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Effects of Computerized Storybooks on Early Literacy Development of Preschool Children with Weak Self-Regulation Skills

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A thesis submitted in partial fulfillment of the requirements
for the degree of Masters of Education at Virginia Commonwealth University.

by

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Abstract

EFFECTS OF COMPUTERIZED STORYBOOKS ON EARLY LITERACY DEVELOPMENT OF PRESCHOOL CHILDREN WITH WEAK SELF-REGULATION SKILLS

By Nora E. Land, BS

A thesis submitted in partial fulfillment of the requirements for the degree of Masters of Education at Virginia Commonwealth University.

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Major Director: Dr. Evelyn Reed-Victor,
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This study examined the effectiveness of two universally designed methods of instruction, teacher-mediated small group reading and individual use of an electronic book with limited teacher interaction, for preschool children who have been identified as having poor behavioral self-regulation. The sample consisted of 18 preschool children enrolled in an urban Head Start program. The children ranged in age from 43 months to 65 months. Children's measures included the Child Temperament and Personality Questionnaire – Short Form (CTPQ-SF), Peabody Picture Vocabulary Test (PPVT), Phonological Awareness Literacy Screening for Preschoolers (PALS-PreK) – the Print and Word Awareness subtest, an expressive vocabulary posttest, and a story retelling posttest. Both universally designed methods were effective in developing an internalization of the story vocabulary, as well as overall comprehension of the story.

Chapter 1 Introduction

There is a need for research in the areas of reading and early literacy since 20% to 30% of our nation's children find learning to read a great challenge (Lyon, 1998). NICHD-supported longitudinal studies followed both strong and poor readers from kindergarten into young adulthood. By the end of first grade, first-graders who struggled to read showed a substantial decrease in self-esteem and motivation. As children moved through elementary and middle school, these problems began to compound and affect their ability to learn in all content areas, and as children entered high school, the opportunity for entry into college was extremely low. The inability to read also posed a significant risk for occupational success, showing that the inability to read or read well can affect all areas of a person's life.

Failure to learn to read adequately is more likely among poor, nonwhite children, and non-native speakers of English. In 2005, the National Assessment of Educational Progress (NAEP) found that 36% of fourth graders read below basic reading levels. Twenty-four percent of white children, 58% of African-American children, 54% of Hispanic children, 27% of Asian children and 52% of American Indian children were below the basic fourth grade reading level. Almost three out of four children that were English language learners and half of all students eligible for the national school lunch program (a measure of socioeconomic status) were also below the basic reading achievement level.

These data highlight the important issues surrounding reading education in America. Millions of children encounter reading problems, and many begin experiencing difficulties very early in school. In recent years, a great amount of attention has been

dedicated to determining the literacy skills children need in order to be successful readers. For example, the National Reading Panel (NRP) was formed to assess the effectiveness of different approaches used to teach children to read. The NRP reviewed research-based knowledge on reading instruction and held meetings across the United States, and in 2000, the NRP concluded its work in *Teaching Children to Read.* The NRP found that 10 million children encounter reading problems early in school. The panel also identified vocabulary development and phonological awareness as essential areas of intervention. This document continues to be the foundation for many literacy programs and policies.

Less attention has been paid to the individual student differences that may impact reading success. Many individual differences can be identified at very young ages. For example, temperament can be observed in infants. Temperament is defined as individual differences in emotional, motor, attentional reactivity and self-regulation (Rothbart, Ellis, Rueda, & Posner, 2003). Temperamental dispositions act as the basis for a person's later personality and behaviors. Temperamental differences also impact a child's ability to develop skills that encourage academic achievement, including the acquisition of literacy skills. For example, children who are temperamentally less distractible and who exhibit more positive emotional intensity are rated by their teachers as being more teachable and achieve higher levels academically than do children without these characteristics (Blair, 2002).

How can we help children who are struggling to learn to read? Children with different abilities and temperament profiles require different methods of early literacy instruction. This study will examine the effectiveness of different teaching approaches in

early literacy to help children with unique needs. More specifically, this study will investigate the effectiveness of using computerized versions of storybooks when performing early literacy interventions with preschool children who have been identified as having poor behavioral self-regulation.

Definitions of Terms

Self-Regulation – Although self-regulation has been defined in numerous ways throughout the available research, this study will rely on the temperamental variable of self-regulation, effortful control. Effortful control is the ability to inhibit a dominant response in order to perform a subdominant response (Rothbart, Ellis, Rueda, and Posner, 2003). Effortful control includes facets of attentional focusing, inhibitory control, soothabilility, and perceptual sensitivity.

Emergent Literacy – Emergent literacy consists of skills, knowledge, and attitudes that are developmental precursors to reading and writing (Whitehurst & Lonigan, 1998). It can be viewed as a developmental continuum with no clear line between pre-reading and reading (Whitehurst & Lonigan, 2001). Children move through the stages in a variety of ways and at different ages. Based on Whitehurst and Lonigan's (1998) model of emergent literacy, this study will focus on the set of skills labeled "outside-in." The outside-in skills represent children's understanding of the contextual framework of written words. This study will focus specifically on vocabulary development and comprehension of the narrative structure of the story.

Universal Design for Learning (UDL) – Both instructional methods used in this study are based on UDL. Universal Design for Learning is a research-based framework for designing curricula that provides access to knowledge and skills for all learners. "This is

accomplished by simultaneously providing rich supports for learning and reducing barriers to the curriculum, while maintaining high achievement standards for all students" (www.cast.org/research/faq/index.html).

Computer-Based Reading Instruction – A universally designed computer program gives students ways to adjust the learning environment based on visual preferences and motor abilities. These programs also offer a wide range of reading supports, allowing children to access as much or as little support as they need.

Teacher-Mediated Reading Instruction – The same story is read numerous times, however, a different topic or idea is the focus of each reading. The teacher plans the instructional activities used while reading the book to meet the different learning styles and needs of each student and provides appropriate scaffolding throughout the lesson to enhance the learning for each child.

Limitations of Study

The sample size for this study is small, which may impact the outcomes. Since the sample was chosen based on very specific qualities (i.e. children with poor self-regulation skills), the results may not generalize to the broader preschool population. The sample was chosen based on parent ratings, rather than teacher ratings, of child temperament and behaviors. Parents view their children's behavior through their interactions in the home and the community, and their views may not represent an understanding of their children's classroom behaviors. Children's differing levels of fine-motor skills may also impact the results.

Chapter 2 Literature Review

Emergent Literacy

The process of learning to read can be viewed as a developmental continuum, with the process beginning early in life and continuing through the school years. The emergent literacy perspective suggests that there is no clear line between pre-reading and reading (Whitehurst & Lonigan, 2001). Children move through the stages of reading in a variety of ways and at different ages. Emergent literacy consists of the skills, knowledge, and attitudes that are developmental precursors to reading and writing (Whitehurst & Lonigan, 1998). Whitehurst and Lonigan (1998) propose a model of emergent literacy that consists of two interdependent sets of skills which they labeled "outside-in" and "inside-out." The outside-in skills represent children's understanding of the contextual framework of written words. Children need an understanding of vocabulary, syntax, and narrative structure to fully comprehend the meaning of written language. The inside-out skills represent children's ability to decode sound and print units. Decoding skills depend on letter knowledge and sound awareness, as well as grammar and punctuation knowledge.

In 2002, the National Reading Panel released a report, *Teaching Children to Read*, which synthesized the reading research on students in kindergarten through 12th grade. No similar synthesis existed on early literacy development for children from birth through age 5 prior to the creation of the National Early Literacy Panel (NELP). NELP (2004) searched the key education databases and only included studies on children up to the age of 5 and that were published in English in refereed journals. Two conditions needed to be met for a skill to be considered an emergent literacy skill (2004). First, the

skill must develop before conventional literacy skills, and second, the skill must be predictive of conventional literacy skills. Early findings by the panel suggest that "certain skills and abilities have direct links to children's eventual success in early literacy development" (Strickland & Shanahan, 2004, p. 75). NELP identified three broad elements of emergent literacy: oral language, alphabetic knowledge, and print knowledge. Oral language includes both vocabulary growth and listening comprehension. Alphabetic knowledge addresses the knowledge of letters and the ability to hear sounds within a word. Letter knowledge and phonological awareness form the basis of early decoding and spelling ability as well as later success. Print knowledge includes the understanding of environmental print, an understanding of the concepts of print, and the ability to invent the spelling of new words.

When discussing emergent literacy, Whitehurst and Lonigan (2001) focus on three elements with the strongest evidence for a link to conventional literacy: phonological processing, print awareness, and oral language. Within the area of phonological processing, the authors identified three interrelated skills. The first is phonological sensitivity, which is defined as the ability to manipulate the sounds of oral language. Second, phonological memory refers to the short-term memory for sound information (Baddeley, 1986). Third, phonological naming is the ability to retrieve sound information from permanent memory. The authors refer to print awareness as the ability to identify the letters of the alphabet. The ability to distinguish individual letters of the alphabet supports the learning of the sounds the letters represent. Within the area of oral language, vocabulary development was identified as critically important in oral language instruction. Children who have larger vocabularies have more developed

phonological sensitivity and, as later readers, are better able to comprehend what they have read.

Predictors of Later Reading Outcomes

With the growing research on emergent literacy skills, attention has been paid to whether preschool differences in literacy development are reliable predictors of later reading abilities. Scarborough (2001) reviewed the available evidence from 61 longitudinal studies that examined this possible connection. Three kinds of samples have typically been used to study the relationship between early literacy abilities and later abilities: preschoolers with early language impairments, offspring of adults with reading disabilities, and children from the same preschools or birth cohorts. Scarborough found many commonalities among the findings from research in these three groups. Verbal skills are better predictors of future literacy levels than nonverbal skills, and verbal skills during the preschool period have been good predictors of differences in phonological awareness, letter knowledge, and print concepts in kindergarten. One reading domain does not typically predict later reading outcomes. For example, a group of children who later developed reading disabilities at first differed from the comparison group in speech production ability, but subsequently differed in vocabulary skills. Scarborough also found the following:

> The magnitudes of the longer-term correlations between preschool language abilities (at ages 2 to 4 years) and school-age outcomes have been as large as the corresponding shorter-term associations between kindergarten scores and subsequent achievement. (p. 101)

Preschool children with weak early language skills who participate in early literacy interventions have been observed to show progress, highlighting the importance of early interventions. Children with a family history of reading disabilities are at high risk for developing reading problems. All of these results suggest a large deal of continuity between early developmental differences and later reading abilities or difficulties.

Whitehurst and Lonigan (2001) developed a structural model of emergent literacy development from their longitudinal study of several hundred Head Start children followed from age 4 through age 10. They collected data on outside-in and inside-out skills at Head Start exit and at kindergarten exit, while measures of reading ability and oral language were collected at the end of first grade through fifth grade. The researchers used structural equation modeling to examine causality within the data, and highlight three main findings from the longitudinal study. First, differences among children in outside-in and inside-out skills are clear by age 4, and these skills remain extremely stable after preschool. This suggests that children who start school behind in these areas are likely to stay behind. Next, inside-out emergent literacy skills (i.e., phonological awareness and letter recognition) in kindergarten are better predictors of second grade reading skills than reading skills in the first grade. Last, the relationship between inside-out and outside-in skills is very strong in preschool, but becomes weak in kindergarten. Based on this finding, Whitehurst and Lonigan suggest that interventions that may impact vocabulary and knowledge of narrative structure need to occur in preschool to have an effect during the decoding stage of learning to read.

Scarborough (1989) supports the theory that differences among kindergarteners in vocabulary and phonological awareness predict reading ability at second grade.

