Computers in a Developmentally Appropriate Curriculum

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another child to have a turn with the computer. Not only was he not in agreement with this directive, he decided to leave school and never return. Without warning he ran from the classroom into the hallway and was on his way outside when intercepted. Where was the enhanced cooperation we had read about in the literature (Haugland & Wright 1997)?

**Overcoming our fears**

Integration, assessment, and individualization of curriculum using discovery centers, project and small-group work with lots of choices to facilitate high engagement, and opportunities for scaffolding of skill development are the heart of our family studies preschool program. As a teaching institution, we are always refining, assessing, and reaching for the next level of application of the developmentally appropriate guidelines.

Rich in the tradition of a play-centered approach to discovery, our program approached the idea of trying to blend the new technology of computers with the more conventional centers with mixed reactions. The cautionary voice of David Elkind (1996), coupled with the warning of "significant losses in creativity" reported by Haugland (1992, 15) when children are exposed to nondevelopmental software, spoke loudest to some staff. A wider review of the research, however, uncovered claims that "even preschoolers can work cooperatively with minimal instruction and supervision if they initially have adult support" (Clements 1987, 34) and "children exposed to developmental software had significant gains in intelligence, nonverbal skills, structural knowledge, long-term memory, and complex manual dexterity" (Haugland 1992, 15).

Shade and Watson (1990) calmed our fears that adding computers might overshadow our traditional learning centers, noting that the initial novelty of computer introduction dissipates within two weeks. Assured by Lipinski and his colleagues (1986) that the computer can be interesting without being engrossing and by Haugland's (1992) experiment in supplementing computer programs with other activities, we decided to make our own attempt at fitting this new technology into NAEYC's developmentally appropriate practice guidelines.

**Changing our approach**

Our initial approach in introducing the computers had been one of open exploration. We loaded a different software program on each of two computers sitting side-by-side on a table with four chairs located directly in front of them. A student teacher sat nearby, available to answer questions and give instructions as needed.

We had wanted the children to apply what they already knew about computers and problem solve as a small group to figure out how to control the action in the software. Of course we used teacher preparation time to allow the teacher assigned to the center to do some advance exploration. No time limits or other restrictions were dictated. Software was selected from the list provided by Haugland and Wright (1997).

At this point the most appropriate way to resolve the resulting turn-taking conflict might have been to involve the children in creating a rule governing when each child's turn was over and allowing for maximum opportunity for all children to have computer time. But we panicked and created our own rule: "Each child may sit at the computer for a maximum of 20 minutes before making another learning choice. A child may control the mouse for 10 minutes and then watch for 10 minutes." Like magic, this rule almost completely and immediately cured the problem.

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Only one point of disputation continued to arise: “Have I really got to be here a full 10 minutes?”

Again without consulting the children, we added to the center an egg timer to be wound to 10 each time the mouse changed hands. As the timer chimed, the child controlling the mouse finished the task she was working on and shifted to the role of collaborator with very little (and often no) direction from a teacher. For ease and convenience, both computers were timed alike whether the children using them began exactly at the same moment or not. This schedule allowed the children to be almost completely independent as they worked at the computers. When a teacher was unavailable to monitor the computer center, each time the timer chimed she could simply come to reset it and let the children mentor one another.

The next dilemma that surfaced was deciding whose turn came at which ding of the egg timer. A territorial rights posturing was happening as other children congegated behind the seated children to defend their claim to the next turn at the computers. They were participating as onlookers for long periods of time, while a rich smorgasbord of other activities lay untasted.

Arbitrarily we decided to use a sign-up list for the children to write their names on as they began their day if they wanted a turn with the computers during discovery time. This proved to be a wonderful idea for many reasons. It provided an important reason for many children who were less literate to practice writing their names. Over the course of the semester, we documented (via the computer sign-up sheets) significant improvement in several children’s abilities to write their names.

The sign-up list also taught the children ordering as they looked to see how many names were between their own and the two children controlling the computers. A child needed to find the last name written on the list to add his just below. As a result children began recognizing the written names of classmates from repeated exposure and association. The process gave the children a sense of security and fairness as they came to know that they could relax and enjoy the other learning centers in the room without missing their opportunity on the computer.

Sometimes children declined their turn on the computer because they were engaged elsewhere and not interested in being interrupted. We always gave a child a second opportunity to return to the computers on the next rotation in the event she was ready then to make a transition. This also allowed the teacher monitoring the center to adjust the maximum computer time for each child to ensure that all children who wished to work at the computer on a given day had that opportunity.

**Maintaining equitable use**

Our concern was for equity of use of the computers across gender, ethnicity, and ability. With a daily list of the children choosing to work with the computers, we could see that several children were not signing up. As we looked for reasons, we came up with a couple of theories that matched most of the cases: no previous experience with computers and preoccupation with social interactions.

