



Nurturing Children’s Love of Learning Through Play and Technology

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Abstract: This paper describes how early childhood teachers can support the development of young children’s love for learning through play and technology. All children need an opportunity to experience and to explore technology at an early age in order to prepare for life in a modern society and to deepen their problem-solving skills. Technology is a big part of young children’s lives, and early childhood educators need to know how to implement play and technology in their programs, yet, overexposure can present a problem. Finding the appropriate balance is critically important. For this reason, suggestions for implementing an appropriate program that blends technology and play are provided along with reviews of educational software and websites that can be beneficial for both children and teachers.

Introduction

Because of the rapid expansion of technology and of its influence in all areas of society, many early childhood educators believe that children and their families need access to high technology in order to succeed in our society (Taylor, 2000; Morrison, 2007). Others, however, are concerned that too much exposure can cause problems for young children. Articles about the harmful effects of technology add to the debate (Cordes & Miller, 2000). Early educators who want the best experiences for young children are faced with conflicting information. This purpose of this article is to support the use of play and technology to nurture the child’s natural curiosity.

The National Association for the Education of Young Children (NAEYC) asserts that today technology is a big part of American life (1996). Technology refers to “the application of tools and information to make products and solve problems” (Morrison, 2007, p. 371). Van Hoorn, Nourot, Scales, and Alward (2007) note its potential benefits for young children’s development as to how the appropriate use of computers as tools can guide play. In order for children to be prepared for life in a modern society, they need an opportunity to experience and to explore technology for the development of their problem-solving skills (Bowman, 1998). However, methods of implementing technology in the classroom for young children need to be carefully considered and implemented wisely. Early childhood teachers need to use technology such as computers as tools to support children’s play (Van Hoorn *et al.*, 2007). Since children play with computers and engage in technology-related activities every day, early



childhood educators should know how to effectively use play and technology in their classrooms (Sluss, 2005).

This paper describes how early childhood teachers can support the development of young children's love for learning through play and technology. This issue will be discussed from the perspective of constructivism which is defined as "the learner constructs knowledge through self-initiated exploration" (Taylor, 2004, p. 20). Constructivism is an effective approach to teach young children, and constructivist teachers offer children authentic tasks and provide them with real materials, equipment, and supplies (Branscombe, Castle, Dorsey, Surbeck, & Taylor, 2003). Likewise, such teachers provide children with the use of technology such as computers as their everyday materials as learning tools. When children actively engage in authentic learning experiences, they can create their own knowledge.

Children's construction of knowledge using play and technology

Though play, children encounter new information every day and use their own existing knowledge to relate to new information and make sense of it. Piaget describes play as subordinating reality to fit their own schemes or assimilating the experiences. Children construct knowledge through equilibration as they move from assimilation to accommodation and back again. They need opportunities to play and then to explore, to observe, to investigate, to predict, to gather information, to create new categories, to describe, and to rethink their thinking. Using technology and play provides a venue for combining assimilation and accommodation. That is, the child moves from fitting material into existing schema (play) to creating new schema for ideas that are new (technology). As the child combines play and technology, they move in and out of play. Also, as they use new technology, they practice what they have learned and this is play.

Teachers should support children's play because it includes "free choice, process orientation, and positive affect" (Johnson, Christie, & Wardle, 2005, p. 216). Children learn in different ways so teachers should consider each child's own unique way of learning and playing. For this reason, constructivist teachers value individualized instruction according to each child's needs (Branscombe et al., 2003). Through the use of technology in relation to play, they can provide each child with individualized instruction (Hertzog & Klein, 2005; Goldberg, 2006). Through play and technology children can expand their own ways of thinking and can develop their abstract thinking skills (Hertzog & Klein, 2005; Nir-Gal & Klein, 2004). Constructivist teachers value play and promote children's thinking skills using play and technology.