Scarborough followed 66 lower- to upper-middle class children from preschool through second grade. At 60 months of age, the children were given the McCarthy Scales of Children's Abilities, the Northwestern Syntax Screening Test, the Boston Naming Test, and three sections of the Stanford Early School Achievement Test (SESAT): Story Comprehension, Word Reading, and Sounds and Letters. At the end of second grade, the children were assessed using the Woodcock Johnson Psychoeducational Battery (WJP), the Decoding Skills Test (DST), and the Phonic Transfer Index (PTI). Children were assigned to one of three outcome groups based on their second grade Reading Cluster scores from the WJP: reading-disabled, low-achieving, and normal readers. At 60 months, children in the normal readers group obtained significantly higher scores than children in the reading-disabled group and low-achieving group on the Boston Naming Test and the SESAT Sounds and Letters test. These differences in vocabulary and phonological awareness were predictive of reading skills in the second grade. Scarborough also found that familial risk was a strong predictor of reading disability, accounting for 19% to 36% of total variance in the reading scores.

Howse, Lange, Farran, and Boyles (2003) also found individual differences in vocabulary skills to be predictive of later reading skills. The study's primary purpose was to better understand the roles of motivation and self-regulation in early school achievement among young, economically at-risk and not-at-risk children. The at-risk participants were 43 kindergartners and 42 second graders involved in a three year longitudinal study. The younger children were assessed using the Test of Early Reading Ability (TERA), and the older children were assessed using the Peabody Individual Achievement Tests for reading (PIAT-R) and the Peabody Vocabulary Test-III (PPVT-

III). They found that the vocabulary measure was the strongest predictor for the future reading achievement scores of kindergartners and second graders.

Wagner et al. (1997) conducted a five-year, longitudinal correlational study that involved 216 children who were assessed annually from kindergarten through fourth grade. The goal of the study was to examine differences in phonological processing abilities and word-level reading as children develop from beginning readers to skilled readers. The children were assessed in the following areas: phonological awareness, phonological memory, serial naming, word-level reading, and verbal aptitude. Phonological awareness greatly influenced subsequent word-level reading at each time period examined. Wagner et al. suggest that this finding indicates the importance of phonological instruction through late elementary school. Phonological naming and vocabulary independently influenced later word-level reading initially, but these influences faded with development. Letter-name knowledge was related to later phonological processing abilities, however, the authors did not find a relationship between word-level naming and later phonological processing abilities.

Literacy skills measured during the preschool year or the beginning of kindergarten have a substantial impact on later reading abilities. All of these findings suggest that early interventions in the areas of phonological awareness, vocabulary, letter-name knowledge, and print awareness may have long-term effects.

Individual Differences in Self-Regulation

The recognition of the importance of early academic skills for later academic success has grown over the last decade. Previous research has found that children's academic performance remains relatively stable after first grade (Entwisle & Hayduck,

1988). Previous research has also shown that important individual differences that may impact academic achievement emerge very early in life (Blair, 2002). Many factors have been identified as having an impact on academic achievement in the early years, such as socioeconomic status and IQ; however, less attention has been paid to other individual differences, such as temperamental differences, that may influence school achievement. Growing research suggests a connection between self-regulatory abilities and later academic performance.

Self-regulation has been defined in numerous ways. Zimmerman (1998) defined self-regulation as self-directedness and performance-control before, during, and after a task. Blair (2002) proposed that self-regulatory skills underlie many of the qualities associated with school success. In fact, he believed that indicators of self-regulation ability are as powerful a predictor of school adjustment as intelligence. The cognitive skills that form the base for "self-regulated learning" (Blair, 2002) are referred to as executive skills. "Executive function is a construct that unites working memory, attention, and inhibitory control for the purposes of planning and executing goal-directed activity" (Blair, p. 113). Executive functions have been shown to be dependent on neural systems of the prefrontal cortex. Damage to the frontal lobe impairs planning, self-monitoring, attention, and responsiveness, but leaves cognitive abilities and general intelligence unharmed.

The temperamental variable related to executive function is called effortful control, which is the ability to inhibit a dominant response in order to perform a subdominant response (Rothbart, Ellis, Rueda, and & Posner, 2003). Effortful control includes facets of attentional focusing, inhibitory control, soothability, and perceptual

sensitivity. Behavior is either driven by positive affect and approach systems or negative affect and avoidance systems. Effortful control allows "the child to suppress these tendencies and to program behavior in conflict situations, giving some freedom from affectively driven behavior" (Rothbart et al., 2003, p. 1114). Effortful control is critical to socialization and success at school.

The behaviors and skills associated with self-regulation have been discussed using many alternative conceptualizations. For example, Cooper and Farran (1991) developed a model of social behavior that distinguishes between two types of learning-related social skills, interpersonal skills and work-related skills. Work-related social skills access the domains of independence, responsibility, self-regulation, and cooperation and involving behaviors like listening, following directions, participating appropriately in groups, staying on task, and organizing work materials. Self-regulation skills have been shown to emerge in the preschool years and remain relatively stable over time (McClelland & Morrison, 2003).

McClelland, Morrison, and Holmes (2000) studied the connection between poor work-related social skills and academic achievement problems. The primary aim of the study was to examine whether work-related social skills predicted differences in academic outcomes above the influence of other important child, family, and sociocultural factors such as IQ, ethnicity, preschool experience, entrance age, family literacy environment, and levels of parental education. The study examined the relationship of poor work-related social skills and academic achievement at school entry and in the spring of second grade. Eighty-two kindergartners were selected from a larger sample of 540 children on basis of poor work-related social skills, defined as scores of

four or less on the Cooper-Farran Behavioral Rating Scale (CFBRS, Cooper & Farran, 1991). The CFBRS is a teacher-rated scale consisting of 37 items rated on a 7-point Likert scale. Parents completed a background questionnaire that provided information on the child, family, and sociocultural variables including ethnicity, gender, intellectual functioning, health, home literacy environment, and preschool experience. The children were also assessed using the Peabody Individual Achievement Test – Revised (PIAT-R), the Peabody Picture Vocabulary Test – Revised (PPVT-R), and an alphabet recognition task.

McClelland et al. found that work-related social skills at the beginning of kindergarten contributed to children's reading, mathematics, vocabulary, general information and alphabet skills, despite the influence of IQ, school entrance age, amount of preschool experience, ethnicity, parental education level, and home literacy environment. Work-related social skills continued to be predictive of academic achievement at the end of second grade, specifically, children with poor work-related social skills performed significantly worse on all academic measures compared to children in the overall sample in both kindergarten and second grade. Based on their research, McClelland et al. proposed that identification of children with poor work-related social skills should be as important as the identification of children with poor academic skills. Once targeted, these children should receive interventions focused on developing work-related social skills and academic skills.

Howse, Calkins, Anastopoulos, Keane, and Shelton (2003) also studied the relationship of teacher-rated behavioral self-regulation and achievement scores of kindergartners. In the spring of children's kindergarten year, the teachers rated the

children on eight items from the COMPSCALE (Instrumental Competence Scale for Children; Adler & Lange, 1997). In addition, five subtests (basic reading, mathematical reasoning, spelling, numerical operations, and listening comprehension) from the Wechsler Individual Achievement Test (WIAT) were used to assess children's early academic achievement at the end of their kindergarten year. Children exhibiting greater behavioral self-regulation in the classroom had higher achievement scores in literacy, math, and listening comprehension. Like the study performed by McClelland, Morrison, and Holmes (2000), this relationship remained strong even when IQ and maternal education were controlled.

Howse, Lange, Farran, and Boyles (2003) further explored the role of self-regulation in early school-achievement differences between economically at-risk and not-at-risk young children. They sought to understand how at-risk children differed from their more advantaged peers in the areas of self-regulation, and how self-regulation skills contribute to early achievement scores. The at-risk participants were 43 kindergartners and 42 second-graders who were initially recruited from Title 1-funded prekindergarten classes, and who qualified for the free or reduced-price school lunch program. The children were administered the Self-Regulation Test for Children (SRTC; Kuhl & Kraska, 1993), a computerized behavioral task developed to explore children's ability to resist distractions and maintain attention to tasks. The teachers also rated the children's self-regulation skills using the short form of the COMPSCALE. To assess early academic achievement, the Test of Early Reading (TERA), the Test of Early Math Achievement (TEMA), the Peabody Individual Achievement Tests for reading (PIAT-R)

and math (PIAT-M), and the Peabody Picture Vocabulary Test-III (PPVT-III) were administered to each child.

Relative to their more advantaged peers, the at-risk kindergartners showed great deficiencies in maintaining attention to the central SRTC task. The authors suggested that at-risk young children may consistently struggle on academic tasks that require attentional regulation. Like the previous studies, self-regulation seemed to be significantly related to reading achievement; however, this study indicates "that children's abilities to self-regulate attention to central tasks led to more positive achievement outcomes over and above the influences of prior reading ability and present vocabulary knowledge" (Howse, Lange, Farran, Boyles, 2003, p.172). Once again, the research points to the need for interventions that address both self-regulatory strategies and language skills.

Lonigan et. al. (1999) recognized the substantial overlap between reading disabilities and attention-deficit/hyperactivity disorder (ADHD) in older children. To study this overlap in preschoolers, the researchers examined the relationship between behaviors associated with ADHD (i.e. inattentiveness) and emergent literacy skills. The main purpose of the study was to investigate the relation between preschool problem behaviors, social competence, and a variety of emergent literacy skills of children from middle- and low-income families. The two groups of children were recruited from childcare centers serving primarily middle-class families and from Head Start programs. The students were given numerous assessments to measure nonverbal IQ, oral language, phonological sensitivity, phonological memory, and print knowledge. The Connors

Teacher Rating Scale (CTRS; Connors, 1969, 1994) was completed by the teachers to assess behaviors associated with ADHD in preschool children.

Lonigan et al. found that behavior problems of preschoolers, specifically problems of inattention, were significantly related to many emergent literacy skills for both children from middle-income and lower-income families. The relationship remained strong when cognitive abilities were controlled. Problems of inattention were consistently associated with less well developed emergent literacy skills. The results indicated that individual differences in attention may be predictive of later reading abilities through their effect on emergent literacy skills. When the two groups were compared, children from the low-income sample scored substantially lower on measures of oral language, phonological sensitivity, lexical access, and print knowledge than the children from the middle-income group.

Independence, control, self-directedness, and the ability to self-regulate are consistently associated with early academic achievement, especially early reading achievement. Preschoolers with greater behavior regulation abilities demonstrate more advanced achievement. Research also suggests that students from lower-income backgrounds may be at greater risk for both deficits in self-regulation and literacy skills. Early literacy interventions need to address children's individual differences and dispositions.

Computers and Early Literacy Development

The process of learning to read is multifaceted and children vary in interests and self-regulation, therefore, interventions to address emergent literacy skills need to be individualized and developmentally appropriate. Whitehurst and Lonigan (1998) gave

three suggestions regarding the future direction of educational practices for promoting emergent literacy skills. First, interventions need to be multifaceted and focus on both inside-out and outside-in components. Second, interventions need to be developmentally appropriate, that is preschool children should have opportunities to learn through active exploration and interaction. They warn that teacher-led instruction requires preschoolers to exhibit skills that they have not developed, such as sitting still and attending well for an extended period of time. Third, they note that computer-based interventions are the most promising method for teaching preschoolers the needed emergent literacy skills because they can be customized to meet the individual's needs.

The process of using the flexibility of computers to customize for an individual's needs is one aspect of universal design for learning (UDL) (Meyer & Rose, 1998). UDL is an educational approach to curriculum and instruction using technology that allows students with diverse learning needs to be successful in the classroom. Delivering curriculum and implementing instruction using the concepts of Universal Design means considering the needs of a wide range of learners, including strengths, weaknesses, and learning styles. A universally designed program or curriculum offers multiple means of representation to give learners a variety of ways to acquire information and knowledge, multiple means of expression to provide learners alternatives for showing what they know, and multiple means of engagement to tap into learners' interests (www.cast.org).

