

Technology in Early Childhood Programs Serving Children from Birth through Age 8

A joint position statement of the National Association for the Education of Young Children and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College

Proposed 2011

It is the position of NAEYC and the Fred Rogers Center that technology and interactive media are learning tools that, when used in intentional and developmentally appropriate ways and in conjunction with other traditional tools and materials, can support the development and learning of young children.

In this position statement, the word "technology" is used broadly, referring to interactive digital and electronic devices, software, multi-touch tablets, technology-based toys, apps, video games and interactive (nonlinear) screen-based media. Technology is continuously evolving. As a result, this statement focuses on the principles and practices that address the technologies of today, while acknowledging that in the future new and emerging technologies will require continual revisions and adaptation.

The most effective use of technology in an early childhood setting involves the application of tools and materials to enhance children's learning and development, interactions, communication, and collaboration. As technology increasingly finds its way into mainstream culture, the types and uses of technology in early childhood programs have also expanded dramatically to include computers, tablets, e-books, mobile devices, handheld gaming devices, digital cameras and video camcorders, electronic toys, multimedia players for music and videos, digital audio recorders, interactive whiteboards, software applications, the Internet, streaming media, and more. These technologies are increasingly expanding the tools and materials to which young children have access both in their homes and in their classrooms, affecting the ways in which young children interact with the world and with others.

The purpose of this position statement is to provide a framework to guide practice in the selection, use, integration, and evaluation of technology tools and screen media in early childhood settings serving children birth through age eight. Early childhood educators can adopt the principles and guidelines from this statement to make informed decisions about the selection of technology tools and screen media; the appropriate use of technology; the integration of technology in early childhood settings; and the evaluation of technology to effectively support children's learning and development.

The 2011 position statement builds upon the guiding principles of the 1996 statement (NAEYC 1996) by: expanding the age range from ages 3 through 8 to now include birth through three; encompassing a broader definition of technology; and adding an emphasis on technological and media literacy. This statement addresses ways in which the types, uses, and impact of technology in the lives of young children, parents, families, and early childhood educators have dramatically and irrevocably changed in the last 15 years (Schomburg & Donohue 2009). The focus is on the use of interactive technology in early childhood settings, thus this statement does not directly address the issues of non-interactive television screen time for children in home settings, how parents should use TV in the home, or violence in the media, which are addressed in the NAEYC position statement, "Media Violence in Children's Lives" (1994).

This statement is grounded in the research on child development, teaching and learning, and in the evolving knowledge base about safe, effective, active, and developmentally appropriate uses of technology and new media (Appel & O'Gara 2001; Clements & Sarama 2003, 2005; Copple & Bredekamp 2009; Couse & Chen 2010; EDC & SRI 2010; Gee & Levine 2009; Greenfield 2004; Kirkorian, Wartella, & Anderson 2009; Linebarger & Piotrowski 2009; NAEYC 2009; Neuman, Newman, & Dwyer 2011; Plowman & Stephen 2005; Rosen & Jaruszewicz 2009;

Schmidt, Rich, Rigas-Shiman, Oaken, & Travers 2009; Vandewater & Lee 2009; Vandewater et al. 2007; Wood, Specht, Willoughby, & Mueller 2008), and is intended to provide support and guidance for early childhood educators about how technology tools and practices can promote young children's optimal social, linguistic, and cognitive learning.

Statement of the Issues

The genie is out of the bottle; technology is here to stay. Young children live in a world of interactive media and they are growing up at ease with digital devices that may still puzzle their parents and grandparents (Berson & Berson 2010; Buckleitner 2009; Calvert & Rideout 2005; Chiong & Shuler 2010; Couse & Chen 2010; Kerawalla & Crook 2002; Lisenbee 2009). In the digital age, young children, parents, and early childhood educators are learning about digital technology and new media simultaneously. These new tools are changing the way we acquire knowledge and how we communicate with each other in much the same way that the printing press expanded access to books and the printed word.

