

AN ANALYSIS OF THE IMPACT OF SELECTED STRUCTURES OF THE  
VIRGINIA PRESCHOOL INITIATIVE ON PALS-PREK PROGRAM SUMMARY  
SCORES FOR AT-RISK PRESCHOOL STUDENTS IN VIRGINIA

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An Analysis of the Impact of Selected Structures of the Virginia Preschool Initiative on  
PALS-PreK Program Summary Scores for At-Risk Preschool Students in Virginia

Patricia Wootten Leary

ABSTRACT

This study examines the impact of selected structures of the Virginia Preschool Initiative on reading readiness in at-risk preschool students in the state of Virginia. The Virginia Preschool Initiative is designed to prepare at-risk four-year-olds for success in kindergarten. According to the Virginia Department of Education, “The purpose of the grants is to reduce disparities among young children upon formal school entry and to reduce or eliminate those risk factors that lead to early academic failure.” (Virginia Department of Education, 2005) The independent variables are the specific curriculum models used by the school division, length of program day, teacher certification, and program sponsoring agency. The dependent variables are the pre and post assessment scores on the eight subtests of the PALS-PreK assessment. A paired sample t-test and one-way ANOVA were conducted using Fall and Spring 2006 PALS-PreK student assessment scores from school divisions that participated in the Virginia Preschool Initiative during the 2005-06 school year to determine the relationship between the curriculum implemented and PALS-PreK Fall and Spring student assessment scores. The findings in this study indicate a statistically significant difference between the Fall and Spring student assessment scores for each of the curriculum models analyzed and at least one curriculum model consistently underperforms the other three curriculum models.

There were no differences in three variables (length of school day, teacher certification, and program sponsoring agency) and were therefore, not subject to analysis.

Dedication

This work is dedicated to my husband, Calvin, who has loved and supported me throughout this process. I thank God daily for bringing this wonderful man into my life. May God continue to bless us and enrich our lives.

## Acknowledgements

When this journey began, I sat in an interview room answering questions about my background, my educational experiences, academic preparation, and my dedication to completing the doctoral process. I remember it well, four years ago, and have often reflected on that interview. One question stands out among others. I was asked if my family was supportive of my starting work on a doctoral degree and I wondered at the time about the relevance of such a question. There is no doubt now as to the relevance of that question. I could not have accomplished my goal of earning a doctoral degree without the unwavering love and support of my husband, my children, my parents, and a host of family and friends. The countless hours spent in classes, writing papers and taking tests, completing the residency in beautiful Blacksburg, VA, and finally, writing the dissertation have all come at the expense of those I love the most.

Thank you, Calvin, for loving me and supporting me throughout these four years. You have provided me the strength and focus that I needed to complete this project. Your constant faith in me has been a source of inspiration for me and kept me at my task long after I wanted to quit.

I'd like to recognize and thank my wonderful chairman, Dr. Travis Twiford. You have been the steady rock that I could come to with questions and worries. Your guidance and support have been phenomenal and I thank you. Thank you to my dissertation committee as well. Each of you has provided me guidance and direction at some point and been very patient with my questions.

My two wonderful children, Kathleen and Christopher, are what I am most proud of in my life. You have brought me tremendous joy as your mother and have taught me

so much about loving and living. You must always remember that nothing worth having is easy in this world and that God is there to help you as you grow. He helps me everyday. I love you both.

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## Chapter I

### The Problem

#### *Problem Statement*

*No Time to Waste* is the title of the 2004 School Readiness Data Book published by the Office of the Secretary of Health and Human Resources and commissioned by the former Governor of Virginia, Mark Warner. This publication provides information about the factors that enable a child to be successful in school and to help policy makers and others focus on the importance of providing quality preschool experiences for the children of Virginia. Former Governor Warner stated, “We can make important early investments, or we can pay for more expensive interventions down the road” (Office of the Secretary of Health and Human Resources, 2004). In his opinion, providing funds for quality preschool programs is important to the success of the state of Virginia.

From birth to age five, children develop socially, physically, emotionally, and intellectually more quickly than they ever will again. This same time period is also one of the most susceptible to damage that is difficult or impossible to repair (National Research Council & Institute of Medicine, 2000). High quality preschool experiences are essential in aiding in the preschool child’s academic, social, emotional and physical development (Barnett, 1998). This is of greater importance when the child is from a background that is high poverty, low in enriching verbal and pre-literacy experiences, and family violence is part of the child’s day to day living experiences (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Espinosa, 2002; Reynolds, 1998).

Virginia has been investing funds in public preschool education for children who are considered to be at-risk since the 1993 report, *A Study of Programs Serving At-Risk Four-Year-Old Children* was completed (Virginia Board of Education). Recently elected Governor of Virginia, Tim Kaine, ran his election campaign with a strong emphasis on the need for quality preschool programs in order to better prepare Virginia's children to be successful in school and ultimately as contributing members of society. He pledged to provide additional funding for preschool children's programs in Virginia through the current Virginia Preschool Initiative (VPI). This program targets students who are considered to be at-risk. The 2006 General Assembly approved an increase in at-risk four-year-old funding for the 2006-2008 biennium from the previous amount of \$5,400 per child to \$5,700 per child. This increase is a further indication of Virginia's willingness to invest in its youngest and neediest citizens.

Despite the financial commitment to preschool programs and the effort to establish criteria for high quality programs, there is no published research to indicate whether the children who participate in the Virginia Preschool Initiative are ready to learn to read when they enter kindergarten. This raises questions. Do the credentials of the Virginia preschool teacher make a difference in student achievement outcomes? Does the length of the preschool day in Virginia have an impact on student achievement? Is the curriculum implemented in Virginia Preschool Initiative classrooms making a positive impact on student achievement? Does the program sponsoring agency (local school division or community organizations) make a difference in student achievement? These are all interesting questions that need answers for the benefit of our youngest and neediest Virginians and Virginia policymakers.

School divisions may choose to evaluate the success of their programs just as Williamsburg-James City County Public Schools did in 2003 and Arlington Public Schools in 2002. However, an evaluation of the preschool program to determine readiness for reading in kindergarten is not a requirement of the State of Virginia or the Virginia Department of Education. The lack of evaluation data forms the basis for the questions to be addressed in this research study.

Generally, preschool programs can be analyzed from two different perspectives: process quality and structural quality (Espinosa, 2002). Process quality refers to the interactions that occur between teachers and preschool children, instructional strategies and materials, characteristics of the physical classroom, etc. Structural quality consists of characteristics of the preschool program such as student to teacher ratios, teacher certification levels, length of the preschool day, the curriculum implemented in the program, etc. (2002).

The study will focus on selected structural aspects of the Virginia Preschool Initiative and their relationship to pre and post Program Summary scores on the PALS-PreK assessment. The research questions that framed this study were:

1. What is the relationship between the length of the preschool day and pre and post-program summary scores on the Phonological Awareness Literacy Screening PreK (PALS-PreK) assessment?
2. What is the relationship between teacher certification and pre and post-test program summary scores on the PALS-PreK assessment?
3. What is the relationship between the curriculum implemented and pre and post-test program summary scores on the PALS-PreK assessment?

4. What is the relationship between the agency that sponsors the preschool program and pre and post-test program summary scores on the PALS-PreK assessment?

According to Gilliam and Zigler (2004), who reviewed the evaluations of state sponsored preschool programs between 1977 and 2003, there are many states that do not evaluate their programs to determine effectiveness in reaching their intended goals. They further found that many states that did evaluate their programs did not use effective evaluation methods, therefore, the results may not be accurate or reliable. Gilliam and Zigler's criteria for determining that a state had conducted an evaluation were specific. In order to qualify, the evaluation had to specify a prekindergarten (preschool) program, provide data that focused on student achievement or some other measurable outcome, and include a sample from across the state. Twenty statewide programs met these criteria and were included in the 2004 study. Virginia was not one of the states included in their study because Virginia had not conducted a formal comprehensive evaluation of the Virginia Preschool Initiative at that time.

The results of Gilliam and Zigler's (2004) review of the state evaluation reports indicate positive effects on standardized achievement tests for students who attended state sponsored preschool programs as well as positive effects for reducing student grade retentions. There were very few positive results on reducing special education referrals and placement. That result was unexpected for the researchers. Only the State of Maryland looked at preschool students over time in the area of special education identification and found that fewer preschool children were identified for special

education services than children who did not attend preschool (13% versus 24% of children studied). Another interesting outcome was that students who attended preschool programs in the 20 programs evaluated did not demonstrate reduced incidents of behavior problems (Gilliam & Zigler, 2004). This is a different result than what had been obtained in earlier landmark studies (Reynolds, Temple, Robertson, & Mann, 2001; Schweinhart & Weikart, 1997; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001). Gilliam and Zigler point out that the evaluation of student behavior in state programs was usually a teacher completed checklist rather than an analysis of student disciplinary records. They indicate this may have skewed the results because teacher checklists are more subjective than reviewing student discipline records.

As a result of their analysis of 20 state preschool programs, Gilliam and Zigler (2004) state, “It is possible that these prekindergarten programs, by helping children to enter kindergarten and first grade more ready for a classroom-based school experience, have set children on an educational pathway more conducive to improved classroom behavior, motivation and academic performance...” The importance of evaluating the quality of the preschool experience is valuable and necessary. In a study of the data from the National Center for Early Development and Learning, *A Multi-State Study of Pre-Kindergarten*, Clifford, et al. (2005) found that “...three structural features may be critical to the implementation and outcomes of pre-k are location of the program, length of school day, and education of the teacher”. These same characteristics will be some of the variables researched in this study.

Preschool programs vary greatly depending on where the preschool child lives and attends school. In the United States, preschool children in the South tend to

participate in more preschool programs for longer hours than those in the West. According to Rosenthal, Rathburn, and West (2005), the results of their report demonstrate a need to look at where the preschool program is located (the region of the country) when analyzing the impact or effectiveness of preschool education experiences for our youngest citizens. This research study will focus on the state of Virginia.

### *Overview of the Virginia Preschool Initiative*

#### *Background*

The Virginia Preschool Initiative was created as an outcome of the 1993 *Acts of Assembly, Chapter 994, Item 126*, which mandated that a study be conducted to assess the programs in place for at-risk four-year-olds in Virginia. This study was presented and published in November, 1993 (Virginia Board of Education). At that time, there were no state funded preschool programs as they were all operated and funded by the federal government through Head Start and Chapter I (now known as Title I). The following year, 1994, the Legislative Committee in Public Education recommended that a state funded preschool program be implemented in Virginia for at-risk four-year-olds who were not being served in any other preschool program such as Head Start. They also recommended that specific research-based criteria for high quality preschool education programs be required throughout the state. In 1995, the Virginia General Assembly passed the *Omnibus Education Act (HB2542)* and the *Appropriation Act* which allocated \$10.3 million to the Virginia Preschool Initiative. Program costs were allocated at \$5,400 per child served, but actual costs are shared. The locality and state share the costs of the program through the funding formula based on the Local Composite Index (LCI) or the localities ability to pay. Virginia served 30% of its unserved preschool students in the

first year of implementation (1995-96). In the ten years since its inception, the Virginia Preschool Initiative has grown in size and in dollars allocated. In 2005-06, the program was appropriated \$46.6 million and planned to serve 100% of the unserved at-risk children in the Commonwealth of Virginia (Virginia Department of Education, 2005).

Each year, the Virginia Department of Education determines which of Virginia's local school divisions are eligible to participate in the Virginia Preschool Initiative based on the number of children who are at-risk and are not receiving services from Head Start. Of the 132 school divisions in the Commonwealth of Virginia, for the 2005-06 school year, 122 school divisions were eligible for funding and 100 used the funds to serve at-risk four year olds (see Appendix A for a complete list of eligible school divisions). The Virginia Preschool Initiative served 11,513 of the 17,329 eligible children in 2005-06. Local school divisions determine if they will participate in the Virginia Preschool Initiative or not. In 2005-06, 22 school divisions were eligible but did not offer the program in their school division. Some reasons divisions choose not to participate were their inability to meet the required local match, not enough classroom space available to house the program, and not enough children in the division who are eligible to participate in the program (Virginia Department of Education, 2005).

