Technology in Early Education

▶ Building Platforms for Connections and Content that Strengthen Families and Promote Success in School

Touch-screen technologies, on-demand multimedia, and mobile devices are prompting a rethinking of education. In a world of increasing fiscal constraints, state leaders are under pressure to capitalize on these new technologies to improve productivity and help students excel. The task is daunting across the education spectrum, but for those in early education (birth through 3rd grade), it is harder still. Until recently, most educators envisioned early learning as story time and hands-on activities with no technology in sight. Yet electronic media use among young children is growing, as are new digital divides between rich and poor, rural, and urban. Tech-savvy educators are incorporating technology in early learning lessons and experimenting with new channels of communication between parents and colleagues.

A red-hot ed-tech marketplace is also creating a feeling of urgency among decisionmakers in state agencies and local school districts who are at risk of spending public dollars on products that sit unused, lock districts into specific brands or platforms, or get in the way of promoting the positive, face-to-face interactions with adults that young children need.

How to ensure thoughtful adoption? State leaders will need to encourage collaboration across many sectors that typically sit in silos, including school districts, early learning programs, libraries, museums, afterschool programs, adult education, and health services. Research centers and post-secondary institutions will need to provide insights and expertise to support this collaboration while also preparing a next-generation workforce to execute it. This issue of *The Progress of Education Reform* looks at technology and how it has an essential role to play as a connector and content disseminator in the service of these collaborations—and ultimately in service of the families who are setting the foundation for their children's success in school and life.

What's Inside

▶ Trends in digital media use by young children

▶ Where to focus: effective teachers & libraries as partners

▶ Building integrated technology platforms for early education

Integrated Networks Supporting Learning for Families and Their Kids

A framework for leveraging technology to:

▶ Create channels for communication and sharing

▶ Provide open access to learning-rich content (books, interactive media, etc.)

= I.T networks, channels of communication, sharing of content

= Research and higher-ed institutions
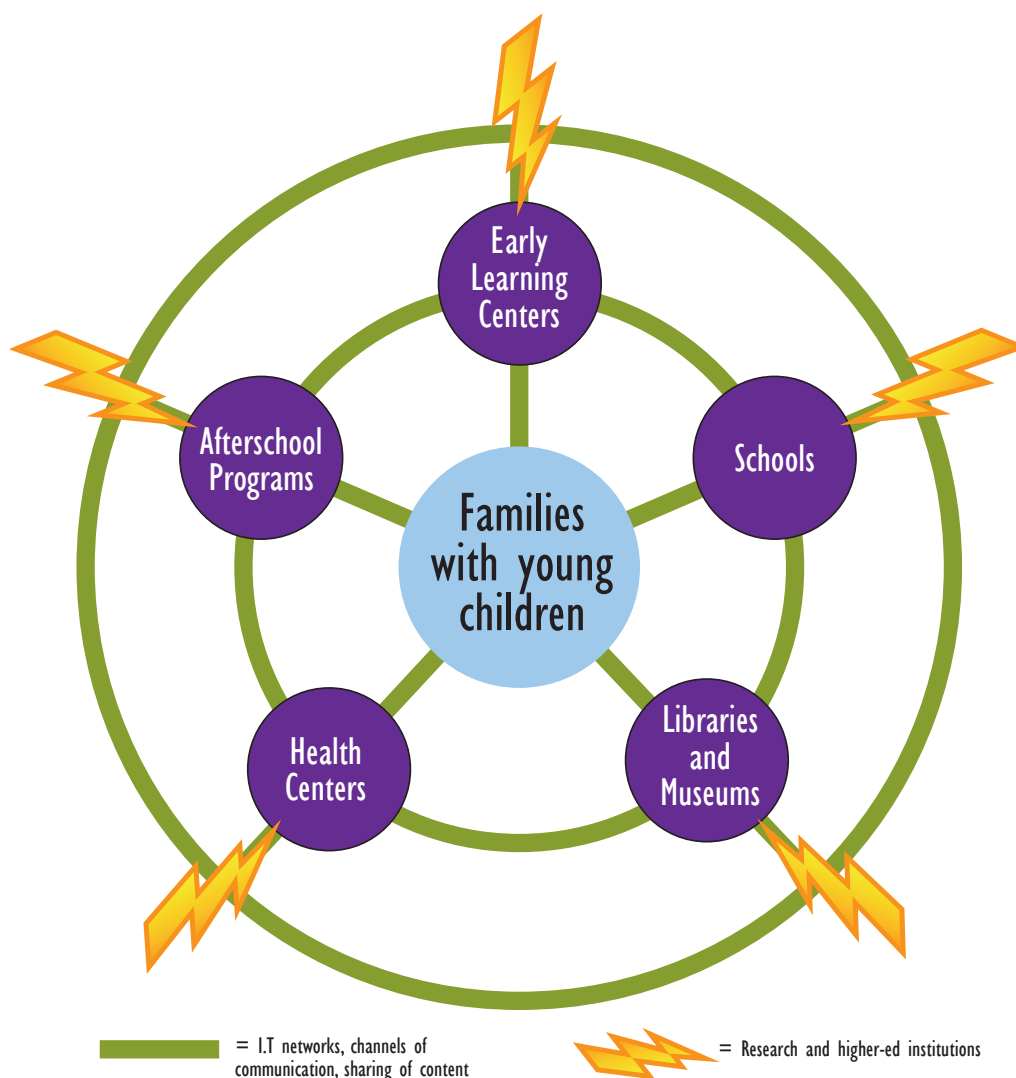
Trends in digital media use by young children