A universally designed computer program gives students ways to adjust the learning environment based on visual preferences and motor abilities. For example, children can choose text sizes, colors, and fonts. Children can also move through a program using various means of input, such as a keyboard, mouse, or switch. These

programs also offer a range of reading supports, allowing students to access as much or as little support as they need. Children can choose to have individual words read to them, words highlighted as they are read left to right, or chose to have entire sentences read.

The needs of children with differing self-regulation abilities can be addressed with a universally designed computer program. Engagement is essential to successful reading, and engagement depends heavily on intrinsic motivation. Intrinsic motivation includes aspects of curiosity, challenge, and enjoyment. Computer technology can build student engagement in early literacy activities through the promotion of intrinsic motivation. Computer technology promotes the growth of intrinsic motivation by providing appropriate levels of challenge, giving quality feedback in a timely manner, scaffolding tasks to provide support, fostering interest, and offering a variety of learning contexts (Meyer & Rose, 1998).

Research in computer-based education has consistently found higher time on task with computer instruction than with traditional teacher-directed instruction (Bullough & Betty, 1991). Orth and Martin (1994) investigated the effects of temperament differences and instructional method on task-engaged behavior and problem-solving performance among kindergarten children. Student temperament was measured by teacher ratings on the Temperament Assessment Battery for Children (TABC, Martin, 1988). A Task Orientation score was based on items that measured activity, distractibility, and persistence. Seventy-eight kindergarten students were randomly assigned to two treatment groups: computer-directed instruction or teacher-directed instruction. The instructional methods of both treatments addressed the same problem-solving skills: classification, sorting, sequencing, and pattern recognition. They found that students

rated lowest on Task Orientation (i.e. high activity, high distractibility, and low persistence) engaged in significantly more off-task behavior with teacher-directed instruction than with computer-directed instruction. The researchers assert that continuous one-on-one interaction, immediate feedback, and the game-like format of computer-directed instruction are all features that may facilitate sustained attention (Orth & Martin, 1994). These features resemble the characteristics of an effective universally-designed computer program discussed by Meyer and Rose (1998).

The computerized version of storybooks is another example of a universally designed computer program that builds intrinsic motivation and reading engagement. McKenna, Reinking, Labbo, and Watkins (1996) suggested that the use of electronic storybooks is an effective instructional method for young children for numerous reasons. First, they offer electronic scaffolds that can be initiated based on student need, such as digitized pronunciations, a variety of listening formats, and connections to other resources, such as a dictionary. They also enable beginning readers to read books at or near their listening levels, and they offer motivating features such as animation, sound effects, and game-like formats. Last, they link well with the printed version of the book for further instruction. The effectiveness of these computerized storybooks has been studied by a growing number of researchers.

Talley, Lancey, and Lee (1997) designed a study to test the effect of CD-ROM storybook programs on preschool aged children's emergent literacy. Seventy-three children from a Head Start program participated in the study. The children's emerging literacy skills were assessed using the Print Awareness Test (Huba & Kontos, 1985), Concepts About Print (Clay, 1979), and Picnic. *Picnic* (McCully, 1984) is a wordless

picture book which has been used to measure a child's understanding of story structure and sequence. Children were divided into three groups based on their emergent literacy scores. The top third were assigned to the "well-read-to group." The remaining students were randomly assigned to the experimental or control group. After the experimental group spent time independently exploring the CD-ROM storybook program, all students received the same measures as a posttest. The mean scores on the Concepts of Print and the Picnic assessments showed significant changes from pretest to posttest for the experimental group, showing that the CD-ROM storybook program was effective in building emergent literacy skills. The researchers propose that computerized storybooks may "have a role to play in providing 'at-risk' children with an immersion in the kind of 'storybook culture' that other children experience from birth" (p. 126).

Reitsma (1988) explored an early version of the computerized storybook as a method of reading instruction. His participants were slightly older beginning readers with ages ranging from 6.8 to 7.5 years. The purpose of his study was to compare the effects of three conditions of reading practice for beginning readers: guided-reading, reading-along, and speech-select. All children were required to read five stories that were written specifically for the study. Twenty target words were repeated in each text. A pretest was given on the twenty target words, and the reading time and the number of errors were recorded. In the guided-reading group, the students read the stories aloud and received sustaining feedback. When a child erroneously read a word, he or she was prompted to correct the error and was given assistance or hints if needed. In the reading-along group, the students read the story while listening to recordings of the same text. Students in the speech-select group read the story independently, but could choose to

receive the spoken version of any word appearing in the text. The students accessed the spoken text using a computer touch pad. A posttest was given on the same twenty target words after five sessions. The independent reading with self-selected feedback method was found to be more effective in increasing target word identification and reading fluency. Reitsma considers that the increase in reading efficiency in young children may depend largely on the amount of independent, self-controlled reading practice available and that computer-aided practice with speech feedback may be a strong means for independent practice. This study demonstrates that students show growth when accessing reading material independently with a range of support available.

Jung and Bus (2002) tested how much book format (regular paper book or computerized storybook) facilitates the understanding of meaning, phrasing, and text features. Twelve children were read a paper book by an adult, while twenty-four children explored the same book in electronic form. All of the participants ranged in age from 4 to 6 years. Half of this group explored the electronic format with restrictions on the game features of the program. The following emergent literacy skills were assessed as pre- and post-tests: emergent reading of picture storybook, word recognition without icons, word recognition with icons, letter knowledge, rhyming, name writing, and word writing. The researchers did not find a significant difference between the two groups after the posttest. Both formats supported the internalization of features of the written word. Children in the unrestricted computer group made very little progress because they spent about half of the time playing games. Results of this study show that electronic books offer experiences that support the internalization of a book's vocabulary and features of the written forms of words (Jong & Bus, 2002). However, computerized storybooks need to

be chosen for more effective instruction; for instance, pictorial explorations need to be tied to the reading of the text to stimulate dual processing and a stronger understanding of the story.

McKenna, Reinking, Labbo, and Watkins (1996) offer some guidelines for choosing computerized storybooks that effectively promote emergent literacy. The program should match the instructional goal: decoding practice, sight vocabulary growth, or fluency practice. Children's knowledge about the concepts of print should be considered as a prerequisite skill before choosing to use an electronic storybook. Children need to be monitored as they interact with computer programs to minimize distractions because audiovisual effects can become distracting and make the instructional features less effective. The electronic books should be at or near a child's listening level and the reading level should challenge the reader slightly.

Growing research suggests that computerized storybooks may have a positive effect on emergent literacy skills in young children. Computerized storybooks offer numerous options to meet the independent needs of children, especially children with weak self-regulation skills. Well-designed programs need to be chosen so young children can independently explore storybooks in a supportive, scaffolded environment.

Study Summary

Self-regulation skills that can be measured during the preschool years are strong predictors of later reading achievement. Children who are unable to control and manage their attention and focus before, during and after a task struggle to learn the basic emergent literacy skills needed to enter kindergarten, such as letter knowledge, oral language, and print awareness. These children require specific, tailored interventions and

instructional methods to meet their individual needs as learners. Using computerized storybooks for children with poor self-regulation is a method with growing support. Well-designed computer programs offer electronic scaffolds that can be initiated based on student need, and they enable beginning readers to read books at or near their listening levels. They also offer motivating features such as animation, sound effects, and game-like formats. Because of these features, research in computer-based education has consistently found higher time on task with computer instruction than with traditional teacher-directed instruction. Higher time on task, stronger interest, and sustained engagement often lead to greater academic success.

It is hypothesized that children who interact with the computerized version of the story will show greater vocabulary and comprehension gains than the children who interact with the traditional paper storybook. In summary, the purpose of this study is to compare two typical instructional approaches: teacher-mediated small group reading and individual use of an electronic book with limited teacher interaction, for preschool children who have been identified as having poor behavioral self-regulation.

Chapter 3 Methods

Participants

Preschool children from an urban Head Start program were selected to participate in this study. The children and the site were already participating in an Early Reading First program funded by the US Department of Education. This early literacy program is an ongoing intervention and research grant, with VCU Institutional Review Board (IRB) approval for the types of interventions and assessments proposed in this study. For this specific study, a research change application was approved by the IRB Board to include this researcher as an investigator. Twenty preschoolers were selected from the total number of Head Start participants, based on their self-regulation ratings as measured on the CTPQ-SF by parents. Most of the children enrolled in the Head Start program were African-American, and most were from low-income families. An equal number of males and females was selected for the sample.

The intervention sessions were lead by the researcher. The researcher is a certified special education teacher with six years of teaching experience.

Measures

The following section will describe the specific assessment tools used to measure the main variables of the study, as summarized in Table 1.

Table 1

Study Variables

Variable	Measure
Effortful Control	Child Temperament and Behavior Questionnaire Short (CTPQ – SF)
Language	Peabody Picture Vocabulary Test – Third Edition
Concepts of Print	Phonological Awareness Literacy Screening for Preschooler (PALS-PreK), the Print and Word Awareness subtest
Story Vocabulary	Expressive vocabulary posttest
Story Comprehension	Story retelling posttest

Child Temperament and Behavior. As part of the larger project, a parent or guardian completed the short form of the Child Temperament and Personality Questionnaire (CTPQ-Short Form) (Victor, Rothbart, & Baker, 2005). This questionnaire measures five broad areas of temperament and personality: unsocialized stimulation seeking, sociable extraversion, internalizing negative affectivity, conscientiousness, and openness to experience. A parent or guardian reported on the frequency of their child's behaviors or feelings. Each of the items is rated on a 7-point Likert-type scale ("1" = never, "2" = rarely, "3" = sometimes, "4" = half the time, "5" = often, "6" = almost always, "7" = always). Of the 22 subscales included on the CTPQ-SF, four subscales (22 items) were combined to create the Effortful Control scale: Falling Reactivity/Soothability, Attention Focusing, Inhibitory Control, and Perceptual Sensitivity. A copy of the CTPQ-SF and each subscales' corresponding item exemplars are located in Appendix E. The Effortful Control scale was chosen because it most closely resembled the characteristics of self-regulation that were present in the literature

reviewed (see Rothbart et al., 2003). Test-retest reliability coefficients range from .85 to .90, and reliability coefficients for low SES children range from .75 to.87.

Language. The Peabody Picture Vocabulary Test-Third Edition (PPVT-III, Dunn & Dunn, 1997) was administered as part of the assessment battery for the larger project. The PPVT-III is a well established standardized test that is designed to measure receptive vocabulary. The PPVT-III also serves as a screening test of verbal ability. For ages three to five years, the alternate forms reliability coefficients range from .90 to .95, the split-half reliability coefficients range from .91 to .94, and the test-retest reliability coefficient is .92. The PPVT was used to establish the children's language levels prior to intervention.

Concepts of Print. The Phonological Awareness Literacy Screening for Preschoolers (PALS-PreK, Invernizzi, Sullivan, Meier, & Swank, 2004) was administered as part of the assessment battery for the larger project. PALS-PreK is a measure of young children's knowledge of emergent literacy fundamentals including: name writing, alphabet knowledge, beginning sound awareness, print and word awareness, rhyme awareness, and nursery rhyme awareness. The Print and Word Awareness task was used to examine group differences since children's knowledge about the concepts of print should be considered as a prerequisite skill before choosing to use an electronic storybook (McKenna, Reinking, Labbo, &Watkins, 1996). Familiarity with the layout of books is an important precursor to learning to read. The Print and Word Awareness subtest assesses children's knowledge of the form and function of book parts as well as skill with pointing accurately to words in a familiar nursery rhyme.