The Virginia Department of Education determines how many children are to be served by the Virginia Preschool Initiative based on the number of four year olds in a locality and then calculates the number of at risk children based on the number of students eligible for free lunch within the school division. School divisions must certify that they are serving at least the identified number of children within the program each year or risk losing funds. For 2004-05, 38 school divisions served less than the identified

number of eligible children and funding was adjusted accordingly (Virginia Department of Education, 2005).

The Virginia Department of Education Guidelines for the Virginia Preschool Initiative provides a list of suggested criteria for local school divisions to determine the students who are at-risk. School divisions may determine what criteria they use for identifying children as at-risk. These criteria may include: the child lives in poverty or is homeless, the child's parents are drop-outs, the child is limited English proficient or has health problems, the family has experienced violence, crime, or incarceration, or the child is being raised by extended family or a single parent.

School divisions may choose to operate the Virginia Preschool Initiative (VPI) program themselves, contract it out to another agency or some combination of the two. School divisions that may not have classroom space for preschool classes may decide to contract the program out to a not-for-profit organization such as the local YMCA or Office of Human Affairs. School divisions may also choose to contract VPI programs with for-profit preschool agencies. In some cases, the school division may decide it can operate some of the preschool classes within its own schools and may need to contract some of them out to another approved agency. School divisions are required to serve the number of identified at-risk four-year-olds in their school division and are funded accordingly. School divisions that do not serve the number at at-risk four-year olds that are identified by the Virginia Department of Education realize a funding amount that matches the number actually served (Virginia Department of Education, 2005).

*Required components of the Virginia Preschool Initiative*

The components of a high quality preschool program are well documented and researched (Espinosa, 2002; Bredekamp, Knuth, Kunesh, & Shulman, 1992; Clifford et al., 2005). According to Bredekamp, Knuth, Kunesh, & Shulman (1992), preschool curriculum needs to address the developmental needs of young learners, contain relevant learning experiences, have integrated subject matter, and be activity-based with many hands on learning experiences. In the National Research Council (NRC) 2001 report, *Eager to Learn: Educating our Preschoolers*, the following factors were identified as being important to preparing preschool children for kindergarten:

1. Professional development of teachers
2. Class size and student to teacher ratios to allow for individualized instruction
3. Positive relationships between students and teachers
4. Specific curriculum that is integrated and developmentally appropriate
5. Well supervised preschool programs
6. Length of the program

The 1993 report, *A Study of Programs Serving At-Risk Four-Year-Old Children*, conducted by the Virginia Board of Education, the Virginia Department of Education, and the Virginia Council on Child Day Care and Early Childhood Programs determined that characteristics similar to those identified in earlier research should be required for the Virginia Preschool Initiative. Some of these required components include a curriculum that is developmentally appropriate, a class size limit of 18 children with one adult for every eight children, teachers and assistants trained in early childhood development, and professional development for teachers, assistants, and administrators in the area of early

childhood development. The Virginia Board of Education also approved requirements for parent involvement, ongoing communication between home and school, family support services to include health care, transportation for children to and from school, and social services as needed. Student academic outcome assessments that include a variety of developmentally appropriate approaches, such as observations and rating scales, are also required by the Virginia Preschool Initiative (Virginia Department of Education, 2005).

Each locality may choose to run a full or half day program and funding is allocated accordingly. The preschool program must be at least the length of the school year although programs in their first year may be less than the length of the school year with funding reduced based on the actual number of days the program is in operation.

Teachers in programs operated by public schools must meet the criteria for “highly qualified” whereas teachers in community-based programs are only required to have an Associates Degree or Child Development Associate certificate. Instructional assistants working in the Virginia Preschool Initiative in a public school must meet the requirements of “highly qualified”. These requirements are to possess an Associate’s degree or a passing score on the ParaPro assessment. Assistants in a contracted preschool program must only possess a Child Development Associate Certificate (CDA), high school diploma, or GED (“Securing Access to Preschool Education”, 2005).

A steering or coordination committee is required by the Virginia Preschool Initiative Guidelines (Virginia Department of Education, 2005). The committee is responsible for overseeing the organizations and agencies that must work together with the lead agency (usually the school division) to ensure that students receive health care

services, social services, and other support services as needed. Children in the Virginia Preschool Initiative receive immunizations, screenings for vision and hearing, dental check ups, physicals, and support devices such as eyeglasses if needed. The committee that coordinates these services is required to meet regularly to ensure services are provided to the children and their families. School divisions must certify that they have established a steering committee and are meeting with the committee regularly.

*State evaluation required*

The Commonwealth of Virginia requires each participating locality to submit an annual application for funds for the Virginia Preschool Initiative. The application requires localities to provide information on:

1. the number of students served
2. teacher and assistant certification levels
3. the type of centers the program will be housed in (public school, not for profit centers, etc.)
4. the curriculum to be implemented
5. the assessment tool used to inform instruction
6. evidence of collaboration with other preschool programs
7. whether or not the locality uses free and/or reduced lunch as a criteria for student selection and eligibility for the preschool program

Localities must develop a preschool plan that addresses a quality preschool education, parental involvement, comprehensive child health services, comprehensive social services, and transportation (Office of Early Childhood Education, 2006). Funds for the program are available in July of the year the application is submitted. Localities

are required to submit an Interim Report in October and a Final Report in July after the school year concludes. The Interim Report requests information on the curriculum being implemented, teacher and student school start dates, professional development activities conducted to date, credentials of employees in the program who are not teachers or assistants, demographic information for each Virginia Preschool Initiative (VPI) classroom, and whether each classroom is housed in a public school or a community-based program center. The Final Report asks for information on the number of children served in the program during the school year, the number of classrooms in the program, the teacher and student start and end dates, and the credentials of the VPI teachers and paraprofessionals. There are no data collected on student assessment or achievement.

### *Definitions*

Preschool – for the purposes of this study, preschool is defined as a full or half day program that serves four year old children before they begin kindergarten, has a classroom component with curriculum that addresses specific learning goals for the students, facilitates the growth and development of the children, and does not serve only children identified as eligible for special education services (Gilliam & Marchesseault, 2005)

Served – children who are receiving preschool education services (Virginia Department of Education, 2005)

Unserved – according to the Virginia Preschool Initiative Guidelines, unserved means the child is not being served by the federally funded Head Start program or the Virginia Preschool Initiative (2005)

Prekindergarten (pre-K) – is used interchangeably with preschool throughout the research literature and often refers to programs whose sole funding source is at the state level (Schulman & Barnett, 2005)

Community-based Preschool – preschool programs that are not housed in public schools and are operating in the community centers by not for profit agencies or private providers that charge a fee for attendance (Holcomb, 2004)

State funded preschool – preschool programs that are paid for with state funds rather than flowing from federal funding sources such as Head Start and Title I (Barnett et al., 2004)

Childcare – provides supervision and looks out for the well-being of a child usually while the parent is at work; services may be provided in a center, with a relative, at home, etc. (Schulman & Barnett, 2005)

Reading readiness – the point in time when a child is prepared to benefit from early reading instruction and is also known as emergent literacy or early literacy (Matthews, Klaassens, Walter, & Stewart, 1999)

PALS-PreK – Phonological Awareness Literacy Screening PreKindergarten version (Invernizzi, Sullivan, Meier, & Swank, 2004)

Highly qualified – According to the Federal No Child Left Behind Act, teachers must have a bachelor's degree, possess a valid state license or certificate, and prove they know the subject they teach in order to be considered highly qualified (“New No Child Left Behind Flexibility”, March 2004).

### Significance of the Study

There is no published research on the benefits of the Virginia Preschool Initiative. In other states, high quality model preschool programs for at-risk four-year-olds have proven through years of research to provide benefits that are long term and long lasting. The positive effects include higher academic achievement in kindergarten and beyond, lower incidents of criminal behavior, less reliance on welfare, fewer instances of grade retention, and fewer referrals for special education services (Campbell et al., 2001; Nores et al., 2005; Reynolds et al., 2001; Weikart, 1988). The Commonwealth of Virginia has implemented a preschool program for at-risk learners that has many of the key elements necessary to positively impact the lives of preschool children who come to school without the background they need to be successful in kindergarten and beyond (“Securing Access to Preschool”, 2005).

Gilliam and Zigler (2001) conducted a meta-analysis of state prekindergarten program evaluations in 2001 that spanned 1977–1998. Their results indicated a need for further study of state preschool evaluations. They updated their study in 2004 (Gilliam & Zigler, 2004) and reiterated the need for quality state evaluations of state funded prekindergarten programs. This study fills a gap in one of the aspects of the preschool research that currently exists. Do at-risk four-year-olds who attend the Virginia Preschool Initiative have the requisite skills necessary to be ready to learn to read when they begin kindergarten? The results of this study will help school divisions in Virginia determine those factors that are positively correlated with achievement on the PALS-PreK program summary outcomes, provide information for policy-makers to justify the expenditure of limited resources and provide information useful to the State Board of

Education as guidelines and requirements are further defined for the Virginia Preschool Initiative.

### Conceptual Framework

This research study explores the theory that identified variables are related to the reading readiness skills of at-risk four-year-old preschool children (See Figure 1). The variables identified for the purpose of this study are length of the school day, teacher certification, preschool curriculum implemented, and the program sponsoring agency. For this study, reading readiness is measured by the PALS-PreK pre and post assessment. This assessment is given in the fall and in the spring of the preschool year. Additional information on the structure of the PALS-PreK assessment is found in Chapter Three of this dissertation.

## Conceptual Framework

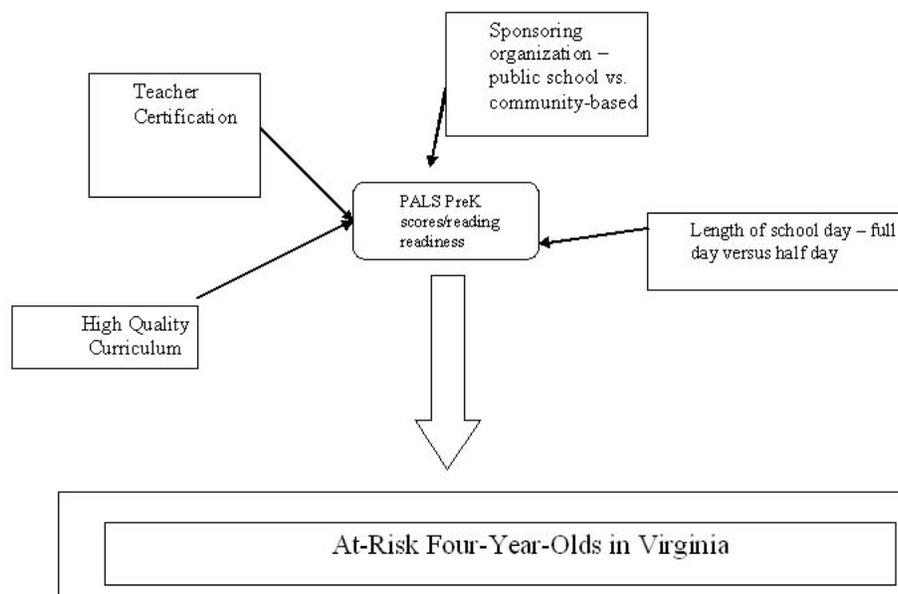


Figure 1 Conceptual Framework

## Limitations

The limitations in this study are based on the population served in the Virginia Preschool Initiative and the instrument used to determine reading readiness for kindergarten. The Virginia Preschool Initiative Guidelines specify that children served in the program must be identified as at-risk (Office of Early Childhood Education, 2006). While the guidelines provide a list of factors to consider when determining the school division's definition of at-risk, the state funds the program based on the number of four-year-olds in the city or county who are eligible for free and/or reduced lunch. School

divisions across the state of Virginia have a wide variety of factors that determine if the preschool child is at-risk. This wide range of factors provides a limitation for this study since the at-risk factors may have varying levels of impact on the academic achievement scores of at-risk four-year olds.

