



Research-to-Practice Brief

THE USES OF TECHNOLOGY TO SUPPORT EARLY CHILDHOOD PRACTICE: INSTRUCTION AND ASSESSMENT

Over the past two decades, the use of technology in early care and education settings has steadily increased, growing out of the recognition that technology may be used to improve program practice and, ultimately, **children's learning and development**^{1,2,3}. Unfortunately, little is known about the effectiveness, function, and requirements for technologies that are available to early childhood programs. Prompted by this gap in knowledge and the increasing prevalence of technology in early childhood settings the Administration for Children and Families (ACF) Office of Planning Research and Evaluation (OPRE) sponsored The Use of Technology to Support Early Childhood Practice project. Its goal was to provide a detailed review of the knowledge base related to the use of technology to support the practice of early childhood practitioners who work directly with children and families. The review examined the uses of technology in three Topic Areas of interest to ACF/OPRE: 1) Instruction and Assessment; 2) Parent, Family and Community Engagement (PFCE); and 3) Professional Development and Informal Learning.

This brief describes examples of how technology may support instruction and assessment of young children (Topic Area 1). It does not review technologies intended for independent child-use or technologies that require little or no direct practitioner involvement. In addition, the brief describes barriers to and facilitators of practitioners' effective use of technology to support early childhood practice. This brief is purely descriptive of the technologies that are currently available and makes no recommendations or endorsements of individual technologies, products, or programs.

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This brief describes how technology may support instruction and assessment.

METHODS

This review utilized the following three research methods:

- *Web-search to identify common and cutting-edge uses of technology*
- *Academic database search to identify literature that evaluates the impact of products or programs using technology*
- *Interviews with 16 early childhood and technology experts (i.e., researchers and developers)*



WHICH TECHNOLOGIES ARE BEING USED TO SUPPORT INSTRUCTION AND ASSESSMENT?

We identified 12 technologies that early childhood practitioners are currently using to support instruction and assessment. The technologies are classified broadly as hardware (i.e., physical electronic devices), software (i.e., programs that run on hardware) or video. **Technologies are being used to present content electronically to individual children or whole groups, provide children with multi-sensory learning experiences, facilitate rapid assessment data entry and scoring, and integrate instructional implications with assessment results.** Please scroll over each technology in the list for more information about the technology and examples of practitioner and child use.

- Apps for Mobile Devices
- Computers
- eBooks
- Interactive Books
- Interactive Whiteboards
- Mobile Devices
- Movement Sensors
- Multi-Touch Tables
- Proprietary Computers
- Software as a Service (SaaS)
- Traditional Software
- Videos

Because Instruction and Assessment is a broad Topic Area, its technologies are divided among three more focused categories: [1\) curricula and instructional tools](#); [2\) assessments](#); and [3\) integrated curricula and assessments](#). Clicking on the hyperlink above will open a webpage that links to a table of sample products and programs that utilize these technologies, as well as external links to product or program websites. The table also indicates which products or programs have evaluative literature. It is important to note that the evidence base regarding the effectiveness of these technologies, products, and programs is limited.

Technology is a tool—a means for practitioners to more efficiently and effectively achieve the ultimate goal of improving child outcomes.

Note: Our review did not address concerns regarding the confidentiality or security of data (e.g., assessment data entered into a program that uses software-as-a-service to provide instantaneous scores and suggestions for individualized instruction).



WHAT ARE THE BARRIERS TO PRACTITIONERS' EFFECTIVE USE OF TECHNOLOGY?

Based on the findings from the expert interviews, early childhood programs face many common obstacles to effective uses of technologies to support instruction and assessment, PFCE and professional development and informal learning. The most common barrier to successful implementation is staff technological literacy. Other common barriers include lack of access to technology resources, **lack of support from administrators for the use of technology**, limited funding for new technologies, and lack of time to learn and use the technology.

Barrier	Description
Technological literacy	Practitioners with limited knowledge about the technology, familiarity with the technology, understanding of how to use the technology (both conceptual and procedural), and comfort using the technology, have difficulty using technology to support practice.
Access to technology resources	Inadequate access to reliable (i.e., working) technology, quality software, up to date technology (both hardware and software), and broadband Internet access can severely hinder technology use.
Administrators' support	When administrators do not support or are ambivalent towards use of technology, practitioners are either not inclined to use the technology or are unable to do so successfully.
Funding	Technology is costly. Many early childhood programs lack sufficient funding to make such significant investments in technology.
Time	Practitioners have difficulty finding time to learn to use a new technology and then use the technology during an already busy work day.

Early childhood administrators play a critical role in either encouraging or hindering practitioners' use of technology.

WHAT ARE THE FACILITATORS TO PRACTITIONERS' EFFECTIVE USE OF TECHNOLOGY?

Experts continually highlighted the critical role early childhood administrators **play in either encouraging or hindering practitioners' use of technology**. Frequently nominated strategies to encourage successful practitioner use of technology include providing practitioners with adequate resources, training, and technical support, leading by example, and recognizing high performing staff. Providing adequate professional development, training and technology support services are two of the most commonly mentioned facilitators for successful implementation and, thus, solutions to the common barrier of limited technological literacy among practitioners.

Facilitator	Description
Access to technology	When practitioners have access to contemporary, reliable technology, they are more likely to be familiar with it and feel comfortable using it.
Professional Development/training	Quality professional development allows practitioners to be more knowledgeable and feel more comfortable using technology.
Understanding benefits to practice	Observing a peer use a technology, or obtaining guidance from a coach can help practitioners understand how and why a technology can benefit their practice.
Technical support	Availability of a resource that can assist practitioners when they inevitably run into an obstacle using the technology facilitates continued technology use.
Administrators' support	Support in the form of adequate funding for the purchase, maintenance and updating of requisite technologies; encouragement to attend trainings and professional development sessions; modeling positive attitudes toward technology use; and recognizing staff who use technology well leads to high levels of practitioner fidelity of technological implementation.

WHERE CAN I FIND ADDITIONAL INFORMATION ABOUT TECHNOLOGIES THAT SUPPORT EARLY CHILDHOOD PRACTICE?

This brief is part of a larger series of materials generated by The Use of Technology to Support Early Childhood Practice project. Click on the hyperlinked text below to access the following materials:

- [Use of Technology to Support Early Childhood Practice Project Information](#)
- [Research Snapshot](#)
- [Executive Summary](#)
- [Full Report](#)
- [Parent, Family and Community Engagement \(PFCE\) Brief](#)
- [Professional Development and Informal Learning Brief](#)

¹ Barron, A. E., Kemker, K., Harmes, C., & Kalaydjian, K. (2003). Large-scale research study on technology in K-12 schools: Technology integration as it relates to the National Technology Standards. *Journal of Research on Technology in Education*, 35(4), 489-507.

² Diamond, K. E., Justice, L. M., Siegler, R. S., & Snyder, P. A. (2013). *Synthesis of IES research on early intervention and early childhood education*. Washington, DC: National Center for Special Education Research, Institute of Education Sciences. Retrieved from <http://ies.ed.gov/ncser/pubs/20133001/pdf/20133001.pdf>. Retrieved from <http://www.flextherapistceus.com/material/Early%20Childhood%20Intervention%20and%20Education%20Research.pdf>

³ National Association for the Education of Young Children., & Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College. (2012). *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8.*, 1-15. Retrieved from http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf

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