Technology has become ubiquitous in the lives of many young children, parents, and early childhood educators. The influence of microprocessor-based tools, computers, the Internet, wireless technologies, digital media, mobile and handheld devices, and Web 2.0 tools for communication, collaboration, social networking, and user-generated content have transformed mainstream culture, particularly in the ways parents and families use technology to manage their daily lives and for entertainment, how teachers use technology in the classroom with young children, and how we deliver teacher education and professional development (Foundation for Excellence in Education 2010; Gutnick, Robb, Takeuchi, & Kotler 2010; Jackson 2011; Rideout 2007; Rideout & Hammel 2006; Rideout, Vandewater, & Wartella 2003; Roerts & Foehr 2004).

This digital revolution makes technological and media literacy for parents and the adults who work with young children more important than ever. Making informed choices about technology and the content of digital media requires knowledge, experience, and active exploration. Providing developmentally appropriate experiences with technology requires an understanding of technology viewed through the lens of known child development theories (Center for Media Literacy 2010; Hobbs 2010; National Association for Media Literacy Education 2007; Rogow & Scheibe 2007), and developmentally appropriate practice (Copple & Bredekamp 2009).

There are conflicting views about whether young children should have access to screen-based media. The American Academy of Pediatrics and the White House Task Force on Childhood Obesity discourage screen media and screen time for children under 2 years of age and recommend limited screen time for older children (American Academy of Pediatrics 2010; Campaign for a Commercial-Free Childhood 2010; Funk, Brouwer, Curtiss, & McBroom 2009; White House Task Force on Childhood Obesity 2010). Concerns have been raised about the lack of empirical research that demonstrates positive benefits from technology use. Much of the concern has focused on the content of entertainment and educational media produced for young children including: the effects of media violence and sexuality on young children and exposure to commercial messages, stereotypes, and inappropriate behaviors and social interactions. Educators and parents have also been cautioned about background TV, the passive use of screen media and the impact of screen time on childhood obesity; irregular sleep patterns; behavioral issues; focus and attention problems; decreased academic performance; negative impact on socialization and language development, time for play and other developmentally appropriate activities; and reduced time interacting with peers, siblings, parents, and other adults (American Academy of Pediatrics 2001; Appel & O'Gara 2001; Brooks-Gunn & Donohue 2008; Campaign for a Commercial-Free Childhood 2010; Common Sense Media 2008; Cordes & Miller 2000; DeLoache, Chiong, Islam, et al. 2010; Rogow 2007; Sook-Jung, Bartolic, & Vandewater 2009; Tompoulos, Dreyer, Berkule, et al. 2010; Vandewater et al. 2007). Early childhood educators must be mindful of these cautions and concerns, particularly for children under 2 years of age. Decisions about whether, how, and when to use technology with young children need to be intentional and based on developmentally appropriate principles and practices.

The precise meaning of “screen media” is elusive, with sometimes conflicting definitions of screen-based media itself. As technology has broadened in scope to include both linear or noninteractive media such as TV, movies, and interactive options such as apps, and movement-activated activities such as Microsoft’s Kinect, the Nintendo Wii, or devices with built-in sensors designed to detect a child’s movement, each unique screen demands its own criteria for best usage (Kleeman 2010). The proliferation of digital devices with screens means that “screen time” is no longer just an issue of how long a young child watches television. The challenge for early childhood educators is to make informed choices that maximize learning opportunities for children while mediating the potential for misuse and overuse of screen media even as these devices offer new interfaces that increase their appeal and use by young children.

The push to integrate technology into early childhood settings can lead to inappropriate use of technology.

Technology and interactive media are tools that must be used appropriately and intentionally. The appeal of technology may lead some educators to use technology for technology’s sake, rather than as a means to an end. Technology may also be used for activities that are not educationally sound, developmentally appropriate, or effective (electronic worksheets for preschoolers, for instance). Passive use of technology and media may also be inappropriately used as a replacement for active play, engagement with other children, and interactions with adults. Educators who are grounded in child development theory and developmentally appropriate practices, and are technologically and media literate have the knowledge, skills, and experience to select and use technology and digital media that are appropriate for the ages and developmental levels of the children in their care, and they know when and how to integrate technology into the program effectively. Educators who lack technological and media literacy are at risk of making inappropriate choices and using technology with young children in inappropriate ways that can negatively impact children’s learning and development.

