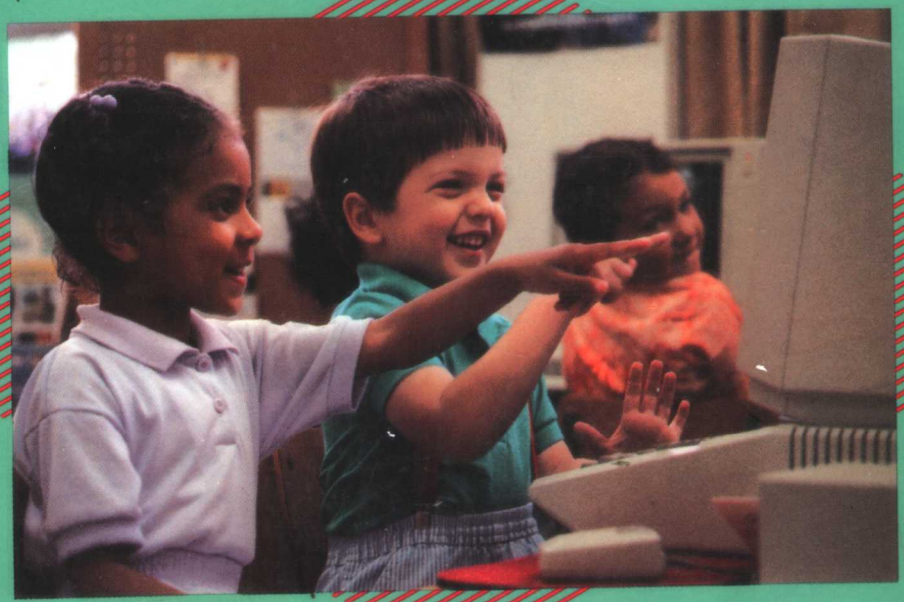
Jane Ilene Davidson

Children & Computers Together in the Early Childhood Classroom



Children and Computers Together in the Early Childhood Classroom

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Preface

Five years ago, my colleague Cindy Paris got excited about integrating computers into her classroom. I listened to her excitement but could not join in. My only experience with computers had been as a graduate student, tussling with a computer system that (a) rarely seemed to do what I wanted, and (b) continually balked at my many errors and lack of technical skill. The experience was less then joyful. I left with the data analyzed and a vow to avoid the computer in the future.

Besides being scared of computers myself, I was concerned that the computer might decrease social interaction, discourage language, provide closed-ended, computer-structured activities that would not allow children to explore, and demand large quantities of my time, forcing me to neglect other important teacher roles. I could not see what it would add to my classroom. However, after watching the children in Cindy's class and in CAPP (Computers As Partners Project) summer camp use the computer, I was converted. The children gathered around the computer sharing ideas, making suggestions, solving problems, exploring and discovering what they could make the machine do. The children quickly learned to use the computer independently and often taught their peers and teachers new ways to use software.

As I began to use the computer in my own classroom, I discovered how simple it was to use and how many possibilities it offered to children. I have grown to see the computer as an excellent addition to the preschool and kindergarten classrooms. However, I have not become a fanatic, like some of the early converts to computer use. Computers are not magical. They do not teach academic skills earlier or better, nor should they. They are one of many media that can make an early childhood classroom a rich learning environment that encourages the development of each individual child.

I wanted to share my excitement and knowledge of computers with other teachers. This book is for the teachers who are afraid of the computer, for those who want to use computers in their classrooms but do not know how to start, and

for those who are already using computers but want to expand their use and knowledge of computers.

For the beginning computer user, this book is full of easy-to- follow practical information about computers. There are clear directions for setting up computers in the classroom (Chapter 2); guidelines for selecting software that best fits a particular class (Chapter 3); suggestions for ways to support computer use in the classroom (Chapters 4–10); methods for using the computer to support the rest of the curriculum (Chapter 11); and illustration and discussion of countless teaching strategies throughout the book.

The "Input for Teacher" boxes in each chapter highlight teaching techniques and resources. A glossary has been incorporated into the body of the text, which defines words as they are used, to assure that the reader clearly understands what is being said.

The book is also highlighted by the more than 70 off-computer activities to support computer use. The activities are imaginative, simple to follow, and provide many suggestions for adaptation and expansion to fit each unique group of children.

The best way to learn about children's computer use is to watch children using computers. Because I cannot enclose children in the book, I have done the next best thing. I have filled the book with photographs and numerous anecdotes of children's interactions with computers.

