A Primer for Communities

pioneering literacy

IN THE DIGITAL WILD WEST: EMPOWERING PARENTS AND EDUCATORS

By Lisa Guernsey, Michael Levine, Cynthia Chiong and Maggie Severns

THE CAMPAIGN FOR GRADE-LEVEL READING

The Campaign is a collaborative effort by foundations, nonprofit partners, states and communities across the nation to ensure that more children in low-income families succeed in school and graduate prepared for college, a career and active citizenship. The Campaign focuses on the most important predictor of school success and high school graduation—grade-level reading by the end of third grade.

ACKNOWLEDGEMENTS

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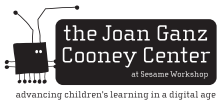

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GUIDING PRINCIPLES OF THIS PROJECT

1. To become proficient readers, children need to be raised in environments that support reading skills, background knowledge and active discovery. Neither skills (such as alphabet knowledge, word reading and print awareness), nor knowledge (such as understanding concepts, oral language development and vocabulary growth) are enough by themselves.[1]

2. Technology can be a helpful ally in literacy development, but by itself is not the answer. What matters most is how parents, children and educators use technology to strengthen their interactions with each other and improve children's familiarity with sounds, words, language and knowledge.

3. Connected, engaged parents are crucial to children's success. Even parents without strong reading skills can make important contributions to their children's cognitive development and later reading success through conversation and joint engagement in learning via traditional and digital media.

4. To ignore technology is to miss opportunities for delivering new content and better teaching to the children who need it most, inadvertently allowing digital divides to grow wider.

SECTION 1

introduction

WHAT ROLE CAN TECHNOLOGY PLAY IN IMPROVING CHILDREN'S READING PROFICIENCY?

In a knowledge-based, global economy, knowing how to read well is more important than ever, and yet a large majority of the coming generation — two-thirds of America's children — are leaving elementary and middle schools with distressingly weak reading skills.[2]

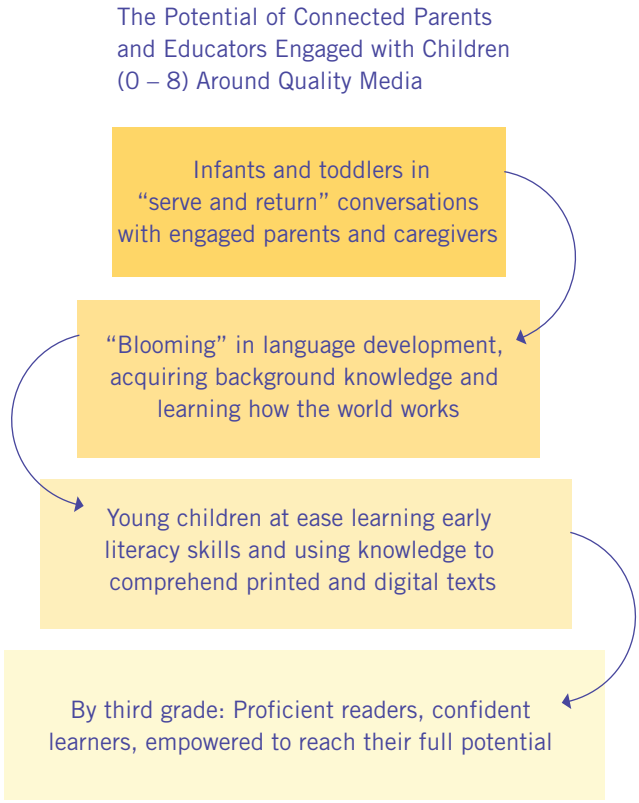
The startling data from the National Assessment of Educational Progress, which indicates that only 34 percent of all fourth-graders and 17 percent of fourth-graders who qualify for free lunch are reading at grade level,[3] should be a wake-up call.

In the past two years, state and national leaders, communities and school districts across the United States have pledged to get serious about closing these deficits. Their work has been spurred in part by the Campaign for Grade-Level Reading, a collaborative effort by foundations, nonprofit partners, states and more than 120 communities across the nation to ensure that more children in low-income families succeed in school and graduate prepared for college, a career and active citizenship. In the spring of 2012, the Campaign asked the Joan Ganz Cooney Center and the New America Foundation to conduct a nationwide scan of technology-based products and technology-assisted programs aimed at improving the early literacy skills of children from birth through age 8. Our task was not to evaluate the effectiveness of products and programs but to act as surveyors of uncharted lands, returning with information that provides a high-level view of what is currently offered to or available to parents, educators and children. Using four guiding principles for examining the role of technology in early literacy (see previous page), we also kept our eyes open for important gaps, probing for what may be missing in current uses of technology by children, parents and educators.

Potential for Parent-Child Interactions That Promote Reading

We came to this research with a grounding in developmental science on how infants, toddlers and preschoolers learn language skills and with an understanding of how those language skills set a foundation for reading proficiency in the early grades of elementary school. (See Cascading Effects to the right.) Just as research has highlighted the power of dialogic questioning and engaging conversation between adults and children during read-alouds of print books,[4] research on electronic media with young children — even as young as infants and toddlers — points to the benefits of parents or teachers engaging in social interactions around other media too. In the research literature, this is known as Joint Media Engagement, a term coined by learning scientists at the LIFE Center, an initiative funded by the National Science Foundation.[5] For this reason, among the many examples we searched for under the umbrella of "early literacy," we gave particular weight to examples of digital and social media aimed at sparking shared moments of engagement between adults and children, especially if those sparks could be sustained so that children are immersed in positive language-building experiences and active discovery.

CASCADING EFFECTS



Technology in the Lives of Young Children

Technology is omnipresent in the lives of most young children today, and new platforms and content for young children are arriving all the time. Television, DVDs, mobile games, YouTube clips, motion-detection platforms like Kinect, digital cameras, Skype and FaceTime — each of these technologies and more are making their way into the households and daily routines of families with young children. In 2009, a Sesame Workshop survey found that around 60 percent of white and Hispanic preschoolers and 66 percent of African American preschoolers had played video games on a console.[6] Today, as the popularity of consoles cedes to easy-to-use touch screen tablets such as the iPad, the proportion of young children who have played digital or interactive games is likely even higher. Around a quarter of young children now have their own gaming devices, according to *Zero to Eight,* a 2011 Common Sense Media report on young children and media. In that report, an analysis of survey data on 6-month to 6-year-old children showed a jump in the quantity of time spent with screen media. The number of minutes per day rose from 1 hour and 36 minutes in 2005 to 2 hours and 8 minutes in 2011, with time on tablets and computers making up a significant chunk of the difference.[7]

