A FRAMEWORK FOR QUALITY IN DIGITAL MEDIA FOR YOUNG CHILDREN: CONSIDERATIONS FOR PARENTS, EDUCATORS, AND MEDIA CREATORS

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April 2012

E X E C U T I V E   S U M M A R Y

Fred Rogers believed that all adults who have anything to do with teaching, nurturing, and entertaining young children should see themselves as caregivers who, without exception, "think of the children first." Today, the ubiquity of digital media in homes, schools and centers, and community sites for informal learning provides both the opportunity and the responsibility to use these new and rapidly developing tools with care. Just as parents and educators are challenged more than ever in their intentions to make thoughtful decisions about the selection and use of digital media with young children, even the most well-intentioned and socially responsible media professionals increasingly are challenged to demonstrate the value of their products.

In 2010, the Fred Rogers Center began to explore the potential for a common framework to guide decisions about quality by parents, educators, and media creators. In January and October 2011, we conducted two roundtable discussions with a total of more than 50 early childhood development and early learning experts, media researchers, media creators and producers, media literacy education experts, advocates, and others. These roundtables were organized to vet the need, the important considerations, and the feasibility for moving forward together on this initiative to develop a common framework for quality in children's digital media.

Based on the roundtable discussions, and drawing from other important work in the field, this draft document proposes three guiding principles of quality in digital media for children birth through age 8 as well as five action areas for promoting the quality principles. We recognize that the Framework is a work in progress. The Rogers Center's *Fred Forward Conference* in June 2012 will determine the extent of consensus on next steps—for our Center and for many other organizations and stakeholders.

Principles of Quality

Principle 1: Quality digital media should safeguard the health, well-being, and overall development of young children.

Principle 2: Quality in digital media for young children should take into account the child, the content, and the context of use.

> **Child:** The distinct cognitive abilities, physical abilities, social-emotional needs, aptitudes, and interests of individual children, at different developmental stages, should be considered.

> **Content:** The intent of the content should be clear—to educate, introduce new information, develop particular skills, entertain—some or all of these.

Context: Especially for children age 5 and younger, the media product should encourage joint engagement (e.g., by parents or teachers with children, by children with their siblings or peers). For older children, interactivity and engagement with the media product, including the engagement of children as creators of content, should be a priority.
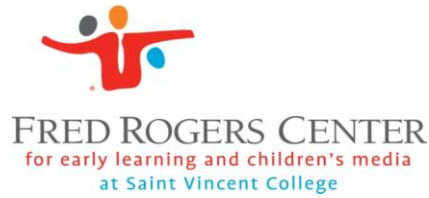
If relevant, the conduciveness of certain location(s) of use (e.g., homes, classrooms, outdoors, other settings for informal learning) to particular goals for learning, development, communication, and/or entertainment, should be specified.

Context of use should take into account the value-added of product features and affordances.

Principle 3: Determinations of quality should be grounded in an evidence base that can be used by parents, educators, policymakers, and others to make decisions about the selection and use of particular digital media products, and by media creators to improve and develop new products in response to consumer expectations of quality.

Action Areas for Promoting Quality

- A research agenda to guide policy and inform practice

- Professional and career development to support field building both for educators and for media creators

- Curation of examples of media products and experiences, including crowdsourcing to engage educators, parents, and media creators at various stages of product development, review, and use

- A broad-based campaign of communication and awareness about quality issues and the quality principles

- Policymaking to encourage innovative development, appropriate use, and equitable access to quality digital media products for early learning and development

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Fred Rogers believed that all adults who have anything to do with teaching, nurturing, and entertaining young children should see themselves as caregivers who, without exception, "think of the children first." Today, the ubiquity of digital media in homes, schools and centers, and community sites for informal learning provides both the opportunity and the responsibility to use these new and rapidly developing tools with care. Just as parents and educators are challenged more than ever in their intentions to make thoughtful decisions about the selection and use of digital media with young children, even the most well-intentioned and socially responsible media professionals increasingly are challenged to demonstrate the value of their products.

