America’s Hispanic families*. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop.

Lee, J. (2015). The iPad and your kid—digital daycare, empowering educator, or something bad? *Ars Technica* [Website].

Lee, J., & Barron, B. (2015). *Aprendiendo en casa: Media as a resource for learning among Hispanic-Latino families*. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop.

Levy, S. (2010, April). Rise of the machines: How tablets will change the world. *Wired*, 18(4).

McCarthy, B., Li, L., Atienza, S., Sexton, U., & Tiu, M. (2013). *PBS KIDS mathematics transmedia suites in preschool families and communities. A report to the CPB-PBS Ready To Learn Initiative*. Redwood City, CA: WestEd.

McCarthy, B., Li, L., & Tiu, M. (2012). *PBS KIDS mathematics transmedia suites in preschool homes: A report to the CPB-PBS Ready To Learn Initiative*. San Francisco, CA: WestEd.

McCarthy, B., Li, L., Tiu, M., Atienza, A., & Sexton, U. (2015). *Learning with PBS KIDS: A study of family engagement and early mathematics achievement. A report to the CPB-PBS Ready To Learn Initiative*. Redwood City, CA: WestEd.

McManis, L. D., & Gunnewig, S. B. (2012). Finding the Education in Educational Technology with Early Learners. *Young Children*, 67(3), 14–24.

National Association for the Education of Young Children (NAEYC) & Fred Rogers Center. (2012). *Technology and interactive media as tools in early childhood programs serving children from birth to age 8: Joint position statement*. Washington, DC: NAEYC.

Nielsen Company. (2009). *Youth and media: Television and beyond*. New York, NY: The Nielsen Company.

Parette, H. P., Quesenberry, A. C., & Blum, C. (2010). Missing the boat with technology usage in early childhood settings: A 21st century view of developmentally appropriate practice. *Early Childhood Education Journal*, 37, 335–352.

Pasnik, S., & Llorente, C. (2013). *Preschool teachers can use a PBS KIDS transmedia curriculum supplement to support young children’s mathematics learning: Results of a randomized controlled trial*. New York, NY, & Menlo Park, CA: Education Development Center, Inc., & SRI International.

Pasnik, S., Llorente, C., Hupert, N., & Moorthy, S. (2015). *Children’s Educational Media 2010–2015: A Report to the CPB-PBS Ready To Learn Initiative*. New York, NY, & Menlo Park, CA: Education Development Center, Inc., & SRI International.

Pasnik, S., Moorthy, S., Llorente, C., & Hupert, N. (2015). *Supporting Parent-Child Experiences with PEG+CAT Early Math Concepts*. New York, NY, & Menlo Park, CA: Education Development Center, Inc., & SRI International.

Penuel, W. R., Bates, L., Gallagher, L. P., Pasnik, S., Llorente, C., Townsend, E., . . . VanderBorgh, M. (2012). Supplementing literacy instruction with a media-rich intervention: Results of a randomized controlled trial. *Early Childhood Research Quarterly*, 27(1), 115–127.

Plowman, L. (2014). Researching young children’s everyday uses of technology in the family home. *Interacting with Computers*, 27(1), 36–46.

Plowman, L., McPake, J., & Stephen, C. (2010). The technologisation of childhood? Young children and technology in the home. *Children and Society*, 24, 63–74.

Rainie, L. (2012, September 11). *Smartphone Ownership Update*. Washington, DC: Pew Internet & American Life Project.

Rich, M. (2014). Moving from child advocacy to evidence-based care for digital natives. *JAMA Pediatrics*, 168(5), 404–406.

Richert, R. A., Robb, M. B., & Smith, E. I. (2011). Media as social partners: The social nature of young children's learning from screen media. *Child Development*, 82(1), 82–95.

Rideout, V., & Saphir, M. (2011). *Zero to eight: Children's media use in America*. San Francisco, CA: Common Sense Media.

Rideout, V. J., & Saphir, M. (2013). *Zero to eight: Children's media use in America 2013*. San Francisco, CA: Common Sense Media.

Roseberry, S., Hirsh-Pasek, K., & Golinkoff, R. M. (2014). Skype me! Socially contingent interactions help toddlers learn language. *Child Development*, 85(3), 956–970.

Shuler, C., Levine, Z., & Ree, J. (2012). *iLearn II: An analysis of the education category of Apple's app store*. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop.