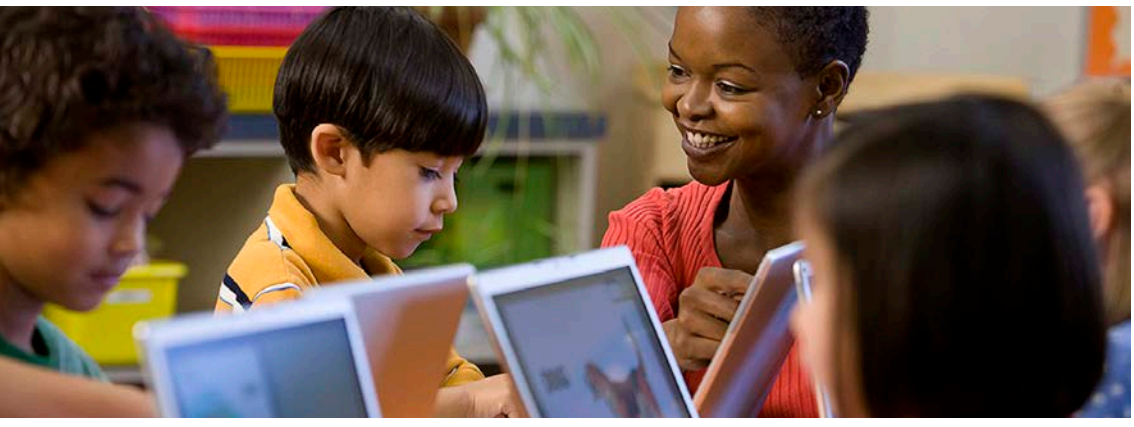
It is not surprising, then, that the market for children's apps, digital games and toys is booming. In a recent examination of the iTunes App Store, the Joan Ganz Cooney Center found that more than 80 percent of top-selling paid apps in the Education Category target

children; of those, 72 percent target preschool-aged children.[8] The e-book marketplace is swelling with titles for children as well. Sales of children's e-books went from $7 million in March 2011 to $19.3 million in March 2012, according to the Association of American Publishers.[9]

Digital Divides in *How* Technology Is Used

The conventional understanding of the digital divide has been centered on access. Do disadvantaged families have computers? Are they up to date? Can they afford broadband Internet access, not to mention new hardware and software? Research suggests that the conventional divide still exists, though historical data on families with young children are hard to come by. More than 30 percent of households of all kinds still do not have computers with access to broadband Internet, according to the federal government.[10] The divide may be turning into an "app gap," a term coined in Common Sense Media's *Zero to Eight* report. It showed that children from low-income households use apps and mobile devices less frequently than children from high-income households.[11]

But examine how parents and educators of varying socioeconomic groups use technology when they have it, and another type of digital divide emerges. Consider a seminal study by Susan B. Neuman and Donna C. Celano, who closely observed the interactions between parents and children during systematic visits to two public libraries in Philadelphia from 1998 to 2010, one in a low-income neighborhood frequented by struggling families and the other in a well-appointed area of the city frequented by highly educated parents and their children. Although both libraries were stocked with computers and literacy software for children, the computers were being used very differently, Neuman and Celano found. Parents from the economically advantaged area treated the computer games as an opportunity to scaffold lessons on vocabulary or the alphabet. Parents from the low-income neighborhood sat apart from and did not interact with their children who were using the computers, even though their kids were often visibly frustrated or resorting to "random clicks" around the screen. The games played by children in the low-income neighborhood library were also different. Researchers observed children of reading age in that library, for example, playing "coloring" games with no lines of text, as opposed to the games played by children in the other library, which had more text and were more challenging for their age group. "What became clear," Neuman and Celano write, "is that while [an initiative to expand access to books and technology in the library] could greatly improve access to material resources, it could not make up for the intangible social and psychological resources — the parents and other adults who make the many pathways to reading



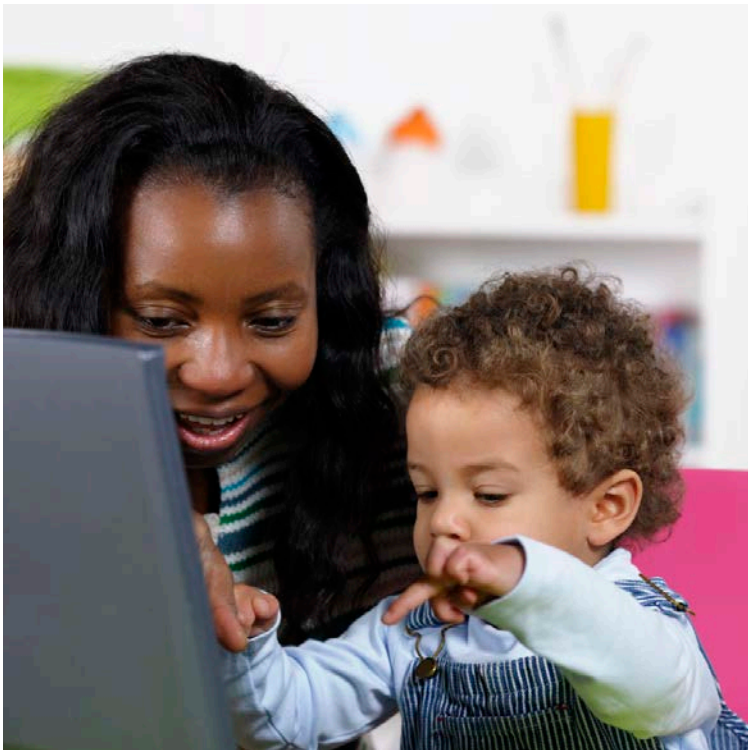
schools

AND COMMUNITY LEADERS HAVE A RESPONSIBILITY TO ASSESS HOW TECHNOLOGY FITS INTO THE LIVES OF THE CHILDREN THEY ARE TRYING TO HELP.

and information-seeking meaningful and important to children."[12] Neuman and Celano, and other experts such as media scholar Henry Jenkins, have referred to this as a "participation gap."

Overlay race and culture on top of these disparate digital media practices, and the picture gets more complicated still. African American and Hispanic children, for example, are no strangers to screen-based media such as television and video games and spend more time each day with screen media than white children. While African American children spend four hours and 27 minutes a day with screen media, white children are spending two hours and 51 minutes, according to surveys of their parents.[13] When it comes to mobile phones as Internet access devices, a 2011 Pew Hispanic Center report showed a digital divide in reverse, with a higher percentage of blacks and Hispanics using their phones for Internet access, email and instant messages than whites.[14]

With so much competing for the attention of today's children, and so much of their future riding on the ability to learn to read, schools and community leaders have a responsibility to assess how technology fits into the lives of the children they are trying to help — and how it might be used to further, not stymie, their language and literacy development.



SECTION 2

scanning

THE DIGITAL MEDIA LANDSCAPE:
A TWO-PRONGED APPROACH

Our scan of the early literacy landscape took two forms. First, we took stock of top-selling products and other digital content, apps, software, websites and games, which are aimed at young children and purport to help build reading skills.