If the computer was merely a machine to teach about and to learn to use, separate from the rest of the learning and curriculum in the early childhood classroom, I would question the value of its use. But the computer is not merely a separate entity that children can learn about and can learn to use, divorced from the rest of the curriculum. The computer can be used to support wide range of learning and development in the early childhood curriculum.

Acknowledgments

This book flows out of the hard work and ideas of many people. I may be the one who wrote the ideas down for others to read, but without those who developed and sustained CAPP, the Computers as Partners Project at the University of Delaware, I would have had nothing to write about. In 1983, Cindy Paris, Sandy Morris, Dene Klinzing, and Alice Eyman obtained a grant from the Office of Computer Based Instruction at the University of Delaware to supply computer equipment for a summer computer camp for 4- and 5-year-olds. The aim of the grant was to evaluate whether computers could be integrated successfully into a developmental preschool curriculum. The project continued growing to include the development of college courses on using computers with young children, a variety of research projects, the expansion of the camp to include children 4 to 8 years old and the integration of computers into the 4- and 5-year-old classrooms at the University of Delaware Preschool. Leon Campbell, the provost of the University of Delaware, was extremely supportive of CAPP. His support was instrumental in its growth.

Thanks to all those mentioned, as well as Nancy Edwards, Daniel Shade, JoAnn Springsteen, and Debbie Brady, who continue to expand and develop techniques for using computers with young children. The practicum students from the course, "Computers in Early Childhood," played an integral part in the development of activities and methods for using computers with young children. Their contributions are greatly appreciated.

Another large group of people who must also be recognized for making a major contribution to this book are the children in CAPP and the preschool who showed us how to make computers best fit their needs. Many exciting ideas came from children's suggestions and their discoveries on the computer. If you really want to learn the best way to teach and guide young children, the children themselves are the ideal teachers.

This book, like most books, has grown and changed during the writing and rewriting process. Many people were instrumental in the revision process. My

reviewers offered pertinent suggestions on the first draft, which helped to clarify what needed to be added, expanded, or clarified in the final version:

Faith Coddington, Education Specialist, Head Start Program, Montgomery County, Maryland

Sue Haugland, Director, Center for Child Studies, Southeastern Missouri State University

Marlene Bumgarner Eltgroth, Coordinator Early Childhood Education, Gavilan College

Joan P. Isenberg, George Mason University

Mary Ellen Abell, John A. Logan College

Betty Larson and Candace Spence, San Antonio College

Jay Whitney, my editor at Delmar, always shared the excitement with me as the book grew and took shape. Jim Hadlock, senior programmer/analyst at the University of Delaware, provided invaluable technical assistance, both as I was learning about computers and as I was writing about them. Daniel Shade kindly offered to use the rough draft of my book in the Computers and Young Children course, offering me valuable insight into the impact of the book on students.

I wish to acknowledge and offer miles of thanks to two colleagues who have supported and assisted me while writing this book. Marion Hyson read and commented on each chapter. She offered praise, suggestions, corrections, and questions that helped me to clarify and improve what I was trying to say. Alice Eyman, the director at the University of Delaware Laboratory Preschool, supported my work in the Lab School as a teacher and supervisor and enabled me to take on the additional work of writing.

Last, but most important, I must thank my family. My husband, Jeff, taught me how to use the word processor; willingly listened, or at least pretended to listen, to the many times I read parts to him; took on extra household and family chores when I had deadlines; and got excited with me over new thoughts, and completed chapters. My children, Lily and Michael, were tolerant of my preoccupation, and overly busy schedule. They kindly offered many suggestions, although many, like Michael's insistence that I should finish the book with "THE END," were appreciated more for their intent, than for their content.

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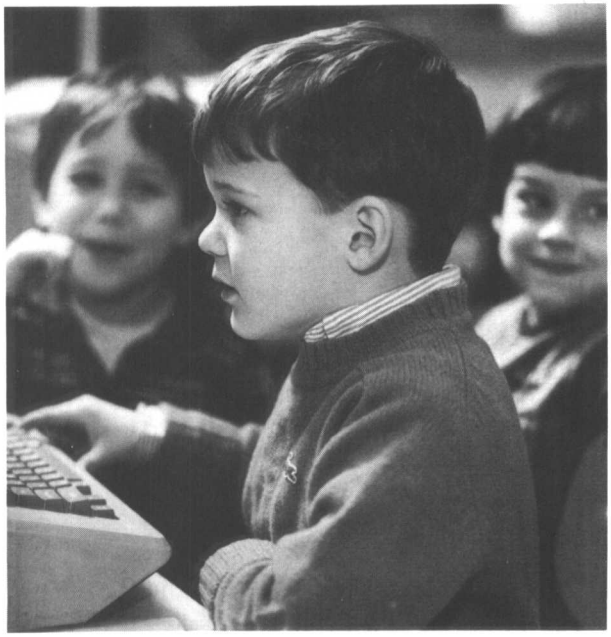
Why Use Computers with Young Children?