Young children are growing and developing at a very fast rate when they are four years old. They may demonstrate knowledge of a concept or mastery of a skill one day and not be able to demonstrate it the next day (Bredekamp, Knuth, Kunesh, & Shulman, 1992). There is a high degree of variability in the performance of young children. According to the 2001 report, *Eager to Learn*, “[the] first 5 years of life are a time of incredible growth, but the course of development is uneven and sporadic...”. This uneven pattern of growth and skill development in young children creates a limitation to this study.

## Chapter II

### Literature Review

This literature review provides a synthesis of the research conducted on preschool education and at-risk learners. The review is framed within the context of the four independent variables and the dependent variable proposed in this study. The independent variables are length of preschool day, teacher certification, specific curriculum model implemented in the program, and the program sponsoring agency. The dependent variable is reading readiness as measured by the Phonological Awareness Literacy Screening (PALS-PreK) pre and post program summary outcome scores.

#### *Historical Perspective*

Several European education pioneers influenced American preschool education. “The ideological origins of the American preschool movement can be traced to the religious, philosophical, political, industrial, scientific and technological revolutions that transformed Europe in the seventeenth and eighteenth centuries” (Beatty, 1995). American preschools relied on the works of well known theorists such as Jean Jacques Rousseau, Johann Pestalozzi, and Friedrich Froebel (Beatty, 1995). From Rosseau’s famous book, Emile, which was written in 1762 to Pestalozzi’s landmark book, How Gertrude teaches her children, came ideas about educating young children in ways that allowed them to explore and experience their environment (Osborn, 1980). As education of the youngest children moved from inside the home to outside the home in the early nineteenth century, the theories and ideas of revolutionary preschool practitioners such as Maria Montessori (who was also a physician) made their way into American preschools.

When Maria Montessori opened her famed Casa dei Bambini in Rome in 1907, it was designed for children of parents who worked long hours. These children were left unattended and unsupervised for the entire day while their parents worked. The tenement building owners were interested in creating a solution to their problem that would prevent damage to their buildings from mischievous unsupervised children (Braun, 1972). The parents had partial ownership in the school as it was considered part of their rent to help pay for the school and the teacher. Dr. Montessori fully believed that the ownership parents had in the school was critical to the success of their children and the school. In her inaugural address Dr. Montessori said, “The parents know that the ‘Children’s House’ is their property, and is maintained by a portion of the rent they pay. The mothers may go at any hour of the day to watch, to admire, or to meditate upon the life there” (Beatty, p. 117). Montessori’s work received a lot of attention when her school first opened, but did not become popular in the United States until the mid 1950’s (Braun, 1972).

Some of the earliest work with disadvantaged children began in Great Britain in the early 1900’s with the establishment of a nursery school for children by Margaret and Rachel McMillan. These sisters were concerned about the welfare of sick children in Great Britain who were receiving no care (Braun, 1972). They worked with very young children (ages 1-6) and mandated health and dental care, regular bathing, and parental involvement as key components to the children participating in their nursery school (Braun, 1972).

In the United States, the Ruggles Street Nursery School and Training Center was created in Boston, Massachusetts in 1922 by Abigail Eliot who had been to visit the school created by the McMillan sisters earlier. The Massachusetts center focused its

work on children in poverty and encouraged mothers to be actively involved in the education of their children (Beatty, 1995). Nursery school teachers were taught to reach out to the mothers on a regular basis and to hold informal conversations about their children's progress whenever possible. If mothers were unable to come to the school, it was not unusual for teachers to go to the homes to discuss children's progress and needs (Beatty, 1995). After many successful years as a nursery school, the Ruggles Street Nursery School became the Nursery Training Center of Boston and provided training in nursery school education for educators from all over the United States. Eliot's work with parents in the education of their children is considered to be the "...hallmark of effective modern childhood education programs" (Beatty, p. 145).

The federal government became involved in preschool education in 1933 with the establishment of nursery schools by the Work Projects Administration (WPA). The WPA's plan was to assist unemployed teachers and others during the Depression and to help children who were suffering from the physical and emotional effects of the Great Depression (Braun, 1972). During this time period, over 3,000 nursery schools were established with over 61,000 children enrolled (Osborn, 1980). In 1942, Congress passed the Lanham Act which provided funds for childcare outside of the public school system. Increasing numbers of women were in the workforce as a result of World War II and many women needed care for their small children while they went to work each day (Braun, 1972). The success of the WPA nursery schools led to the eventual creation of the Federal Head Start Program in 1965. This was the first federal program to focus on the preschool education needs of children in poverty as well as their healthcare and nutritional needs (Braun, 1972). In its first year of operation, Head Start enrolled

“652,000 children in 2500 centers employing 41,000 teachers and using over 250,000 other workers including volunteers” (Osborn, p. 149). Following the first year of operation, then President Lyndon B. Johnson announced that Head Start would become a permanent program and would operate on a year round basis (Osborn, 1980). Edward Zigler, who is often called the Father of Head Start, was appointed to the group that oversaw and researched the federal Head Start Program’s inception and implementation (Beatty, 1995). Much of the research on Head Start and preschool education has been conducted under his supervision and will be explored in another section of this dissertation.

The first state-funded preschool education program appeared in Wisconsin in 1848, when the state legislature approved a constitutional amendment that required all Wisconsin public school districts to provide education to children ages 4-20 in all of its public schools (The Expansion of Early Childhood Programs, 2005). This initial step into state funded preschool education has since expanded and now includes 40 states.

The European influence on preschool education continued in the early 1990’s when the schools of Reggio Emilia, Italy began to appear in the United States although the schools first appeared in Italy in 1963 (“Municipal Infant Toddler Centers and Preschools of Reggio Emilia”, n.d.). These schools emphasize the importance of the child’s development and his associations with those around him “...through the hundred languages of doing, being, reflecting, and knowing” (“Municipal Infant Toddler Centers and Preschools of Reggio Emilia”, n.d.). Reggio Emilia schools include collaboration of the staff in each school, family involvement and the team that focuses on each child’s individual development and/or special needs. The schools are award winning and often

visited by teachers and researchers from all over the world (“Municipal Infant Toddler Centers and Preschools of Reggio Emilia, n.d.).

Public preschool programs for children at-risk of school failure were developed to provide a level playing field for the children as they began formal school in kindergarten. It was believed that these experiences would ensure success in later years as well (Frede & Barnett, 1992). The question that existed was not only whether or not the benefits would exist but also whether or not they would last over time (Frede & Barnett, 1992). Programs like Head Start were funded by the federal government and created in the 1960’s for economically disadvantaged at-risk students to obtain the background experiences needed for later school success (Denton, 2001)

Preschool education programs continue to evolve based on the needs of the four-year-old child (Bloch, Seward, & Seidlinger, 1989, p. 17). Research that supports the implementation of quality preschool programs, including landmark studies, to positively impact the academic achievement of at-risk students is explored in the next section of this paper.

### *Landmark Studies*

This section highlights three landmark studies in preschool education. These studies are widely accepted as the foundation for quality preschool education in the United States. They emphasize the critical elements that ensure a quality preschool experience and that have lasting effects on at-risk students. The critical elements include the variables in this study: length of school day, the curriculum implemented in the program, teacher certification, and the agency that sponsored the preschool program.

The High/Scope Perry Preschool Project, the North Carolina Abecedarian Project and Chicago Parent Centers all have their roots in helping children who come from disadvantaged backgrounds to succeed in school beyond the preschool experience (Schweinhart & Weikart, 1997; Reynolds, 1991; Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001). Each of these studies resulted in additional research that took a look at the long term effects of preschool education throughout the public school years and into adulthood (Schweinhart & Weikart, 1997; Campbell et al., 2001; Weikart, 1988; Reynolds, 1991; Reynolds, Temple, Robertson, & Mann, 2001; Nores, Belfield, Barnett, & Schweinhart, 2005). Because of their importance, each study will be reviewed and key findings will be identified.

#### *High/Scope Perry Preschool Project*

The original High/Scope Perry Preschool study began in 1967 in Ypsilanti, Michigan and included 123 children who were from low income environments. Researchers randomly assigned less than half (58) to preschool and slightly more than half (65) to a group that did not attend preschool (Weikart, 1988). The group that attended preschool received the child-centered High/Scope Curriculum (Weikart, 1988). The curriculum was designed to encourage students to plan and to follow through with plans they made in order to teach them to make good decisions (Weikart, 1988). Another key component to the Perry Preschool Project was parent involvement. Parents were required to participate in weekly home visits that lasted 1.5 hours each. The home visits were designed to help the parents work closely with their child and extend the lessons learned during class that week (Weikart, 1988; Schweinhart & Weikart, 1997).

The original researchers followed these children up to age nineteen. Their results indicated that 67% of the children who attended preschool graduated from high school compared to 49% for the group that did not attend preschool. Also, 50% of the preschool group had jobs at age nineteen compared to 32% of the non-preschool group. The non-preschool group was less satisfied with their work (26%) than the preschool group (42%) and was more likely to have been arrested for criminal acts (51%) than the preschool group (31%). Other results showed that the non-preschool group was more often identified as mentally retarded and receiving public assistance (Weikart, 1988, p. 31).

Follow-up studies have been conducted based on this initial research. One such project was called the High/Scope Preschool Curriculum Comparison Study and was designed to look at which of three preschool curriculum models was most successful for children who were considered to be at or below the poverty level. Each of the curriculum models was operated with high standards and included, "A well-developed and validated curriculum, a system of supervision and ongoing in-service training, a cooperative team of adults who plan carefully for each day, an on-going evaluation system, and a strong parent involvement program" (Weikart, 1988, p. 33).

There were 68 children from Ypsilanti, Michigan (ages three and four) who were identified to participate in the curriculum study between 1967-70. These children were randomly assigned to one of three curriculum models using stratified random assignment. The curriculum models used were High/Scope, a traditional nursery school program and the Direct Instruction Model. Prior to beginning their assigned pre-school program, each child was administered the Stanford-Binet Intelligence Test. The children attended their assigned pre-school program five days a week for 2.5 hours daily and parents were

required to participate in 1.5 hour home visits every two weeks (Schweinhart & Weikart, 1997).

Each curriculum model had distinct differences. The High/Scope curriculum model and nursery school model emphasized student decision-making and planning. In High/Scope, students were required to make a plan for their activities each day and teachers held them accountable for their plan. This encouraged responsibility, initiative and problem solving (Weikart, 1988; Schweinhart & Weikart, 1997). The nursery school model was child-centered and teachers encouraged students to participate in free-play activities as well as respond to lessons planned by the teacher. The Direct Instruction model was built upon teacher directed instruction in which the teacher initiated instruction and questions and the children responded (Weikart, 1988). The results of this curriculum model study indicated that students who participated in each of the pre-school programs exhibited increases in IQ scores as measured by the Stanford-Binet Intelligence Test at the end of the preschool year. The average IQ gain score was about 27 points (Schweinhart & Weikart, 1997). These gains became smaller as the children grew up and further studies were conducted. The researchers concluded that high quality preschool programs were equally effective if they were well implemented and contained specific components of quality preschool programs (Schweinhart & Weikart, 1997).

Follow up studies were conducted when the students from the original study turned 15 and then again at 23 years of age. At age 15, there were very few academic differences between the three curriculum model groups, but some social differences began to emerge (Schweinhart & Weikart, 1997). Children who participated in the Direct Instruction model were more likely to have broken rules or committed crimes than those

who had participated in the High/Scope or nursery school curricula (Schweinhart & Weikart, 1997). When the researchers looked at this group again, at age 23, 52 participants of the original 68 participated in the follow-up study. There were 19 from the Direct Instruction group, 14 from High/Scope and 19 from the nursery school group. Of the Direct Instruction group, 68% were African American and 53% were female. The High/Scope group was 86% African American and 64% female while the nursery school group was 63% African American and 58% female.

An analysis of variance and chi-square were used to test the differences in the mean ranks of the different groups (Schweinhart & Weikart, 1997). This study contained both categorical and continuous variables so both types of analyses were utilized. Since the groups were randomly assigned, the only variable that was controlled for in the analysis was gender.