Cronbach's alpha for the Print and Word Awareness was .75, and the split-half reliability coefficient was .71.

Story Vocabulary. After the intervention sessions were complete, each child was administered a posttest individually. The child was presented with fifteen pictures and was asked to name the picture. The vocabulary and the actual pictures were taken from the book of study, *Vegetable Soup* by Ann Morris (1994). The correct and incorrect responses were recorded, and a score for the number of correct responses was generated, with 1 point for each correct vocabulary word, for a total score ranging from 0-15. A list of the identified vocabulary is in Appendix A.

Story Comprehension. To assess story comprehension, the children were asked to retell the story using the book as a visual reference. The children's story retellings were recorded and were scored after the assessment using a story retelling rubric created for this study (see Appendix B). Because efforts to find a published rubric for preschool story retellings were not successful, the rubric was created by the researcher based on Sulzby's (1985) description of 2- to 6-year-old children's emergent storybook reading behaviors when asked to read to an adult from a favorite book. She explained that children's early development includes a shift from simply responding to pictures toward understanding stories. Lesser experienced children focus on the illustrations and simply label the pictures. As children develop, they begin to attend to the phrasing of the story and have a greater memory of the text. The children's statements made during the instructional sessions, and a content analysis of each page of the book were also used in the development of the rubric.

Generally, the scoring scheme remains the same from page to page; however, the rubric is designed to reflect specific differences amongst the pages. Children's responses to each page were scored using a 4-point Likert scale. One point indicates a child stating he did not know, saying nothing, or stating something irrelevant to the picture and/or words on the page; two points represents a child naming one item on the page; three points denotes an incomplete statement about the page; and four points corresponds to a complete statement. After listening to the recordings of six children retelling the story for the posttest, revisions were made to the rubric to include more detailed examples of what each point category represents. Since the story includes 13 pages, the range of scores for story retelling is 13 to 52.

Procedures

Twenty children were identified from a Head Start program based on their scores on the Effortful Control scale from the Child Temperament and Personality Questionnaire – Short Form (CTPQ-SF). The ten males and ten females with the lowest scores were chosen to participate in the intervention. The twenty children were then randomly assigned to an instructional group. Instructional group 1 interacted with a computerized format of a book individually with limited teacher facilitation, and instructional group 2 interacted with the print storybook version in a small teacher-led group. Both instructional groups interacted with the same book, *Vegetable Soup,* by Ann Morris (1994). The students participated in 5 fifteen-minute sessions, as it takes approximately fifteen minutes to read the story. All sessions for both instructional groups occurred in the same environment.

This study utilized two methods that are based on Universal Design for Learning: the individual use of an electronic book with limited teacher interaction, and a teacher mediated small group reading. Both methods were selected because they represent typical formats for preschool learning.

Instructional Group 1: Computerized Storybook. Instructional Group 1 explored the computerized version of *Vegetable Soup* (Morris, 1994). The computerized version is published as part of the WiggleWorks program (Scholastic, 1994), a beginning literacy system created by the Center for Applied Technology (CAST) for Scholastic. WiggleWorks is a multimedia, interactive CD-Rom based reading and writing program. Schultz (1995) conducted a validation study that included matched experimental and control groups of first graders. For a full academic year, 283 first graders used the WiggleWorks technology and print materials. There were two types of comparison classrooms: five classrooms used the WiggleWorks print books without the computer technology and ten classrooms used their regular language arts curriculum. The students were evaluated three times during the school year using the Iowa Test of Basic Skills (ITBS). Gains on the composite score were significantly higher, at .0001 level, than the comparison group.

In addition to the Read Aloud component, WiggleWorks includes a writing area, a book creation area, and an alphabet manipulation area for spelling. Schulz's study was based on the use of all five components with first graders. Given the developmental level of the preschool children in this study, only the Read Aloud section was available for their use. In the read aloud area, children hear a narrator read the book, providing a model of fluent reading. An arrow is located at the bottom corner. Children must click

the arrow to turn the page. As sentences are spoken, the print is highlighted to help children track the words. Children can hear sentences repeated by clicking on a circle at the beginning of the sentence. Children can also hear individual words repeated by clicking on the word.

Two children worked individually at separate computers in an empty classroom at student sized tables. The WiggleWorks program was loaded onto laptop computers, and a standard mouse was connected to the laptop for easier access to the program. Since children were choosing their own pace for proceeding through the book, headphones were also used to limit the auditory distractions from the read aloud component of the program.

During the first fifteen-minute session, the children were introduced to the electronic version of the book. The researcher worked with children for the entire session in the following ways. First, the children were shown how to use a mouse. The children were then shown how to start the program by clicking on the read aloud button and how to turn the pages by clicking on the arrow

To reduce the differences between the two instructional groups and to maintain the interest of the children, the children were introduced to a new component of WiggleWorks during the second through fifth sessions. Table 2 presents a comparison of the sessions across the two groups. During the second session, the children were shown how to repeat an entire sentence by clicking on the red button next to the sentence. The children were shown how to change the highlighting color during the third session. In the fourth session, the children learned how to repeat an individual word by clicking on the word. The researcher started each session by sitting at the computer with the children

and showed the children how to utilize the new component and the children continued the session working on the computer independently. The children worked independently for the entire session during the fifth session.

When the children were working independently at the computer, the researcher was in the room to monitor the students. The children were allowed to ask questions if needed, and a log was kept of the questions asked during the individual sessions. The only other time the researcher interacted with the children was when the children stated that they were bored or wanted to stop working at the computer, and the researcher verbally redirected the children and provided encouragement to continue. The children were asked to stop at the end of fifteen minutes, regardless of whether or not the children read the book in its entirety.

Instructional Group 2: Standard storybook. Instructional Group 2 interacted with print format of *Vegetable Soup*. The children in instructional group 2 were divided into small groups of 3 to 4 children. The researcher took children from their classroom to a quiet classroom for the fifteen minute sessions. The children sat at a child size table with the adult. The researcher read the story to the children once through during each session.

The sessions were modeled on Toni Linder's transdisciplinary play-based curriculum, *Read, Play, and Learn* (1999). In the *Read, Play, and Learn* curriculum, a specific method for reading the story is used. The same story is read each session, however, a different topic or idea is the focus of each reading. Coleman, Linder, Linas (2005) and Coleman, Linder, Linas, and Meyer (2005) have found significantly higher developmental skills as measured by standard scores on the Mullen Scales of Early Learning for children immersed in *Read , Play and Learn* for one year compared to

children entered in the program for 3 or less months. Analysis using linear regression indicated that the use of *Read, Play and Learn* predicted significantly higher overall developmental scores and receptive language scores. *Read, Play and Learn* has also been shown to increase the frequency of reading in the home, and it has been found that teachers were able to adapt the curriculum to meet the needs of a wide range of children (Linder, 1995).

The researcher read *Vegetable Soup* during each session. A different focus was established for the reading of the story for each of the five sessions. Table 2 lists the topics that were the focus of each session for both of the instructional groups. Appendix C includes the specific plans for each session used to insure uniformity between groups.

Table 2

Comparison of Instructional Group Session Topics

	Instructional Group 1: Individual Use of an Electronic Book with Limited Teacher Interaction	Instructional Group 2: Teacher Mediated Small Group Reading
Session1	Learn to use mouse. Start the program by clicking on the read aloud button. Turn the pages by clicking on the arrow.	Read the story. Prompt the children to point to the pictures of the vegetables when named.
Session 2	Repeat an entire sentence by clicking on the red button next to the sentence.	Read the story. Model the actions in the story.
Session 3	Change the color that highlights the sentence as it is read.	Read the story. Bring in plastic vegetables used in the story. Prompt the children to match the real objects to the object in the picture.
Session 4	Repeat an individual word by clicking on the word.	Read the story. Let some children take turns helping to "read" the story by looking at the pictures in the book.
Session 5	Work independently for the entire session.	Retell the story with the children's assistance using pictures of the vegetables and actions from the book.

Chapter 4 Results

The current study compared two typical instructional approaches, individual use of electronic storybooks with limited teacher interaction and teacher-mediated small group readings when working with preschool children who have been identified as having poor self-regulation. The effectiveness of the instructional approaches was evaluated using an assessment of the story vocabulary and the comprehension of the story through a story retelling task. The results of the two groups were compared for differences.

Demographic Information

The study began with 20 children; however, two children did not complete the study because they withdrew from the program. Of the 18 children who completed the study, nine children were boys and nine children were girls, and all of the children were African American, which is representative of the specific Head Start program in which the children were enrolled. All of the children met the poverty requirements of the Head Start program, and the children ranged in age from 43 months to 65 months with a mean age of 54.72 months, and standard deviation of 6.47. With an alpha level of .05, and a two-tailed significance test, there was no significant differences in age between the two groups, $t(16) = .248$.

Effortful Control and Language

Children's effortful control, concepts of print, and receptive vocabulary were assessed in the fall, several months prior to the study. Means and standard deviations for these variables are shown in Table 3. For the total sample (N=18), the mean effortful control score from the CTPQ-SF was 4.32, with a standard deviation of 0.354. On the

PAL-PreK measure of print and word awareness, the full sample's mean score was 3.50 with a standard deviation of 2.12. The full sample's mean scores on the PPVT-III was 87.22 (SD = 12.89), which is within the average range when compared to the national norms.

Table 3

Effortful Control and Language Means for Total Sample and Instructional Groups

	Total (N=18)		Group 1: Computerized (n=9)		Group 2: Standard Storybook (n=9)	
	M	SD	M	SD	M	SD
Effortful Control	4.32	.354	4.35	0.33	4.28	0.39
Language	87.22	12.89	81.11	13.58	93.33	9.19
Concept of Print	3.50	2.12	3.44	2.07	3.56	2.30

Although children were randomly assigned to instructional groups, potential differences between instructional groups for effortful control, language and concepts of print were tested using t-tests, as displayed in Table 3. The computer instructional group scored significantly lower than the standard storybook group on the PPVT, t (16) = 2.236, <.05. There were no significant differences for Print and Word Awareness, t(16) = .108, nor Effortful Control, t(16) = -.429, at the .05 level..

Hypotheses Testing

The first hypothesis was that the children who independently used an electronic storybook with limited teacher interaction would perform better than the children in the teacher mediated small group readings on the vocabulary posttest. With an alpha level of

.05, and a two-tailed significance test, there were no significant differences on the mean vocabulary posttest scores for the two groups, $t(16) = 1.284$.

The second hypothesis was that the children who independently used an electronic storybook with limited teacher interaction would perform better than the children in the teacher mediated small group readings on the story retelling posttest. With an alpha level of .05 and a two-tailed significance test, there were no significant differences on the means scores of the story retelling posttest for the two groups, $t(16) = .356$.

Table 4

Vocabulary and Story Retelling Outcomes for Total Sample and Instructional Groups

	Total (N=18)		Group 1: Computerized (n=9)		Group 2: Standard Storybook (n=9)	
	M	SD	M	SD	M	SD
Vocabulary	9.17	5.91	8.44	2.83	9.89	1.83
Story Retelling	30.11	41.63	29.56	8.17	30.67	4.58

Anecdotal Notes

Anecdotal notes were kept during the computerized storybook instructional group sessions to track the questions the children asked, the type of redirection needed, and the average amount of time the children read the computerized storybook. Very few children needed verbal redirection and encouragement to continue working on the computer. The two children who needed redirection displayed similar behaviors. They tried to engage other children and the researcher in a conversation about the program and attempted to look at other children's screen. The two children needed an average of four

to five redirections per session. The children rarely asked questions about how to maneuver the computer program or asked questions attempting to clarify their comprehension of the story.