In 2010, the Fred Rogers Center began to explore the potential for a common framework to guide decisions about quality by parents, educators, and media creators. This effort has been a true partnership among a planning group that has included Rogers Center Senior Fellows Ellen Wartella from the Northwestern University Center on Media and Human Development, Chip Donohue from the Erikson Institute, and Roberta Schomburg from Carlow University; David Kleeman from the American Center for Children and Media; Michael Levine from the Joan Ganz Cooney Center at Sesame Workshop; Alexis Lauricella from the Northwestern University Center on Media and Human Development; and Rita Catalano and Michael Robb from the Fred Rogers Center. Our Center's collaboration with the National Association for the Education of Young Children (NAEYC) on the January 2012 position statement on technology and interactive media in early childhood programs has provided an important context of research and best practices. We gratefully acknowledge the support of The Grable Foundation of Pittsburgh for this Framework initiative, and we thank the Erikson Institute and PBS for their generosity in hosting two expert roundtables in 2011.

In this document, we propose three guiding principles of quality in digital media for children birth through age 8, and we suggest five action areas for promoting the quality principles. We will share this draft document for comment by those who have been part of our Framework roundtables as well as other invitees to the Rogers Center's national *Fred Forward Conference*. The proposed quality principles and action areas also are the focus of the 2012 conference.

Background

In January and October 2011, the Rogers Center conducted two roundtable discussions with a total of more than 50 early childhood development and early learning experts, media researchers, media creators and producers, media literacy education experts, advocates, and others. These roundtables were organized to vet the need, the important considerations, and the feasibility for moving forward together on this initiative to develop a common framework for quality in children's digital media. Based on the first roundtable discussion, our planning group developed a statement proposing an approach and next steps ("A Statement on the Development of a Framework for Quality Digital Media for Young Children," June 6, 2011). The following are main messages from that statement.

- Fundamental principles of early childhood development must anchor a framework to promote quality.
- The goal should be to provide informed and informative guidance rather than carved-in-stone prescription.
- More work is needed to identify specific characteristics and affordances of different media platforms and content as they relate to learning and development.

Through our expert roundtables, comments on our June 2011 statement, presentations and discussions at major conferences, and the research and open-comment process for the NAEYC-Fred Rogers Center position statement, we've learned much about both the challenges and the opportunities in developing a common framework for quality.

Challenges

- Being clear about what we mean by "digital media" and, then, defining quality considerations that apply across the board. Acknowledging that innovation and new development make the media landscape of even the near future subject to rapid change, our framework planning defines digital media as devices, applications, and platforms designed for active engagement by and among users. These would include, for example, multi-touch tablets, e-books, smartphones, and mobile apps; handheld and console motion control games; and transmedia suites of content delivered through a combination of television and online and mobile platforms. Especially for children at the youngest end of the early childhood developmental range, tools such as digital cameras and Internet-based communication are included.
- Providing guidance for quality content and use that parents, educators, and media creators alike can apply in meaningful ways and for the different stages of child development from birth through age 8.
- Ensuring for media creators the flexibility to balance creativity, innovation, commercial viability, and consumer expectations of quality in an increasingly competitive market of apps, games, digital toys, and especially for very young children, television.

- Determining the form and scope of the "Framework for Quality." Those who have been part of our discussions to date generally agree on the value of a consensus document that would "frame" guiding principles of quality. But there also is agreement that if it is to have the intended impact, the Framework must include direction for action to support and continually reexamine the quality principles.

Opportunities

- A set of core, clearly articulated quality principles could provide parents and educators with a lens for examining and selecting from a broad spectrum of digital media products, including many not currently reviewed by established programs. The Framework for Quality is not intended to rate or evaluate specific digital media products, but rather to provide basic guidance for parents and educators as they evaluate the content, products, platforms, and experiences that will be best for each child.

- For media creators, the quality principles also could be a lens—or perhaps a common checklist—for explaining to parents and educators the strengths, unique characteristics, and intended goals for their products. Especially for the growing number of independent creators working outside the worlds of public or commercial media, the Framework for Quality could provide support and guidance.

- The Framework could be the basis for working together on a sustainable network of organizations and individuals to share information and create new collaborations for advancing quality. The network should include, for example, well-established national product ratings and awards; the growing number of parent and educator blogs; national digests, newsletters, and other online and print media providing commentary and highlighting examples of best practices; cooperative efforts by media creators to connect with consumers on issues of product value and viability; innovative approaches to professional development for educators and career development for media creators; new and ongoing research programs on uses of digital media and the impact on learning and development for young children; and policymaking to advance access and innovation.