The results of a review of the participants' school records revealed that the High/Scope group had the highest number of years planned to go to school (16.3), yet each had a similar number of years of schooling actually completed. High/Scope had 12.4 years completed, the nursery school group had 12.7 years completed, and the Direct Instruction group had 12.2 years of school completed when interviewed at age 23. Students' special education records were also reviewed for this follow up study and 47% of the students in the Direct Instruction group spent 1-2 years in special education while only 20% and 13%, respectively, of the students in High/Scope and the nursery school group participated in special education. Direct Instruction students failed an average of 9.6 classes while the High/Scope students failed an average of 5.0 classes and the nursery school students failed an average of 4.9 classes (Schweinhart & Weikart, 1997).

Two other areas that were studied in this follow up were the level of community involvement as measured by participation in community activities and the amount of misconduct that was reported at the time of the interview. The students in the High/Scope program reported that 43% of them had participated in volunteer work, that 62% of them were registered to vote and that 62% had voted in the last Presidential election. The nursery school group reported that 44% had participated in volunteer work, 56% were registered to vote and only 22% had participated in the last Presidential election. The Direct Instruction group reported that only 11% of them had participated in volunteer work, only 37% were registered to vote and 21% had voted in the last Presidential election. In the area of misconduct, the High/Scope group reported that they had committed 5.3 acts of misconduct by age 23, while the Direct Instruction group reported 8.7 acts and the nursery school group reported 9.9 acts of misconduct. Students in the Direct Instruction group had also been expelled from high school at a higher rate than the other two groups with 16% of students being expelled as compared to only 7% of the High/Scope group being expelled and only 5% of the nursery group being expelled. Nursery school attendees had never been suspended from work while the High/Scope group had been suspended 0.1 times and the Direct Instruction group 0.6 times. The Direct Instruction group reported that 11% had been suspended from work three or more times by age 23 (Schweinhart & Weikart, 1997).

The last area examined in this follow up study was the arrest records of each of the participants. The Direct Instruction group averaged 3.3 arrests while the High/Scope group averaged 1.7 arrests and the nursery school group averaged 1.3 arrests. According to the results, the Direct Instruction group had the most felony arrests and more arrests

than the other two groups for thefts involving property such as breaking and entering, car theft, etc. This group also had more arrests for assault with a deadly weapon (Schweinhart & Weikart, 1997).

The most recent follow-up study on the High/Scope Perry Preschool Program was a cost benefit analysis and took place in 2005 as the original participants turned 40 years old. This study was able to collect complete data on 119 of the participants (56 of the preschool group and 63 of the no preschool group). These data indicate that by age 40, the preschool group was more likely to have graduated from high school and more likely to have post high school education. An interesting fact in this study was that females were "...one-third as likely to be a high school drop-out [by age 27] with further attainment of associate, bachelor's or master's degrees by age 40" (Nores et al., 2005, p. 247). The study also analyzed the participants' earnings, arrests, and welfare status at age 40 and determined that program participants were more likely to be employed (70% of program males were employed and 53% of non-program males were employed) and less likely to be involved in acts of crime. However, women who participated in the program were more likely to be welfare recipients (59 months as compared to 24 months for those who did not participate in the program) than those who did not participate in the program. The data on males indicated that those who were part of the preschool program reported only being on welfare for an average of 4 months while those who were not in the program report being on welfare an average of 28 months (Nores et al., 2005).

In summary, the researchers indicate that there are positive results for both participants and the public with the High/Scope Perry preschool model. The economic advantages in providing quality preschool programs for children at risk such as the Perry

Preschool Program are many and result in long term financial benefits for participants and the general welfare of the public. The economic impact of this study indicated a return of approximately \$12.90 for every dollar invested of public funds (Nores et al., 2005).

#### *North Carolina Abecedarian Project*

The North Carolina Abecedarian Project began in 1972 following the initial success of the High/Scope Perry Preschool Project. There were 111 infants selected to participate in the project. These children were considered to be at-risk based on factors such as family income, mother's educational level, etc. There were 59 girls and 52 boys in this group and 98% were African American. The infants were randomly assigned to two different groups, a treatment group and a control group. The treatment group (57 infants) received early school care beginning at approximately four months old. The center was open all day long and was staffed by quality personnel and had low infant to teacher ratios (3 to 1 for infants). The early childhood program was run year round and children had experienced five years of the program when they began kindergarten. The preschool curriculum was very well focused and designed to enhance and enrich cognitive skills, motor and language development, and early reading readiness skills. In order to reduce the effect that nutrition may have on cognitive development, babies who were in the control group were given iron-fortified formula until 15 months of age. The families of these babies also received free disposable diapers as an incentive to participate (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Denton, 2001).

Results of this study indicated that students who were in the treatment group had higher IQ scores when they were assessed as preschool students and at ages 6.5, 8, 12, and 15 than the control group. The treatment group also scored higher on standardized achievement tests than those who were in the control group (Campbell et al., 2001; Denton, 2001)

The long term effects of this project were measured when the participants turned 21 years of age. Just as with the High/Scope Perry Project, a large number (104 of 111) of the original participants were available and agreed to participate in the follow-up study. The participants were administered the Wechsler Adult Intelligence Scale-Revised and the Woodcock-Johnson Psycho-Educational Battery to measure both IQ and academic achievement (Campbell et al., 2001).

Data were analyzed using hierarchical linear models to estimate the individual and group growth curves over time. In addition, estimates for individual children's growth curves provided a comparison for each child for both intellectual growth and academic achievement growth (Campbell et al., 2001).

Participants in the treatment group continued to show the same kinds of benefits over the control group that were evident when the groups tested previously. The treatment group scored higher than the control group on the IQ assessment although both groups reflected a slight decline over time by age 21. The reading and math achievement levels for the treatment group were also higher than the control group's scores although both groups showed a decline in achievement scores when tested at 21 years of age (Campbell et al., 2001).

The Abecedarian Project examined the relationship between early intervention, structured pre-school experiences and academic achievement of at-risk learners. The long-term results of this study indicate that those who participated in this early treatment program experienced an increase in cognitive and achievement scores as compared to those who did not participate. The increase in cognitive growth persisted to age 21 (Campbell et al., 2001). The structured experiences provided to its participants, the quality of the teachers involved in the program, the support provided to parents, and the child health care services rendered make this a robust study that is considered by researchers to be a landmark study in preschool education for at-risk students (Campbell et al., 2001; Denton, 2001).

#### *Chicago Child-Parent Centers*

The Chicago Child-Parent Centers were established with Title I funding specifically for children in poverty and at-risk of school failure who lived in Chicago in the mid 1960s (Reynolds, 1991). Parents of eligible children voluntarily enrolled in the program in their neighborhood (Reynolds, 1995). One of the main differences in this study from the High/Scope Perry Project and the North Carolina Abecedarian Project was the funding source. Chicago Child-Parent Centers were publicly funded. The funding came from the federal Title I program and the Child-Parent Centers were located in neighborhoods that were considered to have high levels of poverty. These centers were also different from the Perry Preschool Project and the Abecedarian Project because Child-Parent Centers were closely connected to public schools. They were physically part of the public school although they may have been located in another wing of the building. In addition to preschool classrooms for children, there was also a parent

resource center in each Child-Parent Center. Another difference between Child-Parent Centers and the High/Scope Perry Project and North Carolina Abecedarian Project was the program offered up to six years of services to children and families since children could begin the program at age three and stay until they turned nine years of age. Curriculum in the preschool Child-Parent Centers was not implemented uniformly across all centers, although curriculum components were the same. The curriculum focused on developing pre-reading skills, appropriate social behavior, oral communication and listening skills in children. This lack of emphasis on a uniformly delivered curriculum is another difference between Child-Parent Centers and the High/Scope Perry and North Carolina Abecedarian Projects (Reynolds, 1998).

Results of the Child-Parent Center initiatives indicate that the program has positive effects for children academically and socially (Reynolds, 1991; Reynolds, 1995; Reynolds, Temple, Robertson, & Mann, 2001). Kindergarten students were tested for school readiness when they entered kindergarten and for reading readiness at the end of the kindergarten year. They were tested for achievement in math and the teacher completed a checklist on each child's adjustment to school at the end of the kindergarten year. In grades one through six, students took the Iowa Test of Basic Skills in reading and math to determine academic achievement in these two subject areas.

The results of the teacher checklists and achievement tests indicate that although the results were low for all groups (those who attended the preschool program and those who did not), those who participate in the Chicago Child-Parent centers scored higher on all measures (Reynolds, 1998). Children who participated in the Child-Parent Centers

had fewer incidents of grade retention and were identified less often as eligible for special education services. These differences were statistically significant (Reynolds, 1998).

In 2001, another follow-up study was completed on the 1539 children who were born in 1980 and participated in the Chicago Longitudinal Study. This time, researchers looked at educational achievement and arrest records of the children who were 20 years old at the time of the follow-up study. The results indicate that students who participated in the preschool program had fewer incidents of criminal behavior (as measured by arrests) and had achieved higher levels of education, were less likely to drop out of school and less likely to be identified as eligible for special education services (Reynolds et al., 2001). Reynolds said it best when he wrote, “These findings are among the strongest evidence that established programs administered through public schools can promote children’s long-term success” (Reynolds et al., 2001).

Similarities between the three high quality preschool programs outlined in this section include a focus on high quality preschool education for at-risk students, teacher quality, health services for the children, full day programs with before and after school care, and an emphasis on parent involvement and supporting the families of children involved in the study (Weikart, 1988; Reynolds et al., 2001; Campbell et al., 2001).

#### *State Preschool Perspective*

The numbers of children served in state sponsored preschools is growing. According to Steven Barnett, Director of the National Institute for Early Education Research, the number of children served in preschool programs funded by states grew by 100,000 children between 2002 and 2005 (Barnett & Robin, 2006). Increasing numbers of state legislatures are authorizing money for state funded pre-school programs that

target at-risk student populations. In 2002-03, 38 states funded one or more state prekindergarten initiatives serving nearly 740,000 children (about 45,000 more than the previous year). Currently, only 10 states do not invest some funds in state operated preschool programs and the number of children served in state funded programs is approaching 900,000. This is more than are being served in the federally funded Head Start program (Barnett et al., 2004).

States are increasingly more aware of the need to provide quality preschool programs for children to prepare them for the rigors of kindergarten (Barnett et al., 2004). Despite the state legislatures' awareness of the need, the number of children served does not match the need for services and the funds they are authorizing is not enough to fully serve the population that needs preschool education (Barnett & Robin, 2006). According to Barnett and Robin (2006), state spending on preschool education was about 1 percent of the total K-12 education budget in 2004-2005. This amount is an average and varies depending on the state as some spend more than others on preschool education. States that spend more money on state sponsored programs bear the cost of the programs while some rely on federal funding to cover the majority of the costs associated with the program (Barnett & Robin, 2006). Another cost related issue is whether the program is full or half day in length. States that offer half-day programs may serve more children and spend less money than those that offer full day programs (Barnett & Robin, 2006).

There is a wide range of state preschool programs offered and it varies from state to state and in some cases one region of the country to another. According to the National Center for Education Statistics (NCES), findings from their study on *The Regional Differences in Kindergartners' Early Education Experiences* (Rosenthal, et al.

2005) show that kindergarten students are more likely to have attended a preschool program if they lived in the South or Northeast rather than the West. The report also states that preschool students in the south are more likely to have spent more hours in preschool than those who attended preschool in any other region in the United States (Rosenthal et al., 2005).

The state of New Jersey is currently under order from the New Jersey Supreme Court to implement programs to serve the at-risk children living in urban areas in New Jersey. The case, *Abbot v. Burke*, was a landmark class-action case that has resulted in the state of New Jersey providing quality education for its neediest children across the state. Licensure requirements for preschool educators that require a bachelor's degree in education translate into approximately 90 percent of New Jersey preschool educators possessing at least a bachelor's degree (Holcomb, 2004). This court case also determined that the preschool programs in the state of New Jersey had to have specific classroom standards and guidelines for instruction along with collaboration with private preschool providers. This collaboration allows an ongoing dialog between public and private preschool teachers and administrators about issues such as behavior management, curriculum, health care services, and instructional strategies (Holcomb, 2004). The Office of Early Childhood Education, created at the New Jersey Department of Education, is in charge of establishing the rules and guidelines for preschool programs in the state of New Jersey, disseminating the funds authorized by the New Jersey legislature, and monitoring the quality of programs offered by the local school divisions (Holcomb, 2004).

