Using Technology in Early Childhood Environments
Facilitating Learning and Child-Family-Community Connections

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Abstract: *Pedagogy is demonstrated for using technological resources (computer, digital camera, software, and printer) for an early childhood learning environment to create curriculum materials, enhance activities, and promote child-family-community interactions. Developing lesson materials for introducing concepts; virtual trips into the community; and communication with families are integrated into the daily program planning. This approach using technology always supports and does not overshadow the developmentally appropriate practices essential for quality caregiving and learning for young children ages 3 - 8.*

Preface

Since computers have been widely available, they have quickly become part of the natural landscape and culture (1). Technological advances are woven through many aspects of life and the early childhood program environment is no exception.

Child development professionals are faced with a task of integrating technological equipment and applications into the learning environment of young children in productive and purposeful ways that enhance, and do not detract from, the developmental imperatives and experiences of the child and family. Early childhood educators have expressed concern over computers being used in inappropriate ways with young children (2,3). There is a proliferation of software targeted to young children that is "learning" oriented, some of which is appropriate and some that is not. Haugland and Shade have identified criteria to evaluate what software is beneficial, appropriate and builds confidence in young children (1,4). However, technology use need not be limited to these commercial products that are marketed for children. The rich supply of technological products and capabilities now available opens a wide range of possible applications for the early childhood educator.

Overview of the Importance of Technology in School and Child Care Settings

The ways in which technological resources can be used in the education of young children goes far beyond the use of "games" for children. In the 1996 Position Statement, "Technology and Young Children, Ages 3 through 8" the National Association for the Education of Young Children (NAEYC) identified several issues which were pivotal in determining the positive use of technology with children. Three of those seven issues are: 1) the essential role of the teacher in evaluating appropriate uses of technology; 2) the potential benefits of appropriate use of technology in early childhood programs; and 3) the integration of technology into the typical learning environment. The applications of technology described in this paper will address these three issues in early childhood programming by identifying the teacher's role; the benefits to children, families, and programs; and methods for technology integration that is purposeful, effective and achievable over the long term (5).

Education Standards and Credentialing Related to Technology

The Interstate New Teacher Assessment and Support Consortium (INTASC) provides a widely used set of model standards for beginning caregiver/teacher licensing and development. Founded in 1987, the standards represent 30 U. S. state education departments and the leading professional teaching organizations. The first and second principles encompass aspects of using technology in a developmentally appropriate way with young children. Principle 1 states in part: "The caregiver/teacher understands the central concepts, tools of inquiry . . . and can create purposeful experiences that make these aspects of subject matter meaningful to children." Principle 2 emphasizes the importance of understanding " . . . how children learn and develop, and providing learning opportunities that support their intellectual, social, and personal development." (7)

The Illinois Board of Higher Education (colleges and universities levels) and the Illinois State Board of Education (preschool, elementary, and secondary levels) realize as the education governing bodies that promoting and facilitating the use of technology is beneficial to schools, teachers, children, and families. These governing bodies have initiated commitments and provided grants that encourage cooperation between universities preparing teachers and area schools. In the Six Essential Learnings in a Technological Society of the ISBE, it is identified as a goal that the " . . . student creates, produces and presents ideas, stories and unique representations of thoughts through a variety of electronic/optical media . . ."(8)

Introducing Technology in School and Child Care Settings

The process of integrating technology use in to the early childhood environment for children ages 3 through 8 is a gradual process. The needs and interests of the teachers, children and families drive the direction and pace of technology use. The magical thing is that one project opens the doors to other projects and reveals applications specific to the program or school that were not evident in the beginning. One simply starts somewhere.

Basic Required Technology Components

The basic resources necessary for the types of activities described here include:
- Computer with sufficient operating system and RAM to run the Micro Soft Office programs
- 15" or 17" monitor
- CD writer
- PowerPoint 95 or higher
- Microsoft Photo Editor
- Digital still camera (preferably with FD, floppy disk, LS120 capability)
- Color printer

Other things that can be useful as staff expand on their ideas are a flatbed scanner, computer microphone, web camera, television that accommodates an ATI graphics card, Real Player, and music synthesizer. Additionally, a variety of additional software can provide limitless opportunities for creativity.

Applications That Keep the Goal in Mind

The goal of integrating technology into early childhood environment is to **enhance** pedagogy, not **overshadow** the content with technological dazzle. Young children function in a cognitive dimension that makes learning through real, concrete, sensory-based experiences vital. As wonderful and useful as digital imagery is, it can never serve the purpose of real experiences.

Levels of Technology Applications

I have identified five levels of applications. They are all useful and appropriate. However, this hierarchy reflects that the pedagogical depth and quality is greater at level 5 than level 1. At each level the integrative aspect of the family, community, and near experiences of the child increases.

Levels of Technology

Represents objects and experiences as: 1) an alternative format to printed book; 2) as support for concept teaching; 3) an interface with the near environment of the child and family; 4) a supplement to concrete objects and interactive learning; and 5) a vehicle for documenting interaction and relationships with family and community members.