Purpose of the Framework

This document proposes three guiding principles and five "action areas." The principles are meant to be considerations for parents, educators, and media creators. The action areas at this stage of our thinking are meant to generate strategies for getting the principles into the field—perhaps in different ways for those in different, though often overlapping, roles as family members, educators, and digital media creators and other media professionals. In addition to our own research and information gathering, we have drawn from the important work of the Joan Ganz Cooney Center, Common Sense Media, and others, as well new movements by media creators to connect their development process with users. We acknowledge some of this recent work in Appendix A, and we consider this listing to be the beginning of a growing collection of resources.

> **Principle 1:**
>
> **Quality digital media should safeguard the health, well-being, and overall development of young children.**

Above all, the use and content of digital media should not harm young children. The healthy cognitive, social, emotional, physical, and linguistic development of the whole child is as important as ever in the digital age. Decades of child development research tells us that healthy development depends upon positive and nurturing social interactions between children and adults, creative play, exposure to language, and exploration. A young child's experience with digital media should not exclude or diminish these critical developmental experiences. Digital media should never be used in ways that are emotionally damaging, physically harmful, disrespectful, degrading, dangerous, exploitative, or intimidating to children. This includes undue exposure to violence or highly sexualized images as well as invasive marketing and over-commercialization. Safety considerations include Internet privacy guidelines for children and adults, child-friendly hardware and mechanical features, and standards for digital citizenship.

> **Principle 2:**
>
> **Quality in digital media for young children should take into account the child, the content, and the context of use.**

Drawing from her thoughtful review of the research as well as her own experience as a parent and her extensive interviews of other parents, child development experts, media creators, and others, Lisa Guernsey from the New America Foundation has given voice to the importance of considering "the three C's" of child, content, and context (L. Guernsey, *Into the Minds of Babes: How Screen Time Affects Children from Birth to Age 5*, 2007; *Screen Time: How Electronic Media—From Baby Videos to Educational Software—Affects Your Young Child*, 2012). We agree that all three must be taken into account in the selection, use, and creation of digital media for young children.

The Child

- **The distinct cognitive abilities, physical abilities, social-emotional needs, aptitudes, and interests of individual children, at different developmental stages, should be considered**.

Child development and learning are characterized by individual variation. Developmentally appropriate types and uses of digital media take into consideration the age, developmental level, needs, interests, and abilities of each child. The 2012 NAEYC-Fred Rogers Center position statement provides examples of appropriate uses of

digital media for three developmental stages from birth through age 8 (see Appendix B of this document). Linguistic and cultural diversity, as well as accommodations for children with special needs, also should be considered as decisions are made to create and/or use digital media products with young children. Just as each child progresses in her/his own way from exploration, to learning, and then to transferring knowledge and skills to a variety of tasks, so too should this individualized progression be taken into account to ensure quality in each child's experience with digital media.

Beyond cognitive ability, other developmental abilities are crucial for the success of any children's media experience. At our October 2011 roundtable, media creators and others described both the advantages and the limitations of multitouch, motion-control game consoles, and the television, online, and other elements of transmedia for children at different ages and stages. For example, because children must be able to manipulate and control the technology in order to use it in a meaningful way, the multitouch nature of tablets and smartphones may represent a quality digital media experience for the youngest children, while elementary school-aged children who have mastered mouse control skills may experience a greater variety and different types of content and engagement.

The Content

- **The intent of the content should be clear—to educate, introduce new information, develop particular skills, entertain—some or all of these.**

Keeping in mind that for young children, especially in the earliest years, all experiences contribute to learning and development, media content should be grounded in specific goals. The goals should be easily understood by parents and educators and clearly communicated by media creators. Understanding of learning goals for different developmental stages should guide parents' and educators' decisions about digital media. For parents, educators, and media creators alike, it is important to distinguish between outcomes for learning and practice for automaticity.

Digital media should expand children's access to new content in areas of interest to them. These new tools can fulfill different developmental and learning needs for young children at different times, and even media content intended for entertainment has an educational impact. When considering the quality of digital media content, design features that support exploration and mastery through scaffolded levels of skills and knowledge development, playful learning, and creativity are essential.