According to Gilliam and Zigler (2004), 58% of state-funded prekindergarten programs that have conducted evaluations require teachers to have at least a bachelor's degree compared to states that have not completed evaluations of their state-funded prekindergarten programs where only 30% require a bachelor's degree for teachers. They also found that states that had conducted evaluations were more likely to require programs to operate on a full day or school day schedule (45%) as opposed to 20% for states that had not conducted evaluations. These two variables (length of school day and teacher certification) are important considerations in this research study.

#### *Achievement of At-risk Preschool Students*

Successful preschool programs for at-risk children have several common program characteristics. These include parent involvement, comprehensive health and social services, full day year round services, teachers with at least a bachelor's degree and certification to teach preschool children, a high quality curriculum, professional development for all preschool staff, and a rigorous program evaluation (Gormley & Phillips, 2003; Schweinhart & Weikart, 1997; Reynolds, 1998; Campbell et al., 2001).

The state of Oklahoma is one of three states that offer a preschool program to all four-year-olds. The other two are New York and Georgia (Gormley & Phillips, 2003). Oklahoma's universal preschool program is operated by local school districts, whereas Georgia and New York rely on private providers as well as the public schools to administer their preschool programs. According to Gormley and Phillips (2003), Oklahoma school districts partner with federal agencies such as Head Start and private day care providers to provide preschool services to its children. Oklahoma requires its teachers to be highly qualified and pays them a salary that is commensurate with K-12

teachers. This requirement has resulted in a lower turnover of staff and more consistency in the program (Gormley & Phillips, 2003). Oklahoma does not require a specific curriculum in its preschool classrooms and leaves the decision of what to teach to its teachers and administrators within each school division. School divisions may opt to offer full-day or half-day preschool programming and they are funded accordingly. A study of the Tulsa, Oklahoma preschool program revealed that participants generally saw an increase in academic achievement with Hispanic children demonstrating the most growth. Another outcome of this study was that Hispanic and Black children showed the most growth in academic achievement while enrolled in full day programs as compared to half-day programs. There was no statistical difference for White children regarding length of the school day. The Tulsa program serves at-risk children with 77% on free or reduced lunch. Students who were on free lunch performed better in a full day program while students who did not receive free or reduced lunch performed better in the half-day program (Gormley & Phillips,2003).

Gormley and Phillips (2003) noted that although Tulsa Public Schools contracted with Head Start to operate some of its preschool centers, they required Head Start teachers to meet the same certification requirements as Oklahoma public school preschool teachers. This led them to hypothesize as to the positive impacts Head Start was having on the at-risk preschool children that they were serving. No data were available to support or refute this hypothesis in this study.

Barnett (1998) reviewed 38 studies that focused on the long term effects of early childhood who lived in poverty. The results of his review indicate that academic achievement is positively impacted by early childhood programs although they do not

appear to be long lasting. Barnett attributes this to methodological flaws in the studies. He also looked at the impact of public school programs versus those that are considered to be model programs such as the High/Scope Perry Curriculum Model. Barnett also determined that students who participated in model programs had decreased rates of eligibility for special education and retention in grade but about the same effect on graduation from high school. He summarized his findings with policy implications and indicated that, "...every child living in poverty in the United States ought to be provided with at least one year of quality education prior to school entry in a part-day preschool education program or a full-day developmental childcare program rich in cognitive interactions between teachers and children" (Barnett, 1998, p. 207).

The National Center for Children in Poverty (NCCP) issued a policy brief in September, 2006 entitled *Effective Preschool Curricula and Teaching Strategies* (Klein & Knitzer, 2006). The brief is a synthesis of research on effective curriculum models and their impact on the academic achievement of at-risk preschool learners. The research indicates that at-risk preschool children demonstrate increased achievement in reading and math when they are involved in an "intentional curriculum" and when teachers are involved in effective professional development and training (Klein & Knitzer, 2006). The authors define an intentional curriculum as:

...research-based, emphasizes teachers actively engaged with children, includes attention to social and regulatory skills, is responsive to cultural diversity and English language learners, is not teacher-proof, and requires new ways to measure classroom quality, teacher effectiveness, and student progress. (Klein & Knitzer, 2006, p. 4)

The authors also note the importance of providing teachers with high quality instructional strategies along with a high quality curriculum and enrolling at-risk preschool children in early learning programs that are full day (Klein & Knitzer, 2006). This policy brief does not identify specific curricula that is recommended for preschool programs, however, it does outline the importance of a curriculum that focuses on reading and math as well as language development, higher order thinking skills, and social skills (Klein & Knitzer, 2006). Ellen Frede and Debra J. Ackerman (2007) wrote about the importance of implementing high quality preschool curriculum and raised the possibility that no single curriculum model addressed the needs of all at-risk preschool children. They noted that not all curriculum models have been formally evaluated nor has any single curriculum model proven to be the best for all at-risk preschool learners (Frede & Ackerman, 2007). Their findings support the need for a curriculum model that addresses the developmental, learning and social needs of young children, the need for parent involvement, the need for appropriate assessment for preschool children and meaningful training and professional development for teachers (Frede & Ackerman, 2007).

The location of a preschool program or the preschool program sponsoring agency is another variable that has potential impact on preschool at-risk student achievement. Generally, preschool programs operate in public schools, in private preschools, and in not-for profit centers such as Head Start (Clifford et al., 2005). Magnuson, Meyers, Ruhm, and Waldfogel (2004) analyzed data from the Early Childhood Longitudinal Study – Kindergarten Class of 1998-99 (ECLS-K). After controlling for other variables that impact student achievement, the results of this study indicate that children in

prekindergarten classes experienced the largest gain in reading achievement. Students in preschool programs showed the next largest gain. Students in center-based daycare programs demonstrated the least amount of gain, but had a larger reading achievement gain than children who had stayed home with parents the year before kindergarten. Effect sizes for this study were around .15 and slightly larger for at-risk students at .20 in the area of reading achievement. This study did not look at the curriculum implemented in prekindergarten, preschool or center-based programs and the authors acknowledge that increases in student achievement may be seen if the programs analyzed used the same high quality preschool curriculum. Magnuson, et al. (2004) state that the gains in reading achievement for prekindergarten children in this study may be due to prekindergarten classes that are housed in public schools and held accountable to guidelines and standards of the public schools.

Another variable that appears to impact at-risk student preschool achievement is if the program is a half or full day program. Robin, Frede, & Barnett (2006) studied 294 children who had been randomly assigned to attend either full or half-day public preschool programs. Each class was taught by a certified teacher and had the support of an instructional assistant. The High/Scope curriculum was implemented in each classroom. The results of the study are based on 77 children who participated in full day programs and 217 who participated in half-day programs. The children were a majority Hispanic and African-American and considered at-risk due to their families living in poverty (more than 20 percent). The study took place in a school division in New Jersey after the Abbott v. Burke case had been decided.

The researchers looked at reading and math achievement and if there were gains, whether or not the gains made lasted beyond kindergarten. The results of this study support the hypothesis that full day preschool programs are more beneficial to at-risk children than half-day programs (Robin et al., 2006). Children in the full day program group scored higher on standardized reading and math achievement assessments administered at the end of the kindergarten year than those in the half-day group. The researchers acknowledged that the pre-assessment was given late into the preschool year (two months after school began) and this may have had an impact on the pre-assessment scores since children had been exposed to two months of the preschool program before the pre-assessment was administered. This is true of both the full and half-day programs. It is evident that those in the full day program received more exposure than those in the half-day program prior to the pre-assessment. Robin et al. (2006) recommend further research in the area of length of preschool program day, but feel their results point to substantial benefits for at-risk children who participate in a full day preschool program.

The research on teacher qualifications for preschool programs generally supports the need for preschool teachers to have at least a Bachelor's degree with training in early childhood education (Whitebook, 2003; Barnett, 2004). The research on teacher effectiveness in preschool programs indicates that preschool children who are in classrooms with teachers who possess at least a Bachelor's degree and specialized training in early childhood education are better prepared to enter kindergarten (Whitebook, 2003; Barnett, 2004). According to Whitebook (2003), who analyzed eight studies on this topic, children who have been in classrooms with teachers who possess at least a Bachelor's degree and specialized training in early childhood education have

higher language scores when they enter kindergarten and are better prepared to begin formal instruction in early reading skills. Barnett (2004) agrees with this finding and goes on to say that preschool programs must require at least a Bachelor's degree and training in early childhood education and must compensate preschool teachers for their education and training. Barnett's synthesis of the research conducted in this area states that a preschool teacher with at least a Bachelor's degree and specialized training in early childhood programs are essential in helping preschool children grow and gain the skills necessary to be successful in kindergarten and beyond. However, a recent study refutes the previous research in this area. Early et al. (2007) reviewed seven studies of teacher degree requirements and preschool student achievement. The results of their study appear to refute earlier findings and state that requiring preschool teachers to have at least a Bachelor's degree does not improve classroom quality or academic achievement of preschool children. The researchers looked at data from seven studies conducted previously and applied a consistent statistical analysis to each one. Their findings do not support the requirement that preschool teachers possess at least a Bachelor's degree and have specialized training in early childhood education. They found little or no association between the degree requirement and academic achievement scores on the pre-reading assessment administered in each study (Early et al., 2007). The authors indicate a need for further research on this topic (Early, et al., 2007).

In summary, the research on preschool programs for at-risk children tends to demonstrate positive impacts on student achievement when preschool programs are full day, require highly qualified teaching staff, implement high quality preschool curriculum, and are operated under the guidance of the public schools (Robin et al., 2006; Ackerman

& Barnett, 2005; Magnuson et al., 2004; Schweinhart & Weikart, 1997). More research on these variables is needed to determine if these variables impact reading readiness in at-risk preschool children as they begin kindergarten.

### *Reading Readiness*

Developing strong pre-reading skills at an early age can prevent reading difficulties as children progress through their education (Pullen & Justice, 2003). The role that preschool education plays in the development of these pre-reading skills is crucial, especially with at-risk learners (Pullen & Justice, 2003). As preschool personnel develop curriculum to ensure that children develop necessary pre-reading skills, attention must be paid to phonological awareness, print awareness and oral language development (Pullen & Justice, 2003). The activities and lessons that teachers plan and implement in a preschool setting provide a prime opportunity to develop the background experiences necessary for the development of these skills. The nature of preschool classrooms allows for multiple opportunities to enrich preschool children's oral language skills, awareness of letters and the sounds they make, and knowledge of print. Knowledge of print includes the awareness that letters make up words, that we read from left to right, that words on a page tell a story, that the white areas on the page represent breaks between words and/or thoughts, and that stories may continue on to the next page (Pullen & Justice, 2003). According to the National Reading Panel's 2000 report, *Report of the National Reading Panel: Teaching Children to Read*, the primary focus on early literacy learning for preschool children are alphabets, fluency and comprehension. These areas are closely related to phonological awareness, oral language skills, and knowledge of print and are important components in a preschool program that is focused on developing

children's early literacy skills and beginning reading skills (National Institute of Child Health and Human Development, 2000; National Research Council & Institute of Medicine, 1998).

Current research states the importance of the preschool period in developing early literacy skills and the connection to later reading skills (Bredekamp, Knuth, Kunesh, & Shulman, 1992; National Research, 2001). Specifically, the focus on discrete skills such as phonological awareness and knowledge of print reveals that the experiences preschool children have in this area are critical to their success in subsequent school years and in the area of reading. Reading serves as the basis for success in other academic subjects and lays the foundation for further learning (Molfese et al., 2006; Lonigan, Burgess, & Anthony, 2000).

At-risk preschool students demonstrate significant gains in emergent literacy skills after just one year of preschool experience. These pre-reading skills that children begin kindergarten with enable them to learn to decode words, experience environmental print, and begin the process of learning to read (Molfese et al., 2006). These early literacy skills lead to children being successful readers as they begin kindergarten.