To avoid inappropriate use of technology, educators need positive examples of how to successfully adapt and integrate technology into the classroom to enhance children’s learning and a set of guidelines for the informed and intentional selection, use, and evaluation of technology tools with young children (Edutopia n.d.; Technology and Young Children Interest Forum 2008). Intentional, appropriate, and integrated use of technology is dependent on the ability, knowledge, and skills of teachers. In the digital age, teachers need preservice and professional development opportunities to try out new technology tools, learn about appropriate use of technology, and gain the knowledge and skills to implement them effectively. (See Appendix A, Recommendations for Classroom Practice.)

Current attitudes and practices contribute to the growing digital learning divide. Children who are growing up in affluent families often have full access to technology tools and broadband connections to the Internet in their homes, begin using it at an early age, and have highly developed technology skills and beginning media literacy when they enter school. Children in families with fewer resources may have little or no access to the latest technologies in either their homes or schools and early childhood settings (Becker 2000; Burdette & Whitaker 2005; Calvert & Rideout 2005). Educators must ensure equity by providing opportunities for all children to participate and learn in an environment in which technology tools have been integrated (Judge, Puckett, & Cabok 2004). Accommodations may need to be made for children with special needs to use technology independently (Hasselbring & Glaser 2000).

International Education Technology Standards require basic skills in technology operations and concepts by age five (ISTE 2007). Lack of intentional integration and use of technology in early childhood classrooms can place children without technology exposure at a disadvantage and impede their ability to compete in the 21st century workforce.

Principles for Appropriate Use of Technology to Support the Optimal Development and Learning of Young Children

The selection of technology

- The health and well-being of all children is a primary goal.
- Developmentally appropriate practices must guide decisions about whether, when, and how to integrate technology tools into programs for infants, toddlers, preschoolers, and K-3 children.
- Professional judgment is required to determine if a specific use of technology is age appropriate, individually appropriate, and culturally and linguistically appropriate.

The use of technology

- Appropriate use of technology and screen media depends on the age, developmental level, needs, interests, and abilities of each child.
- Effective uses of technology and screen media are active, hands-on, engaging, and empowering; give the child control; provide adaptive scaffolds to ease the accomplishment of tasks; and are used as one of many options to support children's learning.
- When used appropriately, technology can enhance children's cognitive and social abilities.
- Interactions with technology should be playful.
- Assistive Technology provides equitable access for children with special needs.

The integration of technology

- Technology can enhance early childhood practice when integrated into the environment, curriculum, and daily routines.
- Technology tools can improve how we measure and record development, document growth, plan activities, and share information with parents, families, and communities.
- Technology tools can help educators make and strengthen home-school connections.

The evaluation of technology

- Technological and media literacy are essential to guide early childhood educators and parents in the selection, use, and evaluation of technology tools and screen media.
- Digital citizenship is essential in the 21st century.
- Early childhood programs have an obligation to use technology to bridge the digital divide.

The selection of technology

The health and well-being of all children is a primary goal. The healthy cognitive, social, emotional, and physical development of the whole child is as important as ever in the digital age. Access to technology tools and digital media should not exclude, diminish, or interfere with children's healthy communication, social interactions, play, and other developmentally appropriate activities with peers, family members, and teachers. Early childhood educators must continually monitor and assess research findings on emerging issues related to technology, including 3-D and eye health, exposure to electromagnetic fields, toxins from lead paint or batteries, choking hazards related to small parts, or any other potentially harmful, physiological or developmental effects or side effects related to the use of technology.

