Using Technology to Enhance Early Learning Experiences

When one sees computers as number-crunching, word-processing, video game-playing machines, it's hard to envision how they could play a beneficial role in the play and learning of young children. But set one up with developmentally appropriate software, place it on a low, wide table — or even on the floor — and bring along some books and props, a few peers, and a caring, informed adult, and the computer becomes a magical, multi-sensory environment inviting exploration and discovery!

Computers have become a pervasive (perhaps invasive) presence in our lives. Technology *will* impact young children, but early childhood educators have an opportunity to help ensure early experiences with technology are developmentally appropriate and empowering for all children, regardless of gender, socioeconomic background, or ability. "In practice computers supplement and do not replace highly valued early childhood activities and materials. . . . Research indicates that computers can be used in developmentally appropriate ways beneficial to children and also can be misused, just as any tool can" (NAEYC, 1996).

What We Know About Technology and Kids

Researchers have been observing young learners interact with microcomputers for over two decades. We now know something about choosing developmentally appropriate software, and about the kinds of computer activities that can positively impact learning and social behavior.

by Kirsten Haugen

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While the market has been flooded with children's software, by no means is all of it appropriate or beneficial (Haugland and Shade, in Wright and Shade, 1994). Children themselves don't always make the most appropriate choices, so teachers play a critical role in selecting software. Open-ended software, in which children are free to explore and experiment (rather than working through a preprogrammed sequence of problems), has many beneficial as well as enticing features for young children.

- Children click on a word in the Living Books™ version of *The Cat and the Hat*, and the word is spoken, spelled, or animated, providing a rich context for language exploration.

- Using a painting program, two children make a circle, fill it in, change the color, add a sad face, then make it a happy face, narrating and negotiating as they go. Opportunities to repeat, alter, or undo actions allow children to experiment at their own pace. And when they're done, copies can be printed for each child and for a class album.

- Children click fish on screen one by one to make them swim to the other side; the computer counts aloud and shows the number, helping children develop number sense and one-to-one correspondence. Carefully designed constraints, cues, and feedback provide scaffolding for skills just beyond a child's mastery.

Computer play can also positively impact social skills. Numerous studies demonstrate that when using computers, young children prefer to work with others rather than alone, and prefer seeking help from peers rather than adults. Apart from practicing turn-taking skills, children also do a great deal of talking, negotiating, and cooperating to explore, create, or problem-solve within computer environments (NAEYC, 1996).

Computers, however, do not replace teachers. These benefits have been realized through the efforts of adults who understand the technology *and* the reasons for using it, and are available to facilitate, just as they would in other activities.

The Adult's Role

As with many activities, adults help to set the stage, model the activity, facilitate, and observe.

- **Setting the stage.** Safely set up the computer to encourage exploration and cooperation (see box on page 55). Choose software by evaluating its appropriateness for a given child, group, or activity. Select computer activities to support class themes. Provide props and manipulatives, inviting children to use all learning modalities.

- **Modeling.** While it is not our primary job to walk kids through a particular software program, modeling plays a critical role in successful computer use. Not only can we model safe and appropriate use of computers, turn-taking, and other social skills, we can also model ways of thinking and talking about an activity. It's helpful for a skilled adult to interact with children around an activity before allowing them to explore on their own. This will guide them in their exploration and help focus their attention.

- **Facilitating.** Pair students with complimentary skills. Encourage problem-solving — "What would happen if . . . ?" Simply describe what children are doing and ask questions — "Oh, you've made a house! Tell me about the shapes you used." Sometimes when kids get stuck, gentle suggestions on when to take turns, divide a task, or try something new may be appropriate. And when the inevitable *technical difficulties* occur, invite children to help with trouble-shooting.

- **Observing.** "As we listen and question, we discover more often than not that we are the learners" (Wright and Shade, 1994). Take time to simply watch and listen to children at the computer (and elsewhere) to learn about how they perceive, solve problems, communicate, and collaborate. Computers can support or compensate for developing motor or language skills, thus observing computer play can help identify emerging skills.

Level Playing Fields and Curb Cuts

One special benefit of technology is the many ways in which it can level the playing field for kids with special needs by supporting their efforts to communicate, explore, play independently, or cooperate with a peer. In return, many products and strategies initially designed to accommodate children with special needs are now finding useful roles in mainstream early learning environments. Just as wheelchair curb cuts make life easier for people with strollers, bicycles, and hand trucks, typical kids benefit from more accessible and meaningful tools like Touch Windows,® software that talks, and alternative keyboards like IntelliKeys,® which use custom overlays of pictures and words.

Kids with disabilities also benefit from *low-tech* tools, such as large button-like switches for safely and easily

controlling electrical appliances, and simple communication devices which allow a child to *talk* by touching one or more pictures to play a recorded message. Experienced teachers combine these high- and low-tech tools with more familiar early childhood materials to give kids with disabilities essential early learning experiences which are otherwise inaccessible, and to facilitate learning opportunities for all kids.

These extensive efforts have shown positive results. In a study by the UCLA Intervention Program, toddlers and preschoolers with disabilities showed more active engagement, enjoyment, and social play during age-appropriate computer activities involving peers and adults than during similarly structured activities away from the computer (Howard et al., 1996). Another program in Sioux Falls, South Dakota, used computers and assistive devices for story time activities, and found "children with disabilities demonstrated an increase in spontaneous interactions, turn-taking, initiating wants/needs, and simple problem-solving skills" (Baldwin et al., 1996).

Technology Outreach Time (TOT), a new pilot literacy project for educationally disadvantaged and disabled four year olds, puts these findings to work. Carolina Computer Access Center director Judy Timms writes, "We already know that good software and assistive technologies, if used effectively by trained teachers, can be classroom equalizers for children with disabilities. They also give children from disadvantaged environments self-confidence and important knowledge that helps level the playing fields with typically developing peers." TOT is a collaboration of CCAC, Charlotte-Mecklenburg Schools, and three innovative technology vendors.

Programs like TOT which reach out to disadvantaged children are vital, but generally "the most needy students are getting the least access to technology" (NAEYC, 1996). Child care centers and preschools serving children from disadvantaged backgrounds have an opportunity to level the playing field for these children by providing developmentally appropriate experiences with computers.

Putting It All Together: Using Technology with Thematic Units

The key to the successful integration of technology into early childhood settings is to see computers in the same light as traditional materials rather than as something apart. Perhaps the best starting point for using computers to benefit young learners is to incorporate them into thematic teaching units in much the same way we use more familiar materials. Tying the computer into your favorite themes gives computer use a purpose and focuses the process of selecting software and introducing activities. In addition, a theme provides clear continuity across all the activities in the classroom, giving young learners a leaping off point for their own explorations.

■ *All Aboard!* The library corner is filled with books on trains. The playhouse is now a station, with suitcases, engineer's hats, and bandannas added to the dress ups. The blocks suddenly *become* buildings, train cars, and tracks. A field trip to the local subway or Amtrak station is planned. Tracks appear in the sand table. In the art corner, large boxes are ready to be transformed into box cars, cabooses, engines, and more. In the math area, small train cars are ready for counting or sorting by color, type, or size.

How can technology add to this rich thematic experience? Imagine pairs of children telling a story by using a slideshow program to sequence their own train pictures and record their voices — on-screen, it's a talking book, with a printed copy for each child. Other children decide to print up tickets and a schedule for the train station — the computer allows them to try out several different designs. With multimedia authoring software like IntelliPics®, the teacher creates a simple but effective activity for matching, counting, and coloring different types of train cars. Children explore train themes further using multimedia CD-ROMs like *The Way Things Work* (Dorling Kindersley) and integrate this knowledge back into their imaginative and social play.

■ *Mary Wore Her Red Dress.* Another approach to creating a theme is to start with a favorite piece of software and build a theme around it. Kit Kehr, of the UCLA Intervention Program, describes a week-long theme built around the multimedia story *Mary Wore Her Red Dress* (Don Johnston, Inc.). Every day, the teacher facilitates activities built around the software. For example, a large laminated copy of Mary with clothing to Velcro on provides the basis for a group language activity. In addition, similar clothing for the dolls, dress ups, and felt paper dolls allow kids to extend the activities in other ways. Week-long themes are helpful because "it's developmentally more meaningful to have that repetition, which is what kids are drawn to do." And by the end of the week, kids have encountered the concepts of color, clothing, categorization, and sequencing in an array of related contexts. While experts rely on this approach all the time, it also works especially well for teachers who don't have the time or skills to create custom activities.

■ *Animal Habitats*. A third time-saving approach to building a theme is to base it on a purchased package which includes both traditional and computer-based activities. Animal Habitats (IntelliTools) is one such package, based on the story of *The Curious Polar Bear* who travels the world visiting other habitats. Children explore the book in print and in a talking version on-screen. Five different animal habitats provide the basis for interactive computer activities exploring animal facts, phonics, and language activities. The teacher's guide includes blackline masters and ideas for off-computer activities.

Concluding Comments

Focusing on curriculum is the key to successfully integrating computers into early childhood settings. Using technology to support favorite thematic units can help guide our thinking about technology and children. Computers will impact the lives of young children either positively or negatively. Using computers to provide developmentally appropriate activities for young learners helps ensure that as they grow, children will approach technology with confidence, realize its benefits and limitations, and use it as a tool in their life-long journey of learning and growth.

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Resources

- Alliance for Technology Access (ATA), (415) 455-4575, <www.ataccess.org>
- Broderbund/Living Books, (800) 474-8840, <www.broderbund.com/education> (Kid Pix, Living Books, more)
- Carolina Computer Access Center (TOT Program), (704) 342-3004, <http://ccac.ataccess.org>
- Closing the Gap, <www.closingthegap.com>
- Creative Communicating, (801) 645-7737, <www.creative-comm.com> (Storytime software and adapted books)
- Don Johnston, Inc., (800) 999-4660, <www.donjohnston.com> (Circletime Tales® and UKanDu® software, Discover® tools for computer access, more)
- Edmark, (800) 362-2890, <www.edmark.com> (Kid Desk®, "House" series for young children; Touch Window®; more)
- IntelliTools, (800) 899-6687, <www.intellitools.com> (IntelliKeys programmable keyboard, IntelliPics authoring software, Animal Habitats, more)
- National Association for the Education of Young Children (NAEYC), (800) 424-2460, <www.naeyc.org>
- Toys for Special Children, (800) 832-8697, (Cheap Talk communication devices, ability switches, adapted toys, more)
- UCLA Intervention Program/UCLA Microcomputer Project, (310) 825-4821

Setting Up a Computer for Kids

- Set up the computer in an area large enough for at least two kids, an adult, and books, props, manipulatives, word cards, etc. Invite kids to work together by providing multiple chairs or cushions.
- Get the *interactive* elements of the computer (the keyboard, mouse, monitor, and microphone) at kid level — on a low table or even on the floor! If need be, use Velcro or other fasteners to stabilize these parts.
- Keep the CPU (the *box*), disk drives, printer, etc., out of kids' reach — in a cabinet or up on a counter or shelf. Or buy or make covers for delicate parts. (Numerous commercial and homemade boxes have been designed to prevent damage or theft — put a creative parent to work!)
- Some centers with limited space or budget house the computer on a rolling cart so it can be shared among rooms or put away during high energy activities.
- Teach kids proper computer use and care, and post signs to remind them of the rules. Liquids, food, sand, and magnets can all damage a computer or its parts.
- Trackballs or touch screens may be easier for young kids, as may alternative keyboards with fewer, larger colorful keys and alphabetical layouts, and flat, touch-sensitive keyboards which can use your custom layouts of words and pictures.
- Use a *kid-proof* utility (Kid Desk®, Fool Proof®, etc.) to make the kids' software and files easier to access, and to deter kids from moving, trashing, or changing key files and settings. Kid Desk® provides a kid-friendly environment with added features, such as a printable calendar with "stickers," and "voice mail."
- Not all software needs to be available all the time; the computer doesn't even have to be on all the time. Provide a sign to show when the computer area is *open*.
- Select software to go with your favorite themes. Decorate the computer area to go with the theme. Offer independent, cooperative, and group activities at the computer.
- *More* is not better — be wary of inexpensive software packages claiming to address every developmental area. Reputable educational software companies will send a demo disk or let you preview software.
- Save $$ — your local library or other resources may loan software or CD-ROMS; try software out before you buy it; share recommendations with other educators and parents.
- Use a digital camera or scanner to incorporate photos of kids and events into computer activities and artwork. Scanners can cost under $100.
- If you have money for a new computer set-up, don't spend more than half on hardware. Use the remaining half for software **and** staff training.

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