How teachers can support the development of children's love for learning through play and developmentally appropriate technology

Because technology is constantly changing in today's society, not only have the goals of education changed, but also the notion of what it means to be educated (Morrison, 2007). Technology literacy is one of the important components for



today's young children's learning and development, and early childhood teachers need to develop their teaching skills in using appropriate technology to benefit children. In support of the use of technology, NAEYC's position statement on technology (1996) asserts that developmentally appropriate educational computer programs offer children opportunities to engage in cooperative play, as well as in learning and in creating products. Further, Blagojevic (2003), Clements and Sarama (2003), Fisher and Gillespie (2003), and Wortham (2006) note that developmentally appropriate computer programs promote young children's cognitive, social, and emotional development. Therefore, teachers need to know how they can promote children's construction of knowledge using developmentally appropriate technology. Some general guidelines include:

1. **View technology as an integral part of the classroom.** It should not be relegated to the back of the room or placed in an isolated cubicle where only one child can sit. The computer should be situated in a place that allows all children easy access. When two or more children can interact with the computer at one time, the opportunities for play increase. Technology should be a seamless part of the classroom and viewed as a tool that can be used as a pencil or piece of paper to stimulate creative thinking.
2. **Ensure that hardware and software are appropriate for the age of the children.** Computers, cameras, and printers should be sturdy and be able to withstand considerable wear and tear in the classroom. Technology that does not work on a consistent basis discourages consistent use. Software should also be appropriate and a list of available software is included at the end of this article.
3. **Involve parents in the activities.** The benefits of parents in the classroom are obvious. They can assist the children in using technology. It is less obvious that parents can be involved from their worksite through technology that allows them to look inside the classroom from their desk.
4. **Use a model aligned with development.** Knowledge of technology and play grows exponentially. Some very young children understand more technology than their grandparents, yet overexposure can limit growth and development in other areas. A suggested guideline for technology usage includes different activities and exposure for children at different ages.

Birth to age three: No exposure. Very young children should not use or be exposed to computers. Adults can use the computer to record their play and create materials that stimulate their development.

Four -year-olds: Interaction with computers is appropriate. Simple activities that stimulate play may be used in moderation. Even placing a cardboard computer in the house area can enhance pretend play and the pretend use of a computer predisposes the child to use computers outside the realm of pretense.

Five- to six-year-olds: Children at this age can use computers for creating books, playing games, and writing stories about



their play. The computer should be a center that is available as needed. From a constructivist perspective, children can use it to enhance problem solving and creating materials to communicate their learning.

Seven to eight-year-olds: Primary age children are ready to use the computer routinely to play math games, create power point presentations, conduct simple research and write stories about their play. Again, the concern is overuse that limits time for other activities.

The use of developmentally appropriate technology and play

Both play and technology usage should be developmentally appropriate. Just as children's play needs to be based on free choice (Johnson *et al.*, 2005), children need to have free choice when engaging in technology related activities (Blagojevic, 2003). When teachers design a curriculum that gives freedom of choice and that meets the diverse needs of learners through the use of technology (Blagojevic, Twomey, & Labas, 2002), they can afford play and technology that meet each child's needs. The National Association of Elementary School Principals and the National Association of State Boards of Education endorse the guidelines for Developmentally Appropriate Practice published by the National Association for the Education of Young Children. One of the basic tenets of developmentally appropriate practice is that children learn best through play (Bredenkamp & Copple, 1997). While it is recognized that children can learn in many ways---even under pressure and stress, research demonstrates that learning which occurs in a play environment is more pleasurable, and as such, it promotes a fondness for those learning experiences.

According to the NAEYC (1996), when choosing developmentally appropriate technology, teachers need to ask if it is age appropriate, individually appropriate, and culturally appropriate. When teachers select open-ended software, children can have opportunities to "incorporate their ideas into the software experience" (Prairie, 2005, p. 164), and to become independent computer users. In order to provide such software, teachers must ask the following questions: 1) does it support a child's own pace and active learning? 2) does it involve possible experimentation and initiative in solving problems? 3) does it provide an opportunity to operate from a picture menu? and 4) does it support independent use of the computer (Shade, 1996)?