Second, we sought out examples of programs and models that engage parents and children in activities that encourage the development of language and literacy skills. In both cases, we looked for patterns in how technology, among various platforms and among differing audiences, was being put to work in the service of children's literacy. Given time constraints, we did not attempt an exhaustive review of the product or program landscape. Instead we scanned popular products that purported to teach early reading skills and interviewed industry and early literacy experts over six months.

Tech-Based Products with a Literacy Focus

In April 2012, we looked at products in the iTunes App store, the Android marketplace (known as Google Play) and in Common Sense Media's reviews of electronic and digital media products. Our task was to provide a first-time snapshot, not a comprehensive survey, of what is most visible to parents and what kinds of features related to literacy developers are building into these products.

We scanned the marketplace by looking at "paid" apps, those that require users to pay before installing them on their devices, and "free" apps, which do not require a fee.[15] To provide some parameters for the pool of products included in this overview, we limited our scan to the following:

- Top 20 paid educational literacy apps in iTunes App Store
- Top 20 free educational literacy apps in iTunes App Store

- Top 20 paid educational literacy apps in Google Play
- Top 20 free educational literacy apps in Google Play
- Top 20 featured e-books for kids on iTunes
- Electronic games (other than apps) that focused on literacy and had been reviewed on Common Sense Media for kids ages 2–8, released 2007–2012; n=17
- Websites with a literacy focus that had been reviewed on Common Sense Media and included content for children; n=20

Although e-books are increasingly available to children on multiple platforms, including the Kindle and Nook, this particular scan was limited to e-books available in iTunes.[16]

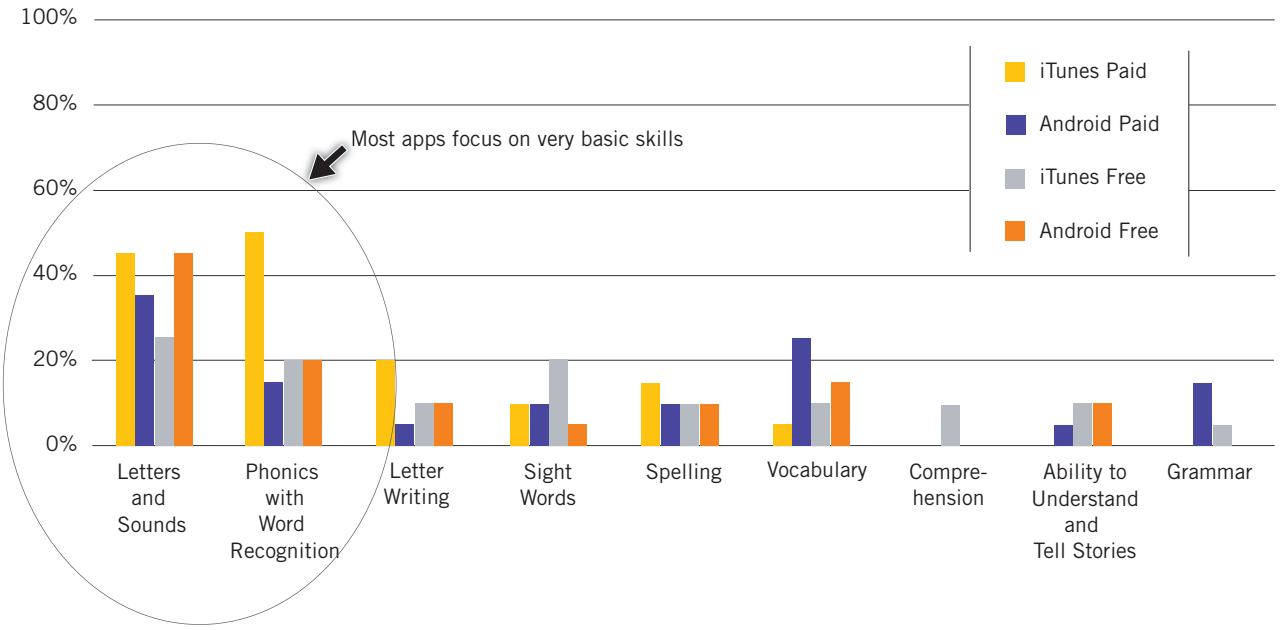
Based on these parameters, we ended up with 137 products to examine. In order to be considered literacy focused, the products had to target one or more of the following literacy skills: print concepts; letters and letter-sounds; phonics with word recognition; vocabulary; letter writing; comprehension; the ability to understand and tell stories; spelling and/or grammar.

We did not evaluate these products independently. Our scan was based on information provided by product descriptions listed on websites, by descriptions provided by app and e-book developers promoting their products in the app stores, and by reviews and information found on Common Sense Media. We also were unable to judge *how* these products are being used within the routine of children's daily lives — a factor that could have an impact on the kinds of literacy skills targeted. Many apps, for example, are designed for short bursts of activity (while waiting at a bus stop or airport, for example) while many websites serve a more enduring purpose (such as those connected to classroom curricula and designed to be used for longer periods and with engagement from teachers or parents).

Product Scan Findings

Digital products aimed at building literacy skills in young children are a significant segment of the market. Yet many of these products may not be providing the educational benefit they claim. Few apps and e-books have information in their descriptions that point to any effectiveness studies to back them up, and most only focus

LITERACY SKILLS TARGETED BY POPULAR EDUCATIONAL LITERACY APPS, APRIL 2012



on very basic literacy skills that would not be useful for children who are beginning to learn skills like grammar and storytelling.

APPS

Most of the apps had been released in the last two years, and they targeted very basic literacy skills, such as letters, phonics and word recognition. Far fewer apps targeted more advanced early reading skills such as comprehension and grammar.

POPULAR INTERACTIVE FEATURES ON CHILDREN'S E-BOOKS, APRIL 2012

NARRATION	95%
HOTSPOTS	75%
WORD/PICTURE LABELS	**15%**
DICTIONARY	**5%**
GAMES/ACTIVITIES	65%
LITERACY ACTIVITIES	**25%**
MUSIC / SOUNDS	60%
TEXT HIGHLIGHTING	50%
ANIMATION	50%
TILT / SHAKE / TURN DEVICE	30%
RECORD OWN VOICE	25%
DIFFERENT LANGUAGES	25%
PARENT INVOLVEMENT	20%
REWARDS	15%
SOCIAL SHARING	10%
3D EFFECTS	10%
CAMERA	5%

E-BOOKS

Many e-books boasted a range of features: 95 percent of the reviewed e-books had optional narration, 65 percent had games and activities embedded, and 60 percent had sounds. But in light of the current research on book-reading and children's literacy development, it is not clear how many of these features help enhance literacy learning. For example, most e-books had narration, but only half had text highlighting to help the reader follow along.