Level One: Technology represents objects and experiences as an alternative format to printed book. The wide array of children's books is a rich resource in the early childhood program. However, some books are difficult to display in a way that all children can see the pages and details of illustrations due to the complexity and size of the drawings or photographic images. At level one the books are captured in digital format and displayed on the large computer monitor using PowerPoint Presentation software so that each page (or slide) is sequentially displayed as the teacher reads the story. Care is taken to properly cite the book and the teacher always holds the printed copy so the children can see the source. These digital books saved on the hard drive along with the original book are part of the permanent library available for children to use on a daily basis.

Level Two: Technology represents objects and experiences as support for concept teaching. When a lesson' subject is volcanoes, clouds, musical instruments, or plants it is necessary to represent objects that are not available to be brought into the classroom. Photographs taken by the teacher, images accessed from scientific and public education web sites, and images enlarged for display from

books are useful to demonstrate basic information. For example, the volcano lesson uses pictures from a book that diagrams the process of an eruption. The clouds lesson uses weather web sites to show cloud types. Lessons on musical instruments use close-up photographs of the various parts of string instruments in order to identify the specific structures and their names. This way all the children can easily see where the "bridge" and the "chin rest" of the violin are located. These close-up photos taken with a digital camera are designed to show the exact details needed and are quickly available for display either on the large monitor screen or on the television using an ATI graphics card and cable. The plants lesson is supported by being able to collect photographs at different stages of growth, showing close detail of plant anatomy, and pictures of plants that are not physically available in the environment.

Level Three: Technology represents objects and experiences as an interface with the near environment of the child and family. The basis for early self-concept development and cultural awareness is for the child to perceive aspects of themselves and others. The teacher is able to create virtual trips into the community by building photograph files. A virtual trip (PowerPoint Slide Show) to the grocery store displays the people who work in the store, the written signs that label the objects for sale, and the categories of goods such as fruits, vegetables, meats, and breads. In our agricultural community, corn is the main crop. Digital photography enables us to take photographs of the cornfields at each stage during the growing season and discuss the growth process and the machinery used to plant and harvest the crops. This method makes aspects of our environment available for use in the classroom since we cannot physically go to the fields or grocery store nor bring the farm machinery to the classroom.

Level Four: Technology represents objects and experiences as a supplement to concrete objects and interactive learning. In an activity plan the teacher brought in a chinchilla, the bedding, food, care items, and toy used by the chinchilla. She described the purpose of each object and how it was used. She accessed an Internet site that gave information about where chinchilla's native habitat and what is necessary for their care. On this site were sound files from adult and baby chinchillas. Information from the Internet was presented in a PowerPoint format for ease of showing during the lesson, taking care to credit the contributing sites. The real chinchilla was then introduced to the children. They were able to feel its fur, watch it eat, see it roll in the volcano dust bath, and play inside its ball that rolled all over the room. This lesson gives an example of how the computer and real objects and experiences are interwoven so that the children have the richest sensory and cognitive understanding.

Level Five: Technology represents objects and experiences as a vehicle for documenting interaction and relationships with family and community members. This level is the richest of all and can utilize aspects of the previous levels by using a cumulative and dynamic process of documenting. An example is our "Strings" project. Amanda Jennings, a teacher invited a parent who is a violin teacher to demonstrate the parts, function, and music of the violin. Her child plays a violin, and during the lesson we captured .mpg files of the music and movement. We added still photographs of the group interaction, close-ups of the parts of the instruments, and compiled this into a project presentation that is a permanent part of our library. Our "Strings" project shows the family, children, and an aspect of the cultural setting of our community. While the real experience cannot be repeated often, the digital record is there to view and enjoy often.

The "Olympics" is a project for which teacher Marissa Bushue compiled a PowerPoint presentation for the children which showed Olympic events and the athletes from past games. Being an athlete herself, Marissa displayed her own medals for the children. For three and four year old children, this is the first medal they have likely ever

seen. Marissa also invited an Olympian in the 1985 Munich Games to visit who is a community member. John Craft, who placed fifth in the triple jump demonstrated how his event was conducted; used the tape measurer to show how the length is calculated; showed the children the special shoes used for track and field events; and let each child experiment by doing a 'triple jump'. This was an incredibly rich experience for the children. The time and work that was invested cannot easily be repeated. However, during the entire lesson digital photographs were being taken. The next step was to integrate these photographs with the original PowerPoint Slide Show and create a new one that is a representation of the events that the children experienced. This Olympics projects is a permanent and delightful record for the children to see, enjoy, and learn from again and again.

Conclusion

The challenge in teaching young children is to realize that they have not experienced the simplest things such as seasons, the seashore, travel, and things that adults take for granted. Children are having the "first time in my life" experiences on a daily basis. Their brains are creating neural connections that allow them to conceptualize, remember, associate, and reason based on their experiences and perceptions. Young children are just learning about what it means to go "through", where is "inside", what is an "Olympics", and that you can

pull a bow made with horsehair across tightly drawn strings and make music. The only way the brains of children can learn about the world is through SENSORY EXPERIENCE. Technology has no higher purpose than to facilitate this need for our children.

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