Computers can be a captivating social activity. (Photo courtesy of Robert Cohen)

Should computers be used in early childhood education? This issue has been hotly debated since the introduction of computers into classrooms. As with any new educational innovation, there are those who say that this is the new wonder machine that will revolutionize education, as well as those who predict dire results if the demon machine is let into the classroom. The following two quotes show the differences between those who view the computer as a "messiah" and those who see it as a "monster" (Mathews, 1980).

> The computer, if it is allowed to infiltrate the very heart of education . . . will destroy education . . . we will be transformed into a culture of psychopaths (Sardello, 1984, p. 631).

> It is in the elementary grades, perhaps even among preschoolers, that microcomputers may ultimately challenge and radically alter traditional instruction modes (Martin, 1981, p. 41).

Until recently, there has been little research on computer use with young children. A number of articles have reviewed the existing research and theoretical statements and set suggested research agendas for the future (Barnes & Hill, 1983; Clements, 1985b; Goodwin, Goodwin, & Garel, 1986). As Goodwin et al. point out, there are numerous "pronouncements and speculations" about the value of, or problem with, using computers with young children. Although I certainly do not want to denigrate research, the value of most materials used in the preschool has NOT been verified through research. For example, *The Block Book* (Hirsch, 1984), one of the best books on block use, cites no research. It discusses the many uses and virtues of unit blocks, describes children using blocks, and, based on observations and child development knowledge, suggests that children can benefit from such use.

No one would advocate disposing of unit blocks until we have proof of their value. In the same sense,

the lack of research proving the value of computers should not cause them to be banned from the classroom. Classroom use should continue as long as teachers see evidence that computers add to the learning environment of the classroom. If subsequent research shows that computers (or, for that matter, blocks, sand play, or other materials used in the classroom) are harmful to children, these materials should certainly be removed.

At this point, it is wise to take a cautious stand. Teachers should observe how computers are used. Are there problems? Can their use be modified to alleviate these problems?

This chapter presents the values and possible concerns of using computers with young children, followed by a discussion of the roles and characteristics of the computer itself. Some of the claims for the computer's potential, both good and bad, may be unsubstantiated. But it is important for teachers who are considering the classroom use of computers to be knowledgeable about this debate and aware of which positions have been verified and which are still hypothetical.

INPUT FOR TEACHERS:

WHAT DOES IT MEAN?

Is ***software*** a new term for you? If so, read the definition in the "**Meaning?**" box. Whenever new terms are used they appear in bold italic type. The definition follows either in the text or in a "**Meaning?**" box. If you come to a word that was defined earlier, and you cannot remember what it means, check the index to find the page on which it is defined.

SOME SAY THAT COMPUTER USE HAS MANY VALUES

According to advocates, computers in the classroom have many potential values.

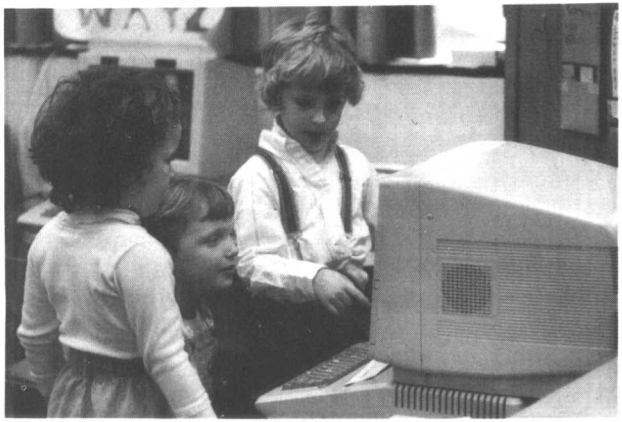
Computer Use Increases Social Interaction and Cooperation

Early critics suggested that computers would decrease social interaction among children, but the research has not shown the predicted negative effect on social interaction. In fact, many studies indicate that the computer encourages social interaction (Borgh & Dickson, 1986; Lipinski, Nida, Shade, & Watson et al., 1986; Swigger & Swigger, 1984). Other studies have shown that computers encourage social interaction of 4-year-olds (Muller & Perlmutter, 1985) and older children (Hawkins, Sheingold, Gearhart, & Berger, 1982) involved in problem-solving situations. Social interaction is not limited to problem-solving situations. Wright and Samaras (1986) describe many instances of children working jointly on the computer creating a make-believe reality. If given appropriate ***software,*** children often work together on computers.