GAMES

Electronic literacy games for platforms such as Nintendo Wii and Leapster are marketed to children every year. Among the games we examined — those reviewed by Common Sense Media from 2007 to April 2012 — the most popular skills targeted by these games were letters and sounds (29 percent of games we scanned) and phonics and word recognition (another 29 percent of the games we scanned). No games focused on letter writing, sight-word recognition or comprehension.

WEBSITES

Websites covered a wider range of literacy skills than the apps and games, with 30 percent of the scanned websites reporting that they had a curriculum available for children in one or more grades, and 20 percent of these websites providing information about some sort of effectiveness study on their educational materials.

DISCUSSION AND UPCOMING TRENDS

Among the most salient findings in our scan was the high proportion of paid iTunes apps that purported to teach reading but focused almost entirely on basic early literacy skills. The app market this spring felt a lot like a digital Wild West, with learn-to-read apps popping up seemingly overnight and little to no information on whether the developers had backgrounds in early literacy or whether the apps were vetted by reading experts or evaluated in any way. As Scott Traylor, the founder of

360KID, a consulting firm for developers of children's media, told us: "There is so much noise in the app space, and much of it is really hit-or-miss."

Some organizations have started to review apps, including Common Sense Media, Kindertown, Yogi Play, Children's Technology Review, Parents' Choice and Appolocious lists created by educators. This fall, Daniel Donahoo, an Australian expert in children's media, opened Better Apps, an assessment tool to prod developers into making better apps. Our research found more apps that go beyond flashcard learning: Some prompt children to move around the real world taking photographs (such as Alien Assignment and Out-A-Bout, created by the Fred Rogers Center for Early Learning and Children's Media); some focus on the reading experience and the building of background knowledge (such as Storia and Reading Rainbow); and some tap into children's natural desire for storytelling and sharing of creative expression (such as Doodlecast and Toontastic). In addition, e-books from companies like Speak-a-Boo and Oceanhouse Media, are building features associated with promoting literacy (enabling children to hear how sounds blend to form words and highlighting words during narration). Lastly, some apps allow young children to engage their loved ones — even at a distance — in joint reading experiences that take advantage of pre-recorded voices (such as A Story Before Bed).

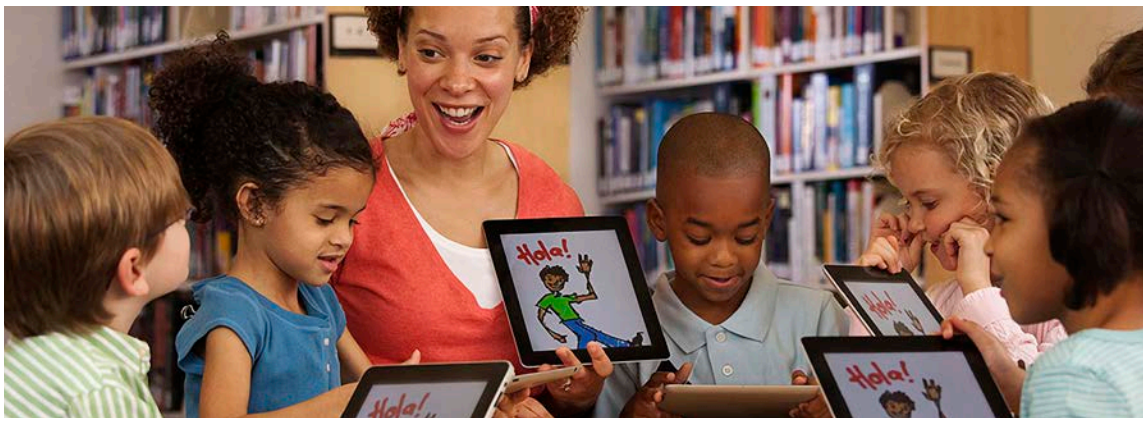
Tech-Assisted Programs

To ensure strong reading skills for all children in the next generation, it will take much more than a flurry of literacy apps. In the second part of our scan, we conducted interviews with 30 people who lead early literacy interventions, are involved in early childhood programs, or conduct research on educational technology. The goal was to unearth evidence of technology being used to support the work of daily or weekly programs and interventions for families with young children, especially vulnerable families coping with poverty and instability. These programs take the form of home visiting, nutrition or parent education for new mothers and fathers; child care, preschool and other early learning programs; improved instruction in elementary schools; English-as-a-second-language programs; library and museum services; and other initiatives to support the growth and development of young children. Not all of these efforts are "early literacy" programs, per se, but when delivered at a high level of quality and sustained over time, several have been found to have a significant impact on literacy skills for children involved, compared to children who do not receive the same kinds of support.[17]

Billions of public dollars are already invested in these programs, so it makes sense to consider how technology might play a role in boosting their effectiveness and modernizing them. In our interviews, program leaders

interest

IN TECHNOLOGY COINCIDES WITH GROWING SUPPORT FOR THOUGHTFUL ADOPTION AMONG EARLY CHILDHOOD EDUCATORS.



expressed high interest in harnessing the power of technology to improve communication, expose parents to new resources and provide rich content for educators to embed in curricula. Some early childhood experts and practitioners said they were skeptical about the value of the apps by themselves and were wary of investing in high-priced technology. "We're not thrilled with [existing media options] but we don't have the time or money to create our own," said Ellen Frede, former co-director of the National Institute for Early Education Research and senior vice president at Acelero Learning. Yet she and others simultaneously expressed hope that services such as social media, texting and video-based resources could spark exchanges and foster better relationships among educators and parents that would, in turn, focus more attention on their children's growth and development.

The interest in technology coincides with a growing base of support for thoughtful adoption among early childhood educators, both to support their teaching and inspire children's learning. In spring 2012, the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center released a position statement that called on teachers to use the tenets of developmentally appropriate practice when deciding how to incorporate technology in child care, preschool and kindergarten classrooms. The Erikson Institute in Chicago, an internationally acclaimed research and teacher-preparation center, recently opened the Technology in Early Childhood (TEC) Center to provide technology-infused professional development to early childhood teachers. Technology in early education was the subject of two recent policy papers: *Take a Giant Step: A Blueprint for Teaching Young Children in a Digital Age,* supported by the Joyce Foundation, which outlines a comprehensive national blueprint for embedding new technologies in the professional preparation and development of teachers of young children; and *Technology in Early Education: Building Platforms for Connections and Content that Strengthen Families and Promote Success in School,* a policy brief for the Education Commission of the States, which focuses on libraries and teacher training.

