Computers and Young Children

Should young children have early access to computers? Here are two points of view—one from **Douglas H. Clements, Ph.D.**, and the other from **Jane M.Healy, Ph.D.**

Douglas H. Clements, Ph.D., is a professor in the Department of Learning and Instruction at the State University of New York at Buffalo.

ECT: We'll start with Dr. Clements. Do you think very young children should be introduced to computers?

DOUGLAS CLEMENTS: This is a hard question. Clearly children as young as one or two can sit on someone's lap and interact with the person and with what's on the screen. And I am sure doing this is not negative for the child. Whether it has a particularly good effect, however, is questionable. There simply isn't any research either way. In my professional opinion, if the child enjoys the experience and seems to be interacting and engaged, then the same benefits are present as when reading a book or playing blocks together. The interaction and encouragement of the adult is what is most beneficial. I say all this expecting that the computer is already in the house and the software is already installed. I can't recommend spending money on software because we don't know if it has a benefit to the child.

ECT: What about preschoolers?

CLEMENTS: The research is not conclusive, but there is plenty that shows there are benefits to computer use before the age of seven. However, a parent or teacher must be involved, encouraging children to explain what they are doing and learning, and challenging them to new and higher levels of thinking. The term for this is "invested mental effort." Many software programs don't challenge children in this way. A child can do a lot alone, but the better and smarter way is for the adult to be there to ask questions at the right times, to enlarge children's cognition, and to affect self-esteem positively. I think computers should be an integrated part of early childhood programs. I am not suggesting that we take children away from their play or from nature walks for computer time. But I do believe that children can learn cognitively during both kinds of experience. The amount of time children spend will vary with individuals, generally somewhere between 15 and 45 minutes. Most importantly, research suggests that if children are introduced to computers before the age of seven, there will be little or no gender bias in their use. However, the longer one waits past that age, the more likely the computer will be a male domain.

Jane M. Healy, Ph.D., has been an educational psychologist and professional educator for more than 35 years. Her most recent book, Failure to Connect: How Computers Affect Our Children's Minds—for Better and Worse, *will be released in paperback this October by Touchstone Books.*

Research is pretty definite that computer work enhances social interaction. In one study, up to 95 percent of children talked about what they were working on, and in another study they spent nine times longer talking to each other when they did puzzles on the computer than when they were working at a table. I think children need both experiences.

ECT: What advice would you give preschool and kindergarten teachers?

CLEMENTS: Be involved. To be successful, teachers must learn the software programs so they can help children get the most out of them. They need to introduce new software and work through problems with the group. If the program features a river, ask "How would you navigate through this?" After children have had a chance to think, work, and respond, they can work on the computer in a learning center. Then the teacher needs to stop by, observe what children are doing, reflect on experiences she's observed during group time or a recall meeting, and ask children to talk about the strategies they've tried.

It's also important to remember that less is more. Have on hand a few simple, good programs. Too many can lead children into surface interaction, which requires no depth of thinking. It's also a good idea to keep pattern blocks next to the computer to help children actualize the abstract pictures on the screen. They can play with shapes and then replicate them on the computer. Different thinking is required to move things onscreen, so this helps children learn about transformations.

Teachers need good hardware, good software, good support, and professional development. They need time to talk to others and plan ways computer use can work with their curriculum.

ECT: How do you think technology can help young children with learning disabilities?

CLEMENTS: There is a little research that shows that children with autistic tendencies or those with severe physical handicaps benefit greatly from computer use. Children with severe developmental delays may also show improvements. For example, one totally mute four-year-old with diagnoses of retardation and autism began to echo words for the first time while working at a computer.

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Using Computers Effectively

Dr. Clements offers the following guidelines for computer use:

- Use computers with all children, including children with physical and emotional disabilities. Indeed, computers can make unique and powerful contributions.
- Use computers to promote social and emotional development. An early, and not unreasonable, concern was that computers would isolate children. That is not the case. In fact, computers increase social interaction! Children also prefer to work with a friend rather than alone.
- Choose software carefully. The programs you select make a difference. For example, open-ended programs foster collaboration. Drill-and-practice software encourages competition. Games with aggressive content can engender the same qualities in children.
- Set up the computer area to foster interaction. Place two seats in front of the computer and one at the side (for an adult) to facilitate the sharing of ideas. Centrally locating the computer invites other children to pause and participate in the computer activity and helps keep teacher participation at an optimum level.

Choosing Early Childhood Software

When choosing and reviewing software, ask yourself:

- ◆ Is the child in control, "an actor not a reactor?"
- ◆ Does the child set the pace of the activity?
- ◆ Are instructions clear?
- ◆ Does the software teach powerful ideas, not just trivia?
- ◆ Can the child operate the program independently?
- ◆ Does it feature discovery learning, not skill drilling?
- ◆ Does it capitalize on the child's intrinsic motivation rather than using external rewards?
- ◆ Is process more important than product?
- ◆ Does the program reflect the child's experience in the real world?
- ◆ Are technical features well designed (the software runs quickly, saves child's work, has uncluttered graphics)?
- ◆ Does the program display cultural, gender, and ability equity?