Meaning? SOFTWARE

Software is a set of instructions used to direct a computer to perform some activity. The software children use is usually stored on a disk. The type of software loaded into the computer determines what the computer will do.

Many other studies have shown that computers do not affect the social interactions in the classroom either positively or negatively. Children's social interactions on the computer are similar to those seen elsewhere in the classroom (Hoover & Austin, 1986; Lipinski et al., 1986; Shade, Nida, Lipinski, & Watson, 1986). While using computers, children often work together to discover how to make the computer do what they intend. Observational studies reported



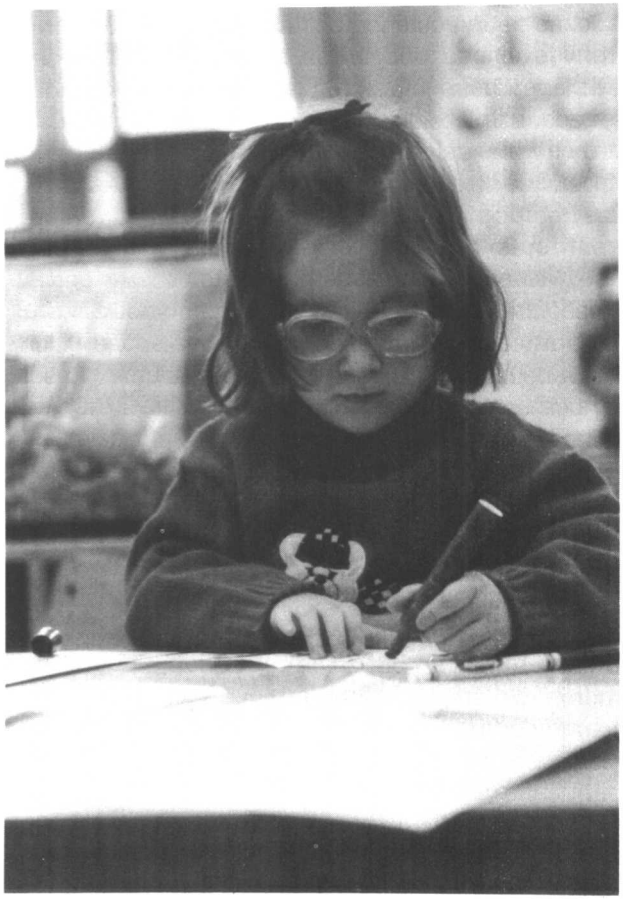
Cooperative computer ventures are common.

that the computer is often a group activity with two or more children clustered around a single ***monitor*** (Campbell & Schwartz, 1986; Church & Wright; 1986; Shade et al., 1986). In one study in which children were initially encouraged to use the computers singly, the children's need to use them together was so strong that the researchers adjusted their rules (Swigger & Swigger, 1984). Peer teaching is often evident as children share their discoveries or past experiences with each other (Paris & Morris, 1984; Shade et al., 1986).

Meaning? MONITOR

A **monitor** is the visual display for the computer, usually a picture tube like that used on a television.

It is true that children do sometimes play alone at the computer, but it is also not uncommon to see a child sitting alone looking at a book, engrossed in a puzzle, drawing intently, or constructing a block building. Many activities can be done either independently or socially.



Children are often constructively involved in solitary activities such as drawing.

Computer Use Bolsters the Child's Self-concept

If the right ***programs*** are selected, each child can be in control of the computer. The child becomes someone who is independent and powerful (Burg, 1984; Ziajka, 1983). According to Wright and Samaras (1986), "The child's self-concept as a craftsman becomes more positive as he or she masters the machine" (p. 77). Being successful at, and in control of, an adult kind of activity, such as computer use, can lead to increased feelings of self-confidence and self-worth (Beaty & Tucker, 1987). There has been a great deal of research to show that young

children can use the computer independently (Shade et al., 1986; Paris & Morris, 1985; Borg & Dickson, 1986). Weiner and Elkind (1972) suggest that at the preschool age, children "begin to recognize the difference between past and present skills" (p. 258). They see new behavior as compared to old behaviors and are therefore able to recognize their own achievements, "achievements that can have a lasting influence on an individual's sense of personal competence" (p. 259). Although there has been no experimentally designed research assessing a child's self-concept before and after computer use, many of the observational studies do demonstrate the child's pleasure with independent use (Hyson & Morris, 1985; Shade et al., 1986; Wright & Samaras, 1986).

