

Using Technology Appropriately in the Preschool Classroom

By Ann S. Epstein, Senior Director of Curriculum Development at HighScope

At work time in the house area, Carol and Simone want printed menus for their restaurant. At the computer, Carol sits in front of the screen and Simone sits beside her. They decide to serve macaroni and soup. Simone instructs Carol to type "M" for macaroni and "S" for soup "like in my name." They print "M" and "S" pages and open their restaurant for business.

Introduction

As technology¹ for young children proliferates, educators and parents wonder if, when, and how to use it appropriately to support early development. Professional organizations concerned with children's well-being feel pressured to issue position papers. For example, the policy statement of the American Academy of Pediatrics (AAP) Council on Communications and Media (2011) states unequivocally that children under age two should not be exposed to any **screen media** and emphasizes the value of unstructured play for the young child's developing brain. At the same time, AAP recognizes that high-quality **interactive media** can have educational benefits for children above age two, improving "social skills, language skills, and even school readiness" (p. 1041). A joint position statement of the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center for Early Learning and Children's Media (2012) goes further



Technology is playing an increasing role in society today, prompting us to ask if, when, and how to use it appropriately with young children.

¹See the sidebar on page 3 for a definition of terms used in this article.

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in green-lighting technology. While cautioning against its passive (non-interactive) use, the statement says that “technology and interactive media are here to stay” (p. 2) and that, appropriately used, with the support of knowledgeable adults, they “can be harnessed for [early] learning and development” (p. 2).

Popular media have also weighed in on the issue. Columnist Steve Almond, in *The New York Times* (June 21, 2013), expressed the ambivalence of many parents when he both lamented the obsession of his young children (ages 4 and 6) with their digital devices and admired their determination to use them, including for “educational” purposes such as reading. Reporter Ruth Konigsberg acknowledged that in “the debate about wired children ... people have strongly held beliefs about something that can’t yet be proven conclusively one way or another” (*Time*, August 12, 2013, para. 8). Press coverage on the topic alternates between concerns about the loss of children’s creativity and social skills versus claims about the speed at which the children learn to process information. Studies, scarce as they are, are cited to buttress the reporter’s point of view.

Indeed, research has a hard time keeping up with the latest digital inventions and how children use them. Studies on young children, particularly before they reach school age, are infrequent. Nevertheless, the data (summarized below) are converging on the fact that passive media can contribute to language delays, obesity, social withdrawal, attention problems, and even irregular sleep patterns. A few studies point to the potential benefits of the limited use of technology *if* it respects the hands-on way young children learn. However, it is too soon to predict technology’s long-term effects on the acquisition of knowledge and skills across all domains of development.

Like everyone committed to promoting high-quality early education, and making it accessible to young children of all backgrounds, HighScope confronts these same



Guidelines based on research and practice can help early childhood professionals make thoughtful decisions about how much and what types of technology to use with young children.

Terms Used in This Article

Note: The following definitions are a composite of those offered by the American Academy of Pediatrics (2011), National Association for the Education of Young Children and Fred Rogers Center for Early Learning and Children's Media (2012), Levin (2013), and others. They are meant purely to describe, not to prescribe (recommend) or proscribe (criticize) their use.

Technology – The tools, digital devices, and other electronic machines or equipment that deliver media. These currently include, but are not limited to, televisions, computers, smart-phones, tablets, videogame consoles, DVD and music players, web-based programming, and eReaders.

Screen media – Technology that delivers visual and auditory content to users via a screen.

Interactive media – Technology that allows users to control the content that the device delivers. Choices made by the user (input) affect the information provided by the technology (output).

questions and dilemmas about technology. In this article, we therefore present a HighScope position statement on young children and technology, based on the tenets and practices of the HighScope Curriculum and the research available to date. Our intention is to inform early childhood educators *today* as they make programmatic decisions, and to provide guidelines for evaluating the technology of the *future*.