This notion of age appropriateness is further illustrated in Shade's observations (1996) that when choosing software for children, teachers must see if it is suitable for children's developmental stages. Four-year-old children might use specific software because of its easy access, while seven-year-olds may enjoy the same program because of their learned skills and of the more complex knowledge and skills provided to them. Nevertheless, some drill-and-practice software might be meaningful to some children who have experiences in working with computers, and they may become more confident with a structured program. Again, teachers need to pay attention to each child's age, developmental stage, and needs (Prairie, 2005).



In accordance with the age appropriate use of technology, teachers also need to pay attention to individual appropriateness of technology when considering how to get them involved in learning activities using technology. Some children may need more time and encouragement, but others may find it easy to participate in activities using technology (Morrison, 2007). To implement individually appropriate technology in the classroom, teachers should provide activities involving technology in relation to their students' learning goals. The use of computers must support the existing educational goals, values, themes, schedules, lesson plans, unit plans, and activities in the classroom (NAEYC, 1996). Teachers can integrate computer-related activities into the daily classroom routine and can observe children's reactions and interactions with computers. By conducting such observations, teachers will be able to select appropriate computer related activities based on each child's needs and preference.

From the perspective of providing developmentally appropriate technology, teachers need to focus on the issue of cultural appropriateness. When teachers promote equitable access to technology, this issue can be addressed. In the field of early childhood education, providing all children and their families with access to technology is a vital issue (Becker, 2000; Morrison, 2007; NAEYC, 1996). Technology-related materials without bias (Morrison, 2007) can support culturally appropriate technology in the classroom. To illustrate, teachers should choose technological materials which include depictions of other people of different abilities, ages, gender, and socioeconomic and cultural backgrounds. Such materials should have multiple language availability, diverse environments, gender equity, and a wide representation of many cultures (Haugland, 1992). This perspective on technology is similar to the NAEYC's position stating that teachers need to pay attention to the important issues of "eliminating stereotyping of any group and eliminating exposure to violence" (1996, p. 14).

In order to carry this notion of cultural appropriateness further, teachers must meet the needs of children with disabilities as well as with limited English proficiency. NAEYC's position (1996) on technology clearly asserts that teachers must ensure that children with special needs have access to technology. To ensure such access, many early childhood professionals implement assistive technology to help children and their families (Morrison, 2007; Mulligan, 2003). Assistive technology refers to any materials or device that can be used to support, improve, and sustain functional abilities of persons with disabilities, according to Public Law 100-407, the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act). Assistive technology includes a variety of products, "from simple devices such as adaptive spoons and switch-adapted battery-operated toys to complex devices such as computerized environmental control systems" (Morrison, 2007, p. 377). To demonstrate, a battery-operated keyboard can be used to play music as well as to enjoy it, and a battery-operated toy such as the Alpha Talker II helps a child "to learn and to use a basic core vocabulary" (Morrison, 2007, p. 385).

Teachers can determine which assistive technology program is appropriate by following the three criteria: a) technology should be able to respond to each child's educational goals, b) technology should have practical use for children, their families, and teachers, and c) technology should have the capability to provide users with desirable outcomes (Holder-Brown & Parette, 1992).



Teachers who implement these guidelines will find it much easier to determine the correct balance of computer usage in their classroom.

As suggested earlier, teachers should provide software with multiple language capabilities (Haugland, 1992; Morrison, 2007). Because early childhood classrooms are constantly becoming diverse, teachers must meet the unique needs of children from multiple language backgrounds (Clements & Sarama, 2003; Morrison, 2007). To meet such needs, teachers can use appropriate software to support the development of language for children with limited English proficiency. In order to find such programs, teachers have to explore, to experience, and to discover the positive power of developmentally appropriate programs. After careful experimentations with such programs, teachers can comfortably integrate particular software in their classrooms.