Perspectives on Assisting Parents and Teachers

"It's not about needing to have an electronic application to help build literacy as much as it is to take advantage of technology to help solidify relationships." – Kathleen Strader, Assistant Director, Home Visiting Coordinating Center, ZERO TO THREE

"Just throwing all of this on a digital hub is not going to do much. [Producers should also be] providing the scaffolding and support and inroads to that content." – Mary Haggerty, Manager, Educational Outreach at WGBH Educational Foundation

"Don't invest all your money in the tool. Invest as much or more in professional development." – Kelly Hunter, Executive Director, Children's Literacy Initiative

"At school, technology will really help for making sure fewer kids fall through the cracks. At home, it could more easily provide access to print that's at the right level and that [children] are interested in." – Diana Sharp, cognitive scientist and literacy consultant

Leaders in state departments of health and education are also starting to include technology in their plans for building systems of early learning. Maryland and Massachusetts, for example, are using grants from the federally supported Race to the Top-Early Learning Challenge to develop digital resources for teachers and parents. And school districts such as the Chicago Public Schools have built on materials from PBS to create "Virtual Pre-K" materials that parents can tap into online to help get their children ready for kindergarten.

Harnessing technology to leverage existing programs is not a foregone conclusion, however. Nor is there any guarantee that it will be effective, especially if technology is not embedded in a way that furthers a program's mission. Many early childhood programs have been scaled back in the wake of the Great Recession and continue to be hampered by stressed finances and patchwork operating systems. Other hurdles include weak distribution channels for the most effective models and products, and a lack of information on how and why low-income families and ethnic minorities use technology in their everyday lives.

Despite these challenges, our interviews brought to light several cases of programs beginning to use digital media and interactive technologies. What follows is a sampling of approaches, with a few described in fuller detail in sidebars. (See p. 22 for the list of interviews conducted.)

SUPPORTING PARENTS

Organizations that promote literacy by reaching parents are testing a range of tech tools, including social networking programs such as Twitter and Facebook, text-based messaging, e-book subscriptions and on-demand video. The promise of these tools coupled with concerns about new digital divides begs the question of how well these tools will work to reach the hardest-to-reach parents. The time is ripe for pilot projects and independent evaluation of the ways in which technology engages parents of young children.

Pioneering Projects: Examples of Supporting Families and Communities

Early Learning Environment from Fred Rogers Center

- In an interactive online space, parents and educators can customize "playlists" of videos, games and activities online and off designed by early childhood experts.

The Baby Elmo Program

- Using "Sesame Beginnings" videos as a launch pad for interaction with their children, incarcerated fathers are provided with models for positive engagement with their children during visits and after release from prison.[18] The videos are from Sesame Workshop, which has hundreds of video clips, literacy games and tools.

Storytimes Online

- The Idaho Commission for Libraries offers a DayByDayID.org website with daily messages to parents about literacy-building activities and daily featured e-books from Tumblebooks, a subscription service free to library users. Virginia and South Carolina, the origin of the idea, have built similar programs.

Wonderopolis

- Daily tweets, Facebook posts and links to videos about the "wonder of the day" designed to inspire conversation, vocabulary building and further exploration. From the National Center for Family Literacy, which has published more than 700 wonders so far.

Pocket Literacy via Ounce of Prevention Fund

- The Ounce of Prevention Fund, a national nonprofit, has partnered with Parent University's Pocket Literacy Coach in sending daily texts to parent's mobile phones with ideas for literacy activities and reassurances to lessen the stresses of parenting. In 2013, 1,500 Head Start parents will participate in an evaluation of the service.

Mind in the Making Learning Communities

- Thirty-five organizations in 22 states have created communities of parents, educators and health professionals who come together regularly to watch video clips from baby experiments and discuss ideas from *Mind in the Making,* a critically acclaimed book by Ellen Galinsky of the Families and Work Institute.

Comienza en Casa: Engaging Dual-Language Learners

The demographics of the United States continue to diversify, with 21 percent of school-age children speaking a language other than English at home.[19] Only 7 percent of English Language Learners are reading at grade-level by fourth grade, according to the Nation's Report Card.[20] Early childhood educators face a big challenge: How can they help these children learn to read in English while respecting and valuing their families' culture and home language as well?

An innovative iPad project for families in rural Maine, called Comienza en Casa, provides some hints. The project, created by the Maine Migrant Education Program and nonprofit organization Mano en Mano (Hand in Hand), incorporates iPad use, traditional early learning activities and information to help parents improve school readiness and literacy skills for preschool and kindergarten children who speak little to no English. Activities, delivered at home by a bi-lingual educator, are based on a newly designed curriculum that combines carefully selected apps with off-screen activities and family-focused discussions supporting identified learning goals. Activities for the unit on "Growing Things," for example, use the e-book app *I Like Spring;* an interactive app based on the PBS show *Sid the Science Kid;* a choice of *Doodlecast* or *Storykit* creativity apps children can use to tell stories about signs of spring in their neighborhood; activities involving gathering, sorting and using natural materials found outside the house in projects; and a one-page handout (in Spanish) shared and discussed by the home visitor with parents about spending time with their children outdoors.

"We wanted to be extremely intentional about the iPad," said Bonnie Blagojevic an Apple Distinguished Educator who co-designed the curriculum with her adult daughter, Ana Blagojevic, migrant education coordinator and advocate at Mano en Mano.

To read parent feedback, see examples of chidren's work, and find links to additional project details, visit www.manomaine.org/programs/mep/comienzaencasaparents.

ASSISTING EDUCATORS

Software for reading instruction is already common in elementary schools, with research showing mixed results,[21] but innovations in digital media, from Skype to voice recognition to streaming video, are opening up new possibilities. A goal shared by many educators we interviewed, as described by Shelley Pasnik of Education Development Center, is to use "technology as a curriculum supplement and not to replace what teachers are already doing. We need to knit together the experiences of both using digital and more traditional resources."

Pioneering Projects: Examples of Supporting Reading Teachers

Success for All

- A curriculum and professional development model in more than 1,000 schools; uses video clips to augment teachers' lessons and computer-assisted tutoring. Results from a randomized controlled trial show technology enhancing rather than replacing teaching.[22]

Targeted Reading Intervention with Webcam Coaching

- A University of North Carolina program that emphasizes one-on-one sessions between classroom teachers and struggling readers for 15 minutes a day. Using iChat, FaceTime or Skype, literacy coaches support teachers remotely.[23]

Innovations for Learning

- Chicago-based nonprofit that develops computer-based reading programs to assist teachers and manages a Skype-like system for volunteer tutors. Tutors call classrooms weekly and go online for shared book-reading with first-graders. Participants include the Chicago Public Schools and District of Columbia Public Schools.

iREAD (I Record Educational Audio Digitally)

- Students use iPods to record themselves reading books; teachers listen to audio files and personalize instruction according to what they hear. Developed by the Escondido Unified School District in San Diego.[24]

CLI Compass

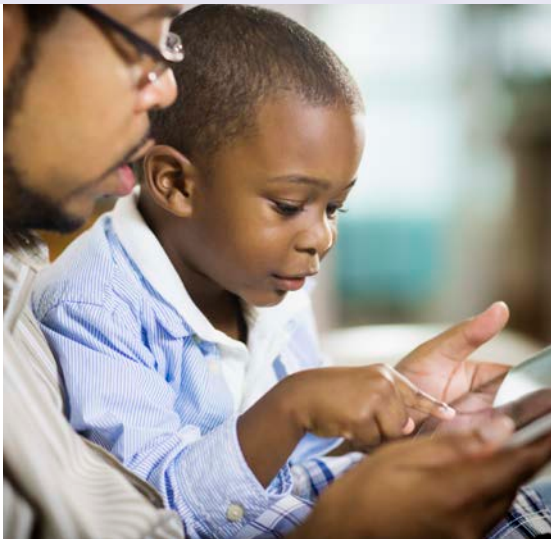
- The Children's Literacy Initiative, a program for training reading teachers used in 350 schools around the country, recently opened a free online video library of effective teaching techniques.