- **The decision to create or use particular affordances (e.g., multi-touch screens, interactivity, feedback) and platforms (e.g., mobile, transmedia, multi-platform) to deliver particular types of content should be intentional.**

The different digital media that are part of children's lives offer unique opportunities, benefits, and challenges. In the television era, a two-dimensional grid aligning best practices at different ages or developmental

stages might have been adequate. Today's digital screens can be fixed or mobile; some excel at storytelling and others at gaming; different media are solitary or social; devices may be self-contained or may be networked around the world. Each type of screen offers parents and other caregivers unique ways both to find the best content and to avoid the rest—from television's limited channel menu offering pre-selected content scheduled or on-demand, to app stores with nearly unlimited bandwidth and in some cases an editorial team deciding what to sell, to the "wild west" frontier of YouTube and the Internet. Many media professionals are working to make best use of different types of screens, alone and in combinations, as tools for learning and development—from serious games and deeply educational apps, to children's television that enlightens *and* entertains, to production tools that turn even very young children into creators.

During our Framework roundtable discussions, media researchers and child development experts noted the importance of the relationship between content and platform. The 11 media creators on our October 2011 roundtable panels described digital media features or affordances that have the capacity to enrich and extend content. These include the intentional integration of different modes of learning and play patterns by delivering content across multiple platforms, consistency and progression of content within and across platforms, guidance for adult and child users, large volumes of content with different developmental benefits, and navigation tools that simulate page turning and other familiar offline interactions with learning tools. There also was some concern about a possible tendency to use tablets and other new media platforms to recreate, rather than expand upon or improve, tasks that currently are done well using more traditional tools. For example, the use of flashcards on a tablet computer does not provide additional benefit compared to traditional paper flashcards.

The Context

- **Especially for children age 5 and younger, the media product should encourage joint engagement (e.g., by parents or teachers with children, by children with their siblings or peers). For older children, interactivity and engagement with the media product, including the engagement of children as creators of new content, should be a priority.**

Children learn through social interaction with other adults and other children. Digital media can be a powerful tool in the context of a learning and caring relationship by helping children and their caregivers to make connections between on-screen and off-screen activities, and by emphasizing joint media engagement and co-participation between adults and children and between children and their peers. When educators and parents participate fully in young children's experiences with digital media designed to support joint engagement, the adults play an important role in assessing a child's level of understanding and helping to process information, in determining when the child is ready to progress to the next level of knowledge and skill development, in extending the media experience to offline opportunities for learning and development, and in strengthening social-emotional bonds through language-rich interactions during and after the media experience. When young children

engage with each other in the context of a quality media experience, they benefit from opportunities for problem solving and to develop executive function skills including sharing, empathy, and inhibiting behavior.

- **If relevant, the conduciveness of certain location(s) of use, such as homes, classrooms, outdoor, and other settings for informal learning, to particular goals for learning, development, communication, and/or entertainment, should be specified.**

Historically, media technology was stationary. Televisions were heavy and remained in family rooms at home. Movies were shown in traditional movie theaters. Mobile media technology presents a new aspect of context. In certain circumstances, depending on the goals and motives of the media experience, the location of the media use plays an important role in determining the quality of the experience. And, with increasing access to devices and content, opportunities to optimize the effect of content—and the child's engagement with the content—by including opportunities for use across contexts should be explored.

- **Context of use should take into account the value-added of features and affordances.**

Designers of digital media for young children should keep it as simple as possible and avoid adding features just because they are available. For example, some features might be inappropriate for younger children who have difficulty with finer movements. Likewise, the quality of a young child's experience with motion-activated media should include authentic, truly engaging interactions with other children and adults.

Principle 3:

Determinations of quality should be grounded in an evidence base that can be used by parents, educators, policymakers, and others to make decisions about the selection and use of particular digital media products, and by media creators to improve and develop new products in response to consumer expectations of quality.

- **Although a new research agenda is still being developed to support better understanding of how young children use and learn with digital media, and of the short- and long-term effects on learning and development, decisions about quality should be made based on the best available evidence.**

The established body of research and literature on the effects of television viewing and screen time on young children, while foundational, does not adequately inform educators and parents about the effects of multiple digital devices, each with its own screen. As multi-touch technologies and other emerging user interface possibilities become more affordable and available, new research is needed on what young children are able to do with these tools and how the variety of digital media can be integrated for formal and informal learning. It is important for parents, educators, and media creators alike to be aware of the various types of evidence for assessing quality and to be active participants in the evidence gathering process.