The children, on average, read the computerized story book twice, including those who needed more redirection. Typically the children navigated through the book much faster during the second reading. While reading, the children seldom clicked the arrow to move the pages backwards, and chose to have the entire sentence read to them far more often than choosing to have the individual words read. The children also seemed to enjoy the music in the background; they often quietly moved their head to the beat of the music.

Chapter 5 Discussion

Like previous emerging research exploring the issues related to young children's experiences with printed or electronic books, this study generated mixed findings. Both universally designed methods were effective in developing an internalization of the story vocabulary, as well as overall comprehension of the story.

Story Vocabulary

Both instructional groups performed well on the story vocabulary posttest. When presented with pictures from the book, the groups learned on average between eight and nine corresponding vocabulary words. The book clearly identifies two or three words per page that have a corresponding picture. The visual appearance of the page did not differ on the computerized version, so a child in interacting with the computerized version of the story saw and heard exactly what a child in the other instructional group encountered. Although the children in the instructional group that interacted with the print version of the story were involved in more discussion about the vocabulary words and experienced the vocabulary words in different mediums (i.e. plastic vegetables), the children on the computers listened to the story at least two times per session. Perhaps the fact that the children on the computers listened to the story twice as much as the other group equalized the experiences of the two groups.

The only vocabulary word that the children in the computer instructional group struggled with was 'vegetables.' The majority of these children missed the word, whereas, almost all of children in the teacher-mediated instructional group named the word correctly. The word 'vegetable' is the only word that does not appear on a page with a direct picture representation. The child needs to understand that all of the

individual produce items in the book are considered vegetables. Computerized storybooks are possibly better at teaching concrete vocabulary words than words with more of an abstract meaning.

Talley, Lancey, and Lee (1997) found that computerized storybooks were successful in building emergent literacy skills in children from a Head Start program. Although their study focused on concepts of print, an understanding of a story structure, and a comprehension of a story's sequence, they suggested that the method may be beneficial for "at-risk" children who may not experience a literacy rich home. The current study also shows that computerized storybooks are effective in developing the vocabulary of at-risk children, especially since the groups showed receptive language differences prior to the study.

De Jung and Bus (2002) also compared a group of children interacting with a story book in a traditional teacher-led method and a group of children using a computerized format. Like the current study, they found that the children who explored the electronic storybook were very successful in internalizing the book's vocabulary. De Jung and Bus found that the children made progress only when the written form of the word was presented with an icon or picture. This finding further emphasizes the need for children to interact with a computerized storybook that clearly represents the vocabulary words in a visual manner.

Story Comprehension

The children in both instructional groups performed equally well on the story-retelling posttest. Sulzby (1985) devised a scheme of independent reading of favorite books. Children responding to books on levels 1-2 are not yet able to weave stories across

pages, even after interactive reading session, and just label or comment on pictures. Children responding to book on levels 3-5 are better able to connect stories across pages, but do not succeed in telling a complete story using the phrasing in the book. The highest level children (levels 6 and above) can retell a story using both the correct content and the story phrasing. In the current study, the children in both groups often only labeled items found in the picture. The children in the computer instructional group made slightly more comments unrelated to the page, whereas, the children in the teacher-mediated instructional group began to use incomplete statements that represented the content of the story.

The children in the teacher-mediated group may not have comprehended more of the story, but were given an opportunity to learn the language skills needed for story retelling. The teacher mediated instructional group had more social interaction with a more knowledgeable adult and their peers. Vygotsky (1978) proposed that the life-long process of development is dependent on social interaction and that social learning leads to cognitive development. He stated: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)" (Vygotsky, 1978).

An important factor in the concept of social learning is the influence of the More Knowledgeable Other (MKO) (Vygotsky, 1978). The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, coach, older adult, or peer. Computers can also act as the More Knowledgeable Other

(Galloway, 2001). Although the children who independently used an electronic book with limited teacher interaction did not benefit from social interaction, the children did benefit from the higher level skills provided by the computer.

Both groups may have benefitted from the incorporation of movement into their learning experience. While the children in the teacher-mediated group modeled the actions in the story and manipulated real objects, the children who independently used an electronic book moved to the rhythm of the music that played in the background of the storybook.

Although very little research has looked at the connection between computerized storybooks and story comprehension, particularly story retelling, De Jung and Bus (2002) found that children did not recall as much language and story structure when using electronic storybooks as when stories were read to them by adults. They proposed that some of the options of electronic books may distract children's attention from the text in favor of iconic and pictorial explorations. WiggleWorks, the electronic storybook program used in the current study, does not contain distracting animations.

De Jung and Bus (2004) did a follow up study to further explore the possible benefits of electronic books. The researchers used Sulzby's scheme of independent reading of favorite books, and only included the children who responded on levels 3-5. The children were from families of low socioeconomic status and ranged in age from 4 years 4 months to 6 years. After the 12 intervention sessions, the children retold the three stories introduced in standard and electronic format. De Jung and Bus found the children were able to retell a story when they experienced it independently in electronic form. The children were able to recall 50% of the story events using 8.5% of words (154 out of

1,817) obtained from original texts. These results were comparable to the children's scores after repeated adult-led book readings.

Self-Regulation of Behavior

Meyer and Rose (1998) state that engagement is essential to successful reading and engagement depends heavily on intrinsic motivation. Computers promote intrinsic motivation by providing appropriate levels of challenge, scaffolding tasks to provide support, and fostering interest. The children that interacted with the computer remained engaged and task oriented despite their low self-regulation ratings by their parents. The majority of children rarely interacted with the other children in the room and needed very little verbal redirection. As Meyer and Rose (1998) proposed, the computer was an effective method for keeping the children engaged and interested during the current study.

Although De Jung and Bus (2004) did not specifically choose children with poor self-regulation skills, they found that children did not take a playful approach when listening to an electronic storybook. In fact, when navigating an electronic storybook, the children acted much like they did in the condition where adults read to them. The children navigated through the story in the sequence dictated by the story, and they initiated several readings of the same story. The children in the current study also navigated properly through the story and read the story on average twice.

Limitations of Study

A few factors may have influenced the outcomes of the study. First, the sample size was small (N=18), and the results may have been different with a larger sample of preschoolers. Second, since the sample was chosen based on individual differences in

effortful control, the results may not generalize to the broader preschool population. The sample was chosen based on parent ratings of child temperament. Parents view their children's behavior through their interactions in the home and the community, and may not be as familiar with their child's performance during an instructional activity or task as the child's teacher would be.

Although children were randomly assigned to instructional groups, a difference did exist between the two groups in prior language skills. The computerized instructional group scored significantly lower than the standard storybook group on the PPVT. Another limitation may be the standardization of instructional sessions, because each individual child contributed differently to the experience of the group. Variability in interactions resulted from different energy levels, needs, and behaviors of the children. The study also did not control for children's differing fine motor skills which may have affected their use of the computer.

Whereas Read Play and Learn! was designed specifically for the preschool population, WiggleWorks was created for school aged children. Attempts were made to limit sections of WiggleWorks to make the program more accessible for preschool children. If some of the other sections had been used, the experiences of the two groups may have been more equal. For example, the read and playback section allows children to "read" the text into a microphone and then hear their words read back to them. This section would have allowed the children interacting with the computer to practice the retelling skill, as the children in the other instructional group did.

Recommendations for Future Research

Digital technologies offer new means of assisting struggling learners to learn early literacy and reading skills. Research in this area is constantly changing and evolving. This study attempted to add to the field of knowledge about using technology for young children to develop early literacy skills.

According to Boone and Higgins (2007), a need exists to further study the improving instructional qualities of computer-based technologies to assist struggling learners. They suggest the following three areas of future research:

1. Formative and summative evaluation of educational products that include the tenets of UDL in their instructional design.
2. Appropriate instructional and accessibility design for content on the Web and in educational software for persons with cognitive disabilities (e.g., learning disabilities, ADHD, autism).
3. Effectiveness and usability of commercial educational software for reading instruction for persons with specific disabilities, both high and low incidence. (Boone & Higgins, 2007, p.137-138)

The current research could be expanded to further evaluate the use of digital storybooks to meet the needs of persons with other cognitive disabilities. Digital storybooks could also be evaluated for its effectiveness in addressing other early literacy skills (e.g. letter knowledge, phonological awareness). More specifically, could children learn both concept and concrete vocabulary when using digital storybooks? For children to be engaged in a digital storybook, what specific facets of concepts of print do children need to understand prior to use?

Since both methods utilized in the study were based on Universal Design for Learning (UDL) were found to be effective in teaching early literacy skills, it would be beneficial to do further research on the use of two methods in a preschool classroom. Would using both methods boost the children's outcomes on early literacy assessments? If given choices, which method would children select, and would that vary based on their levels of self-regulation?

Lastly, further research could attempt to replicate this study using children from a Head Start program with both low and high self-regulation. Additional studies could focus on replication in a larger sample to see if there are differential outcomes for children with varied socio-economic status, as well as replication in a busy preschool classroom to determine whether methods have differential effects within a more distracting environment.

Instructional Implications

Different universally designed methods can have positive effects on children's early literacy skills, despite children's low self-regulation skills. Universal Design for Learning supports teachers' efforts to meet the challenge of this diverse population of students by employing accommodating instructional materials, techniques, and strategies that help teachers differentiate instruction to meet these varied needs. When designing instruction, teachers should consider their student's needs in the following ways:

1. What is the most effective way for this student to acquire the specific information or knowledge? It is a teacher's responsibility to provide "multiple means of representation."

2. How will this student show what he or she knows? Students should be provided access to "multiple means of expression."
3. How will the teacher tap into this student's interests? Teachers should consider "multiple means of engagement" to build an intrinsic motivation for learning. (Meyer & Rose, 1998)

Using these guiding questions, teachers need to match specific children's differences, strengths, weaknesses, and learning styles to an instructional method for teaching emergent literacy skills. This study has shown that both the individual use of an electronic storybook with limited teacher interaction and teacher mediated small group readings are effective in developing vocabulary and story comprehension in children identified with poor self-regulation skills.

If teachers decide to use an electronic storybook, they should follow some guidelines when choosing computerized storybooks that effectively promote emergent literacy (McKenna, et al., 1996). First, the program should match the instructional goal: vocabulary development, letter sound practice, or story comprehension. Second, children's knowledge about the concepts of print should be considered as a prerequisite skill before choosing to use an electronic storybook. Children should also be monitored as they use the computerized storybook to minimize distractions. Lastly, the electronic books should be at or near a child's listening level and the book's reading level should challenge the reader slightly. Most importantly, teachers need to recognize the importance of choosing quality and developmentally appropriate software.

This study also suggests that teachers should consider the social learning needs of the children. When choosing the specific instructional goals to be addressed when using

a digital storybook, teachers should consider if the skill requires social mediation in order to learn. Also, would the children benefit from a more knowledgeable model when learning the new skill? This study has shown that the More Knowledgeable Other (MKO) could be a teacher or a computer. A digital storybook needs to offer a level of scaffolding that challenges students, and it should be presented at a level that is slightly higher than the child's skill level.

Since both universally designed instructional methods were found effective for children with low self-regulation skills, a teacher could consider letting a child select the activity in which they want to participate. During choice time, a teacher could offer the opportunity for a teacher-mediated small group reading of a book in the library area and the individual opportunity to use a digital storybook on the computer. Allowing a child to select an activity based on interest could build stronger engagement and motivation to read.

Finally, the current study suggests considerations for classroom scheduling. In particular, this study support the value of small group instructional time as well as the value of computer-based experiences based on the unit of study.

