Technology and Early Child Development

Mary Eming Young
Senior Public Health Specialist, The World Bank

Technology cannot be effectively used unless it is used widely and equitably among all groups in our society. For the majority of the world and in particular for children living in poverty, we are far from addressing the merits of using (or how to apply) technology in education and learning, let alone closing the digital divide among the “haves” and “have-nots.” This article summarizes the use of technology in early childhood, with special focus on the U.S. context.

Technology is a tool that can provide an added option for young children to learn. Learning is a process where children (the learners) actively build an understanding of the world based on their experiences and interactions. Computers need to be viewed not as new ways to transmit information, but new ways for children to create, experiment, and explore. When used appropriately, technology can support and extend learning in valuable ways to increase educational opportunities for children. It is critical, however, to find a balance, knowing how to align the elements of healthy childhood with the unique capabilities offered by technology (Van Scoter, Ellis, and Railsback, 2001).

Early years are critical in a child’s physical, socio-emotional, language, and cognitive development. What, how, and how much children learn in school depends largely on the cognitive, social and emotional competence they develop during their early years. New interactive technologies make it easier to create environments in which students can learn by doing, and technologies can help visualize difficult to understand concepts.

Child development

Young children from birth to eight are learning rapidly, using all their senses to take in sensory inputs and experiences around them. They learn through play and exploration across developmental dimensions including:

* Social and emotional development – the ability to form and sustain relationships, gives meaning to learning experiences;

* Language development – language empowers children in both cognitive and affective parts of the educational program – experience with written and oral language provides children with tools to interact with others and to represent thoughts, feelings and experiences;

* Physical and motor development – child’s health is connected to preparedness for and performance in learning. Healthy children are able to focus and actively engage in the learning process.

* Cognitive and general knowledge – experiences and interactions with peers and adults allow children to construct knowledge of patterns and understand relationships between objects or events and learn ways to solve problems.

A substantial body of research on technology use with young children focusing on social, language and cognitive skills is available. In brief, the following are some findings:

* Social and emotional development – technology cannot replace human interaction or relationships or take the place of reading together and sharing conversations. Properly used, computer and software can serve as a catalyst for social interaction and conversations related to children’s work.

* Language development – Everyday playful experiences in print-rich environments expose children to reading and writing. Language and literacy development are major strengths of technology use with young children. Studies show that computers encourage longer, more complex speech and the development of fluency. Young children interacting at computers engage in high levels of spoken communication and cooperation such as turn taking and collaboration. Computers elicited more social interaction than the traditional activities such as puzzle assembly or block building.

* Physical and motor development – A word processor allows composition and revision without being distracted by the fine motor aspects of letter formation. Computers should not replace active outdoor play. The American Academy of Pediatrics recommends screen time (TV, computer and video) at a maximum of one to two hours per day for young children.
Cognitive and general knowledge – Computer experience promotes greater gains in verbal and nonverbal skills, problem solving, and abstraction and conceptual skills as compared with children without computer experience.

Play is important for intellectual development. Used appropriately, computers can introduce positive elements of children’s play and learning as they explore and experiment. Technology that is connected to what children already know and can build upon leads to greater motivation and self-direction. Loss of creativity can be a problem if children use drill and practice software. Open-ended software that provides opportunities to discover, make choices and find out the impact of decisions would foster creativity.

Two key questions need to be asked when including/considering technology in the early childhood curriculum:

* Is it developmentally appropriate, i.e. is it consistent with how a child develops and learns at the child’s current developmental stage?

* Will the activity benefit the child?

Use of technology in learning

Sound learning objectives should guide the choice of materials and tools including technology. Studies show that when computers are located in the classroom, children’s developmental gains from using appropriate software are significantly greater than when they are in a computer lab. Computers, when placed in labs, limit children’s access. There is a tendency to use drill and practice software in labs while more tool-oriented software is used in the classroom. In lab settings, away from the integral part of classroom activities, there is less collaboration and peer tutoring.

Besides computers, there are numerous other technologies that can be used effectively to support learning. For example: tape recorders support early literacy experience. They allow children to listen to recorded stories and to follow along in a book as they hear it being read on tape. When a teacher records children’s dictated words or from the tape recorder, children see how the spoken word can turn into the written works. These activities integrate all aspects of literacy, speaking, listening, reading and writing. Cameras, video records of students’ activities and photos can share the learning among students. TV/VCRs can record students’ activities and play back videos of class activities.

Addressing inequities

Issues of digital divide have become a national agenda in the U.S. At the same time, access does not imply equity. Connectivity is a doubtful goal without fundamental school reform. Ensuring equitable use of computers by children implies access to the technology, appropriate content for the stages of development and appropriate application to support or enhance learning. These dimensions include:

* Access – lower income and ethnic minority children have limited access to computers and use.

* Type of use – different groups of students often use computers in different ways, and the types of learning opportunities they receive are very different. Underserved areas including poor, inner city, rural communities are more likely to use drill and practice software in which the computer leads the students through the lessons. Whereas in better off communities, students use computers more for project-based, inquiry-based and collaborative learning. Low achieving students may be given limited computer time for working on basic skills and not allowed access to programs to promote creativity and independent thinking. Girls may receive unequal encouragement and opportunities. Technology should be used as part of a curriculum and not used by only some children or as a reward for good behavior.

* Curriculum – Software should be chosen with awareness to avoid biases and to make children feel represented. Moreover, content must be tailored to the needs of the population sub-groups and to allow for different learning styles and ability levels.

In sum, the presence of computers does not ensure access. Educators need to purposefully plan for equal access by all children, regardless of gender, ability level, race or socioeconomic class and to continually monitor and manage computer use with young children.

References:
