

Technology in Early Childhood Education
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In 2002, President George W. Bush signed into law the No Child Left Behind Act (NCLBA). This act caused the most sweeping changes in education since the Elementary and Secondary Education Act of 1965. While most observers discuss the standards and accountability significance of the Act, there are direct implications for early childhood learning and technology. Within the standards and accountability requirements, early childhood learning has become significantly more important. Children are being asked to master reading skills at even earlier ages than ever before. The “Reading First” initiative requires educators to create programs to teach reading that are based on scientific research and to ensure children are reading at or above grade level by the end of third grade. Funding for research and implementation will be increased to ensure educators have the best available resources to teach reading. The use of technology to enhance learning is expected in the NCLBA. The Act states:

- It's not enough simply to have a computer and an Internet connection in the classroom if they are not made part of the learning process.
- Technology is a tool like any other and the value comes not from having access to it, but rather in how it is used.
- Enhancing Education Through Technology (ED Tech) under *No Child Left Behind* will improve the quality of education by developing new ways to apply this tool to teaching and learning. (Bush, 2002)

The goal is to have technology work concurrently with other strategies to improve academic achievement. This puts a great deal of pressure on the educators and students in the early childhood education arena.

The integration of instruction with technology is not new. For over twenty years, educators have been using computers in their classrooms. But without a large quantity of quantitative research to verify the impact of technology in the classroom, opinions are mixed regarding technology's value in early childhood education. Cuban (2001) acknowledges that computers in the early childhood classroom can be beneficial, as long as the teacher integrates it into the curriculum. His study of eleven preschool/kindergarten classes concludes that teachers more often incorporate the computers to sustain or reinforce learning, keeping the whole child philosophy of "developmentally appropriate" work and play at the foundation of their program as opposed to having technology drive the curriculum. He goes on to ask an interesting question, "Just because children can do something when they are young, should they do it?"(Cuban, 2001, p.39) The Alliance for Childhood is one of the strongest groups to say "no" to Cuban's question. This group advocates a no technology approach to early childhood learning. They have an impressive list of educators, pediatricians, psychologists, authors, parents, and researchers who believe the use of computers in early childhood education is detrimental to the academic, social, and physical development of young children. In their report "Fools Gold: A Critical Look at Computers and Childhood", they recommend a moratorium on computer use in early childhood both at home and at school. Citing obesity, visual strain, repetitive movement injuries, developmental delays in sensory impressions and movement, isolation, and decreased cognitive skills as potential harmful side effects, they believe computers do not belong in a early

childhood program. They advocate a move toward a stronger bond between parents and children, teachers and children, more creative and hands-on learning activities at home and in schools, full disclosure by the manufactures of computers as to the physical hazards of computer use, and the end of commercialization regarding technology in early childhood (Alliance For Childhood, 2000).

Much of the cognitive concern regarding computer use comes from a constructivist interpretation of Piaget's theories considering learning and education. In 1964 Piaget wrote:

The principal goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done-men who are creative, inventive, and discoverers...We need pupils who are active, who learn early to find out by themselves, partly by their own spontaneous activity and partly through materials we set up for them: who learn early to tell what is verifiable and what is simply the first idea to come to them. (Wadsworth, 1978, p. 99)

Piaget's pre-operational stage of development encompasses the childhood years from 18 months to eight years. During this stage children should be encouraged to create new knowledge through active hands-on activities. Many advocates of early childhood learning are concerned that the children will use computers today as the workbooks of the 1970's and 1980's (Brown, 1996). Monke believes:

there is little hope that our children will make wise choices about what technology will offer them if they never had the opportunity to stand, and think, apart from the technology itself. (Monke & Delamater, 2000/2001, p.4)

Children are in danger of being “left behind” if they do not extensively participate in listening to stories, art, music, and the use of manipulatives. Today’s technology will not be the same technology in 10 years, so pushing technology on young children does not create a student ready for work challenges post high school graduation (Monke & Delamater, 2000/2001). If knowledge is derived by action, then does the passive use of a computer create knowledge? Delamater believes that a moratorium on computers goes too far and he acknowledges that more research is required, but the current information does not necessitate such a radical conclusion. Computers can be an integral part of the early childhood curriculum(Monke & Delamater, 2000/2001).

In 1996, the National Association for the Education of Young Children (NAEYC) issued a position statement entitled: Technology and Young Children–Ages Three through Eight. The statement recommends the following technology guide for early childhood programs:

- NAEYC believes that in any given situation a professional judgment by the teacher is required to determine if a specific use of technology is age appropriate, individually appropriate, and culturally appropriate.
- Used appropriately, technology can enhance cognitive and social abilities.
- Appropriate technology is integrated into the regular learning environment and used as one of the options to support children’s learning.
- Early childhood educators should promote equitable access to technology for all children and their families. Children with special needs should have increased access when this is helpful.

- The power of technology to influence children's learning and development requires that attention be paid to eliminating stereotyping of any group and eliminating exposure to violence, especially as a problem-solving strategy.
- Teachers, in collaboration with parents, should advocate for more appropriate technology applications for all children.
- The appropriate use of technology has many implications for early childhood professional development. (NAEYC, 1996)

This position statement has become the foundation from which to develop support for the appropriate use of technology in early childhood education. The association acknowledges that technology is significant in American life today and that the potential benefits are well documented. They also point out that the research shows that computers enhance a highly active learning environment, not create one. Integration is key. To this teachers are charged with using sound judgement when using computers, just as they evaluate any learning resource (NAEYC, 1996).

Haugland (2000) suggests that preschoolers should experiment and explore technology. Minimal instruction and intervention is the best way to encourage skill development. Teachers are encouraged to observe the interaction and talk with the children about their experiences. In kindergarten through second grades, children should be given the opportunity to use software designed to encourage growth. Directed computer assisted instructional activities are also encouraged such as writing composition. Students should work in pairs or groups to encourage cooperation and problem solving. She correlates the benefits of computers to two major factors-

the types of experiences and the frequency of access. Student gains include improved motor skills, creativity, mathematical thinking, and better critical thinking skills.

Giving children the power of technology is advocated by Maurer and Davidson (1999). Their experience with teachers and young children points to a possible change in how we present new technology to children. Typically, teachers learn the technology first and instruct the children in its proper use. According to their research, this type of instruction can slow the learning process. Many children learn new technology faster than the adults. If children are given the hands-on opportunity to explore, learning can take place at a faster rate and give the children a larger portion of the technology power. One example comes from a first grade class where the teacher is asked to select two “word-processing experts”. These children, who were not high achieving students, were trained by the observers to type their journal using a word processor. These “experts” then taught their classmates. The hardest part for the experts was getting them to “sit on their hands”. Two positive things happened in this activity; the entire class was able to computerize their individual journals, thus gaining computer skills, and the experts gain much needed self-esteem. Through these and other observations, the researchers recommend that teachers should become facilitators of technology, that children will accept responsibility for both their own and their classmate’s learning, and that this responsibility creates opportunities for children to accept the power of technology without some of the pitfalls and concerns regarding the early use of technology (Mauer & Davidson, 1999).

Clements (1998) suggests that “we no longer need to ask whether the use of technology is developmentally appropriate” (p.3); we need to determine how to facilitate learning. His research shows that computers facilitate social interaction, open ended software promotes

cooperative learning and the close placement of computers encourages peer review. Drill and practice software can promote turn taking and competition. The use of a keyboard produces a sense of pride, not trouble. He also suggests the integration of technology into the curriculum, not isolation.