### *Opponents to Preschool*

Despite the volume of research on early intervention programs such as preschool for at-risk students, there are those who do not favor the time or funding to provide extensive preschool programs for at-risk learners. Olsen (1999) reviewed the efforts states made prior to the article's publication to implement universal preschool programs and challenged the findings of several landmark studies including the Perry Preschool Project. The author disputes the federally funded Head Start program and states the

program "...has been a failure" (Olsen, 1999, p. 2) since it was created and does not demonstrate positive impact on student achievement among poor children. Based on the author's interpretation of program results, she states that government must not sponsor preschool programs financially and should remain "...neutral with regard to early intervention...it is not the province of the state to educate young children" (1999, p. 21).

In their review of data from the Early Childhood Longitudinal Study Loeb, Bridges, Bassok, Fuller, & Rumberger (in press) found that children who attended preschool had increased levels of student achievement in reading and math but had negative results in social behaviors. The results further demonstrate that the earlier the child enters a center-based preschool program (before age two) the higher the math and reading achievement scores become while negative social behaviors increase at the same rate. At-risk children who enter preschool at age two or three achieve more and display less anti-social behavior than children who enter preschool before the age of two (Loeb et al., in press).

Opponents to preschool point to the negative side effects of beginning preschool education early and refer to the Loeb et al. (in press) research when making their point. States that are looking at implementing universal preschool for all children may use this to point to a reason why universal pre-K is not a good idea. For this study, it is important to look at both sides of the issue to understand the full picture of preschool education for at-risk learners. Including the views of preschool opponents in this literature review helps to present a fuller picture of preschool education in the United States.

## Chapter III

### Methodology

This chapter explains the research topic and outlines the research questions. It also provides details on the data collection procedures, the methodology, and the population used in the study. The sampling procedure is outlined and a detailed description of the sample is provided.

The purpose of this research study was to determine the relationship between four specific structural variables in the Virginia Preschool Initiative and the PALS-PreK pre and post test program summary scores. The four structural variables are length of the preschool day, teacher certification, the curriculum implemented in the preschool program, and the preschool program sponsoring agency. The results of this study identify those structural variables that appear to influence the PALS-PreK pre and post program summary scores.

#### *Research Questions*

Research questions frame a study and are the core of the research. Good research questions provide answers to the gaps in research on a particular topic (Lauer, 2006). They also identify the data and method of analysis that is used. The research questions for this study were:

1. What is the relationship between the length of the preschool day and pre and post program summary scores on the PALS-PreK assessment?
2. What is the relationship between teacher certification and pre and post test program summary scores on the PALS-PreK assessment?

3. What is the relationship between the curriculum implemented and pre and post test program summary scores on the PALS-PreK assessment?
4. What is the relationship between the agency that sponsors the preschool program and pre and post test program summary scores on the PALS-PreK assessment?

The results of these research questions provide information to policy makers who allocate resources to preschool programs in Virginia and create policy and guidelines related to preschool experiences for at-risk learners that will enable them to refine the existing Virginia Preschool Initiative. These results also provide useful information to the State Board of Education as guidelines and requirements are further defined for the Virginia Preschool Initiative. Possible impacts might include new regulations regarding the length of the preschool day, teacher certification, preschool curriculum implemented and/or the sponsoring agency for the preschool program.

### *Population*

The study population includes the public school divisions in Virginia that participated in the Virginia Preschool Initiative for at-risk students and met the criteria for this study in 2005-06. The sample technique used is purposeful sampling. Purposeful sampling is defined as selecting a sample based on specific predetermined criteria that fit the research study (Sowell, 2001). This strategy allowed the researcher to select school divisions that met the identified criteria. The criterion for inclusion in the proposed study was that a school division have 100% implementation of each of the four structural variables in their preschool programs. The identified criteria were analyzed and

correlated with PALS-PreK pre and post program summary outcomes to provide answers to the research questions.

There were 100 participating public school divisions of the 122 eligible to participate in the Virginia Preschool Initiative in 2005-06. The 100 participating school divisions served over 11,500 at-risk preschool children. Program structure data were collected on each VPI participating school division for 2005-06 using information provided by the Virginia Department of Education, Office of Early Childhood Education. Applications filed annually by each school division include the program structure data needed to answer the research questions for this study. This information was analyzed based on the four independent variables in the study that had been identified through an examination of the current research: teacher certification, length of preschool day, curriculum implemented, and program sponsoring agency. School divisions that met strict criteria for inclusion in the study were those who had programs that had 100% implementation of each of the four variables for investigation for the Virginia Preschool Initiative in 2005-06. A summary of the criteria is listed in the following table:

Table 1  
Summary of Variable Criteria

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Matrix for Participation

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Variable	Criteria
Teacher Certification	100% possess at least a Bachelor's degree 100% possess less than a Bachelor's degree
Length of School Day	100% operate a full day schedule 100% operate less than a full day schedule
Types of Schools or Centers	100% Public School 100% Not for Profit Center/Community Action 100% For Profit Center
Curriculum Taught	100% High/Scope 100% Creative Curriculum 100% Houghton Mifflin Pre-K 100% Pearson's Opening the World of Learning 100% Wright Group, Doors to Discovery

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### *Data Collection*

Descriptive information on the structure of each school division's preschool program was collected from the annual application submitted to the Virginia Department of Education, Office of Early Childhood Education for the 2005-06 school year. A spreadsheet was developed to organize and analyze the information gathered. School divisions that had only one level of each of the four variables were identified. These identified school divisions were contacted and the appropriate requests made to obtain permission to use each school division's pre and post PALS-PreK program summary data for the 2005-06 school year. Institutional Review Board (IRB) permission was requested and approved before the research on the proposed study was conducted.

Descriptive information on each school division is reported in the study, however, no school division names are identified in this study. The information was gathered from school system websites, the Virginia Preschool Initiative applications, and the Virginia Department of Education. The descriptive information provides an understanding of the public school divisions in Virginia that were included in the study and thus provides a framework for understanding the population analyzed (see Appendix B).

### *Instrumentation*

PALS-PreK is an assessment developed by the researchers in the PALS Office at the University of Virginia in 2000 in conjunction with the Virginia Department of Education. It is an assessment of emergent literacy skills that provide a base for children to be ready to read (Invernizzi, Sullivan, Meier, & Swank, 2004). The assessment and various revisions were piloted, field tested and revised in 19 preschools in the

Commonwealth of Virginia between Spring 2000 and the 2002-03 school year. PALS-PreK was piloted in four preschools with 138 preschool children in Virginia during the 2003-04 school year. Teachers were asked to field test the items and provide feedback to the test developers. Scores on the PALS-PreK assessment are reported by skill rather than a summed or total score. By reporting scores on individual skills, teachers can make instructional decisions for individual children by skill and plan instruction accordingly. The post test scores are reported the same way as the pre-test scores. The program summary scores are reported in the Fall and Spring on all children who took the PALS-PreK during that test administration (Invernizzi et al., 2004).

The PALS-PreK assessment measures student achievement in name writing, alphabet knowledge (upper and lower case), letter sounds, beginning sound awareness, rhyme awareness, print and word awareness, and nursery rhyme awareness. Each of these skills is considered to be precursors to beginning reading skills and serve as the foundation for early literacy skills (Invernizzi, et al., 2004).

PALS-PreK is a reliable instrument as measured by Cronbach's alpha. Scores for Cronbach's alpha ranged from .75 to .93 on each of the subtest areas. Guttman split-half was also used to determine reliability and resulting scores varied from .71 to .94 ( a 1.0 is considered to be perfect reliability). Inter-rater reliability was also measured for the PALS-PreK and resulted in Pearson correlation coefficients of .99 for each of the subtests.

PALS-PreK has established content validity, construct validity, and criterion-related validity. Content validity was established by a panel of experts that was convened to review the items selected for the PALS-PreK assessment. The items that are included

in the assessment are focused on the skills being assessed. During the pilot stage of the assessment's development, the nursery rhymes that had the highest alpha coefficients were selected for inclusion.

Construct validity was established using factor analysis. The analysis revealed that the PALS-PreK is measuring a single construct and that construct is early literacy or pre-reading skills (reading readiness). According to Invernizzi et al. (2004), "The PALS-PreK factor accounts for 34% to 76% of the total variance in the children's scores across all tasks in both the phonological awareness and literacy screening components of PALS-PreK."

Criterion-related validity was measured by looking at three assessments that assess aspects of early or emergent literacy. These assessments are well established and are considered reliable assessments. The correlations with PALS-PreK and the selected assessments ranged from medium low to significant and medium high and significant. Predictive criterion-related validity was analyzed as well. Students who took the PALS-PreK assessment in the spring were administered the PALS K assessment the next fall. There was a significant relationship between the PALS-PreK summed scores and the PALS K summed score ( $r = .91, p < .01$ ). When a multiple regression analysis was run it was clear that there was a relationship between a child's performance on the PALS-PreK and the PALS K ( $R^2 = .84$ ). The scores on the subtests in the PALS-PreK predicted 84% of the variance in the resulting PALS K score (Invernizzi et al., 2004).

Lastly, longitudinal analyses were conducted on two separate groups of preschool students who were assessed using the PALS-PreK assessment at the end of the year in preschool. These scores were compared to the students' spring PALS K scores that were

obtained after their first year in kindergarten. The relationship was significant and somewhat high ( $r = .53, p < .01$ ). A multiple regression analysis was run and the results demonstrate that the PALS-PreK did predict variance in student performance on the PALS K assessment conducted in spring after completing a year of kindergarten ( $R^2 = .305$ ) (Invernizzi, et al., 2004).

### *Methods of Analysis*

In a quantitative study, a researcher may look for relationships between independent and dependent variables. These relationships may be further explored to determine if one or more variables can predict another (Sowell, 2001). In early childhood education there are structures that have proven to be related to student achievement and can predict student achievement (Barnett, 1998; Campbell et al., 2001; Gormley et al., 2005; Reynolds, et al., 2001; Schweinhart & Weikart, 1997). Descriptive research is often used in education and social science research and more often than not does not include random assignment to treatment or non-treatment groups known as experimental design (Lauer, 2006). Descriptive research can determine relationships between variables but not causality. Correlations reveal if variables are related to each and what the strength of that relationship is, but cannot determine if one or more variables causes an effect on one or more other variables (Sprinthall, Schmutte, & Sirois, 1991).

This study examined the relationship between four structures in the Virginia Preschool Initiative and student achievement as measured by the Program Summary outcome scores on the PALS-PreK pre and post assessment. Descriptive statistics are provided on each subtest administered in the PALS-PreK assessment (pre and post). The difference in mean scores of the pre and post assessments are reported. A correlation

analysis was used to determine if there is a relationship among variables (Sowell, 2001) and was conducted with the four independent variables (length of school day, teacher certification, curriculum implemented, and type of center) and with the independent variable PALS-PreK Program Summary outcome scores.

A multiple regression analysis is used when there is more than one predictor variable and one or more criterion variables (Lauer, 2006; Sowell, 2001). Multiple regression analysis was used to determine if the predictor (independent) variables predict the criterion (dependent) variable in this study. Specifically, multiple regression was used to determine if:

1. The length of the school preschool day predicts or explains the Program Summary subtest scores on the PALS-PreK.
2. The level of teacher certification predicts or explains the Program Summary subtest scores on the PALS-PreK.
3. The curriculum implemented predicts or explains the Program Summary subtest scores on the PALS-PreK.
4. The agency sponsoring the preschool program predicts or explains the Program Summary subtest scores on the PALS-PreK.

### *Conclusion*

This research study was designed to determine the relationship between four program structures (length of school day, teacher certification, curriculum implemented, and agency that operates the preschool program) and the PALS-PreK Program Summary scores in the Virginia Preschool Initiative during the 2005-06 school year. Statistical analyses were utilized to determine the correlation of the identified variables and then to

determine if the independent variables could be used to predict the dependent variable.

The program data was obtained from the Virginia Department of Education. Student achievement data was requested and obtained from school divisions that are identified based on the specified criteria.