Digital media and interactive technologies are becoming an integral part of young children's daily lives.

▶ *Mobile devices are the rage.* Fifty-two percent of young children (0 to 8) have access to a smartphone, video iPod, or tablet such as an iPad or Android device.[1]

▶ *Television is still king.* Young children watch TV on average an hour and 44 minutes each day compared to less than 30 minutes with computers and videogames.[2]

▶ *Families are big consumers of technology.* Two-thirds of homes with children (0 to 11) have computers and Internet access, more than half have some type of videogame system, and a large majority have cell phones.[3]

A national survey by Common Sense Media in 2011 showed that children are spending increasing amounts of time with screen media compared to 2005.

Minutes Spent per Day with Screen-Based Media Increased from 2005 to 2011 among 6-month to 6-year-olds
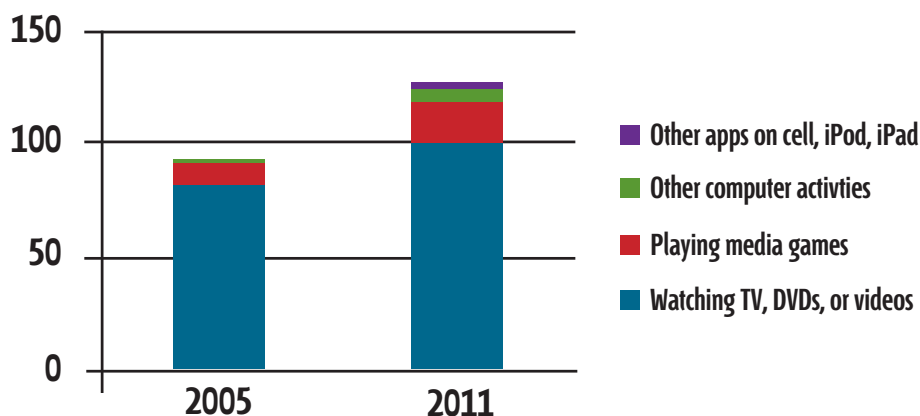
Source: Common Sense Media, 2011; Kaiser Family Foundation, 2005.

Note: Questions in this survey differed slightly between years. In 2005, apps did not exist. In 2011, questions about watching videos, playing games, and doing other computer activities included references to apps and tablets such as iPads.

Some child advocates worry that screen time is substituting for activities children need for their physical, social, and cognitive development. The American Academy of Pediatrics recommends limiting screen time to fewer than two hours a day among children over 2 and no screen time for those under 2.[4] Research is mixed on whether screen-based technology has a negative impact, and the answer often depends on context, content, and the child's age and needs.[5] For example, experimental studies have shown that children's interactions with their parents—and by extension their chances to practice talking with them—are reduced when parents are in a room where the TV is always on,[6] but several studies have also shown that child-directed educational media is associated with gains in language development.[7] And simply keeping media away from children may not automatically lead to positive interactions, particularly if the adults in a child's life are stressed, depressed, or occupied with other responsibilities (not to mention being engrossed in their own devices and screen-based activities).

Digital Divides
The Challenges (2011 Data)

- **Uneven Internet access**: 68% of households in the United States have access to broadband Internet networks; lower-income families, people with less education, those with disabilities, blacks, Hispanics, and rural residents are less likely to have access.[8]

- **Preschools ineligible for e-rate discounts**: The federal government provides 'e-rate' discounts to schools and libraries for Internet service, but many publicly funded pre-K programs, including Head Start centers, are not included in the program, and no discounts are available for centers that serve children under the age of 3.[9]

- **The 'app gap'**: 10% of children from low-income households have a parent with a smartphone, compared to 34% of those in upper-income households. In spring 2011, 14% of lower-income parents had downloaded apps for their children to use, compared to 47% of higher-income parents.[10]

Seeking Signs of Shifts

- **Smart-phone adoption across income levels**: Disparities in access to smart phones may change with upcoming generations of parents: Among low-income young adults (18-29), there is no divide: 39% own smartphones, on par with the national average.[11]

- **Assessing tech disparities in early learning centers**: Researchers at Northwestern University and the Fred Rogers Center for Early Learning and Children's Media are surveying pre-K programs to determine the extent of teachers' access to digital learning tools.