We established a routine of taking children past the computers as they finished their program check-in to give them a brief description of the activities available in each of the centers, and they were invited to sign their name to the computer waiting list. Some of them signed and some of them decided to move on to one of the other centers. Two children in particular chose to take turns at the computer.

Creig, a child with autism, was mainstreamed in our program for socialization. Creig had no previous experience with a computer and in his first attempts made no connection between the movement of the mouse and what appeared on the screen. However, he was able to control the letter machine in the software program.
Bailey's Book House by striking the keyboard in response to the questions. On the basic level he would type a key, and the screen would say the letter, display it, and play a short, animated video-clip alliteration of words beginning with that letter. On the more advanced level, a giraffe asks for a specific letter and Creig had to type that letter on the keyboard to see the animation.

After two or three times working with this game, Creig became so proficient that he could find the key on the keyboard and strike it before the child controlling the mouse could position the mouse over the letter on the monitor keyboard and click. Creig didn't make the connection, however, that his computer partner didn't think this was cool, even though he repeatedly pushed his hands off the keyboard when his response beat hers.

Within six weeks Creig could match the letters on the screen with those on the keyboard, control the mouse, and successfully select the rhyming words. He willingly took suggestions from the other children who sat beside him, made choices of activities independently, and relinquished control of the mouse at the ding of the bell.

Our most exciting experience came after Creig's very first experience with the computer. He finished and stood up just as Michael was searching for someone to play Star Wars with him. Michael saw Creig standing there, unengaged, and asked him if he wanted to play. Not only did Creig agree (his usual response had been "no"), but he assumed his own Star Wars role, interacting appropriately with the role Michael chose.

This exchange was our first observation of dramatic role play between Creig and another child. Creig had been interacting with his partner while working at the computer, and that social engagement shifted to full interactional role play as soon as he finished. Because the cooperative computer interaction and the ensuing role play followed each other so close in time, to us there seemed a direct connection.

Rachel approached the computers timidly, as she did everything that was new to her. In her first attempts to make silly sentences in Bailey's Book House, she asked the teacher to help her move the mouse because she had no idea how to control it. The teacher placed her hand over Rachel's hand on the mouse, and they moved it together. This direct instruction helped Rachel become more competent and confident.

Rachel was learning to recognize all of the letters in her name so that she could write it correctly. Given a choice of a literacy program or a math game, she most frequently chose the literacy program. Initially she relied on the computer to show her the alphabet letters to find on the displayed keyboard, although she could name most of the letters.

After about a month of exposure to the literacy activities, Rachel's accuracy became almost perfect, and she began using the paint program to draw letters for her teacher to guess. She skillfully drew them correctly, using a mouse as well as the appropriate labels. In fact, she began to identify (read) the other children's names, using the beginning letters of each.

Mastery of a skill that initially challenged her was a big confidence builder for Rachel. She tried it; she persisted; she succeeded. The bonus gains in literacy as well as math skills highlight the potential value of computers as one component of an integrated, child-centered curriculum.

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**Our conclusions about computer uses**

Did the children really learn to cooperate? You bet! This was one of our major goals for the children across the curriculum. We had a group of very independent, egocentric children, many of whom were accustomed to being the center of their family's attention. Initially they each wanted to dominate the attention of a teacher rather than interact with their peers. But there simply were not enough of us to go around. More important, their task was to learn cooperation and problem solving with their peers.
My afternoon preschool had three teachers with 19 children. Not only were the children able to sign the waiting list by themselves, but also they helped one another with questions that arose. They willingly shifted control of the mouse at the ding of the timer and found the next child on the waiting list.

**Outcomes and benefits**

Integrating computers into our early childhood classroom has enriched our project-based, hands-on curriculum. Computers came to support the rest of the curriculum as we included them as one of our options in seeking to facilitate a child’s acquisition of skills, knowledge, and dispositions to a higher level. We watched the children increase their levels of cooperation and independence, which allowed the inclusion of computers as a discovery center with minimal adult supervision.

Most of our children already had experience using computers or had computers available for their use in their homes. By including computers as an integral part of our curriculum, we hope to foster in young children a positive disposition to control and master this vital technology.

**References**


**Resources**


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**Emergent Literacy Staff Development**

8 videotapes, 2 training videos, printed materials

**Module 1**: Building a Firm Foundation For Early Literacy Development

**Module 2**: From Scribbling to “Real” Writing

**Module 3**: Developing a Literacy-Rich Environment

**Module 4**: Making Quality Children’s Literature Available to Every Child

**Module 5**: The Shared Language Time

**Module 6**: Ongoing Assessment of Emergent Literacy Behaviors

**Module 7**: Science, Math and Literacy: A Winning Combination for Young Children

**Module 8**: Science, Math and Literacy: A Way of Life for Young Children

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