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Appendix A:

Vegetable Soup Vocabulary

Vocabulary Word	Picture	Alternate Responses
1. water	Pg. 4 – water from faucet only	
2. pot	Pg. 4 – blue pot only	
3. carrots	Pg. 6	
4. celery	Pg. 6	
5. beans	Pg. 6	green beans
6. sweet potatoes	Pg. 7	potatoes
7. mustard greens	Pg. 7	greens
8. onions	Pg. 8	
9. tomatoes	Pg. 8	
10. Green Peas	Pg. 9	Peas
11. parsley	Pg. 10	
12. salt	Pg. 11	
13. pepper	Pg. 11	
14. soup	Cover picture	
15. vegetables	Pg. 3	

plural and singular forms accepted

Appendix B:

Vegetable Soup Retelling Rubric

Page	1 point	2 points	3 points	4 points
Page 4: Put some water in a pot.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names one: pot or water.	Names pot and water. --- Use complete statement only involving pot or water.	Uses complete statement: put water in pot, place water in pot
Page 5: Then add some more. You'll need a lot.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names water and/or pot. --- Only says more or a lot. --- Repeats first page.	Uses incomplete statement: you'll need more, add more, add a lot	Uses complete statement: Add more because you'll need a lot, put more water you'll need a lot
Page 6: Add fresh carrots, celery, beans . . .	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names one vegetable.	Names two or three vegetables. --- Uses complete statement and names at least one vegetable: Add carrots, Put in beans	Uses complete statement and names two or three vegetables: Add carrots and green beans, Put celery and carrots in the water
Page 7: sweet potatoes, mustard greens.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names one vegetable partially (i.e. potatoes, greens).	Names one vegetable completely or two vegetables partially (i.e. sweet potatoes).	Names both vegetables completely (i.e. sweet potatoes, mustard greens).
Page 8: Stir in onions, tomatoes, too.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names one vegetable.	Names both vegetables. --- Uses complete statement and only one vegetable: Add onions, Stir in tomatoes.	Uses complete statement and both vegetables: Add onions and tomatoes, Put tomatoes and onions in water
Page 9: Add green peas. You'll need a few.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Says peas.	Uses complete statement representing only one sentence: add peas, You need a few peas	Uses complete statement representing both statements.

Page 10: A bit of parsley's very nice . . .	I don't know/ child says nothing/says something has nothing to do with picture/words.	Says parsley.	Says something about adding parsley.	Uses complete statement: Add parsley, Parsley is nice
Page 11: with salt and pepper for the spice.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names either salt or pepper.	Names both salt and pepper.	Uses complete statement: Add salt and pepper, Salt and pepper for spice/taste
Page 12: Cook it slowly on low heat.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names oven or stove.	Uses a complete statement, but statement only describes picture: Put pot on the oven, The soup goes on the stove	Uses accurate, complete statement: Cook the soup on stove, Cook over heat
Page 13: Simmer until it's time to eat.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Uses statement describing the act of eating. ---------- ---------- Says eat.	Uses a complete statement, but statement partially represents sentence: It's time to eat, Time to eat soup	Uses accurate, complete statement: Cook 'til it's time to eat, Simmer until the soup is ready
Page 14: When the carrots lose their crunch . . .	I don't know/ child says nothing/says something has nothing to do with picture/words.	Names the carrots.	Uses a complete sentence, but does not include the word crunch: The carrots are done, When the carrots are soft.	Uses a complete sentence with the word crunch included.
Page 15: then you'll know it's time for lunch.	I don't know/ child says nothing/says something has nothing to do with picture/words.	Uses a statement about putting the soup in the bowls to eat.	Uses a complete sentence, but does not say lunch: It's time to eat	Uses a complete sentence with the word lunch included.
Page 16: Sip Sip Sip Sip Sip It's time for sipping VEGETABLE SOUP!	I don't know/ child says nothing/says something has nothing to do with picture/words.	Says It's time to eat/ Everyone is eating. ---------- ---------- Says anything about eating. ---------- ---------- Says Sip Sip Sip Sip Sip	Says Sip Sip Sip Sip Sip with an additional statement about eating without saying vegetable soup: It's time to eat, Time for eating soup	Says Sip Sip Sip Sip Sip with an additional statement about eating vegetable soup.

Appendix C:

Session Lesson Plans

Session 1
Instructional Group 1

Learn to use the mouse. Start the program by clicking on the read aloud button. Turn the pages by clicking on the arrow.

☑ Introductions
☑ Explain purpose of group, amount of sessions
☑ Reward for participation
☑ Introduce students to the computer (program will already be up and running – students will see the sign in page): discuss screen, keypads, mouse; work as group at one computer
☑ Introduce the mouse – move mouse around the sign in page, practice clicking by clicking on name and go button
☑ Instruct students to chose Vegetable Soup and click go button
☑ Instruct students to start the program by clicking on the read aloud button
☑ Show students how to turn pages by clicking on the arrow at the bottom right hand corner
☑ Discuss when to turn the page (after the music and words are done being read)
☑ Alternate between the two students to practice turning the page.
☑ If the students finish before the 15 minutes, move through the book again
☑ Review when to turn the page and how to turn the page
☑ Tell students that they will work alone at their own computers with headphones at the next session

Instructional Group 2

Read the story. Prompt the children to point to the pictures of the vegetables when named.

☑ Introductions
☑ Explain purpose of group, amount of sessions
☑ Reward for participation
☑ Introduce book – point to and name title, point to and name author and illustrator, discuss cover picture, have children make predictions about what the book is going to be about
☑ Title page – discuss title, author and illustrator again
☑ Pg. 3 – Ask children to name the vegetables in the picture, what is your favorite vegetable?
☑ Pg. 4/5 – Prompt children to point to the **pot** and **water**
☑ Pg. 6/7 – Prompt children to point to **carrots, celery, beans, sweet potatoes, mustard greens**
☑ Pg. 8/9 – Prompt children to point to **onions, tomatoes, green peas**
☑ Pg. 10/11 – Prompt children to point to **parsley, salt, pepper**
☑ Pg. 12/13 – Prompt children to point to the **soup**
☑ Pg. 14/15 – Prompt children to point to carrots, green peas, parsley
☑ Pg. 16 – Prompt children to point to soup

Session 2
Instructional Group 1

Repeat an entire sentence by clicking on the red button next to the sentence.

- ☑ Seat the children at their own computers
- ☑ Introduce headphones
- ☑ Remind students to chose Read Aloud section and to chose Vegetable Soup
- ☑ Review when to turn the page and how to turn the page
- ☑ Show students how to reread a sentence by clicking on the red button at the beginning of the story. Have each child practice twice on one page.
- ☑ Explain the I will be in the classroom monitoring them if they need help, ask questions if needed
- ☑ Let the students work independently for 15 minutes
- ☑ If students finish before 15 minutes, encourage them to read the story again

Instructional Group 2

Read the story. Model the actions in the story.

- ☑ Introduce book – point to and name title, point to and name author and illustrator, discuss cover picture, have children make predictions about what the book is going to be about
- ☑ Title page – discuss title, author and illustrator again
- ☑ Page 3 – Name each vegetable
- ☑ Page 4/5 – Act out turning on water, picking up pot, putting water in the pot
- ☑ Page 6/7 – Act out cutting up vegetables, adding vegetables to pot
- ☑ Page 8/9 – Act out stirring in vegetables, adding peas
- ☑ Page 10/11 – Act out shaking salt and pepper shakers
- ☑ Page 12/13 – Act turning on stove, putting pot on stove, simmering
- ☑ Page 14/15 – Act out scooping soup into bowls
- ☑ Page 16 – Act out eating soup, being happy

Session 3
Instructional Group 1

Change the color that highlights the sentence as it is read.

- ☑ Seat the children at their own computers
- ☑ Remind students to chose Read Aloud section and to chose Vegetable Soup
- ☑ Review how to use the mouse
- ☑ Review when to turn the page and how to turn the page
- ☑ Review how to reread a sentence by clicking on the red button at the beginning of the story.
- ☑ Log into the teacher section of the program. Show children that you can change the highlighting color. Have each child chose the color that they would like to highlight the words as the story is read.
- ☑ Explain the I will be in the classroom monitoring them if they need help, ask questions if needed
- ☑ Let the students work independently for 15 minutes
- ☑ If students finish before 15 minutes, encourage them to read the story again

Instructional Group 2

Read the story. Bring in plastic vegetables used in the story. Prompt the children to match the real object to the object in the pictures.

- ☑ Introduce book – point to and name title, point to and name author and illustrator, discuss cover picture, have children make predictions about what the book is going to be about
- ☑ Title page – discuss title, author and illustrator again
- ☑ Page 3 – Name each vegetable
- ☑ As the story is read, encourage children to point to the actual vegetable that matches the vegetable on the page (no prompting)
- ☑ If students do not point to the vegetable on their own, ask the children to point to the vegetable
- ☑ If the children chose the wrong vegetable, correct and discuss how the real vegetable and the picture of the vegetable are the same.

Session 4
Instructional Group 1

Work independently for the entire session.

- ☑ Seat the children at their own computers
- ☑ Remind students to chose Read Aloud section and to chose Vegetable Soup
- ☑ Review how to use the mouse
- ☑ Review when to turn the page and how to turn the page
- ☑ Review how to reread a sentence by clicking on the red button at the beginning of the story.
- ☑ Review how to repeat an individual word by clicking on the word. Discuss why they would want to repeat the word.
- ☑ Explain the I will be in the classroom monitoring them if they need help, ask questions if needed
- ☑ Let the students work independently for 15 minutes
- ☑ If students finish before 15 minutes, encourage them to read the story again

Instructional Group 2

Read the story. Let some children take turns helping to "read" the story by looking at the pictures in the book.

- ☑ Introduce book – point to and name title, point to and name author and illustrator, discuss cover picture, have children make predictions about what the book is going to be about
- ☑ Title page – discuss title, author and illustrator again
- ☑ Page 3 – Name each vegetable
- ☑ Call on one child to "read" a page, help fill in any missing information
- ☑ Read each page after the child has read the page
- ☑ Have a different child read each page, rotate amongst the children

Session 5
Instructional Group 1

Work independently for the entire session.

- ☑ Seat the children at their own computers.
- ☑ Remind students to choose Read Aloud section and to choose Vegetable Soup.
- ☑ Review how to use the mouse
- ☑ Review when to turn the page and how to turn the page
- ☑ Review how to reread a sentence by clicking on the red button at the beginning of the story.
- ☑ Review how to repeat an individual word by clicking on the word. Discuss why they would want to repeat the word.
- ☑ Explain that I will be in the classroom monitoring them if they need help, ask questions if needed.
- ☑ Let the students work independently for 15 minutes.
- ☑ If students finish before 15 minutes, encourage them to read the story again

Instructional Group 2

Retell the story with the children's assistance using pictures of the vegetables and actions from the book.

- ☑ Introduce book – point to and name title, point to and name author and illustrator, discuss cover picture, have children make predictions about what the book is going to be about
- ☑ Title page – discuss title, author and illustrator again
- ☑ Page 3 – Have children name each vegetable
- ☑ Retell the story without the book using photocopied pictures from the book and using movements that go with the story.
- ☑ Give each student a picture from the book. In sequential order, have each child tell the part of the story that is connected to their picture.
- ☑ Encourage children to make the movements used earlier.
- ☑ Continue to have the children tell the story until the entire story is complete
- ☑ If a child struggles with their part of the story, refer the child to the book for help, and/or give verbal reminders

Appendix D:

MCV Campus

Virginia Commonwealth University

Office of Research Subjects Protection
Office of Research

BioTech Research Park Building One
800 East Leigh Street, Suite 111
P.O. Box 980568
Richmond, Virginia 23298-0568

804 828-0868
Fax: 804 827-1448
TDD: 1-800-828-1120

DATE: February 13, 2006

TO: Evelyn Reed-Victor, PhD
Special Education and Disability
Box 842037

FROM: Lea Ann Hansen, PharmD
Chairperson, VCU IRB Panel D
Box 980568

RE: **VCU IRB #: 04360**
Title: Richmond Early Reading First

On February 10, 2005, this research study was ***approved for continuation*** by expedited review according to 45 CFR 46.108(b) and 45 CFR 46.109(e) and 45 CFR 46.110 Category 7. This research involves children and is approved under 45 CFR 46.404.

