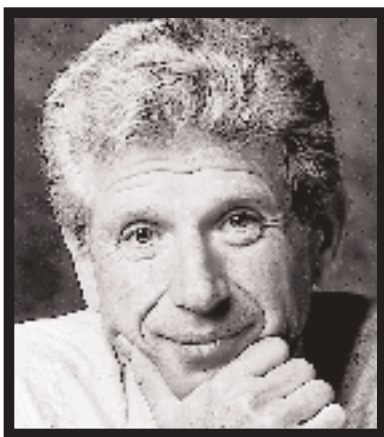


Computers for Infants and Young Children

by David Elkind



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The fastest growing crop of educational software is so called *lapware* for infants and toddlers from six months to two years. As the term lapware implies, this software is targeted to an infant who is seated upon her parent’s lap. While a limited exposure of children three years and older to computers can be justified, a comparable case cannot be made for infants and toddlers. The parent’s lap notwithstanding, the use of computers with the very young carries many more risks than it does benefits. In this article I will present a cost/benefit analysis of computer use for the two age groups — infancy and toddlerhood (ages 0-2) and the preschool years (ages 3-5).

At the outset, I want to make clear that I am not opposed to technology or to computers. Technology and computers are simply tools that can be used for good or ill. It is the misuse of technology in general, and of computers in particular, that can do harm to children.

■ Infancy and Toddlerhood

The following is the sales pitch for a lapware program called *Colors* designed for infants and young children.

“Does your child know his primary colors? *Colors* sounds and graphics will capture the young one’s attention and before they know it they are learning. *Colors* is designed as *infantware*. *Colors* will aid your toddler in learning his or her primary colors. It also helps them associate letters and the written word with the spoken word.” “Echo Kids” (Infant Software, The Net)

Let us examine this claim that *Colors* will teach infants and toddlers the primary colors and help them associate the printed letters and words with the spoken one. First of all, it is well established that infants can identify colors during the first few months of life without the aid of any computer program. By about two months, babies can tell red from green; and by four months, they can respond selectively to red, green, blue, and yellow. Like adults, they also prefer red and blue to the other colors (Bornstein, 1976; Teller and Bornstein, 1987). Clearly, the writers of *Colors* do not know anything about infant visual development or they would not have designed a program to help infants learn something they already know.

The program also purports to teach infants and young children to associate printed letters and words with the spoken word. Here again, this assertion is totally at variance with the abundant research regarding the attainment of literacy. First of all, the infant’s visual system is relatively undeveloped. It is only after about two years that toddlers have the visual acuity to discriminate between different letters, and the ability to identify words comes even later. It is only during the third year that some children learn to associate these discriminations with letter and word names. Secondly, children do not begin to associate letters with the (abstract) sounds that they represent until at least age four or five. Finally, the first words children learn are not color words but rather function words that are tied to concrete actions, such as “stop” and “go.” The understanding that letters and printed words are symbols for sounds and spoken words is an extraordinarily complex achievement that most children do not acquire until ages five or six (e.g., Baron, 1992).

The above critique reveals the major problem with so-called lapware and indeed with much of the software for infants and young children. Basically, those writing the software do not know child development and make no effort to learn even the basics of what research has to tell us about what children learn and when. As a result, they make the two errors that were illustrated above; namely, they either instruct the child in something she already knows, or they attempt to teach the child skills that are far beyond the child’s developmental reach. For these reasons, such programs are a waste of both time and money.

These programs are, however, more than just wasteful; they are potentially harmful. An infant’s visual system is not fully developed until about the second year. We don’t know what the effect of watching a computer screen may be on the visual system which is not adapted to that type of stimulation or overstimulation. In addition, encouraging the child to concentrate on visual stimuli could lead him to neglect information coming from the other senses. Yet this is an age when children should be developing all of their senses to aid in sensory integration. Auditory discrimination, for example, must be integrated with visual discriminations for children to move successfully into reading. A too early concentration on the visual could impair the development of the other senses and the whole process of sensory integration.

An even more serious side effect of such programming is their potentially harmful impact upon the parent-child relationship. One of the characteristics of such programs is that they suggest to the parent that there are *right* and *wrong* responses the infant or toddler can make to the screen. Without even being fully aware of it, parents may emotionally reward the baby when he makes a *right* response and emotionally withdraw when he makes a *wrong* response. Parents may even get frustrated and angry at the infant’s *wrong* responses. This puts the young child in an unnecessarily stressful situation in which behavior that is meaningless to him gets randomly rewarded or punished. Lapware thus has the potential for impairing the child’s sense of trust and security that are essential for the infant to explore his world with pleasure and confidence.

There are many good reasons, then, for not exposing infants and toddlers to lapware. The people who design the programs don’t know infants and young children and try to teach them either what they already know or what is far beyond their intellectual reach. In addition, getting a young child to focus her undeveloped visual system on a computer screen might do damage to that system and also inhibit the development of the other senses and their integration. Finally, by putting parents in a *right/wrong* mind set, such lapware may impair an infant’s healthy attachment to, and trust in, parents. The resulting insecurity could have a negative affect upon healthy development.

■ Early Childhood

By the age of three, most children are well along in both their sensory motor development and integration, and in their language development. At this age, some

exposure to the computer and carefully selected computer programs is much less risky than it is at the earlier age levels. But even for this age group, some of the basic errors of the lapware developers are again in evidence. For example, those who advocate software for toddlers argue that it teaches them that they have control over their own learning. Yet infants who discover that a rattle makes a sound when it is shaken do not need a computer program to tell them that they have control over their own learning.

Other reasons for exposing young children to computer programs were expressed by teachers and parents participating in a study of how children under four respond to computer programs carried out by Bishop (1998). The parents and teachers looked at eight titles designed for children four years and under. The testers were generally pleased with what they found. The reasons given for introducing computers to children at a young age were predictable. "Teaching young children computer skills gives them a head start for the skills they will be learning at school." Or, computer programs "allow children to make choices and encourage them to become confident self-motivated learners."

Yet many computer skills are learned more quickly, and more effectively, at a later age than at an early one. An eight year old will pick up keyboard and mouse skills more quickly than an infant and be less likely to develop bad habits and misunderstandings. Likewise, there is no evidence that computers give infants an academic head start. On the other hand, there is abundant evidence that children can learn to make choices and to become self-motivated, confident learners without computers.

Bishop also argues that in addition to the above benefits, computer programs introduce children to the ABCs, to 1,2,3s, to color recognition, and other basic skills. Yet we know from more than 20 years of

Sesame Street that although television helps children learn their numbers and letters earlier than ever before, this does not translate into better reading and math skills. That fact is clearly evidenced by our falling reading and math scores and by our low standing on international comparisons of academic achievement. If television has not been successful in teaching young children higher order reading and math skills, why should computer programs?

Computers for young children are, then, far from an unmixed blessing. While some exposure of children over three to well designed and age appropriate program may do no harm, it is unlikely that such exposure will have important benefits. There is no evidence that this experience gives children an edge in computer literacy, self-confidence, or self-esteem. In this regard, it is well to remember that Bill Gates did not have a computer as an infant and young child, nor did the majority of those individuals designing the hardware and writing the software for computers. All of the purported benefits of exposing infants and young children to computers can easily be acquired through other means and with less risk.

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