Ready to Learn "Transmedia" Products

- Interactive media developers, the Corporation for Public Broadcasting, PBS and other education media specialists are creating and evaluating learning products across TV, Internet, electronic white boards and touchscreen tablets.

TEC Center

- The Erikson Institute, a graduate school in child development, opened the Technology in Early Childhood Center to strengthen teachers' ability to select, use, integrate and evaluate technology in the classroom.



SECTION 3

taking stock

WHAT MATTERS MOST FOR EARLY LITERACY INNOVATION WITH TECHNOLOGY

Learning to read is a complex process that starts with children's language and literacy experiences from their earliest months and continues throughout their early years as the effects of knowledge acquisition and skill development cascade forward, building upon each other (see diagram on p. 4).

Becoming a strong reader requires decoding skills and background knowledge, both of which have the potential to be aided by interactive digital media and other forms of new technology. When used to spark joint engagement between adults and young children, and to help parents and teachers to deepen educational experiences, digital media have great potential to help all families, and especially vulnerable ones, make vital literacy connections anytime and anywhere.

However, as we found in our scan of literacy-focused products reported here, technology changes so quickly that browsing the app store can feel like a digital version of entering the Wild West. Parents and educators face a fast-growing array of products purporting to help their children learn to read but receive little information on how or if these products live up to their claims. New attempts at curating the educational category of the app store attest to the need for early childhood and literacy experts to get involved.

In addition to the fast evolving and chaotic Wild West of digital apps, our interviews with early childhood leaders also uncovered a pioneering spirit among leaders of programs that support families and their children. New approaches to technology are emerging from a diverse array of parent education and home visiting programs, libraries, preschools, community volunteer initiatives, teacher training programs and curriculum models.

The findings in this report are illustrative. They are not intended to be a full accounting of tech-based literacy products or tech-assisted programs. Future work should

go beyond an examination of product descriptions and involve in-depth exploration of features embedded in these products and the research supporting them. The myriad features and genres of e-books and e-readers also demand more attention, especially as libraries, schools and individual teachers and parents invest in subscription services that can provide families with access to books 24-7. Our interviews with experts also pointed to a need for more evaluations and case studies of how early childhood programs use technology to reach parents and assist teachers.

Future Mapping: Four Approaches

The projects, products and research studies we have highlighted in this report point to the untapped, but very real promise that well-deployed technologies can have in helping children who are failing to perform well in early reading assessments. The use of technology is changing rapidly, as is the knowledge base on which literacy approaches will work best for diverse children and families. We forecast that communities committed to making a demonstrable impact on grade-level reading will need to prioritize their technology-based efforts by determining which of four key areas are most pressing:

1. *Promoting personal connection* among parents and educators via social media, cell phones, texting and the development of hybrid (online and offline) learning communities.

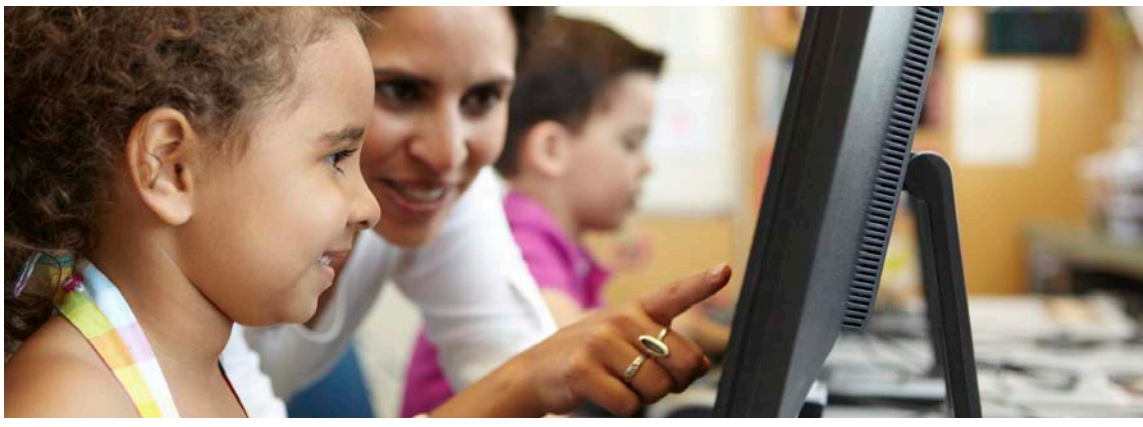
2. *Reinforcing basic skills* by vetting and making available to parents and educators apps, literacy-supportive e-books, and on- and off-line games to play with their children.

3. *Building background knowledge* by providing new routes for taking advantage of content-rich library materials, museum offerings, e-book services, immersive games and multimedia "field trips."

4. *Improving the workforce* by connecting educators (including librarians and family child care providers) to each other, to new resources for literacy instruction and active learning, and to professional development opportunities.

browsing

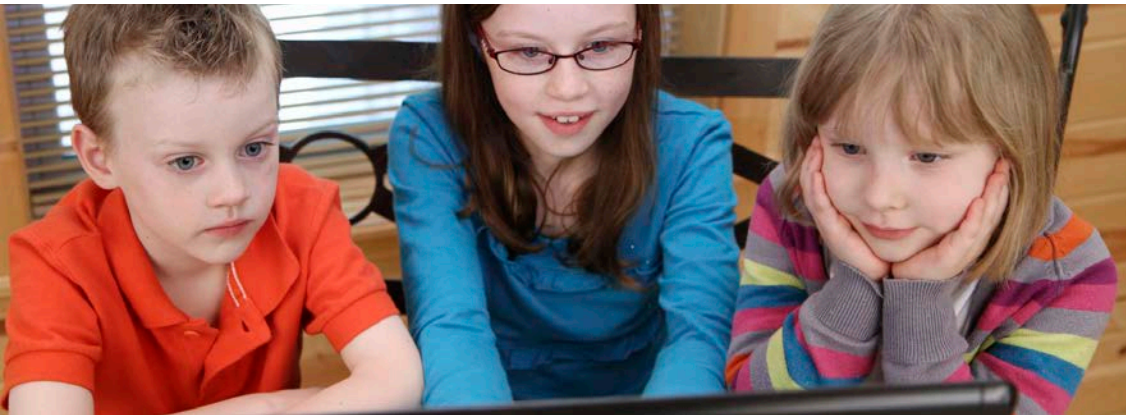
THE APP STORE CAN FEEL LIKE A DIGITAL VERSION OF ENTERING THE WILD WEST.