Developmentally appropriate practices must guide decisions about whether and when to integrate technology tools into programs for infants, toddlers, preschoolers, and K-3 children. Appropriate technology use is balanced with, and enhances, the use of essential materials, activities, and interactions in the early childhood setting, and becomes part of the daily routine (Anderson 2000; Van Scoter, Ellis, & Railsback 2001). Technology does not

replace activities that are important for children's development like creative play, real life exploration, physical activity, conversation, and social interactions (Guernsey 2010). Technology should be another tool to support learning, not the focus of the learning, and should be used as an additional resource for expanding young children's access to new content (Guernsey 2010). The goal is for early childhood educators to use their knowledge of child development and effective practices to carefully select and use technology in the service of healthy development, learning, creativity, interactions with others, and relationships.

Professional judgment is required to determine if a specific use of technology is age appropriate, individually appropriate, and culturally and linguistically appropriate. Early childhood educators are the decision makers in whether, how, what, when, and why technology is implemented, applying their expertise and knowledge of child development and learning, individual children, and the social and cultural contexts in which children live. The adult's role is critical in making certain that thoughtful planning, careful implementation, reflection, and evaluation guide decision making about how to introduce and integrate any form of technology into the classroom experience. Selecting appropriate technologies for the classroom is similar to choosing any other learning material. Teachers must constantly make reflective, responsive, and intentional judgments to promote positive outcomes for each child (NAEYC 2009). Developmentally appropriate teaching practices must always be the guiding goal when selecting any kind of material for the classroom, including electronic and digital materials.

Teachers must take the time to evaluate and select technology tools for the classroom and carefully observe children's use of the materials to identify opportunities and problems and make appropriate adaptations. This means that they must be willing to learn about and become familiar with new technologies as they are introduced and be intentional in the choices they make.

While selecting interactive media for children, teachers should use verifiable criteria based on good practices and not depend on non-verifiable claims included in the product's marketing material. In the selection process, teachers should consider initial cost and also other non-specified costs (i.e., renewal and additional items needed to use the product) and inappropriate incentives for children to use the product and buy more products from the vendor. If developers and publishers of interactive media commit to using research-based information in the development, marketing, and promotion of their products, selection of interactive media will become less mysterious and easier for teachers and parents (Buckleitner 2011).

To be adequately prepared and to support the effective use of technology in learning environments for young children, early childhood educators need available, affordable, and accessible professional development opportunities that include in-depth, hands-on technology training, on-going support, and access to the latest technology (Appel & O'Gara 2001; Guernsey 2010). Educators must be knowledgeable and prepared to make informed decisions about how to appropriately implement technology to meet the social, physical, and cognitive needs of young children. Educators also need to be knowledgeable enough to answer parents' questions and steer children to media and technology experiences that have the potential to exert a positive influence on their development (Guernsey 2010).

The use of technology

Appropriate use of technology and screen media depends on the age, developmental level, needs, interests, and abilities of each child. There is a developmental progression in children's use of tools and materials, typically moving from exploration to mastery and then to functional subordination. Anecdotal evidence suggests this same progression is evident in the ways that children interact with digital tools. Infants and toddlers use technology as something to explore, to control, to touch, taste, shake, and as a tool for banging. Certainly, some technological tools are inappropriate for children from birth to age two. Passive screen viewing has not been associated with specific learning and development in infants and toddlers (Schmidt, Rich, & Rifas-Shiman 2009). Yet mobile, multi-touch screens, and newer technologies have changed the way our youngest children interact with images, sounds, and

ideas (Buckleitner, 2011). For example, a children's author may choose to tell a story in traditional print form, as an interactive e-book, or both. Interactive media is one more source of exploration and mastery. When experienced in the context of human interaction, these interactions become very similar to early book reading or joint adult-child exploration. Preschoolers have varying levels of ability to control digital media, but with adult mediation they demonstrate mastery of simple digital devices and are often seen using the tools as part of their pretend play. In the early school-age years, children are becoming proficient in using technological tools to accomplish something: make a picture, play a game, record a story, take a photo, make a book, or other age-appropriate learning activities.