In summary, early childhood teachers can implement both play and technology to support children's learning and development when they know about developmentally appropriate play and technology for their charges. Teachers also need to be aware of both positive and negative aspects of technology for young children. Just as Morrison (2007) states that "today's children are the dotcom generation" (p.371), their lives are saturated with technology. Thus, in order for them to compete in this global economy, children should have ample opportunities to become technology literate, and teachers need to know how to support children's technology literacy by providing play environments which includes computers, video recorders, television, videotapes, digital cameras, and other types of assistive technology (Morrison, 2007).

Resources to support technology and play

Software for Children.

Reading Success by Smithson-Berry Publications (Available from Smithson-Berry Publications at 1-877-732-3935 or www.smithson-berry.org).

Reading Success is a software program that takes children on a journey through the *Itty Bitty City* while offering them multiple interactive visual and auditory learning experiences. The research-based program focuses on early literacy skills including phonemic awareness, language development, phonics, fluency, comprehension, and vocabulary. Pre-reading skills addressed in the program include: sequencing, categorizing, rhyming, recognition of letters, development of language and vocabulary, and identification of colors and shapes. Reading readiness activities include: categorizing, vocabulary and language development activities, patterning, letter sequencing, capital and lower case letter identification, consonant and vowel identification, blending letter sounds, and sight word identification. Early readers can practice previously learned skills while increasing their sight vocabulary, creating simple sentences, exploring homophones and diphthongs, practicing verb tense, and actually reading early readers. The following are comments made by children and their teachers while playing this game:

- One four-year old commented, "Look! 'Nine' and 'Vine'-they rhyme! I can rhyme!"



- 9 Another preschool child stated, “I wish I could go into the Itty Bitty City. It is fun there!”
- 9 According to a teacher who implements the program in her classroom, “I have had to start using a timer in the classroom since I have started implementing the *Itty Bitty City* program. The children never want to quit!”
- 9 One child’s motivation to continue playing is the “fireworks” that occur when a level of play is successfully completed. He stated, “I can’t quit until I get the fireworks. I want to get fireworks!”

Reader Rabbit Learns to Read with Phonics by The Learning Company
(Available at www.learningcompany.com)

This software program is suitable for children ages three to six. The software uses a dual approach, using both phonics and sight word identification, to encourage reading readiness skills. Activities included in the program support the development of letter sound recognition, blending skills, and patterning ability. The program also aids in the development of vocabulary skills. The *Road to Reading* mission, a component of the software program, features Mat the Mouse. Mat the Mouse is a young mouse who wishes there were no more words in the world during a moment of frustration at her inability to read. The children help Mat the Mouse restore the alphabet to the world, one letter at a time.

Alphabet Express by School Zone Publishing Company (Available at www.schoolzone.com)

After logging on to this program, children can choose to listen to an alphabet song, play early literacy games, or select a letter of the alphabet to learn about via games and coloring pages. Printable handwriting pages are available for each letter of the alphabet. The bright colors and lively music captures the interest of the very youngest learners. The program is recommended for children from ages three to six.

Adobe Photoshop by Adobe (Available from Adobe at 1-800-279-2795 or www.adobe.com)

Adobe Photoshop can be used to create slideshows and class books using digital photos taken in the classroom. Slideshows are a great way to document a school year, or special event, in pictures. Slideshows can be saved to disk and are keepsakes that parents are sure to enjoy. By making class books using *Adobe Photoshop*, teachers can help students retell their own classroom experiences through writing. Children love to take the books home to share with friends and family!

