Technology

Parent Involvement in Young Children's Computer Use and Cognitive Development

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The purpose of this study is to investigate the relationship between parental involvement in computer use and children's cognitive development. The research questions were as follows: 1. Are there any differences in the cognitive development of Head Start children who do not have computers at home? 2. Does the children's frequency of using computers impact their cognitive development? 3. What types of parent involvement with their child on the computer impacts child's cognitive development?

Participants: As part of a larger study on computer use with young children, 237 parents of Head Start preschool children were asked whether they owned a computer. One hundred and thirty-six children were included in the present study because their parents indicated that they owned a home computer.

Measures: Children were assessed using the McCarthy Scales of Children's Abilities and the Boehm-3 Test of Basic Concepts. The investigators developed a 60-questions Family Survey for the specific purpose of this study. Parents in this survey were asked: "How do parents or other adults use the computer with your child in the home? (Circle all that apply)" with six multiple responses. The responses included both active parental involvement (e.g. "Teach the child to use the computer", "Play games with the child", "Use educational software with the child" and "Challenge the child while he/she uses the computer) and passive parental involvement (e.g. "Watch the child while he/she uses the computer" and "Child watches adult while he/she uses the computer").

Coding Data: Forty-eight percent of the parents reported using the home computer with their child "every time" or "most of the time". Parents who reported teaching the child to use the computer, using educational software with the child, playing games with the child on the computer, and challenging the child to use the computer, were all coded as "active involvement". "Passive involvement" included watching the child use the computer or having the child watch the parent while on the computer.

Results: Research Question 1: Children who used computers at home had significantly higher scores on subscales of McCarthy and higher percentile on Bohem-3 than children who did not have access to computers. Research Question 2: Frequency of computer use was significantly related to subscales of McCarthy and higher percentile score on Bohem-3. Children with weekly use of computer scored the highest. Research Question 3: Children whose parents reported more

active involvement on the computers had significantly higher cognitive scores than children whose parents reported passive involvement.

Discussion, Educational Implications and Conclusion: First, accessibility to computers promotes children's cognitive development, particularly school readiness. Second, parents should encourage their children to play on the computer once a week. Third, parents should be encouraged to be actively involved with their children than passively observe or monitor their children on the computer. These results support Vygotsky's theory of socially mediated learning, where a child learns through scaffolding of a task by a more experienced partner, such as a parent (Vygotsky, 1978). In conclusion, parents' involvement in young children's computer use does promote cognitive development.

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The Implementation and Impact of Computer Software on Mathematics Learning in a Rural Head Start Program

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Children from low-income families are at risk for underachievement in mathematics during their elementary school careers presumably because they lack early experiences that inform their understanding of mathematic concepts (Klein & Starkey 2004; Clements & Sarama, 2002). For this reason, Head Start programs must identify effective methods of supporting children's mathematics learning.

An emerging body of research suggests that computers can be used effectively in early education programs (Bowman, 1998; Clements & Sarama, 2002, 2004). The advantages of computer use in Head Start classrooms are clear because Head Start children may be less likely to have access to computers in their homes than their more economically advantaged peers. Computers can provide Head Start children with activities designed to support their learning of early mathematic concepts, but are not a substitute for early childhood mathematics curriculum.

In this study we discuss our collaborative research with Head Start practitioners in West Virginia. We examine the implementation and impact of computer software on the mathematics learning of forty-seven four and five year old Head Start children. The study was embedded in a larger study, Children's School Success (CSS), involving the development and examination of the effectiveness of a practically-based, comprehensive curriculum for preparing young children at risk for early failure in school. In CSS, mathematics activities are based on the work of Clements and Sarama whose Building Blocks curriculum for preschool children focuses on the standards outlined by the National Council of the Teachers of Mathematics (NCTM, 2000).

In three CSS Head Start classrooms we added a software package designed to complement the original Building Blocks curriculum to children. In classroom one (control), children had access to the software but were offered little specific guidance from the teachers in its use. In two implementation classrooms (two and three), we provided training to the teachers, assistant teachers and a parent volunteer about the software use including strategies for connecting curriculum activities to the software activities. In classroom two, an assistant teacher provided ongoing guidance to the children while they used the software. In classroom three, an assistant teacher and a volunteer parent assisted the children with the software. Outcome measures, including the Woodcock-Johnson III Tests of Achievement (Woodcock et al, 2001) and a revised version of the Building Blocks Assessment, a curriculum-based measure, were gathered pre and post intervention.

Multiple analyses of variance demonstrated no significant effects for use of the software or assignment to class. Children who used the software more frequently did not demonstrate greater gains in mathematics performance than children who used the software infrequently. Our findings suggest that, while computer software may be used as a supplement to mathematics curriculum in Head Start classrooms, considerable training, planning and support is needed.

Importantly, it does not appear that mathematics software can be used as a substitute for manipulative activities important to children's understanding of early mathematics concepts.

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