Simon, F., & Donohue, C. (2011, May-June). Tools of engagement: Status report on technology in early childhood education. *Exchange* (199), 16–21.

Strouse, G., O'Doherty, K., & Troseth, G. (2013). Effective Coviewing: Preschoolers' Learning From Video After a Dialogic Questioning Intervention. *Developmental Psychology*, 49(12), 2368–2382.

Takeuchi, L., & Stevens, R. (2011). The new co-viewing: Designing for learning through joint media engagement. New York, NY: The Joan Ganz Cooney Center at Sesame Workshop and LIFE Center.

Tversky, B. (2015). The cognitive design of tools of thought. *Review of Philosophy and Psychology*, 6(1), 99–116. doi:10.1007/s13164-014-0214-3

United States Congress. (2015). *Every Student Succeeds Act of 2015*. 114th Cong. 1st sess. S. 1177. Washington, DC: GPO. Report 114-354.

Vittrup, B., Snider, S., Rose, K. K., & Rippey, J. (2014). Parental perceptions of the role of media and technology in their young children's lives. *Journal of Early Childhood Research*, 1–12.

Wartella, E., Blackwell, C., Lauricella, A., & Robb, M. (2013). *Technology in the lives of educators and early childhood programs*. Latrobe, PA, & Chicago, IL: Fred Rogers Center for Early Learning and Children's Media at St. Vincent's College & Northwestern University.

Wong, A. (2015, June 17). The Sesame Street Effect: How the children's show has enhanced learning in America—and why it's a reminder of what's lacking from education today. *The Atlantic*.

Zero to Three. (2014). *Screen Sense: Setting the Record Straight*. Washington, DC: Author.

APPENDIX: LIST OF INTERVIEWEES

Dylan Arena
Kidaptive

Eva Baker
National Center for Research on Evaluation, Standards, and Student Testing, UCLA

Kim Berglund
Stanford University*

Sandra Calvert
Georgetown University

Kevin Clark
George Mason University

Sara DeWitt
PBS

Chip Donohue
Erikson Institute

Michael Fragale
Corporation for Public Broadcasting

Susan Friedman and Peter Pizzolongo**
National Association for the Education of Young Children

Roberta Golinkoff
University of Delaware

Lisa Guernsey
New America Foundation

Bill Isler
Fred Rogers Company

Pamela Johnson
Corporation for Public Broadcasting

Frances Judd
Mrs. Judd's Games

Vikki Katz
Rutgers University

Elida Laski
Boston College

Michael Levine
Joan Ganz Cooney Center

Barbara Lovitts
Corporation for Public Broadcasting

David Lowenstein
PBS

Betsy McCarthy
WestEd

Seeta Pai
Common Sense Media*

Danica Petroschius
Penn Hill Group

Jeremy Roberts
PBS KIDS Digital

Jennifer Rodriguez
PBS

Georgene Troseth
Vanderbilt University

* Organizational affiliation at the time of interview.

** Joint interview.

EDUCATION DEVELOPMENT CENTER, INC.
CENTER FOR CHILDREN AND TECHNOLOGY

The Center for Children and Technology (CCT) is a unit of Education Development Center, Inc., a nonprofit international research and development organization dedicated to improving the quality, effectiveness, and equity of education throughout the United States and in more than 35 countries. Since 1981, CCT has been at the forefront of creating and researching new ways to foster learning and to improve teaching through the development and thoughtful implementation of new educational technologies. CCT's work is centered in three areas: research, including basic, formative, and program evaluation; design and development of innovative technology prototypes and products; and the implementation and operation of large-scale technology integration efforts.

SRI INTERNATIONAL
CENTER FOR TECHNOLOGY IN LEARNING

SRI International is an independent, nonprofit research institute conducting client-sponsored research and development for government agencies, commercial businesses, foundations, and other organizations. The mission of the Center for Technology in Learning (CTL) is to improve learning and teaching through innovation and inquiry. CTL research and development activities contribute to the knowledge base of effective learning and teaching and embody research insights in the innovative design, use, and assessment of interactive learning environments. In its development, research, and evaluation work, CTL seeks to create tools that lead to better teaching and learning, to develop assessments and conduct evaluations that contribute to the evidence base about the effectiveness and conditions for success of technology-supported innovations, and to inform both the policy and research communities.

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