What the Research Says

One researcher states that “Media culture influences how children behave and treat one another. It also shapes *how* they learn, *what* they learn, [and] what they *want* to learn [author’s italics]” (Levin 2013, p. 1). As noted above, however, research on the use of technology by and with young children is scarce. Moreover, while some studies have been conducted by academics, others have been done by groups with an interest in (if not explicit ties to) media producers and distributors. That said, here is what is known about young children’s use of digital technology at the time of writing this article:

The amount of technology used by children. Young children today spend a great deal of time in front of screens. This encompasses both foreground media (meant for children) and background media (meant for other family members but which young children see and/or hear). For example:

- Children spend an average of seven hours a day using screen media, including one to two hours a day for those under age two. Ninety percent of parents report that children below age two watch some form of electronic media.
- While some studies report children aged two to four average two hours a day of screen time (Rideout, 2011), other research finds children aged two to five years spend more than 32 hours a week in front of a screen (McDonough, 2009). “For many children, this is more time than they spend in any other activity except sleeping” (Levin, 2013, p. 13).
- Fifty-two percent of children aged birth to eight have access to a smart phone, tablet, or similar electronic device (Guernsey, 2012).

How technology is used by children. Educators agree that literacy today means developing digital literacy (technology-handling skills), much as it meant concepts about print (book-handling skills) in the past (National Institute for Literacy, 2008). However, the way that digital education takes place has important implications for its effectiveness.

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Studies show that

- Most parents admit to using screen time as a distraction, peace keeper, or babysitter while adults do household chores (AAP, 2011).
- Educational content matters at least as much as format (Wainwright & Linebarger, 2006). For example, interactive literacy programs appear to foster early reading skills while those that use drill-and-practice techniques do not (Corporation for Public Broadcasting, 2011).
- Technology is only effective when teachers mediate its use with the same developmentally appropriate practices they apply to any other type of learning experience (Plowman & Stephen, 2005; 2007).

The effects of technology use by children. Most research has documented the negative effects of media use by young children; however, a few studies suggest its potential benefits, provided the format, content, and use of the technology is developmentally appropriate. Here are examples of both the negatives and the positives:

- For children below age two, media exposure has been associated with language delays (Linebarger & Walker, 2005).
- For preschool and school-aged children, media use has been associated with physical, behavioral, and mental health problems, including obesity, poor sleep habits, aggressive behavior, and attention disorders (Nunez-Smith, Wolf, Huang, Emanuel, & Gross, 2008).
- Children in households with heavy media use (that is, where the television is on all or most of the time) are read to less often (25 percent less for three- to four-year-olds and 38 percent less for five- to six-year-olds) than in other households with low or moderate media use (Rideout & Hamel, 2006).
- The more time children under age five spend with media, the less they interact with others (siblings, parents, peers) and the less creative their play (Vandewater, Bickham, & Lee, 2006).
- For children aged one to three, background television reduces the amount of time they play and diminishes their focused attention when they do play (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008).
- “Active, appropriate use of technology and media can support and extend traditional materials in valuable ways ... both cognitive and social” (NAEYC & The Fred Rogers Center, 2012, p. 7). For example, computers allow young children to manipulate

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shapes (mathematics) with greater dexterity than they can manage by hand and often promote collaborative (social) problem solving (Clements, 2002).

- “Additional research is needed to confirm the positive outcomes of technology tools on children’s language and vocabulary development, logical-mathematical understanding, problem-solving skills, self-regulation, and social skills development” (NAEYC-Fred Rogers Center, 2012, p. 7).



While most research documents the negative effects of media on young children, some studies point to its potential social and cognitive benefits when used appropriately.

HighScope Position Statement on Young Children and Technology

The prevalence of technology in the world today impels us to question if, when, and how digital media can be used appropriately in early childhood settings. As such, HighScope presents here a position statement (pp. 6-7) on young children and technology. The statement is not intended to replace those cited above (AAP and NAEYC-Fred Rogers Center), but to briefly lay out the “big picture” issues that adults should consider in evaluating the use of technology with young children.

Rationale for statement. Our position was developed with three overarching guidelines to reflect HighScope’s commitment to good early childhood practice. The statement therefore:

1. Takes the *available research* into account.
2. Is based on the HighScope tenets of *active participatory learning* (Epstein, 2014; Epstein & Hohmann, 2012).
3. Acknowledges the crucial role of adults (and their associated *professional development*) to mediate the appropriate use of technology and balance it with other venues for early learning.