Kid Pix Studio Deluxe by Broderbund (The Learning Company) (Available from The Learning Company at 1-800-825-4420 or www.broder.com)



Kid Pix allows children to create artwork using the computer. The creativity toolbox provides resources so that children can draw, paint, and animate artwork. Their work can also be accompanied by movement and sound. Artwork can be saved, combined to form a slideshow, or sent to friends and family via email. Skills addressed in the program include: colors, shapes, numbers, and letters. Early vocabulary usage is also encouraged.

Kidspiration by Inspiration Software, Inc.
(Available from Inspiration Software, Inc. at 1-800-877-4292 or <http://www.kidspiration.com/productinfo/kidspiration/index.cfm>)

Kidspiration allows children to create graphic organizers using pictures, texts, and spoken language. The program can help children to develop study skills by helping them to create visual representations of important concepts. *Kidspiration* can aid students in the development of the following skills: categorization, communication, and estimation. The program is intended for children in Kindergarten through fifth grade.

Bailey's Book House by Edmark (Available from Edmark at 1-800-362-2890 or www.edmark.com)

Bailey's Book House is recommended for children from the ages of 2-5. When interacting with the software, children select from seven early literacy activities that focus on letter recognition, rhyming, and vocabulary development. Children also can create printable cards for various occasions and "write" stories. The program also encourages the development of basic computer skills.

Sammy's Science House by Edmark (Available from Edmark at 1-800-362-2890 or www.edmark.com)

Sammy's Science House encourages children to think scientifically while learning about the weather, seasons of the year, animal habitats, and other basic concepts. Sequencing, sorting, and classifying skills are addressed. The children love that the program allows them to manipulate various characteristics of the environment to create different animated scenes. For example, children can select different precipitation and wind levels and observe their effects. Creativity is encouraged throughout the program.

Websites for Children.

www.starfall.com

At this site, parents and educators can find activities, handouts, and interactive games that support children's learning at the pre-reading, beginning reading, intermediate reading, and advanced reading levels. Very young children can discover the letters and the sounds that the letters make while exploring the site. Animated pictures that reinforce the sounds made by the particular letters are available for each letter, and short jingles help to teach the sounds. Beginning reading acquisition is encouraged by the interactive books available at this site.



The students can manipulate the pages of the available books while working on the computer, and the computer will “read” the books to the children, highlighting each individual word as it is read. Printable books and skill-building worksheets are available to reinforce the skills learned via the computer. For more advance readers, various genres of interactive books are available including plays, comics, myths, folk tales, and fables. Fictional and non-fictional works are also available.

<http://www.sesameworkshop.org/sesamestreet/>

At this site, children can learn about letters, numbers, shapes, sorting, the weather, and many other topics while playing interactive games and listening to stories. Digital coloring pages are available as well as printable games. A special section of the website is designed just for parents. While visiting, parents can get tips on parenting and educational issues and find suggestions for enjoyable activities to complete with their children.

<http://www.bbc.co.uk/cbeebies/>

An underlying belief of *CBeebies* is that children learn through play. Interactive stories and games are available at this site. Several games and stories have been modified to meet the needs of special needs children.

<http://www.storyplace.org/>

Available in both English and Spanish, this website provides children with an opportunity to explore interactive books. The digital library contains selections for preschool and elementary-aged children. Both online and printable activities are available at this site.

<http://www.bookhive.org/>

The site is designed to offer information on various children’s books to children ages birth through 12, as well as parents and teachers. Book reviews, along with parental notes, can be found for a wide variety of books. Searches may be conducted based on author, illustrator, title, interest area, reading level, or number of pages.

<http://www.literacycenter.net/>

Started with a Small Business Innovation Research (SBIR) contract from the U.S. Department of Education, LiteracyCenter.net offers free resources for parents and educators to aid in the development of early literacy skills. Resources are available in English, Spanish, Dutch, and French. Interactive activities available at this site provide young children with the opportunity to learn about colors, letters, numbers, shapes, phonemes, rhyming, and writing. At the site, additional information on the importance of each skill addressed is available.