Only when computers are integrated into the curriculum as a vital element for instruction and are applied to real problems for a real purpose, will children gain the most valuable computer skill the ability to use computers as natural tools for learning. (Davis & Shade, 1994, p.1)

Integration is not a cluster of unrelated activities about a topic. Integration is a natural and necessary goal of learning—to bring together language, mathematics, science and social studies in a way that provides the learner the chance to become educated about a specific topic. When computers are used to complete a writing assignment, the computer is integrated into the lesson. When a drawing program is used to make a family quilt, the program serves a useful purpose, it is not just arbitrarily thrown in to add technology to the lesson. Teachers need to be the instructor to promote comfort and familiarity with the technology, the coach to provide guidance, the model to show how things are done, and the critic to ensure appropriate technology is placed in the hands of the students (Davis & Shade, 1994). There are several ways to integrate technology. Looking at pictures of zoo animals, observing an animal using a web cam, listening to a story and playing a math game are all ways to give children the technology experience. But, if the integration of technology is the goal, then thematic units can be used to combine structured, sequential, and well-organized strategies, activities, children's literature, and materials used to expand a particular concept.

A thematic unit is multi-disciplinary and multi-dimensional; it knows no boundaries. It is responsive to the interests, abilities, and needs of students and is respectful of their developing aptitudes and attitudes. (Fredericks, Meinbach, & Rothlein, 1993, p.5)

Technology has a place in the early childhood classroom, in the form of the thematic unit.

According to Kelly (2001), there are three levels of integration for the Internet into thematic units:

- One: use the Internet in an already established unit. Using a pre-done or commercial unit, find some Web sites that compliment the activities.
- Two: use a variety of Internet-based activities in your unit of study. Locate web sites and develop additional activities based on that information.
- Three: include a major Web-based focus from support of other media. The children are presented a topic and launch into their own research from your initial group of bookmarked sites. This would be more appropriate for older children.

Quality web units start with the curriculum or standards; they incorporate well researched sites, activities, connected ideas, variations in time for individual students, and evaluation both during and after the unit. Early childhood units should use sites that are teacher evaluated, readable, and on the topic. Research skills and copyright information should be introduced at this level (Kelly, 2001).

As presented in the No Child Left Behind Act, technology in early childhood education must serve a purpose in instruction. It must be integrated into the early childhood classroom. Just as books, puzzles, and games provide learning experiences, so must technology do its part to enhance learning and achievement. The use of technology for technology's sake will not help

young children develop strong skills and achieve learning goals. Educators need to explore ways to integrate the technology in meaningful and purposeful ways in order to provide a learning environment that gives children many ways and path to reach similar goals. Further research must be done to determine the most effective ways to put technology into the curriculum while safeguarding the child's need for an active hands-on learning experiences.

In April of 2003, while looking for new information regarding the use of computers in early childhood education, I was not surprised to find there were few new qualitative or quantitative research findings. The overwhelming theme heard from early childhood educators continues to be to integrate technology into the student's daily work while preserving the young student's need for active hands-on learning. Matching the technology to the curriculum and teaching at the student's developmental level is the most effective way to encourage young students to use technology effectively (Van Scooter, Ellis & Railsback, 2001). I must agree. Having taught in the early childhood education field for many years, I know students learn better when the instruction and the tools have meaning. Students in my classes who work with a word processor to produce assignments are developing both writing and technology skills. Teachers of young children are encouraged to guide the acquisition of knowledge and to facilitate the development of technology skills. A plus for using technology at a young age is the ease with which the students acquire confidence with technology (Skeele & Stefankiewicz, 2002). Concern regarding the use of the Internet abounds in many schools, so many early childhood students are unable to take virtual field trips, use online learning activities, participate in e-pals or in collaborative projects, and access graphics and materials for special projects. With proper preparation on the part of the teachers, young students can benefit from limited access to the

Internet (Skeele & Stefankiewicz, 2002). Early childhood educators require continued professional development and support to increase their confidence and skill with using technology with young children. When the teacher is comfortable with the integration of technology as a tool for learning, the students in their class will gain social and academic skills in a technology rich environment.

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