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Content of statement. The content of the statement reflects four underlying dimensions:

1. We begin with *choice*, recognizing that not all programs have the resources, access, or cultural inclination to include technology in the classroom. At the same time, we should be mindful that inequalities in exposure may have implications for children’s subsequent school readiness.
2. The statement then sets forth guidelines to determine *what, when, and how* to use technology appropriately with young children, considering all aspects of their development.
3. The position states in simple terms the *role and responsibility of adults* in supporting young children’s use of technology.
4. Our position acknowledges the *rapidly changing world* in which the statement is issued. We avoid mentioning specific digital devices because the statement could quickly become obsolete.

HighScope Position Statement on Young Children and Technology

HighScope believes technology, when appropriately designed for young children over age two and used with the guidance of supportive adults, can promote early learning and development. To use technology as one of many effective teaching tools, apply the following principles and ideas:

1. Incorporating technology in the classroom is a choice, not a necessity. While familiarity with technology is important in today’s world, and access to technology is an equity issue, early learning primarily occurs through interactions with other materials, people, events, and ideas.

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“The overriding message is that computers and other electronic equipment should take a back seat to children's hands-on learning with manipulatives and direct social interaction... That said, incorporating technology in the classroom can provide an important experience for all children, particularly those whose family income or other factors limit access.”

HighScope Position Statement on Young Children and Technology, continued

2. Technology is one of many tools that young children can use to carry out their play ideas, acquire knowledge and skills, and solve problems. Using technology is an interesting end in itself (discovering how it works), as well as a means to an end (extending role play, solving problems).
3. Technology should be used in moderation to supplement, not replace, hands-on learning with real materials that provide a full range of physical, sensory, intellectual, and social experiences.
4. Technology should be interactive and open-ended, and it should promote discovery learning, not emphasize drill and practice. Software should encourage creativity, problem solving, and reflection.
5. Technology should serve as a catalyst for social interaction. It should allow children to use equipment and programs together, share observations and discoveries, and assist one another.
6. Adults should act as partners when children choose to use technology, just as they partner and interact with children during other types of play.
7. Choose hardware that is safe and sturdy enough for children to use independently. If concerns about equipment costs or damages are overriding, it will restrict children's use of the technology and limit the potential benefits.
8. Because new technologies are being developed all the time, their appropriateness for young children's physical, cognitive, and social development must be evaluated on an ongoing basis.

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Teaching Strategies to Support the Appropriate Use of Technology in the Classroom

The overriding message is that computers and other electronic equipment should take a back seat to children’s hands-on learning with manipulatives and direct social interaction. It is noteworthy that, in reviewing anecdotes from the Child Observation Record (COR) and COR Advantage (HighScope & Red-e Set Grow, 2013) to illustrate this article, using classrooms in which technology was readily available to children,



Choose technology that is interactive and open-ended, and introduce a program or application to a few children at a time.

the author found very few in which children used it in their play. Whether this reflects preschoolers’ choices about what to play with and/or teacher choices about what to record, it suggests that children and adults gravitate toward real, hands-on materials.

That said, incorporating technology in the classroom can provide an important experience for all children, particularly those whose family income or other factors limit access (Lee & Burkham, 2002). At the same time, be aware that even those with wide exposure at home happily use other objects to represent such devices during play; for example, a block may stand for a smart phone:

At work time in the house area, Fernando swipes his hand across a small wooden block and tells Allegra, “I’m calling the pizza guy. Do you want mushrooms or hot peppers?”

Programs need *not* give children working digital or mobile devices (disabled ones with batteries removed are okay). After all, we did not put working push button phones in classrooms ten years ago, nor would we ever put a working stove in the house area because children pretend to cook. Young children enjoy using facsimiles of the real thing in ways that imitate actual adult use:

During planning time, Leila uses a battery-less camera to “take a picture” of the “art area.” When asked what she will do there, Leila answers, “Make something with the play dough.”