VCU IRB APPROVED CONSENT/ASSENT FORM (attached):

- Parent Information and Consent Form (Parent/Guardian) (dated 8/22/2005; 4 pages; received 1/30/06)
- Research Subject Information Form (Teacher) (dated 3/9/2005; 2 pages; received 1/30/06)
    - One of the conditions set forth in 45 CFR 46 117(c) (1), (2) for waiver of documentation of consent has been met and the IRB Panel has waived documentation of consent.

PLEASE NOTE:

- The protocol submitted for continuing review (received 1/30/06) was not the last IRB-approved version, and therefore, is not included in this approval. The protocol document used for this approval is the last IRB-approved version (received in ORSP 3/9/05).

This approval expires on January 31, 2007. Federal Regulations/VCU Policy and Procedures require continuing review prior to continuation of approval past that date. Continuing Review report forms will be mailed to you prior to the scheduled review.

This Institutional Review Board is in compliance with good clinical practices (GCP) as defined under the U.S. Food and Drug Administration (FDA) regulations and the International Conference on Harmonization (ICH) guidelines. Virginia Commonwealth University is approved by DHHS to conduct human subjects research under a Federal Wide Assurance #FWA00005287. **All correspondence related to this research study must include the IRB protocol number and the investigator's name(s) to assist us in locating your file.**

The Primary Reviewer assigned to your research study is Lori Keyser-Marcus, PhD. If you have any questions, please contact Dr. Keyser-Marcus at lakeyser@mail1.vcu.edu or 827-1727; or you may contact Susan Kimbrough, IRB Coordinator, VCU Office of Research Subjects Protection, at sdkimbrough@vcu.edu or 827-1445.

Attachment – Terms of Approval

VCU IRB
CHANGE IN RESEARCH SUBMISSION FORM

PRINCIPAL INVESTIGATOR:	Evelyn Reed-Victor, PhD
EMAIL:	
RESEARCH COORDINATOR:	Christopher Chin
EMAIL:	
P.O. BOX #:	842020
VCU IRB #:	4360
TITLE OF PROJECT: Richmond Early Reading First	

DOCUMENTATION SUBMITTED	NUMBER OF COPIES		ADDITIONAL GUIDANCE
☐ CHANGES REQUESTED BY THE VCU IRB	Refer to correspondence from the IRB	Refer to correspondence from the IRB	Each copy submitted must include this form as a cover page. The IRB will consider for approval. Notification of the IRB decision will be provided to the Investigator.
☐ PROTOCOL CHANGE [1] ☐ CHANGE TO CONSENT/ ASSENT FORM(S) [2] ☐ ADVERTISEMENT OR CHANGE TO ADVERTISEMENT [3]	If initial review was EXEMPT or EXPEDITED, **submit 4 COPIES**	If initial review was FULL BOARD, **submit 20 COPIES**	Each copy submitted must include this form as a cover page. The IRB will consider for approval. Notification of the IRB decision will be provided to the Investigator.
☐ INVESTIGATIONAL DRUG BROCHURE AMENDMENT [4] ☐ PACKAGE INSERT [4]	If initial review was EXEMPT or EXPEDITED, **submit 4 COPIES**	If initial review was FULL BOARD, **submit 4 COPIES**	Each copy submitted must include this form as a cover page. The IRB will review and acknowledge. Acknowledgement will be provided to the Investigator.
☐ NEW OR COMPETING CONTINUATION RESEARCH APPLICATION [Entire application (exclusive of appendices) must be submitted]	If initial review was EXEMPT or EXPEDITED, **submit 4 COPIES**	If initial review was FULL BOARD, **submit 4 COPIES**	Each copy submitted must include this form as a cover page. The IRB will consider for approval. Notification of the IRB decision will be provided to the investigator.
☐ NEW PRINCIPAL INVESTIGATOR AND/OR MEDICAL MONITOR INFORMATION (Provide CONFLICT OF INTEREST DISCLOSURE STATEMENT and CV or 2-3 page BIOSKETCH. If submitting biosketch, the NIH biosketch form 398 must be used.) [5]	If initial review was EXEMPT or EXPEDITED, **submit 4 COPIES**	If initial review was FULL BOARD, **submit 4 COPIES**	Each copy submitted must include this form as a cover page. The IRB will consider for approval. Notification of the IRB decision will be provided to the Investigator.
☒ OTHER (please specify) [6]: Add Nora Land (MEd candidate) as investigator			Contact the Office of Research Subjects Protection for guidance at 827-1735

[1] In addition to the revised protocol, submit red-line/strike-out version of the REVISED PROTOCOL OR a SUMMARY OF THE CHANGES. Also provide an explanation of why the changes are being made. If unable to revise protocol document, explain why the document cannot be revised.

[2] In addition to the revised consent/assent form(s), submit red-line/strike-out version(s) of the CONSENT/ASSENT FORM(S). Also provide an explanation of why the changes are being made.

[3] In addition to the revised advertisement, submit RED-LINE/STRIKE-OUT VERSIONS when changes are proposed.

[4] In addition to the investigational drug brochure amendment or package insert, submit a LIST OF THE CHANGES made and indicate whether after considering the RISK/BENEFIT RATIO, any changes are proposed in the conduct of the study (i.e., a change to the protocol or consent form).

[5] If requesting a CHANGE IN THE PRINCIPAL INVESTIGATOR, this form must be signed by the current PI or Department/Division Chairperson or Dean

[6] If notifying the IRB of the addition of investigators to your study, you must submit four copies of the CONFLICT OF INTEREST DISCLOSURE STATEMENT for each investigator added to the study.

SIGNATURE OF PRINCIPAL INVESTIGATOR OR DESIGNEE:	DATE OF SIGNATURE:

No.:
Rec'd by:
Date:
Actions:
To COIRC:
To File:

VIRGINIA COMMONWEALTH UNIVERSITY

Conflict of Interest Disclosure Statement

Under VCU Research Policy, the Principal Investigator and all others who have responsibility for the design, conduct, or reporting of research, must disclose financial interests in any external entity that is related to the work to be conducted under the proposed project or is interested in the results of the project. Providing this information is mandatory Any individual who voluntarily discloses financial interests related to extramurally supported research projects should also use this form. Under the Virginia Public Records Act, this information may be made available to the public upon request.

Principal Investigator: Evelyn Reed-Victor

School/Dept: School of Education/Special Education & Disability Policy

Funding Entity: Early Reading First

Contract/Grant No: 520450

Title of Research Project: Richmond Early Reading First

Reason for Disclosure: ☐ New Proposal ☐ Additional Support ☐ New Protocol ☒ New Investigator ☐ New Interest Obtaine
☐ Revisions to Grant/Contract ☐ Grant/Contract Continuation

Disclosure and Certification

By signature below, each individual certifies that either no Financial Interest exists or that a complete listing of all financial interest is provided on a Disclosure Supplement form. All individuals named below further acknowledge their responsibility to disclose any new Financial Interest obtained during the term of the award.

The Principal Investigator's signature certifies that all individuals required to make disclosures have been listed below.

A. Do you, your spouse, or dependent children have a Financial Interest in an external entity related to the work to be conducted under the project or interested in the results of the project? (See reverse for definitions of Financial Interests.) – Check response below adjacent to your signature.

B. If the project is funded, to the best of your knowledge, does any VCU employee have a financial interest, including an ownership or equity interest, in the sponsor? Check response below adjacent to your signature.

C. Project is Unfunded: ☐

1. _____ Signature (PI) Date Evelyn Reed-Victor Print or Type Name of Principal Investigator	A. ☒ NO	☐ YES, Supplement Form attached
	B. ☒ NO	☐ YES, Name
2. _____ Signature Date Nora Land Print or Type Name of Investigator	A. ☒ NO	☐ YES, Supplement Form attached
	B. ☒ NO	☐ YES, Name
3. _____ Signature Date Print or Type Name of Investigator	A. ☐ NO	☐ YES, Supplement Form attached
	B. ☐ NO	☐ YES, Name
4. _____ Signature Date Print or Type Name of Investigator	A. ☐ NO	☐ YES, Supplement Form attached
	B. ☐ NO	☐ YES, Name
5. _____ Signature Date Print or Type Name of Investigator	A. ☐ NO	☐ YES, Supplement Form attached
	B. ☐ NO	☐ YES, Name

(please attach additional pages as required)

Child Temperament and Personality

Short Form

Developed collaboratively by Hampton University & University of Oregon

INFORMATION

1. Child's Name_____

2. Twin or multiple birth? ___Yes ___No If yes, what type (fraternal or identical) _____

3. Your name: _____

4. Relationship to Child: _____MOTHER _____FATHER
_____OTHER, PLEASE SPECIFY_____
Are you a single parent?___YES___NO

Thank you for taking part in this questionnaire. In the following pages, we ask you to circle the responses that ***describe your child****. As you go through the questionnaire, some statements or words will be similar to ones you have rated earlier; please continue to respond until you have completed the entire questionnaire.*

DIRECTIONS:

Please read each statement. Look at the scale and circle the number that tells the amount of time your child acts or seems to feel this way. Please try to complete all items. ***On rare occasions, you might find that an item seems not to be appropriate for the age of your child. If so, please write NA.*** .

How often does this statement describe your child?	
1 Never	***5 Often***
2 Rarely	***6 Almost always***
3 Sometimes	***7 Always***
4 About half the time	

SAMPLE QUESTION:

MY CHILD IS . . .