Websites for Teachers.

www.internet4classrooms.com

From this site, educators can access a wide variety of educational resources including:

- assessment assistance to aid in test preparation
- practice modules/tutorials to support the development of technological skills needed to use multiple software programs including PowerPoint, Word, Excel, Inspiration, Internet Explorer, Dreamweaver, HyperStudio, Macintosh, Windows/PC, WebQuest, Works, Netscape, and Claris
- links to frequently updated sites containing notable quotes, trivia questions, and other interesting facts
- guidelines for effective searching of the internet
- links to numerous sites that can be used to enhance learning in the classroom. The links are grouped according to subject area, grade level, and topic.

<http://school.aol.com/>

Resources for students, educators, and parents are available at this site. Students can access information including games, lessons, and tutorials to enhance learning in math, science, language arts, social studies, the arts, and other elective subjects. Reference tools such as atlases, almanacs, dictionaries, and encyclopedias are available as well as news sources, educational games, and weather forecasts. For educators, lesson plan builders, flashcard, worksheet, and puzzle makers, clip art resources, and rubric generators are available. Tips for integrating technology into the classroom, creating web sites, online collaborative projects, and internet safety can also be found at this web site.

www.PlayhouseDisney.com/Educators

Educators can search for classroom activities, recipes, puzzles, games, and songs at this web site. When at this site, the educator is able to search for information by selecting specific skills to be addressed, themes to be reflected, and age levels (from 2-5) to be included in the activities. Each search generates age-appropriate activities that can be used in the classroom.

<http://teacher.scholastic.com/>

Subject-related online activities, lesson plans, and teaching tools are available at this site. Teachers can generate flashcards, make rubrics, create a class homepage, and find age-appropriate lesson plans. With Scholastic's Global Classport, educators can connect with classrooms and collaborate with teachers in 182 countries!



<http://netc.org/earlyconnections/>

Developed by the Northwest Educational Technology Consortium, the site provides resources and information for educators on the use of technology in early childhood education. Information on how technology relates to children's development during different stages can be found at this site. Also, information on how to incorporate technology into the classroom and links to additional information can be found.

www.techandyoungchildren.org

The official site of the NAEYC Technology & Young Children Interest Forum, the web site offers information on the best practices for using technology with children, a technology information exchange, research references on the use of technology with young children, resources for funding technology, and tips for using the internet.

<http://school.discovery.com/>

At this site, educators can find lesson plans, create puzzles, download free clip art, and create custom quizzes and worksheets. By signing up for an online account, teachers are able to store their online creations for future use. An entire section of this site focuses on Science Fairs, offering project ideas and multiple links where further information can be found. *Brain Booster* word puzzles that require higher order thinking skills are also available for educators to use in their classrooms.

<http://educationworld.com/>

Educators can find a plethora of information organized according to the following topics: lesson planning, professional development, technology integration, school issues, and Education World at home. Tips for the classroom, management tools, and printable ideas and activities can be found here. Links to other professional resources are also available at this site.

<http://www.alphabet-soup.net/>

At the site, educators can find thematic units, games, activities, recipes, and lots of free printables. Alphabet coloring pages, thematic writing paper, bulletin board borders, and printable books are among the resources available to educators. The site is well-organized and updated frequently.

<http://www.teachersandfamilies.com/index.html>

From the site, teachers and families can access preschool theme-based activities, projects and printable practice pages. Links to valuable study resources relating to subject and grade level can be found for students in grades



K-12. Articles on current issues and links to further information are available for parents.

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Children learn through play Toys are fun, but toys are also tools that help children learn about themselves and the world around them. Play is critical to the healthy growth and development of children. As children play, they learn to solve problems, to get along with others and to develop the fine and gross motor skills needed to grow and learn. Hospital staff often use play as a means of providing therapy to children. Play helps a child do the following: • Develop physical skills. Gross motor skills are developed as a child learns to reach, grasp, crawl, run, climb and balance. Fine motor sk