Effective uses of technology and screen media are active, hands-on, engaging, and empowering; give the child control; provide adaptive scaffolds to ease the accomplishment of tasks; are integrated into early childhood practices, curriculum, routines and environment; and are used as one of many options to support children's learning. To align and integrate technology with other core experiences and opportunities, young children need tools that help them explore, create, problem solve, consider, think, listen and view critically, make decisions, observe, document, research, investigate ideas, demonstrate learning, take turns, and learn with and from one another. Effective technology tools connect on-screen and off-screen activities and bring adults and children together rather than push them apart, with an emphasis on co-participation between adults and children and children and their peers.

When used appropriately, technology can enhance children's cognitive and social abilities. Digital and electronic technology offers opportunities to extend learning in early childhood settings in much the same way as other materials, such as blocks, manipulatives, art materials, play materials, books, and writing materials. Screen media can expose children to experiences that they cannot have in real life (exposure to animals, objects, people, landscapes, experiences, and virtual field trips). Digital media can also help children save, document, revisit, and share their real-life experiences through images, stories, and sounds. When used appropriately and with caution, the active use of technology can support and extend traditional materials in valuable ways. Research points to the positive effects of technology in children's learning and development, both cognitive and social (Clements & Sarama 2003a, 2003b; Fischer & Gillespie 2003; Freeman & Somerindyke 2001; Greenfield 2004; Haugland 1999, 2000; Heft & Swaminathan 2002; Kirkorian, Wartella, & Anderson 2008; Linebarger, Piotrowski, & Lapierre 2009; Rideout, Vandewater, & Wartella 2003).

Interactions with technology should be playful. Play is central to children's development and learning. Children's interactions with technology mirror their interactions with other play materials and include sensory-motor or practice play, make-believe play, and games with rules. Young children need opportunities to explore digital materials in playful and creative ways. Appropriate experiences with technology allow children to control the medium and the outcome of the experience, to explore the functionality of digital tools, and to pretend about how these materials might be used in real life. Increasingly, educational media producers are exploring the learning power of interactive games and collaborative play involving children and their family members or teachers. Digital games fall into the same category as board games and other self-correcting learning activities, with the same opportunities and cautions related to children's developmental stage.

Assistive Technology can provide equitable access for children with special needs. For children with special needs, technology has proven to have many potential benefits. Technology can be a tool to augment sensory input or reduce distractions. It can provide support for cognitive processing or enhance memory and recall. The variety of adaptive and assistive technologies ranges from low-tech toys with simple switches to expansive high-tech systems capable of managing complex environments. When used thoughtfully, these technologies can empower young children, increasing their independence and supporting their inclusion in classes with their peers. With adapted materials, young children with disabilities may no longer have to be excluded from activities. With use of appropriately designed technology, educators can increase the chance that children will have the ability to learn, move, communicate, and create.

Technology has supported inclusive practices in early childhood settings by providing adaptations that allow children with disabilities to participate more fully in the early childhood setting. Augmentative communication devices, switches, and other assistive devices have become staples in classrooms that serve children with special needs. Yet, with all of these enhanced capabilities, these technologies require thoughtful integration into the early childhood curriculum. Educators must match the technology to each child's unique special needs, learning styles, and individual preferences (Behrmann 2011).

The integration of technology

Technology can enhance early childhood practice when integrated into the environment, curriculum, and daily routines. The successful integration of technology into early childhood programs refers to the use of technology tools and resources such as computers, digital cameras, software applications, and the Internet in daily classroom practices (Edutopia n.d.; Hertz 2011; Technology and Young Children Interest Forum 2008). The goal of technology integration is for the use of technology to become routine and transparent—when the focus of a child or educator is on the activity or exploration itself, not on the technology being used. When the use of technology tools supports educator and program goals for children, provides children with digital tools for learning and communicating, and helps to improve child outcomes, then technology integration has been successful (Edutopia n.d.).

Careful evaluation and selection of materials is essential in early childhood settings. For example, one of the earliest and most familiar technologies in early childhood settings is Froebel's use of blocks. Montessori materials are another example of what we consider to be traditional early childhood supplies. Felt-tipped markers brought a new way for children to explore graphic representation that fell somewhere between paintbrushes and crayons.