## Chapter IV

### Results

This study explored the theory that specific identified structural variables in the 2005-06 Virginia Preschool Initiative are related to the PALS-PreK assessment that is administered to at-risk four-year-old preschool children in the Commonwealth of Virginia. Specifically, the independent variables studied were length of the school day, teacher certification, preschool curriculum implemented, and the program sponsoring agency. The dependent variables were the 2005-06 PALS-PreK pre and post test Program Summary outcome scores of students in school divisions that were eligible to participate in the study.

Chapter IV reports the findings of the research questions that framed this study.

The research questions were:

1. What is the relationship between the length of the preschool day and pre and post-test program summary scores on the Phonological Awareness Literacy Screening PreK (PALS-PreK) assessment?
2. What is the relationship between teacher certification and pre and post-test program summary scores on the PALS-PreK assessment?
3. What is the relationship between the curriculum implemented and pre and post-test program summary scores on the PALS-PreK assessment?
4. What is the relationship between the agency that sponsors the preschool program and pre and post-test program summary scores on the PALS-PreK assessment?

The results of the study and analyses are in this chapter. School divisions that participated in this study are not identified by name. In 2005-06, there were 122 school divisions that were eligible to participate in the Virginia Preschool Initiative. The Commonwealth of Virginia identified 17,329 at-risk children eligible to participate in 2005-06. There were 100 school divisions that elected to participate in the Virginia Preschool Initiative in 2005-06. Those school divisions served a population of 11,513 at-risk four-year-olds.

Each participating school division is required to submit an application for the Virginia Preschool Initiative annually. The researcher reviewed applications for 2005-06 and school divisions were selected to participate in this study based on the components listed on each school division's application. The criteria for school divisions to be selected for the study were based on the four independent variables that were identified through an examination of the current research: teacher certification, length of preschool day, curriculum implemented, and program sponsoring agency. In order to be eligible for this study, all of the Virginia Preschool Initiative students in the eligible school divisions had to meet the following criteria:

- All students must be assigned to teachers who possessed a Bachelor's degree or higher or
- All students must be assigned to teachers who possessed less than a Bachelor's degree

In addition,

- All students must be enrolled fulltime in the Virginia Preschool Initiative program or

- All students must be enrolled part-time in the Virginia Preschool Initiative program

The third criteria was that

- All students must be enrolled in one curriculum model within the school division's Virginia Preschool Initiative program or
- All students must be enrolled in a program that is sponsored by one of four agencies: a public school division, a for-profit school, a community action school or a non-profit school

There were 92 school divisions that met the criteria for the study. These school divisions served 9,430 at-risk four year olds. Each of the program coordinators of school divisions eligible for the study was contacted (see Appendix B for a copy of the e-mail sent) and was requested to send the 2005-06 PALS-PreK pre and post program summary scores for their respective school division. Each eligible school division's Virginia Preschool Initiative coordinator was contacted at least three times to request data. The requests were made via e-mail and telephone. The sample obtained for this study was 18 school divisions representing 5,270 (56%) of the 9,430 at-risk four year olds eligible to participate in the study.

The data collected from the 100 Virginia Preschool Initiative applications revealed that the 2005-06 Virginia Preschool Initiative programs were more alike than different. Every school division participating in this study had the same response in three of the four independent variables: teacher certification, length of school day and program sponsoring agency (see Tables 3, 4, and 5). The lack of variability in program structures prevented the researcher from conducting a multiple regression analyses on these three

independent variables. The results of the analysis of the 2005-06 Virginia Preschool Initiative applications revealed that the curriculum used by the participating school divisions was the only discriminating variable throughout the Commonwealth of Virginia. Based on the response of 18 school divisions who agreed to participate in the study, the researcher analyzed PALS-PreK student subtest scores (pre and post) for each of the four curriculum models implemented in the Virginia Preschool Initiative to determine the answer to the research question: What is the relationship between curriculum implemented and PALS-PreK pre and post student subtest scores?

A paired sample *t*-test is conducted when a group is given a pre and post test or treatment at two different times (Jaeger, 1993). The PALS-PreK assessment is administered in the fall and in the spring of the preschool year. The sample size of 5,270 at-risk students out of the 9,430 at-risk students who were eligible to participate in the study is strong and represents 56% of the population who were eligible to participate in the study. The first null hypothesis tested with the paired samples *t*-test was: There is no difference in 2005-06 PALS-PreK pre and post student subtest scores in the Virginia Preschool Initiative.

Based on the results of the paired samples *t*-test, a one-way Analysis of Variance (ANOVA) was conducted to further determine the relationship between the curriculum models implemented in each of the school divisions that participated in the study and the PALS-PreK post subtest scores. A one-way ANOVA is used when the researcher wants to compare more than two averages (Jaeger, 1993). In this case, the researcher tested the null hypothesis: There is no difference in PALS-PreK post subtest scores among the four curriculum models implemented in the school divisions that participated in the study.

The alternative hypothesis tested was: There is a difference in PALS-PreK post subtest scores among the four curriculum models implemented in the school divisions that participated in the study.

PALS-PreK pre and post subtest scores were sent to the researcher in a variety of ways including as a spreadsheet in an e-mail attachment, via fax, via the United States Postal Service, and in one case the researcher drove to the school division to pick up hard copies. The student scores on the hard copies of the PALS-PreK pre and post class summary sheets were entered into a spreadsheet to obtain a common format.

#### *Descriptive Analysis*

The 18 participating school divisions represent five of the eight Regional Study Groups in the Commonwealth of Virginia. All students served by the Virginia Preschool Initiative are defined as at-risk as determined by each participating school division. Students are defined as at-risk based on such factors as eligibility for free or reduced lunch, homelessness, being raised in a single parent household, speaking a language other than English, etc. Descriptive information for each of the divisions that participated in this study was collected from the Virginia Department of Education website, each school division's website, and the 2005-06 Virginia Preschool Initiative applications submitted to the Office of Early Childhood at the Virginia Department of Education. The school division with the smallest number of Virginia Preschool Initiative population reported that agreed to participate in the study is School Division 3 with five Virginia Preschool Initiative students. The school division with the largest number of Virginia Preschool Initiative population reported that agreed to participate in the study is School Division 11

with 1,529 Virginia Preschool Initiative students. The school divisions are described in Table 2.

Table 2  
2005-06 Populations of School Divisions Participating in the Study

School Division	Regional Study Group	Student Population	VPI Population Reported
Division 1	5	11,045	96
Division 2	2	40,336	218
Division 3	6	2,089	5
Division 4	6	7,445	221
Division 5	1	2,249	12
Division 6	5	2,787	32
Division 7	2	22,799	528
Division 8	6	7,895	179
Division 9	5	8,808	202
Division 10	6	9,634	156
Division 11	2	36,054	1,529
Division 12	2	15,872	632
Division 13	5	11,613	267
Division 14	7	4,271	156
Division 15	2	13,852	250
Division 16	2	74,313	551
Division 17	7	7,454	171

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Division 18	7	6,629	92
Total		285,145	5,297

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### *Findings*

The first research question looked at the relationship between the length of the school day and the PALS-PreK pre and post program summary scores. Of the 18 school divisions that agreed to participate in the study, all 18 indicated they operated their 2005-06 Virginia Preschool Initiative classes on a full day schedule (see Table 3).

The finding for this research question mirrors that of the majority of school divisions that participated in the Virginia Preschool Initiative for 2005-06. As determined by my document review, all of the responding school divisions (100%) indicated that they participated in the Virginia Preschool Initiative. Including non-responding school divisions, 97% operate on a full day schedule. There are three (3%) school divisions that operate a combination of full and half day programs, but the majority of children in each of these programs attend a full day program. No school divisions in Virginia operated preschool programs solely on a half-day schedule in 2005-06. Therefore, my sample is reflective of statewide data.

Table 3 Length of School Day

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School Division	Length of Day
School Division 1	Full Day
School Division 2	Full Day
School Division 3	Full Day
School Division 4	Full Day
School Division 5	Full Day
School Division 6	Full Day
School Division 7	Full Day
School Division 8	Full Day
School Division 9	Full Day
School Division 10	Full Day
School Division 11	Full Day
School Division 12	Full Day
School Division 13	Full Day
School Division 14	Full Day
School Division 15	Full Day
School Division 16	Full Day
School Division 17	Full Day
School Division 18	Full Day
Total	18

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The second research question explored the relationship between teacher certification and pre and post program summary scores on the PALS-PreK assessment. Based on the review of the applications and those school divisions that agreed to participate in the study, 16 (89%) of the 18 school divisions indicated that 100% of their 2005-06 Virginia Preschool Initiative teachers had at least a Bachelor's degree. Two school divisions indicated that they employed teachers with a Bachelor's degree or higher and teachers with less than a Bachelor's degree (see Table 4). This finding is consistent with school divisions who participated in the Virginia Preschool Initiative in 2005-06 based on the document review. Out of the 100 school divisions that participated in the Virginia Preschool Initiative in 2005-06, 95 (95%) indicated on their application that they employ teachers that have a Bachelor's degree or higher. The remaining five (5%) indicated they hire teachers with a Bachelor's degree or higher and teachers with an Associate's degree or Child Development Associate's degree (CDA).

Table 4  
Teacher Certification Participating School Divisions

Bachelor's Degree or Higher	Bachelor's and Associate's Degree	Bachelor's and Child Development Associates Degree (CDA)
16	1	1

The third research question looked at the relationship of the curriculum implemented by participating school divisions and the pre and post program summary scores for the PALS PreK assessment. The 18 school divisions that agreed to participate

in the study each implemented one of four curriculum models: Creative Curriculum, a Locally Developed curriculum based on the Virginia Foundation Blocks for Early Learning, Wright Group curriculum, or High Scope curriculum (see Table 5).

Table 5

## Participating School Divisions Curriculum Implemented With Student Totals

	Creative Curriculum	Locally Developed Curriculum	Wright Group Curriculum	High/Scope Curriculum
School Divisions	5	5	1	7
Students	1,164 (22%)	571 (11%)	515 (10%)	3,020 (57%)

The 18 school divisions represented 5,270 students assessed or 56% of the total population eligible for the study. Of the 18 school divisions that agreed to participate in the study, only one school division had a copy of their 2005-06 Virginia Preschool Initiative PALS-PreK Program Summary scores. The researcher used the individual student data files from each school division to calculate program means for each school division and each subtest. Due to the small number of school divisions that agreed to participate in the research study, the researcher analyzed PALS-PreK pre and post student subtest scores rather than PALS-PreK pre and post Program Summary scores.

For the 18 school divisions that agreed to participate in the study, student subtest scores on the 2005-06 PALS-Pre-K pre and post assessment and the four different curriculum models implemented were analyzed using a paired samples *t*-test. For the one-way analysis of variance (ANOVA), the PALS-PreK post test only student subtest scores were analyzed. The PALS-Pre-K assessment consists of eight subtests that are administered in the fall and again in the spring. The eight subtests are name writing, upper case alphabet recognition, lower case alphabet recognition, letter sounds, beginning sound awareness, print and word awareness, rhyme awareness and nursery rhyme awareness. Each of the subtests is administered and students are scored according to specified guidelines.

Statistical Package for the Social Sciences (SPSS) was used to conduct the statistical analyses. Descriptives were run first to review the sample size, mean scores and standard deviation of the sample with all curriculum models. Descriptive statistics for the eight subtests (fall and spring) indicate variability in the number of students who took each of the subtests from 2,509 students who were assessed on lower case alphabet recognition in the fall to 5,270 students assessed on print awareness in the spring.

Students in this sample demonstrated improved mean scores in each of the subtests from the fall to the spring administration in all curriculum models implemented. Each subtest experienced improvement by approximately 1/3 with one subtest experiencing almost 50% growth. The largest percent improvement (45%) is in the fall to spring administration of the upper case alphabet recognition subtest. The mean score in the fall was 9.17 upper case letters recognized and the mean score in the spring was 20.84 letters recognized. The next largest percent growth (39%) was seen in the letter

sounds subtest which was 4.74 letter sounds in the fall and 14.86 letter sounds in the spring. The least percent of growth (31%) was in the print awareness subtest which was 5.11 in the fall and 8.22 in the spring. (See Table 6).