Meaning? PROGRAM

Program has two different but related meanings: (1) A program is a series of commands or instructions to the computer. Some programs are short; others require a whole disk to store all of the commands. (2) The word ***program*** is often used to refer to a piece of software.

Computers Increase Thinking, Reasoning, and Problem-Solving Skills

Papert (1980) states that the use of computers allows users to develop intimate contact with their own thinking. Many have claimed that using the computer, especially being involved with the computer language, **Logo,**[1] does increase children's thinking skills. Research to date has been contradictory in regard to **Logo's** effectiveness with young children. Pea (1983), in a study of younger elementary school children using **Logo,** found that the children did not gain in either specific or generalizable knowledge. Papert (1986) refutes Pea's work, claiming both that the way in which **Logo** was used was unclear and that the posttest did not accurately test whether the children's cognitive skills had increased because it tested the wrong attributes. Clements and Gullo (1984) found that 6-year-olds using **Logo** had increased skills in the following areas: fluency, originality, general divergent thinking, reflectiveness, metacognition, and the ability to give accurate directions. Studies of older children using **Logo** have been more uniformly positive.

Although **Logo** may not increase children's problem-solving skills, this does not preclude computers from facilitating thinking skills. In observing children using computers, it is clear that they are engaged in productive thinking. For example, 4-year-olds enjoy typing random series of letters on **Bank Street Writer** (a ***word processing*** program).[2] Initially, They type lines of gibberish, as children do when first exploring a typewriter. When the last line on the monitor is filled, the text moves up, making space for new text. To the children, it looks like the typing has vanished. They are amazed with this new prop-

INPUT FOR TEACHERS:

WHAT IS SOFTWARE?

In discussing how children use computers, this book mentions many different pieces of software. At times, the software is described in the text; at other times, it is not. If readers are unacquainted with a named piece of software, they should refer to the software appendix at the end of the book.

[1]**Logo** is a programming language developed by Seymour Papert. The commands needed to create graphic designs and to write programs for recreating pieces of the design can be simplified to a single character making it easier for children to use.

[2]The use of **Bank Street Writer** described here was observed in the four-year-old lab school class in 1987.

erty of the program and type faster to see if they can make it happen again. Some children may then discover that the ***left arrow*** [←] erases what has been typed. When the erasing has emptied the screen, the text written earlier moves down, filling the screen again. Children exclaim over each new discovery, bringing other children to watch and comment.

Meaning? WORD PROCESSING

Word processing involves using the computer to record and print words in a manner similar to a typewriter. Word processing programs allow the writer to enter, edit, store, and print text.

These children are involved in problem solving, though perhaps at a different level than children using **Logo**. They are exploring the reactions of the computer to their actions. They then repeat actions to see if they can reproduce the previous results. Children also put together actions in new ways to speed the desired result. One child was eager to have the text move up and found that typing only a few characters then pressing the [***Return***] ***key*** would make the cursor reach the bottom of the page faster, and in consequence make the page move up more quickly. Numerous such examples of children exploring and manipulating the actions of the computer can be found when watching children interact with open-ended software.

Meaning? RETURN

The [**Return**] key on the computer is used in many programs to tell the computer that you have finished your entry or made a choice. On the IBM and some other computers, the [**Enter**] key fulfills these functions.

Meaning? KEY

A **key** is a button on the computer keyboard, with symbols, letters, numbers, or words, which you push to give the computer instructions.

Computers Help Children Construct and Revise Concepts

According to Piaget (Forman & Kuschner, 1983; Kamii & DeVries, 1978), children learn by constructing their own knowledge. They learn physical knowledge about objects by manipulating objects. Piaget also discusses another form of knowledge: logico-mathematical knowledge. Despite its name, this knowledge is not limited to mathematical knowledge. Children construct logico-mathematical knowledge by putting past experiences, knowledge, and concepts into relationships. A child builds a concept of gravity, although in a rudimentary form, by dropping many objects and seeing the results. The child concludes that objects fall when dropped. In the same way, children using **Bank Street Writer** are creating concepts about the functioning of the computer. When they get to the bottom of the screen, some of the letters will disappear. The child who tried pressing the [**Return**] **key** to get the text to move up faster may have been taking a concept developed while using the typewriter and seeing whether it would apply to the computer as well.

According to the National Association for the Education of Young Children (NAEYC) criteria for developmentally appropriate practice, "Learning is a complex process that results from the interaction of children's own thinking and their experiences in the external world" (NAEYC [Bredekamp, Ed.], 1986, p. 47). Children learn while playing with sand, water, blocks, paint, and dolls. While playing, they are constructing new concepts and revising old ones. The