Teaching Strategies for Using Technology With Young Children

- Model safe and careful use of technology.
- Choose child-friendly hardware.
- Select appropriate programs or applications.
- Locate classroom technology to facilitate social exchanges.
- Encourage children to verbalize their thinking as they solve technology problems.

Finally, note that the strategies listed below refer to how teachers can support the *children's use of technology*. This is a different issue than how adults themselves might use electronic devices to promote early learning, much as they might have used a camera in the past. For example, a teacher may take photos on a mobile device during work time and use them to facilitate recall by holding the device while children swipe the screen to look “backwards” and “forwards” at the sequence they followed to carry out a project. Or video recordings made by a teacher could be shared with students after a field trip, to help the children recall and build on their experiences. These and other ideas allow adults to take advantage of technology and familiarize children with it at the same time, while not expecting children to use it in developmentally inappropriate or unrealistic ways.

Teaching Strategies

To choose appropriate technology and mediate its use by young children, try the strategies listed below. (For further details and more ideas see Epstein, 2012, and Epstein & Hohmann, 2012):

- **Model safe and careful use of technology.** Help children learn to use technology in ways that will neither hurt them nor damage equipment — the same care they take with other classroom materials.

At work time in the block area, while exploring (battery-less) cameras, Mateo shakes one in frustration. “How does the lens open?” he asks. His teacher suggests he push different buttons to see what happens. He does and then says excitedly, “Watch! When I press this, it opens!”

- **Choose child-friendly hardware.** Innovations make technology increasingly easier for young children to use. Choose devices that are appropriate for young children’s perceptual and physical capabilities. Encourage children who already know how to use the equipment to help their peers.

At work time in the book area, George uses the computer. He looks at Sue [his teacher] and says, “Help.” When Sue comes over, he points to the screen. The program he wants to use is not open. Maria, who is at the other computer, says to George, “You have to click it.” She reaches over and opens the program for him. Later, Maria shows him how to click the “X” to close the program. Then George himself clicks on the next program he wants to play.

- **Select appropriate programs or applications.** Emphasize interactive, open-ended learning, not drill and practice. Introduce a program or application to a few

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children at a time, as a small-group activity, before making it available at work time. For example, the following was observed the day after children explored drawing materials and a computer drawing program at small-group time:

At work time at the computer, Leila uses the coloring program to create a flower and butterfly picture and print it out. She says, “My flower. My happy.”

- **Locate classroom technology to facilitate social exchanges.** Allow space for children, as well as the adults playing with them, to use devices together. Classroom technology should be visible from other areas of the classroom so children can wander over and join in, as happens in this example:

At work time in the book area, Angel and Ellie sing along with the ABC song on the computer. When they play it again, Asa and Rufus come over and sing and dance too.



Children's use of technology is often social. Provide enough space and chairs for children and adults to use technology together.

- **Encourage children to verbalize their thinking as they solve technology problems.** Help children reflect on their solutions (e.g., How do I make it louder? How can I turn the puzzle piece to fit?). Be available so they do not get frustrated or discouraged when something is not working. Acknowledge their attempts to solve problems (including with humor), as in this example:

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“Technology is one, but only one, piece of the early childhood curriculum. Use it with balance and with creativity.”

At work time in the book area, when the computer program stops working, Avalon calls to Christine [her teacher] for help and says, “Maybe we can put a curse on it.” She waves her hands over the computer and laughs. Christine laughs with her and observes, “That doesn’t seem to be working.” Avalon says, “Maybe if I turn it off and on again.” Christine encourages her to try her idea. Avalon does and when the program re-boots, Avalon says “That did it!!” Christine responds, “You solved the problem.”

The use of technology with young children offers many opportunities for early learning, but we must proceed with caution as a slowly growing body of research helps us to make wise choices. Even as we discover the types of emerging interactive media and teaching strategies that work well in preschool and beyond, we should not forget the enduring truth that young children learn best through direct interaction with people and materials, in activities they choose and shape themselves, and which spur them to reflect on what they are doing and learning. Technology is one, but only one, piece of the early childhood curriculum. Use it with balance and with creativity.

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