1. sweet 1 2 3 4 (5) 6 7

MY CHILD ...	**Never**			**Half the Time**			**Always**
1. is lively and enthusiastic	1	2	3	4	5	6	7
2. is eager to learn new things	1	2	3	4	5	6	7
3. gets anxious and jittery	1	2	3	4	5	6	7

MY CHILD ...	Never			Half the Time			Always
4. is dependable and trustworthy	1	2	3	4	5	6	7
5. acts insecure with others	1	2	3	4	5	6	7
6. likes to put things in order	1	2	3	4	5	6	7
7. is affectionate	1	2	3	4	5	6	7
8. has a sense of humor	1	2	3	4	5	6	7
9. has good concentration	1	2	3	4	5	6	7
10. notices the smoothness or roughness of objects	1	2	3	4	5	6	7
11. is sociable	1	2	3	4	5	6	7
12. is shy with people	1	2	3	4	5	6	7
13. is quick to learn	1	2	3	4	5	6	7
14. acts like a show off	1	2	3	4	5	6	7
15. is disobedient	1	2	3	4	5	6	7
16. becomes self-conscious when around people	1	2	3	4	5	6	7
17. likes to play so wild and recklessly that s/he might get hurt	1	2	3	4	5	6	7
18. is creative	1	2	3	4	5	6	7
19. runs rather than walks from room to room	1	2	3	4	5	6	7
20. notices when someone is wearing new clothing	1	2	3	4	5	6	7
21. is mean	1	2	3	4	5	6	7
22. has temper tantrums when s/he doesn't get what s/he wants	1	2	3	4	5	6	7
23. is cheerful	1	2	3	4	5	6	7
24. is friendly	1	2	3	4	5	6	7
25. when practicing an activity, has a hard time keeping her/his mind on it	1	2	3	4	5	6	7

| MY CHILD ... | Never | | | Half the Time | | | Always |

26. tends to be impulsive	1	2	3	4	5	6	7
27. acts responsibly	1	2	3	4	5	6	7
28. seems fearful	1	2	3	4	5	6	7
29. finds self control difficult	1	2	3	4	5	6	7
30. is too trusting	1	2	3	4	5	6	7
31. likes to look at art	1	2	3	4	5	6	7
32. is artistic	1	2	3	4	5	6	7
33. has difficulty waiting for gratification	1	2	3	4	5	6	7
34. is energetic	1	2	3	4	5	6	7
35. becomes sad if plans don't work out	1	2	3	4	5	6	7
36. moves from one task to another without completing any of them	1	2	3	4	5	6	7
37. moves about actively (runs, climbs, jumps) when playing inside	1	2	3	4	5	6	7
38. has a large vocabulary	1	2	3	4	5	6	7
39. is aggressive towards others	1	2	3	4	5	6	7
40. enjoys riding a tricycle or bicycle fast and recklessly	1	2	3	4	5	6	7
41. can resist temptation when s/he needs to	1	2	3	4	5	6	7
42. takes risks	1	2	3	4	5	6	7
43. makes hasty decisions	1	2	3	4	5	6	7
44. is very temperamental	1	2	3	4	5	6	7
45. seems to listen to even quiet sounds	1	2	3	4	5	6	7
46. likes to clean his/her room	1	2	3	4	5	6	7
47. is always on the move	1	2	3	4	5	6	7
48. likes to finish everything s/he starts	1	2	3	4	5	6	7
49. is withdrawn from others	1	2	3	4	5	6	7
50. frequently displays feelings of sadness	1	2	3	4	5	6	7
MY CHILD ...	**Never**			**Half the Time**			**Always**

51. seems depressed when unable to accomplish some task	1	2	3	4	5	6	7
52. is rude	1	2	3	4	5	6	7
53. often rushes into new situations	1	2	3	4	5	6	7
54. is happy	1	2	3	4	5	6	7
55. has difficulty waiting in line	1	2	3	4	5	6	7
56. gets quite frustrated when prevented from doing something	1	2	3	4	5	6	7
57. is organized	1	2	3	4	5	6	7
58. is easy to like	1	2	3	4	5	6	7
59. is active physically	1	2	3	4	5	6	7
60. comments when someone has changed his/her appearance	1	2	3	4	5	6	7
61. has good thinking abilities	1	2	3	4	5	6	7
62. stays upset for a long time	1	2	3	4	5	6	7
63. is slow to warm up with new people	1	2	3	4	5	6	7
64. seems naïve	1	2	3	4	5	6	7
65. is good at solving problems	1	2	3	4	5	6	7
66. has a long attention span	1	2	3	4	5	6	7
67. is irritable	1	2	3	4	5	6	7
68. seems lonely	1	2	3	4	5	6	7
69. can wait before entering into new activities	1	2	3	4	5	6	7
70. is outgoing	1	2	3	4	5	6	7
71. blames him/herself for any failures	1	2	3	4	5	6	7
72. is a joy to be with	1	2	3	4	5	6	7
73. is loving	1	2	3	4	5	6	7
74. notices others' facial expressions	1	2	3	4	5	6	7
75. is quick-tempered	1	2	3	4	5	6	7

MY CHILD ...	**Never**			**Half the Time**			**Always**
76. when upset, begins feeling better quickly	1	2	3	4	5	6	7

77. is disrespectful	1	2	3	4	5	6	7
78. completes a task s/he begins	1	2	3	4	5	6	7
79. is interested in new things	1	2	3	4	5	6	7
80. acts wild	1	2	3	4	5	6	7
81. likes to keep everything in its place	1	2	3	4	5	6	7
82. has a good memory	1	2	3	4	5	6	7
83. becomes quickly aware of a new item in the room	1	2	3	4	5	6	7
84. seems afraid of a lot of things	1	2	3	4	5	6	7
85. is self-disciplined	1	2	3	4	5	6	7
86. is full of energy, even in the evening	1	2	3	4	5	6	7
87. is a hard worker	1	2	3	4	5	6	7
88. is curious	1	2	3	4	5	6	7
89. is quick to understand what is said or going on	1	2	3	4	5	6	7
90. has trouble sitting still when s/he is told to	1	2	3	4	5	6	7
91. likes hugs and kisses	1	2	3	4	5	6	7
92. needs others to do things for him or her	1	2	3	4	5	6	7
93. wastes a lot of time before settling down to do a task.	1	2	3	4	5	6	7
94. likes to paint or draw	1	2	3	4	5	6	7
95. is interested in nature	1	2	3	4	5	6	7
96. persists when things are difficult	1	2	3	4	5	6	7
97. gets nervous	1	2	3	4	5	6	7
98. if upset, cheers up quickly	1	2	3	4	5	6	7
99. keeps his/her things neat and tidy	1	2	3	4	5	6	7
100. shows a lot of imagination	1	2	3	4	5	6	7

MY CHILD ...	Never			Half the Time			Always
101. when drawing, coloring, or writing shows strong concentration	1	2	3	4	5	6	7
102. gets angry easily	1	2	3	4	5	6	7
103. loves to be with other people	1	2	3	4	5	6	7
104. has many interesting ideas	1	2	3	4	5	6	7
105. is easy to soothe when s/he is upset	1	2	3	4	5	6	7
106. is good at following instructions	1	2	3	4	5	6	7
107. needs help with a lot of things	1	2	3	4	5	6	7
108. is easily distracted when listening to a story	1	2	3	4	5	6	7
109. likes to write	1	2	3	4	5	6	7
110. does things carefully and with thought	1	2	3	4	5	6	7
111. becomes discouraged when s/he has trouble making something work	1	2	3	4	5	6	7
112. smiles a lot at people	1	2	3	4	5	6	7
113. worries about a lot of things	1	2	3	4	5	6	7
114. makes friends easily	1	2	3	4	5	6	7
115. gives in to others	1	2	3	4	5	6	7
116. often laughs out loud with other children	1	2	3	4	5	6	7
117. argues a lot	1	2	3	4	5	6	7
118. lacks confidence	1	2	3	4	5	6	7
119. can be taken advantage of by others	1	2	3	4	5	6	7
120. can easily stop an activity when told "no"	1	2	3	4	5	6	7
121. likes to ask questions	1	2	3	4	5	6	7

Thank you!

Effortful Control Facets and Corresponding Item Exemplars

Falling Reactivity/Soothability

For children, the rate of recovery from peak distress, excitement, or general arousal.

Short Form	My child…
62	stays upset for a long time
76	when upset, begins feeling better quickly
98	If upset, cheers up quickly
105	is easy to soothe when s/he is upset

Inhibitory Control

The capacity to plan and to suppress inappropriate approach responses under instructions in novel or uncertain situations. The current scale consists of seven items.

Short Form	My child…
41	can resist temptation when she/he needs to
55	has difficulty waiting in line
69	can wait before entering into new activities
90	has trouble sitting still when she/he is told to
106	is good at following instructions
120	can easily stop an activity when told "no"

Attention Focusing

Tendency to maintain attentional focus upon task-related activities. The current scale consists of eight items.

Short Form	My child…
9	Has good concentration
25	When practicing an activity, has a hard time keeping his/her mind on it
36	Moves from one task to another without completing any of them
66	Has a long attention span
101	When drawing, coloring, or writing shows strong concentration
108	Is easily distracted when listening to a story

Perceptual Sensitivity

This scale reflects children that consistently detect subtle and slight amounts of low intensity stimuli from the external environment. This scale consists of six items.

Short Form	**My child…**
10	notices the smoothness or roughness of objects
20	notices when someone is wearing new clothing
45	seems to listen to even quiet sounds
60	comments when someone has changes his/her appearance
74	notices others' facial expressions
83	becomes quickly aware of a new item in the room

Adapted from the *Manual for the Short Form of the Child Temperament and Personality Questionnaire (CTPQ-Short Form)* (Victor, Rothbart, & Baker, 2005).

Table 5

Correlations of Study Variables

	Gender	Age	Effortful Control	Language	Concept of Print	Story Vocabulary	Story Comprehension
Gender							
Pearson Correlations	1	.080	.526*	.248	.027	.353	.372
Sig. (2-tailed)		.754	.025	.320	.915	.151	.128
Age							
Pearson Correlations	.080	1	.026	.289	.589*	.631**	.442
Sig. (2-tailed)	.754		.919	.244	.010	.005	.066
Effortful Control							
Pearson Correlations	.526*	.026	1	-.060	-.182	.266	-.051
Sig. (2-tailed)	.025	.919		.812	.471	.286	.840
Language							
Pearson Correlations	.248	.289	-.060	1	.342	.293	.509*
Sig. (2-tailed)	.320	.244	.812		.165	.237	.031
Concept of Print							
Pearson Correlations	.027	.589*	-.182	.342	1	.405	.533*
Sig. (2-tailed)	.915	.010	.471	.165		.096	.023
Story Vocabulary							
Pearson Correlations	.353	.631**	.266	.293	.405	1	.449
Sig. (2-tailed)	.151	.005	.286	.237	.096		.062
Story Comprehension							
Pearson Correlations	.372	.442	-.051	.509*	.533*	.449	1
Sig. (2-tailed)	.128	.066	.840	.031	.023	.062	

Note. N=18, *. Correlation is significant at the 0.05 level (2-tailed), **. Correlation is significant at the 0.01 level (2 tailed).

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M.Ed. Early Childhood Special Education, Virginia Commonwealth University, May 2007

B.S. Interdisciplinary Social Science, Minor in Special Education, James Madison University, 2000

Professional Experience
Literacy Coach, Partnership for Excellence in Early Language and Literacy Skills (PEELLS), Virginia Commonwealth University, May 2007 – Present

Early Childhood Special Education Specialist, Richmond Early Reading First, Virginia Commonwealth University, April 2006 – Present

Research Assistant, Richmond Early Reading First, Virginia Commonwealth University, June2005-April 2006

Virginia Standards of Learning Tutor, Henrico County Public Schools, September 2004- June 2005

Special Education Teacher, Henrico County Public Schools, August 2001- June 2005

Special Education Teacher, Rockingham County Public Schools, December 2001 – June 2001

Certifications
Virginia Teaching License, Certified K-12, LD, ED, MR, ECSE

Professional Affiliations
International Reading Association (IRA)
Council for Exceptional Children (CEC), Division for Early Childhood (DEC)

Honors
Project Uplink Scholar, Virginia Commonwealth University, 2003-2005
Golden Key Honor Society
Kappa Delta Pi Education Honor Society
Outstanding Special Education Student Award, 1999

Publications
Virginia Department of Education Training and Technical Support Center. (n.d.). *Instructional Support Team Manual: Reading Strategies.* Richmond, VA: Author.

Presentations
"Choosing and Using Computerized Storybooks," Richmond Area Reading Council Fall Conference, Richmond, Virginia, November 2006.

"Have It Your Way: Make Your Own AT Products," TechKnowledgy 2006: 9th Annual Assistive Technology Conference, Richmond, Virginia, November 2006.

"Positive Alternative to Handling Misbehavior," VCU Head Start Staff Development, Richmond, Virginia, September 2006.

"Kick it Up a Notch with Assistive Technology," Shining Stars: Virginia's Third Annual Early Childhood Conference, Virginia Beach, Virginia, July 2006.

"PowerPoint: A Tool for Differentiation," Henrico County Summer Institute, Richmond, Virginia, July 2005.

"PowerPoint: Practical Classroom Applications," EdTech 2005, Ashland, Virginia, May 2005.