As our lives are infused by technologies, early childhood classrooms can benefit from the possibilities of extending children's learning through judicious use of technology tools and new media. As part of the overall classroom plan, technologies should be used in ways that support existing classroom developmental and educational goals rather than distort or replace them. For instance, drawing on a touch screen can add to children's graphic representational experiences. This should not replace paints, markers, crayons, and other graphic art materials but provide one more option for self-expression.

With a focus on technology as a tool, not an end in and of itself, teachers can avoid the mindless use of screen and audio media that is often so objectionable in early childhood settings. Intentionality is key to the developmentally appropriate use of technology in early childhood settings. One must consider whether the goals can be more easily achieved using non-digital materials or whether the technology actually extends learning and development in ways not possible otherwise.

In today's technology-rich world, exciting new resources such as augmented reality games, 3D-rendered collaborative games, and immersive world environments represent the next frontier in digital learning for our youngest citizens—leaving it to talented educators and caring adults to determine how best to leverage each new technology as an opportunity for children's learning. Careful evaluation and selection of materials is essential for appropriate integration of technology and new media in early childhood settings.

Technology tools can improve how we measure and record development, document growth, plan activities, and share information with parents, families, and communities. Technology can also improve how educators measure development, document growth, plan activities, and share information with parents and families. Digital portfolios, photographs, and audio and video recordings have made it possible to document, archive, and share a child's accomplishments. Communication and social media tools can be used to share a child's developmental progress and communicate with parents and families. Documentation and assessment can inform instruction, helping adults improve the quality of the programs they offer young children.

Technology tools can help educators make and strengthen home–school connections. With technology becoming more prevalent as a means of communicating with one another, early childhood educators can use social media tools to stay in touch with families. Posting photos of children’s drawings or block buildings along with narratives dictated by the children or explanations of why these types of play are important can help families understand the critical role of play in early childhood development. Sending weekly, monthly, or even daily updates through Twitter or e-mail can help families feel more connected to their children while they are away. Inviting children to take a picture of something they have done and helping them upload the photo to a file that can be mailed is a way to help children understand ways of communicating with others and helps them learn more about the functions of reading and writing. We often talk about the value of writing down notes a child may want to give to parents. Using e-mail, educational texting, or other communication tools demonstrates the same concept about communication and helps to build media literacy skills at the same time. If information is stored on a computer, the photos and notes can be printed and given to families who do not use technology to send or receive messages (Edutopia 2010).

Modeling the effective use of technology tools for parent and family communication and engagement in the classroom with young children also creates opportunities to help parents become better informed about technology and digital media, to empower them to make responsible choices about technology use and screen time at home, to engage parents as teachers and extend classroom learning activities to the home, and to encourage co-viewing and participation in digital media between parents and their children.

The evaluation of technology

Technological and media literacy are essential to guide early childhood educators and parents in the selection, use, and evaluation of technology tools and screen media. Technological and media literacy are essential for the adults who work with young children. Young children and their families are surrounded by technology and digital media, and the prevalence of technology in their daily lives, in their learning, and in their work will continue to increase and expand in more ways than we can predict. Early childhood educators need to understand that technology-based materials can vary widely in quality, and they must be able to easily identify products that help rather than hinder early learning (NAEYC 2009).

For the adults who work with young children, technological literacy includes both knowledge and competence. Educators need the understanding, skills, and ability to use technology tools to improve learning and prepare young children for a lifetime of technology use. Media literacy means that educators have the knowledge and experience to think critically about selection, analysis, use, and evaluation of media for young children. Technological and media literacy enable early childhood educators to critically examine the impact of technology on young children. Children who gain media literacy skills gain critical viewing, listening, and web browsing skills. Children learn to filter the messages they receive so that they learn to make wise choices and gain the lifelong learning skills that they need going forward in using technology and information (Center for Media Literacy 2010; Hobbs 2010; International Society for Technology in Education 2008; National Association for Media Literacy Education 2007; Rogow & Scheibe 2007).