Evidence can be broadly defined and can include, while not being limited to, two types. First, evidence obtained during development and before product release would consist of usability testing with children and

adults to show that a product can be used comfortably and without frustration; and formative research, pilot testing, user interviews, and other information obtained during the process of product creation for use in making product refinements in line with the intended goals for child, content, and context. The second type of evidence, obtained after product release, would include evaluation or summative research to show that goals for learning and development are achieved; and consumer research for evidence of satisfaction, popularity, and impact among parent, educators, and child consumers.

Action Areas for Promoting Quality

1. Research

Research-based evidence about what constitutes quality digital media and media experiences for young children is needed to guide policy and inform practice. Research is needed on a range of issues including the affordances of digital media most likely to engage children of different ages, those most aligned with learning outcomes, and those most enjoyed by young children, families, and educators. Other research should be directed at how different content and genres can interact in influencing children's engagement, enjoyment, and learning from digital media products. Research is needed to develop metrics for assessing digital media (e.g., the different types of interactivity elicited from digital media products, how this is measured, whether the impact varies for children at different ages and developmental stages), and to determine the long-term developmental consequences of very young children's use of particular types of digital media.

2. Professional and Career Development

Field building among educators and media creators is critical. New models of professional and career development, including the establishment of communities of learning and innovation, within and across sectors, should be explored. For media creators, it seems important to connect established professionals with new creators through networks for mentoring, apprenticeships, and other personal and virtual relationships. For educators, teacher education and professional development should include digital media literacy as well as opportunities for exploration and creation using digital media.

3. Curation and Crowdsourcing

Examples of media products and experiences should be made available to educators, parents, and media creators both during the process of development and after product release. All three stakeholder sectors should be engaged in proposing and commenting upon the examples. For parents and educators, online and offline libraries could support decisions about use. For media creators, curation and crowdsourcing could be a source of mentoring and advice as well as input from users including both adults and children. Potential should be explored for connecting current ratings and review programs with media creators during the development process, if this can be done in a way that does not affect the objectivity of the post-release review.

4. Communication and Awareness

The Framework could provide a common language for communicating about quality in digital media for young children. Ongoing activities for communicating to educators, parents, and media creators regarding research findings, examples of quality, policy matters, and other related issues should be developed. The nature and sustainability of a national public information campaign should be explored.

5. Public Policy

Policies are needed to encourage innovative development, appropriate use, and equitable access to quality digital media products, including development in the public, corporate, and independent sectors of media creation and distribution. Policy that promotes quality in early childhood care and education generally also should support research, professional development, and the adoption of innovative, media-based tools for use in centers and classrooms, in homes, in community settings, and to link formal and informal learning settings.

Conclusion

The goal of the Framework for Quality is to help guide and engage parents, educators, and media creators in the development process and in the use of digital media for early learning and development. We recognize that the Framework is a work in progress. The discussions at our expert roundtables over the past year have shaped the ideas proposed in this document. The Rogers Center's *Fred Forward Conference* in June 2012 will determine the extent of consensus on next steps—for our Center and for many other organizations and stakeholders.

APPENDIX A: SELECTED EXAMPLES OF RELATED RESOURCES

[This listing provides examples of related work in the field that addresses the various dimensions of quality and the action areas in this draft Framework document. Additional resources should be suggested and will be added as part of the ongoing Framework initiative.]

- Center on Media and Human Development, School of Communication, Northwestern University, "Children, Media, and Race: Media Use Among White, Black, Hispanic, and Asian American Children," June 2011.
  http://web5.soc.northwestern.edu/cmhd/wp-content/uploads/2011/06/SOCconfReportSingleFinal-1.pdf

- Center for Children and Technology, Education Development Center.
  http://www.cct.edc.org/whatwedo.asp

- The Children's App Manifesto. A. Russell & D. Donahoo, 2011.
  http://childrensappmanifesto.net/

- *Children's Technology Review*. http://childrenstech.com/

- CMCH: Center on Media and Child Health at Children's Hospital Boston, Harvard Medical School, and Harvard School of Public Health. http://www.cmch.tv/

- Common Sense Media, http://www.commonsensemedia.org/. "Zero to Eight: Children's Media Use in America." Common Sense Media Program for the Study of Children and Media, Fall 2011.
  http://www.commonsensemedia.org/sites/default/files/research/zerotoeightfinal2011.pdf