Where to focus?

The time is overdue for thinking about the communication technologies and interactive media that could support early education efforts in states and localities. But how? Here are two starting points:

Teacher effectiveness

The best ways to embed interactive media into preschool or elementary school lessons are not always obvious. Nor are educators well-versed in how to use social media and mobile technology to share resources with parents and colleagues. Professionals who do not have computers in their workplaces and are not regular computer users at home may be especially challenged, especially when asked to use systems for tracking children's progress, meet with mentors via video chats, search curricular materials by state standards, or simply lend e-books.

All of this will require educators to gain knowledge about where, when, and if various forms of digital media can play a role in children's learning. Concerted efforts to improve teacher preparation and training are already underway in states around the country,[12] but it's not clear how many are including any technology-focused training.

Fortunately, new resources have emerged in the past two years. In 2010, the Corporation for Public Broadcasting issued grants in six states to public television stations that partner with state departments of education to spur the integration of multimedia materials (such clips from the literacy show, *The Adventures of SuperWhy!*) into standards-based curricula used by early learning centers.[13] In a landmark report in 2011, the Joan Ganz Cooney Center and Stanford University recommended several steps toward helping teachers integrate media into their teaching practices, expanding the use of public media as a resource for teachers, and eliminating disparities in access to technology infrastructure in schools and communities.[14] In 2012, two new centers opened to provide ed-tech resources to adults who work with young children: the TEC Center at Erikson Institute in Chicago and the Early Learning Environment established by the Fred Rogers Center at Saint Vincent College in Latrobe, Pennsylvania.[15]

States are in a unique position to push for sustained, in-depth training because of their power to set standards for higher education institutions, develop licensing systems for educators, create or enhance scholarship programs and alternative certification routes for renewing the workforce, and encourage in-service professional development throughout school districts and state-funded pre-kindergarten programs.[16]

Helping Families to Use Technology Wisely

A source of guidance: Librarians, health professionals and teachers could become resources for parents and caregivers seeking advice on how to find educational media or set limits on TV watching or gaming.

Becoming better communicators: Educators could use technology tools to "make and strengthen home-school connections," as noted in the recent position statement from the National Association for the Education of Young Children.

Library partnerships

Public libraries have a long history of providing early learning opportunities, from weekly story-time sessions to workshops for parents on child development. They also provide digital media resources and other electronic media such as videos and audio books, as well as computers with high-speed Internet access. But elementary schools, pre-kindergarten programs, and child care centers are often not designed to take advantage of those services, nor are public librarians typically asked to share in professional development opportunities with principals, directors of early learning centers, teachers, or school media specialists.

> *By integrating emerging digital technologies into education and lifelong learning for all professionals, beginning with teachers of children aged 3 through 8, we can establish a cost-effective and productive pathway for learning in the 21st century.*
>
> *Take a Giant Step, 2011.*

Raising awareness of what libraries can offer

- **The Office for the Administration for Children and Families in the U.S. Department of Health and Human Services recently issued a memorandum to Head Start and child care agencies encouraging them to "connect with the public library in your community."[17]**

- **The Institute for Museum and Library Services is committing $2 million of its federal grants over two years to early learning partnerships that match the goals of the Campaign for Grade-Level Reading.[18]**

States have the power to ensure that library agencies and the multiple libraries under their charge—including school media centers—are reaching families with young children. State agencies provide financial support for Internet workstations in libraries where parents log in to access email—information portals for low-income parents who do not have access at home. Just under half of all state library agencies pay for Internet access in public libraries and 29 provide equipment for Internet access.[19] Yet libraries are not always included in early education conversations. For example, many early childhood advisory councils do not include a representative from the library community.[20]

States Harnessing Technology for Early Learning

Some states are piloting technology-assisted interventions using dollars won in federal grant competitions. Two examples:

- **Massachusetts is developing a "digital hub" for early learning as part of its 2011 Race to the Top-Early Learning Challenge grant. The hub will provide resources for parents and educators, as well as research-based digital videos, games, and activities for children.[21]**