SECTION 4

recommendations

FROM THE WILD WEST TO SUPPORTING PIONEERS IN DIGITAL INNOVATION



In a recent report on media multitasking, Claudia Wallis concluded, "New technology sometimes brings change that is so swift and sweeping, that the implications are hard to grasp."[25]

Such is certainly the case with the rapid expansion of media use by young children for ever-larger portions of their waking hours. Academics, policymakers and practitioners are now showing a keen interest in, and considerable worry about, the influence of digital media on children's learning and healthy development. And, of course, parents are scrambling to keep up with the preponderance of new gadgets that influences modern household arrangements and communication patterns.

A vigorous national dialogue is taking place over the right balance between media consumption, the potential negative impact that inappropriate digital content can have on vulnerable children and the worry that children are increasingly leading physically inactive lives. These legitimate concerns must be juxtaposed with emerging evidence from the learning sciences and innovative practices showing how well-deployed digital media can promote new skills, raise achievement and bring children, parents and educators together across time and space.

This report is intended to add insight to this fast-moving phenomenon and to mobilize members of the Grade-Level Reading Communities Network, and others, to keep a close eye on what young children are doing now and how their use of technology will evolve. Our findings point to a dizzying marketplace, promising models from leaders who straddle the worlds of early childhood and digital media, and a sense of possibility that technology can be a positive force for change in closing gaps and driving innovation in the early literacy and learning fields.

In assessing opportunities for breakthroughs in early literacy through the wise deployment of emerging technologies we recommend that communities take on a "pioneering spirit" with three near-term action steps:

Conduct community audits. Assess disparities in access and capacity to use technology for literacy outreach. Communities have an important obligation to take stock of literacy programs and determine who has access to what, across the traditional and digital media landscape. This opens up the opportunity to "homestead the Wild West" and curate materials for families. Teams of early educators, digital media experts, scholars and parent advocates should combine forces to identify educationally robust models and products that use research-based technology solutions to promote early literacy.

Create public engagement initiatives on the need for critical thinking about media. Early educators, researchers and parents are seeking critical information about where to put down stakes in this new Wild West. In this rapidly changing media environment, the creation of public information and engagement campaigns by philanthropies, government, industry groups and children's advocates can be a vital service. For parents' intent on figuring out how to navigate the new terrain of digital media for their children, there are a few places to turn for advice on best practices. Communities should build upon projects that rate the educational effectiveness of new apps and educational media, introduced by organizations such as Common Sense Media, and new professional standards for technology use that have been established by NAEYC and the Fred Rogers Center. Engagement efforts may include:

- Publishing guides on choosing digital media; encouraging parents to use media to learn together with their children
- Training teachers how to integrate technology into reading instruction when appropriate
- Holding "town hall meetings" and "summits" for parents and the general public
- Expanding media literacy curricula to include preschool and primary grades

Create a place in every community where children, parents and educators can experiment together with online and offline literacy materials. Many preschool and elementary school children are emerging tech-savvy "digital natives." They crave engaging experiences with new technologies: witness the thousands of toddlers documented on YouTube who are using their fingers to "swipe" print books. But they still need help navigating interfaces, evaluating information available online and offline, and putting their fledgling tech skills to the most productive

research

HAS SHOWN THAT PARENT TRAINING CAN HELP IMPROVE INTERACTIONS DURING BOOK-READING AND EARLY EVIDENCE SHOWS THAT SUCH TRAINING IS NEEDED FOR DIGITAL MEDIA AS WELL.

uses. Parents need places to learn from educators and other parents. And even tech-savvy educators need time for collaborating with colleagues, in person and remotely, as they review and test the possibilities afforded by the intersections of new and old media.

Building on important models developed by corporations, (e.g., Intel's, Microsoft's and Comcast's digital connection initiatives), national informal education leaders such as the Boys & Girls Clubs of America and the federally supported Community Learning Centers, communities should create spaces where young children can gain confidence with and receive adult support in building their literacy and interactive technology skills *as well as* receive guidance and encouragement for active discovery of print books, the physical world and hands-on activities. These centers — based in preschools, elementary schools, libraries, parent education and home visiting programs — should expose children to high-quality, engaging digital and hands-on tools that integrate language and literacy development with learning in art, science, math and more. These centers should be staffed in part by knowledgeable mentors who can help children and parents make the most of the media around them. Research has shown that parent training can help improve interactions during book-reading and early evidence shows that such training is needed for digital media as well.[26] Lastly, these centers can be hubs for professional development and collaboration for the early childhood workforce, including teachers, coaches, librarians and administrators.

We also recommend that policymakers and philanthropies take the following two long-term steps:

Support sound research on how both technology content and contexts are affecting reading development. At present, public and private funding of technology tools and approaches is unevenly distributed, highly fragmented and lacking in research priorities or mechanisms to foster knowledge application, agency coordination and interdisciplinary collaboration. The U.S. Department of Education's Ready to Learn program has potential to improve this situation, and its last round of grants helped to develop and evaluate the effectiveness of publicly available television programs with an emphasis on early literacy.[27] But more is needed, including better mechanisms to identify the added value from integrating digital media in learning practices, as well as to develop rigorous design and performance metrics to improve the effectiveness of teachers and caregivers. In speaking with program experts and examining recent research, we found several holes in the research that are critical to fill:

MEDIA USE PATTERNS AND FAMILY ROUTINES

Currently, there is a pressing lack of quality measurement of how children and their families use media. For example, some households are permeated by media that are considered "ambient noise." These families are in effect "always connected,"[28] a pattern that may have a negative impact on children's growth and development but that is especially difficult to analyze. We don't have good data on the nature of the media that very young children are experiencing in their homes, making it difficult to gain a keen understanding about the role of family and peer influences across developmental periods. New research should also focus on the quality of the content consumed and document the settings in which children are exposed to interactive technologies. Of particular interest is "Joint Media Engagement" in which children, adults and peers may jointly (and naturally) enjoy playing and learning together via digital games, e-books and other media.