Using technology as a tool to support practice and enhance learning requires professional judgment about what is developmentally and culturally appropriate (Hobbs 2010). Early childhood educators who are informed, intentional, and reflective use technology as a routine part of the learning environment. They choose technologies and technology-supported activities that serve their teaching and learning goals and needs well. They align their use of technology with curriculum goals, a child-centered and play-oriented approach, hands-on exploration, active meaning making, and relationship building (Technology and Young Children Interest Forum 2008). They ensure equitable access so that all children can participate. They use technology as a tool in child assessment and recognize the value of these tools for parent communication and family engagement. They model the use of technology tools as professional resources to connect with colleagues and continue their own educational and professional

development.

Digital citizenship is essential in the 21st century. Adults need to expose children to, and model, developmentally appropriate and active use of digital tools, media, and methods of communication and learning in safe, healthy, acceptable, responsible, and socially positive ways. In addition, every child has the right to a unique and healthy digital identity that starts at birth. We advocate protecting against the exploitation of a child’s name or image for commercial purposes, or the use of a child’s image online without parental consent (International Society for Technology in Education 2007). Digital citizenship also includes the development of discernment in children and adults. Children and adults need to be able to locate and choose appropriate and valid sources, resources, tools, and applications.

Early childhood programs have an obligation to use technology to bridge the digital divide. The high cost of providing access to technology that is continually evolving in early childhood settings creates dilemmas for educators when determining allocation of limited resources. Research and awareness of the value of technology for early learning should be directed to policy makers and private funders concerned with digital equity.

In the early 1960s, Head Start and other early childhood programs targeted the differences in access that children from differing economic backgrounds had to print media. Today we face similar challenges with regard to digital media, technology tools, and broadband access to the Internet. Children of the affluent have many more opportunities to explore technology in their homes than do children of families with fewer resources. To be successful and productive members of society in the 21st century, young children need opportunities to develop the early “technology-handling” skills akin to the “book-handling” skills that are associated with early literacy development. Opportunities to explore digital cameras, audio and video recorders, printers, and other technologies in early childhood settings give access to these materials to children who may not otherwise have opportunities to explore the learning potential of technology. Educators must also give serious thought to the learning advantage that high quality digital content brings to children, especially when combined with skillful teaching and complementary curriculum resources that work together to accelerate learning and narrow the achievement gap between low-income children and their more affluent peers.

Summary

This statement provides guidance to educators on developmentally appropriate practices with digital technology and screen media. It is the role and responsibility of the educator to make informed, intentional, and appropriate choices about how and when technology is used in early childhood classrooms for children birth through age eight. Technology and media should not replace beneficial educational activities, creative play, or interactions with peers and adults in early childhood settings. Educators must use professional judgment in evaluating and using technology, just as they would any other learning tool or experience, and must emphasize active engagement rather than passive uses of technology and media. They must also weigh the costs of technology along with the cost of learning materials against their program’s resources to achieve a balance for their classrooms. A balance between the use of digital and electronic materials must also be weighed against the use of natural and three-dimensional materials.

Our recommendation is that early childhood educators provide a balance of activities in programs for young children and that technology and digital media be recognized as valuable tools to be used intentionally with children to extend and support active, hands-on, creative, and authentic engagement with those around them and with their world.

Today’s children are growing up in a rapidly changing digital age that is different from that of their parents or grandparents. We encourage educators to explore the opportunities for joint media engagement and active co-viewing, participating, playing, and learning. When used wisely, technology can support learning relationships,

offering opportunities to bring adults and young children, and children with their peers, together around a shared experience that is enjoyable and engaging and supports children’s optimal learning and development.

Thanks to a rich tradition of research and thinking that dates back hundreds of years, we know much about how young children grow, learn, play, and develop. There has never been a more important time to apply these old-fashioned principles to cutting-edge technology. By exploiting the potential, and being acutely aware of the possible downsides, we stand to improve program quality, and leverage the potential technology offers for the benefit of every child.