- **Pennsylvania has prioritized "infusing digital technology and Universal Design for Learning (UDL)" in its birth-through-12th-grade plan for its 2010 Striving Readers Comprehensive Literacy grant. UDL is an approach used throughout the country, in and out of education settings, to make materials and tools available to all, including those with special needs and disabilities.[22]**

Resources

Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8
Washington, D.C.: National Association for the Education of Young Children and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College, March 2012.
http://www.naeyc.org/content/technology-and-young-children

Take a Giant Step: A Blueprint for Teaching Young Children in a Digital Age
Brigid Barron et al., New York: The Joan Ganz Cooney Center at Sesame Workshop and Stanford University, 2011.
http://joanganzcooneycenter.org/Reports-31.html

Families Matter: Designing Media for a Digital Age
Lori Takeuchi, New York: The Joan Ganz Cooney Center at Sesame Workshop, May 2011.
http://joanganzcooneycenter.org/Reports-29.html

Always Connected: The New Digital Media Habits of Young Children
Aviva Lucan Gutnick et al., New York: The Joan Ganz Cooney Center at Sesame Workshop, March 2011.
http://joanganzcooneycenter.org/Reports-28.html

Zero to Eight: Children's Media Use in America
Los Angeles: Common Sense Media, October 2011.
http://www.commonsensemedia.org/research/zero-eight-childrens-media-use-america

Screen Time: How Electronic Media – From Baby Videos to Educational Software – Affects Your Young Child
Lisa Guernsey, New York: Basic Books, 2012.
http://www.screentimebook.com

Exploring the Digital Nation: Computer and Internet Use at Home
Economics and Statistics Administration and the National Telecommunications and Information Administration, Nov. 2011.
http://www.esa.doc.gov/Reports/exploring-digital-nation-computer-and-internet-use-home

Sampling of Public Libraries & Various Possible Benefits to Early Childhood Programs and the Children & Families They Serve
Information memorandum published jointly by the Office of Head Start and Office of Child Care within the Administration for Children and Families, 2012.
http://www.acf.hhs.gov/programs/ccb/law/guidance/current/im2012-01/im2012-01_a.pdf

Findings from Ready to Learn, 2005-2010
Washington, DC: Corporation for Public Broadcasting and PBS Raising Readers, 2011.
http://www.cpb.org/rtl/

Building integrated technology platforms for early education

Policymakers should situate parents and educators— not the technology— as the most important element in a child's environment. Technology should be a conduit for strengthening communication channels and bringing learning-rich resources to parents.

States are at different stages in developing coordinated systems of birth-to-age-5 programs and in creating seamless connections to elementary schools, but the following actions should be relevant to most states as they plan strategically for the use of technology in early education. State leaders should:

▶ *Take advantage of early childhood advisory councils*
  o Set statewide goals for improving outcomes for children's learning and development, then craft a plan for how and where technology can assist.
  o Include librarians and elementary school representatives in council membership.

▶ *Take stock of where and how technology is being used*
  o Audits and needs assessments: To what extent are state agencies, local school districts, and state-funded early learning programs already harnessing technology to improve sharing and communication? Where is improvement needed?
  o Accessibility surveys: Do families have access to broadband Internet at home? Do educators have access in their classrooms or learning centers? What are their entry points— texts on cell phones, social media networks?
  o Outreach: What types of technology are used to reach parents and provide resources to educators and health professionals who work with young children, birth to 3rd grade? Are resources accessible to families who rely on mobile phones more than computers or printed materials?

▶ *Focus on library partnerships and professional development for educators*
  o Embed educational technology training in teacher training programs
  o Develop training programs that help educators see how to better integrate digital media and interactive tools in classroom activities in developmentally informed ways, when it makes sense to do so.
  o Promote the sharing of resources among libraries, schools, and birth-to-5 programs such as parenting playgroups and preschools.

▶ *Recognize the power of open access to communications technology and media.*
  o When approving publishers for curricular materials or vendors for technology products, favor companies that will expand families' and educators' access to materials and allow for easy sharing and re-use.
  o Get involved in national efforts to improve broadband connectivity and digital literacy in disadvantaged areas at a local and state level, including initiatives to expand utilization of the wireless radio spectrum.
  o Leverage public media assets: Are early education programs taking advantage of free materials provided by public broadcasting stations and being strategic about integrating them into curricula?
  o Enable routine but responsible sharing of child-level data between schools, early learning centers, libraries, afterschool programs, and other learning locations.

Endnotes

1   *Common Sense Media, Zero to Eight: Children's Media Use in America* (Los Angeles: Common Sense Media, Fall 2011).