CULTURAL DIFFERENCES

Recent studies conducted by the Pew Hispanic Center and by independent scholars have found that for many low-income and Hispanic adults, cell phones are the preferred or only means of accessing the Internet and engaging in online searches. Recent studies are also documenting that Hispanic and African American families are adopting new digital

devices such as tablets for family communication and knowledge acquisition in different ways.[29] In addition to the community needs assessments noted above, we need more analysis on ethno-cultural variation across the country in the use of digital devices and access to quality educational content among the largest young child and family demographic groups.

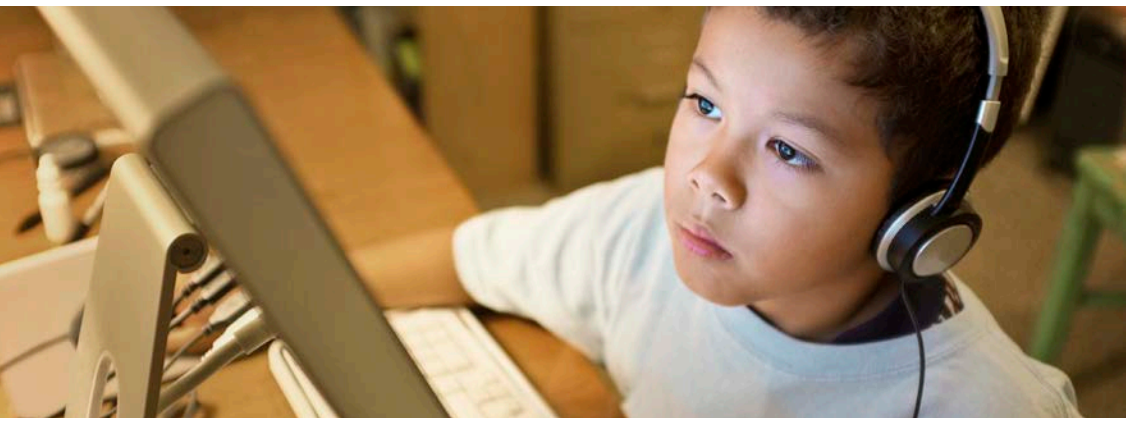
Create partnerships for innovation. Philanthropy and the public sector are uniquely situated to stimulate collaboration among the tech industry, educators, parents and community institutions such as schools, libraries and universities. We need to establish innovative methods to fund and stimulate creative networks of partners with different areas of expertise. Federal, state and local government and philanthropies should provide incentives to create new types of partnerships. Possible models to scale up include:

- The public-private partnerships that the MacArthur Foundation and the Institute for Museum and Library Services have forged with their You Media Learning Labs initiative, which is incenting community-based libraries, museums, early literacy and youth groups to plan new learning campaigns with technology partners.
- The Digital Promise Initiative, a nonprofit corporation organized by the President's Office of Science and Technology Policy, Congress, the National Science Foundation and the U.S. Department of Education, which should prioritize early learning and technology.
- Multi-stakeholder partnerships stimulated by a reinvigorated PBS-CPB public media investment that connects research to digital production, and enables free distribution of high-quality media to low-income communities. Another especially promising model is the nonprofit initiative known as the First Book Marketplace, which currently reaches over 2 million low-income children with print books and might be transformed with new digital books and literacy materials in the next several years.
- Incentives from government, philanthropy and capital markets to advance "double-bottom-line" social investment firms — organizations interested in both profit and social change — that wish to close literacy gaps. Global sources such as the Acumen Fund and Echoing Green Foundation are supporting a new corps of entrepreneurs to tackle challenges associated with poverty and illiteracy. The federal government's Small Business Innovation Research (SBIR) grants should continue to prioritize early literacy in future competitions.

Conclusion

As fourth grade reading metrics tragically indicate, current policies and practices have done little to address a national crisis in literacy sapping the potential of millions of young children. Our findings suggest that we are at an opportune moment for harnessing digital media to support parents, educators and children in building the next generation's reading skills. The rapid adoption of technology is roiling public debate over what young children should know and be able to do, but it has yet to cause a ripple in advancing a new pathway to reading success.

As technological innovation inexorably evolves, and demand for deeper learning for children grows, it is essential to align early literacy and technology practices to help every child get a decent start. As things stand, industry is actively creating a product mix; yet, so far we see only spotty examples of evidence-based products that could have a positive impact on the children who need help most. Parents have accepted, some with relish and others uncomfortably, that technology is here to stay as a vital part of their children's lives. And educational groups are forging new consensus about how to bring more value to the digital media in young people's lives. We conclude that media use by preschool children is not by itself the critical concern, but that, especially for children at risk, technology's potential to be a game changer will not be reached unless vital new supports for parents and educators are established. In the digital age, it is these caring adults who still matter most.



technology's

POTENTIAL TO BE A GAME CHANGER WILL NOT BE REACHED UNLESS VITAL NEW SUPPORTS FOR PARENTS AND EDUCATORS ARE ESTABLISHED.

Interviews Conducted

Francie Alexander, Vice President and Chief Academic Officer, Scholastic Education

Stephanie Bailey-White, Projects Coordinator, Idaho Commission for Libraries

Bonnie Blagojevic, Education Consultant, Morningtown Consulting

Jeremy Brueck, Co-director, Akron Ready Steps, Akron, OH

Linda Burch, Chief Education and Strategy Officer, Common Sense Media

Chip Donohue, Director, TEC Center at the Erikson Institute

Linda Espinosa, Professor of Early Childhood Education (ret.), University of Missouri

Ellen Frede, Senior Vice President, Acelero Learning

Ellen Galinsky, President, Families and Work Institute

James Gray, Chief Learning Officer, Yogi Play

Mary Haggerty, Education Outreach Manager, WGBH

Kelly Hunter, Executive Director, Children's Literacy Initiative

Janice Im, Chief Program Officer, ZERO TO THREE

Sherri Killins, Commissioner of Early Education and Care, Commonwealth of Massachusetts

Emily Kirkpatrick, Vice President, National Center for Family Literacy

Deborah Linebarger, Associate Professor of Education, University of Iowa

Kristin Martin, Executive Director, Project LAMP

Carolina Nugent, Director of Education, Kindertown

Shelley Pasnik, Director, Center for Children and Technology, Education Development Center

Michael Robb, Director of Education and Research, Fred Rogers Center for Early Learning and Children's Media

Phil Shapiro, Librarian, Takoma Park Library, Washington, DC

Diana Sharp, Cognitive Scientist and Literacy Consultant

Robert Slavin, Director of the Center for Research and Reform in Education, Johns Hopkins University

Marsha Semmel, Director of Strategic Partnerships, Institute for Museum and Library Services

Carly Shuler, Strategy Lead, Play Science LLC

Kathleen Strader, Assistant Director, ZERO TO THREE

Scott Traylor, CEO and Founder, 360Kid

Dan Weisberg, National Director, Innovations for Learning

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