- The Joan Ganz Cooney Center at Sesame Workshop

    "iLearn II: An Analysis of the Education Category of Apple's App Store." C. Shuler, with Z. Levine & J. Ree, January 2012.
    http://www.joanganzcooneycenter.org/upload_kits/ilearnii.pdf

    "Take a Giant Step: A Blueprint for Teaching Young Children in a Digital Age." B. Barron, G. Cayton-Hodges, L. Bofferding, C. Copple, L. Darling-Hammond, & M.H. Levine, November 2011.
    http://www.joanganzcooneycenter.org/upload_kits/jgcc_takeagiantstep.pdf

    "The New Coviewing: Designing for Learning Through Joint Media Engagement." L. Takeuchi & R. Stevens, with B. Barron, E. Branch-Ridley, H. Cooperman, A. Fenwick-Naditch, S. Fisch, R. Herr-Stephenson, C. Llorente, S. Mehus, S. Pasnik, W. Penuel, & G. Revelle. The Joan Ganz Cooney and LIFE Center`, Fall 2011.
    http://joanganzcooneycenter.org/upload_kits/jgc_coviewing_desktop.pdf

- New Media Literacies Project. PLAY! (Participatory Learning and You!).
  http://playnml.wikispaces.com/PLAY%21

- Parents' Choice®: Children's Media and Toy Reviews. http://www.parents-choice.org/

- PlayLearnParent. http://playlearnparent.com/

- PBS KIDS Ready to Learn. U.S. Department of Education, Corporation for Public Broadcasting, PBS.
  http://pbskids.org/readytolearn/commitment.html

- PBS LearningMedia.
  http://www.pbslearningmedia.org/content/

- *Fred Rogers Center Early Learning Environment™.*
  www.yourele.org

- SPARK: The Pittsburgh Kids+Creativity Network. http://www.sproutfund.org/sparkpgh/

- *Spotlight on Digital Media and Learning* (Blogs, Featured Stories, Studentspeak, Videos).
  http://spotlight.macfound.org/featured-stories/

- "Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8." 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, approved January 2012.
   http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf

- *Working Examples*. J.P. Gee & D. Davidson.
  http://workingexamples.org/frontend

APPENDIX B. EARLY CHILDHOOD DEVELOPMENTAL STAGES AND RELATED, DEVELOPMENTALLY APPROPRIATE EXPERIENCES WITH DIGITAL MEDIA

(Based upon, with selected excerpts from, the "Examples of Effective Practice" developed to accompany the January 2012 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, "Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth Through Age 8.")

Infants and Toddlers, birth to age 2. During the earliest years, infants and toddlers need interactions primarily with human beings, making passive screen time inappropriate for these youngest children. Developmentally appropriate use focuses instead on digital media as tools for exploration in the context of human interactions. Children birth to 2 need to explore, manipulate, and test everything in the environment; increasingly in today's world, this includes the exploration of digital technology and interactive media. Toy representations of digital objects can engage toddlers in pretend play based on how the adults in their lives model the use of cell phones, cameras, laptops, CD players, and other media of this type.   Children of this age are drawn to buttons and cause-effect toys. Digital media tools that incorporate these features must be safe, sturdy, and not easily damaged. Just as toddlers tend to chew on books, children under 2 are very likely to chew on technology tools.

Preschoolers, ages 3 to 5. During these 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 tools (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 media—including, for example, digital pictures, videos and audio recordings of artwork and dramatic play, websites for hosting and sharing children's activities, e-books for storytelling and story sharing, and well-designed software, mobile apps, and other interactive media that encourage co-participation with adults and with other children—provide outlets for creativity and learning. Touchscreens reduce the barrier to participation and may be better suited for even very young children than earlier media devices that required well-developed fine motor skills, like computer mice.

School-aged Children, ages 6 to 8. During the early school years, children begin to use the tools of the society at higher levels. In our culture, that typically means learning to read and write, calculate, and investigate. Children use books, touchscreen devices, 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. Examples of developmentally appropriate digital media for this age include software, games, and technologies that go beyond traditional drill and practice to foster creativity; Web 2.0 tools for writing, collaboration, and playful experimentation; assistive

technology devices to expand access for children with special needs; language translation software and keyboard adaptations for dual-language learners; gaming for development of social skills, STEM learning outcomes, and language and reading literacy; and cameras, scanners, recorders, and editing software for producing media, a key component of developing media literacy.