2   Ibid.

3   Aviva Lucan Gutnick et al., *Always Connected: The New Digital Media Habits of Young Children* (New York: The Joan Ganz Cooney Center at Sesame Workshop, 2011), p. 15.

4   AAP Council on Communications and the Media, "Media Use by Children Younger than 2 Years," *Pediatrics* (Boston: American Academy of Pediatrics, 2011), http://pediatrics.aappublications.org/content/early/2011/10/12/peds.2011-1753.full.pdf+html.

5   *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8,* (Washington, D.C.: National Association for the Education of Young Children and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College, March 2012) 3; Lisa Guernsey, *Screen Time: How Electronic Media – From Baby Videos to Educational Software – Affects Your Young Child* (New York: Basic Books, 2012).

6   Heather Kirkorian et al., "The impact of background television on parent-child interaction," *Child Development* (Washington, D.C.: Society for Research in Child Development, 2009) p. 1350-1359.

7   Heather Kirkorian, Ellen Wartella, and Daniel Anderson, "Media and Young Children's Learning," *Children and Electronic Media*, special issue of *The Future of Children* (Washington, DC: Princeton University-Brookings Institution, Spring 2008). See also S.L. Calvert and B.J. Wilson (Eds.), *The Blackwell Handbook of Children, Media, and Development* (Boston: Blackwell, 2009) and Lisa Guernsey, *Screen Time* (2012).

8   *Exploring the Digital Nation: Computer and Internet Use at Home* (Economics and Statistics Administration and the National Telecommunications and Information Administration, U.S. Department of Commerce, November 2011) p. v.

9   To find out if a Head Start or state-funded pre-K program is eligible for an e-rate discount, go to the Universal Service Administrative Company's eligibility table for non-traditional education: http://www.usac.org/sl/applicants/beforeyoubegin/non-traditional/eligibility-table.aspx.

10 *Zero to Eight*, p. 10.

11 "35% of American Adults Own a Cell Phone," Aaron Smith, Pew Internet & American Life Project, July 11, 2011.

12 See applications submitted to the U.S. Department of Education and U.S. Department of Health and Human Services by states for the Race to the Top-Early Learning Challenge 2011: http://www2.ed.gov/programs/racetothetop-earlylearningchallenge/awards.html.

13 E-mail correspondence on June 4, 2012 with Pamela Johnson, executive producer of the *Ready to Learn Program* for the Corporation for Public Broadcasting.

14 Brigid Barron et al., *Take a Giant Step: A Blueprint for Teaching Young Children in a Digital Age* (Digital Age Teacher Preparation Council, Joan Ganz Cooney Center at Sesame Workshop and Stanford University, 2011).

15 For the Fred Rogers Center Early Learning Environment (known as "Ele") go to: http://ele.fredrogerscenter.org/. For the TEC Center at Erikson Institute, see http://teccenter.erikson.edu.

16 Laura Bornfreund, *Getting in Sync: Revamping the Preparation of Teachers in Pre-K, Kindergarten and the Early Grades* (Washington, D.C.: New America Foundation, 2011). http://earlyed.newamerica.net/publications/policy/getting_in_sync.

17 "Head Start, Child Care, and Public Libraries: Partnerships to Support Young Children and Their Families ACF-IM-HS-12-04," *Federal Register*, May 9, 2012.

18 "IMLS Commits Up to $2 Million to Advance Goals of the Campaign for Grade Level Reading," Institute of Museum and Library Services, press release, December 2, 2011.

19 "Table 8. Library access to the Internet, by type of support from state library agencies," and "Table 9. Number of Internet workstations available for public use in state library agency outlets" (Institute of Museum and Library Services, State Library Agencies Survey, Fiscal Year 2010).

20 See the archive of Early Childhood Advisory Council descriptions collected by the National Governors Association: http://www.nga.org/cms/home/nga-center-for-best-practices/center-issues/page-edu-issues/col2-content/main-content-list/state-early-childhood-advisory-c.html.

21 The Department of Early Education and Care, Commonwealth of Massachusetts, *From Birth to School Readiness: The Massachusetts Early Learning Plan 2012-2015* (Boston: Commonwealth of Massachusetts Department of Early Education and Care, 2011).

22 U.S. Department of Education, Striving Readers Comprehensive Literacy Discretionary Grant Abstracts for FY2011, http://www2.ed.gov/programs/strivingreaders-literacy/awards.html.

The author

Lisa Guernsey is the Director of the Early Education Initiative at the New America Foundation *(earlyed.newamerica.net)* and the author of *Screen Time: How Electronic Media – From Baby Videos to Educational Software – Affects Your Young Child* (Basic Books, 2012).

Acknowledgments

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