Adapted by Jane Healy from *Young Children and Technology: A World of Discovery* (Allyn & Bacon, 1997) by Susan W. Haugland (Contributor), June L. Wright, and Daniel D. Shade.

Research suggests that if children are introduced to computers before age seven, there will be little or no gender bias in their use.

—Dr. Clements

EARLY CHILDHOOD TODAY: Dr. Healy, in your book *Failure to Connect: How Computers Affect Our Children's Minds—for Better and Worse*, you recommend that children under the age of seven not use computers at all. Could you explain why?

JANE HEALY: In the case of the child under seven, there are few things that can be done better on a computer and many that fail miserably by comparison. Teachers and parents must understand that if young children are allowed too much access to computers, they are missing a golden opportunity to develop the personal, social, and emotional skills they will need to function effectively in adulthood.

A young child's attention naturally jumps from one thing to another, and some forms of electronic media may prolong this immaturity. Distracting graphics and special effects, coupled with the temptation to click impulsively, encourage stimulus-bound behavior which, in turn, contributes to attention problems. Teachers often feel that computers interfere with their focus on language skills, imagination, thought process, internal motivation, and negotiation. In fact, in a large study of child care, researchers found that children's intelligence, academic success, and emotional stability were determined primarily by the personal and language interactions they had with adults.

ECT: Why is seven the age boundary?

HEALY: Between ages six and seven, there is an important developmental milestone for the human brain. I believe this time is a realistic stepping-stone into constructive computer use. In fact—for children above age seven—combining computer and manipulative activities may result in better learning. Younger children, however, are better off spending this valuable time in a physically and linguistically enriched environment. Even for children who lack this type of privileged experience, there is no evidence that computer applications will make up the inevitable gaps.

ECT: What advice do you have for early childhood teachers who are using computers with children?

HEALY: I would tell them to find ways to limit the time children spend on computers, diligently control software choices, not allow the computer to waste children's time, and be seriously concerned about computers taking precedence over social and language-related experiences. Care has to be taken that software isn't seducing children into playing non-thinking games or pushing buttons to get rewards. There are very interesting things teachers can do with computers. However, most require the one-on-one presence of an adult, because children need a teacher there to discuss, ask questions, and explain.

ECT: What are your major concerns about electronic learning?

HEALY: Computers must never be allowed to supplant supportive human environments. And we must remember that children need practice integrating

the senses through many different kinds of play experiences, managing their own minds—not having their minds distracted or programmed from outside. Symbols must be internalized through concrete experiences before they can be understood in the abstract, such as on a computer screen. Children need to hold the counting bears and place them in a pile of three to relate that concept to the number "three." When computers make up the images, children's minds don't have to work to create them. In addition, electronic media can cause overstimulation and prevent children from focusing on the task at hand.

Teachers should be seriously concerned about computers taking precedence over social and language-related experiences.

—Dr. Healy

ECT: Do you think computers and technology can benefit young children with special needs?

HEALY: Yes, they can. Voice software is good for phonemic awareness and physical therapy. However, therapists want children to maximize their potential, so we don't want to chance missing opportunities by putting children on computers too soon.

Using Computers Effectively

Dr. Healy offers the following guidelines for computer use:

- Starting children on computers too early is far worse than starting them too late.
- A child should be able to understand the cause-and-effect relationship of moving a mouse or touching the screen to get a reaction before she starts to use a computer.
- Look for software that makes the child feel independent. Such software might enable the child to navigate in and out of activities, hear spoken directions, or access understandable help screens.
- Downplay skill-and-drill math and phonics activities in favor of interactive problem solving or open-ended use, where the child is free to explore and discover ways to use the materials.
- Stop the program occasionally to encourage the child to talk about what is happening, what he is doing, and why. Ask questions about how he accomplished something. If there is an icon or image on the screen, make sure the child understands its relationship to real-life objects and events.
- Supplement "eyes-on" with "hands-on." Find some real-life experiences that extend and complement virtual ones.
- Show children how you physically connect the computer, printer, and other components. Keep emphasizing that people control the computer, not the other way around.
- Don't let screen time substitute for lap time, and don't expect stories on CD-ROM to substitute for interactive reading with loving adults.
- Consider eliminating the use of clip art if you decide to let children use digital drawing tools.
- Evaluate the aesthetic qualities of software and CD-ROMs.
- Closely supervise any child on the Internet.
- Whenever possible, make computer use a social experience by putting two chairs at the machine and encouraging conversation and collaboration with peers.
- If a young child begins to show signs of computer addiction, cut down on or eliminate screen time and make sure plenty of alternative activities are available.
- Don't ever forget that the best multimedia, interactive environment is the real world. ECT