Appendix: Recommendations for Classroom Practice

Infants and Toddlers	
<p>During the earliest years, infants and toddlers need interactions primarily with human beings. They need to freely explore, manipulate, and test everything in the environment. Increasingly in today’s world, this includes the exploration of digital technology and interactive media. Children of this age are drawn to buttons and cause-effect toys. Technology tools that infants and toddlers might use must be safe, sturdy, and not easily damaged. Just as toddlers tend to chew on their books, children under 2 are very likely to chew on technology tools.</p>	<ul style="list-style-type: none"> • Allow children to explore digital materials in the context of human interactions, with an adult as mediator and co-player. As with shared book reading, use shared technology time as an opportunity to talk with children, use new vocabulary, and model appropriate use. • Avoid passive screen time. Although many parents claim that baby videos calm an otherwise fussy child, there is little research to suggest that infants and toddlers learn from watching videos. If they are distressed, they need the comfort of a caring adult not an electronic toy. • Provide children with toy representations of digital objects to encourage toddlers to begin pretending about the ways in which others use technology: cell phones, cameras, laptops, CD players, etc.
Preschool and Kindergarten	
<p>During the preschool years, young children are developing a sense of initiative and creativity. They are curious about the world around them and curious about learning. They are exploring their ability to create and communicate using a variety of media (crayons, felt-tipped markers, paints and other art materials, blocks, dramatic play materials, miniature life figures) and through creative movement, singing, dancing, and using their bodies to represent ideas and experiences. Digital technologies provide one more outlet for demonstrating their creativity and learning.</p>	<ul style="list-style-type: none"> • Freely explore touch screens loaded with a wide variety of and developmentally appropriate interactive media experiences that are well designed and enhance feelings of success. • Begin to explore and feel comfortable using “traditional” mouse and keyboard computers for using Flash-based websites or looking up answers with a search engine. • Capture photos of block buildings or art work that children have created; videotape dramatic play and replay for children to view. • Celebrate children’s accomplishments with digital media displayed on a digital projector or on a classroom website. • Record children’s stories about their drawings or their play; make digital audio files for documentation of progress.

	<ul style="list-style-type: none"> • Explore digital storytelling with children. Co-create digital books with photos of the children’s play or work; attach digital audio files with the child’s own voice as the narrator. • Share e-books with a teacher or a small group of children. • Use digital microscopes and other science materials to capture images and store them on a computer. • Search digital files for photos of places, people, animals, or objects and converse with children about what they are finding. • Use video conferencing software to communicate with families and children in other places. • Set up play experiences for children to construct and explore their ideas about how technology works.
School-age Children	
<p>It is during the early school-age years that children begin to use the tools of the society with competence. In our culture, that typically means learning to read and write, calculate, and investigate. Children use books, touch screens, writing instruments, and tools for studying scientific and social concepts. As digital technologies increasingly become the tools that older children and adults use in their work and home lives, younger children seek to emulate this usage, first through imitation and representational play, and then later, through mastery of the tools for their own self-expression and learning. Web 2.0 technologies allow the child to be the producer of the technology, adding to the appropriateness, motivation, and usability of technology tools.</p>	<ul style="list-style-type: none"> • Explore a wide range of quality interactive media experiences, on a variety of platforms. These include literacy software, games, and technologies that go beyond drill and practice and that foster creativity. • Use Web 2.0 tools for writing, collaboration, and playful experimentation. • Include a range of assistive technology devices to expand access for children with special needs. • Include language translation software and keyboard adaptations for dual-language learners. • Provide geometry software that allows children to explore the concept of shape by stretching, bending, shrinking, or combining images. • Use gaming as a way to explore math, readings, social studies, and science concepts. • Provide digital microscopes and other digital tools for investigation. • Encourage children to become proficient in using digital tools such as cameras, scanners, recorders, and editing software. • Integrate the ISTE standards into the curriculum.

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