Table 6

PALS Pre-K Pre and Post Subtest Scores Growth Chart

Subtest	N	Min. Growth	Max. Growth	Mean	Percent	Percent Difference
Fall Name	5164	.00	7.00	4.03	58	
Spring Name	5264	.00	7.00	6.38	91	33
Fall ABC Upper	5126	.00	26.00	9.17	35	
Spring ABC Upper	5266	.00	26.00	20.84	80	45
Fall ABC Lower	2509	.00	26.00	10.82	42	
Spring ABC Lower	4487	.00	26.00	20.76	80	38
Fall Letter Sounds	2518	.00	26.00	4.74	18	
Spring Letter Sounds	4425	.00	26.00	14.86	57	39
Fall Beginning Sounds	5105	.00	10.00	4.55	46	
Spring Beginning Sounds	5250	.00	10.00	8.22	82	36
Fall Print Awareness	5154	.00	10.00	5.11	51	
Spring Print Awareness	5270	.00	10.00	8.22	82	31
Fall Rhyme Awareness	5131	.00	10.00	4.49	45	
Spring Rhyme Awareness	5255	.00	10.00	7.75	76	32
Fall Nursery Rhyme	5153	.00	10.00	4.77	48	
Spring Nursery Rhyme	5250	.00	10.00	8.12	81	33

Students who take the upper case alphabet recognition subtest are given the lower case alphabet recognition subtest only if they recognize at least 16 upper case alphabet letters and are given the letter sounds assessment if they correctly identify nine lower case letters. Students are scored based on their performance in each subtest. Not all students who took the post-test were assessed with the pre-test and not all students who took the pre-test were assessed with the post test.

A paired samples *t*-test was conducted on the entire sample using fall and spring pre and post subtest scores for each student. The results of the test indicate that the correlation in each pair of scores (fall and spring) is statistically significant ( $p \leq .01$ ) for each of the pairs, therefore, the null hypothesis is rejected. There is a difference in PALS-PreK pre and post-test student subtest scores. A summary of all subtests (pre and post) including means, standard deviation, correlation coefficient, and significance level is detailed in Table 7.

A second paired samples *t*-test was conducted running each curriculum model separately to determine if there was correlation between the curriculum model and pre and post PALS-Pre-K scores. The null hypothesis tested was “there is no difference in PALS-PreK pre and post subtest scores among the four curriculum models implemented”.

The sample sizes for each of the curriculum models was varied with the largest population of students participating in the High Scope Curriculum model (3,020 students or 57%) and the smallest number of students participating in the Wright Group Curriculum (515 students or 10%). The results indicate that in each of the four

curriculum models, there is a statistically significant correlation between the pre and post PALS Pre-K scores in all subtests ( $p \leq .01$ ).

There is also a statistically significant difference in the mean scores (pre and post) for each curriculum model: Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum and High Scope Curriculum and the null hypothesis was rejected for all subtests. The difference is significant ( $p \leq .01$ ). Tables 8-11 include the results of the paired sample *t*-test for each of the curriculum models.

Table 7

Paired Samples *t*-Test Statistics

	Mean	Standard Deviation	Difference	Correlation	Sig.
Pair 1 Fall Name	4.07	2.18	2.31	.427	.001
Spring Name	6.38	1.18			
Pair 2 Fall ABC Upper	9.31	9.20	11.73	.475	.001
Spring ABC Upper	21.04	7.28			
Pair 3 Fall ABC Lower	11.26	9.50	10.51	.520	.001
Spring ABC Lower	21.77	6.62			
Pair 4 Fall Letter Sounds	4.98	6.82	11.45	.462	.001
Spring Letter Sounds	16.43	7.99			
Pair 5 Fall Beginning Sounds	4.60	3.41	3.68	.379	.001
Spring Beginning Sounds	8.28	2.65			
Pair 6 Fall Print Awareness	5.17	2.64	3.09	.452	.001
Spring Print Awareness	8.26	1.89			
Pair 7 Fall Rhyme Awareness	4.53	2.80	3.28	.402	.001
Spring Rhyme Awareness	7.81	2.60			
Pair 8 Fall Nursery Rhyme	4.82	2.47	3.38	.445	.001
Spring Nursery Rhyme	8.19	2.02			

Table 8 includes the results of the paired samples *t*-test for the Creative Curriculum. There is a statistically significant difference ( $p \leq .01$ ) in the mean scores of the subtests between fall and spring (pre and post) for at-risk preschool students participating in the Creative Curriculum. This means there is no chance the differences observed occurred by chance.

Table 8

Paired Samples *t*-Test Statistics - Creative Curriculum

N= 1,097	Means	Mean Differences	Sig.
Fall Name	3.80		
Spring Name	6.16	2.36	.001
Fall ABC Upper	8.35		
Spring ABC Upper	18.74	10.39	.001
Fall ABC Lower	12.93		
Spring ABC Lower	21.57	8.64	.001
Fall Letter Sounds	4.99		
Spring Letter Sounds	13.25	8.26	.001
Fall Beginning Sounds	4.28		
Spring Beginning Sounds	7.51	3.24	.001
Fall Print Awareness	5.23		
Spring Print Awareness	7.90	2.67	.001
Fall Rhyme Awareness	4.46		
Spring Rhyme Awareness	7.27	2.81	.001
Fall Nursery Rhyme Awareness	4.52		
Spring Nursery Rhyme Awareness	7.56	3.04	.001

The results in Table 9 indicate a statistically significant difference ( $p \leq .01$ ) in the mean scores of the subtests between fall and spring (pre and post) for at-risk preschool students who participated in a Locally Developed Curriculum. One of the curriculum

options for school divisions who participate in the Virginia Preschool Initiative is for the school division to create a curriculum at the local level. This option is listed as Locally Developed on the Virginia Preschool Initiative application.

Table 9

Paired Samples *t*-Test Statistics - Locally Developed Curriculum

N= 514	Means	Mean Differences	Sig.
Fall Name	4.17		
Spring Name	6.55	2.38	.001
Fall ABC Upper	7.79		
Spring ABC Upper	21.01	13.22	.001
Fall ABC Lower	8.15		
Spring ABC Lower	21.00	12.84	.001
Fall Letter Sounds	2.44		
Spring Letter Sounds	15.80	13.36	.001
Fall Beginning Sounds	4.32		
Spring Beginning Sounds	8.71	4.39	.001
Fall Print Awareness	4.75		
Spring Print Awareness	8.18	3.43	.001
Fall Rhyme Awareness	4.42		
Spring Rhyme Awareness	7.90	3.48	.001
Fall Nursery Rhyme Awareness	5.40		
Spring Nursery Rhyme Awareness	8.58	3.18	.001

The paired sample *t*-test results in Table 10 are for the Wright Group Curriculum.

These results indicate a statistically significant difference ( $p \leq .01$ ) in each of the subtests

between fall and spring (pre and post) for at-risk preschool students who participated in the Wright Group Curriculum.

Table 10

Paired Samples *t*-Test Statistics – Wright Group Curriculum

N= 486	Means	Mean Differences	Sig.
Fall Name	4.23		
Spring Name	6.28	2.08	.001
Fall ABC Upper	10.61		
Spring ABC Upper	21.75	11.14	.001
Fall ABC Lower	15.50		
Spring ABC Lower	23.26	7.76	.001
Fall Letter Sounds	7.56		
Spring Letter Sounds	18.85	11.29	.001
Fall Beginning Sounds	5.15		
Spring Beginning Sounds	8.61	3.46	.001
Fall Print Awareness	5.49		
Spring Print Awareness	8.21	2.72	.001
Fall Rhyme Awareness	4.58		
Spring Rhyme Awareness	7.91	3.33	.001
Fall Nursery Rhyme Awareness	4.60		
Spring Nursery Rhyme Awareness	8.43	3.83	.001

Table 11 includes the results of the paired samples *t*-test for the High Scope Curriculum. The results indicate a statistically significant difference in the fall and spring (pre and post) subtest scores for each of the eight subtests for at-risk preschool students who participated in the High Scope Curriculum ( $p \leq .01$ ).

Table 11

Paired Samples *t*-Test Statistics - High Scope Curriculum

N= 2,753	Means	Mean Differences	Sig.
Fall Name	4.13		
Spring Name	6.46	2.33	.001
Fall ABC Upper	9.76		
Spring ABC Upper	21.86	12.10	.001
Fall ABC Lower	10.80		
Spring ABC Lower	21.73	10.93	.001
Fall Letter Sounds	5.08		
Spring Letter Sounds	16.97	11.89	.001
Fall Beginning Sounds	4.68		
Spring Beginning Sounds	8.44	3.76	.001
Fall Print Awareness	5.16		
Spring Print Awareness	8.44	3.28	.001
Fall Rhyme Awareness	4.57		
Spring Rhyme Awareness	7.99	3.42	.001
Fall Nursery Rhyme Awareness	4.87		
Spring Nursery Rhyme Awareness	8.33	3.46	.001

The results of the paired samples *t*-test clearly indicate a statistically significant difference in the pre and post test scores for each of the curriculum models. The accepted level of statistical significance for social science research is .05, however, the significance level of .000 is well under the .05 level as well as the more stringent .01

level. There is no chance that the difference that exists in pre and post mean scores in each curriculum model occurred by chance.

A one-way Analysis of Variance (ANOVA) was conducted to evaluate the relationship between each of the four curriculum models implemented and the PALS-PreK post subtests only. The independent variable was curriculum implemented. The curriculum models tested were: Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum, and High Scope Curriculum. The dependent variable was the PALS-PreK post subtest. The eight subtests analyzed were: name writing, upper case alphabet recognition, lower case alphabet recognition, letter sounds, beginning sound awareness, print and word awareness, rhyme awareness, and nursery rhyme awareness.

There was variability in the sample sizes for each of the curriculum models with the largest percentage of the sample in the High Scope Curriculum (57%) and the smallest percentage in the Wright Group Curriculum (10%). There was also variability in the sample sizes from one subtest to another making them unequal (see Appendix C). According to the directions for the PALS Pre-K assessment, students who recognize at least 16 upper case alphabet letters are then administered the lower case alphabet assessment. Students who recognize at least nine lower case letters are assessed on the beginning sounds subtest (Invernizzi, et al., 2004). This tiered requirement for participating in the lower case alphabet assessment and beginning sound assessment contributes to some of the variability in the sample sizes and the possibility of a Type I error exists.

The one-way ANOVA indicated statistically significant differences in seven of the eight subtests in at least one curriculum model at .000 ( $p \leq .01$ ). Although slightly

weaker, (.052), a statistically significant difference was indicated for one of the eight subtests which is the lower case alphabet recognition subtest. The results of the ANOVA support the hypothesis that the four curriculum models tested have differentiated and significant impact on PALS-PreK post subtest scores. Table 12 summarizes the F score and significance levels for each of the subtest assessments.

Table 12

## One-Way Analysis of Variance PALS PreK Subtests - All Curriculum Models

Subtest	F	Sig.
Spring Name	22.27	.001
Spring ABC Upper	44.17	.001
Spring ABC Lower	2.58	.052
Spring Letter Sounds	53.80	.001
Spring Beginning Sounds	39.18	.001
Spring Print Awareness	18.51	.001
Spring Rhyme Awareness	16.08	.001
Spring Nursery Rhyme	43.56	.001

Although not statistically significant, students who participated in the Creative Curriculum model obtained the lowest mean score of all four curriculum models in each of the eight PALS-PreK subtests. The next lowest mean scores were from students who participated in the Wright Group Curriculum model. Students in this group scored the

second lowest mean score in three of the eight subtests. The Locally Developed Curriculum model and High Scope Curriculum model performed about the same with each group achieving the second highest mean scores in four of the eight subtests.

Figure 2 displays the 2005-06 PALS-PreK spring mean scores of the name writing, beginning sounds, print awareness, rhyme awareness, and nursery rhyme awareness subtests. Students who participated in the Creative Curriculum had the lowest mean scores on each of these subtests. Students who participated in the Locally Developed, Wright Group and High Scope Curriculum models performed equally well on each subtest regardless of which curriculum model in which they participated. The largest disparity in scores was in the beginning sounds subtest where students who participated in the Creative Curriculum scored about one point less than students in the other three curriculum models (see Figure 2).

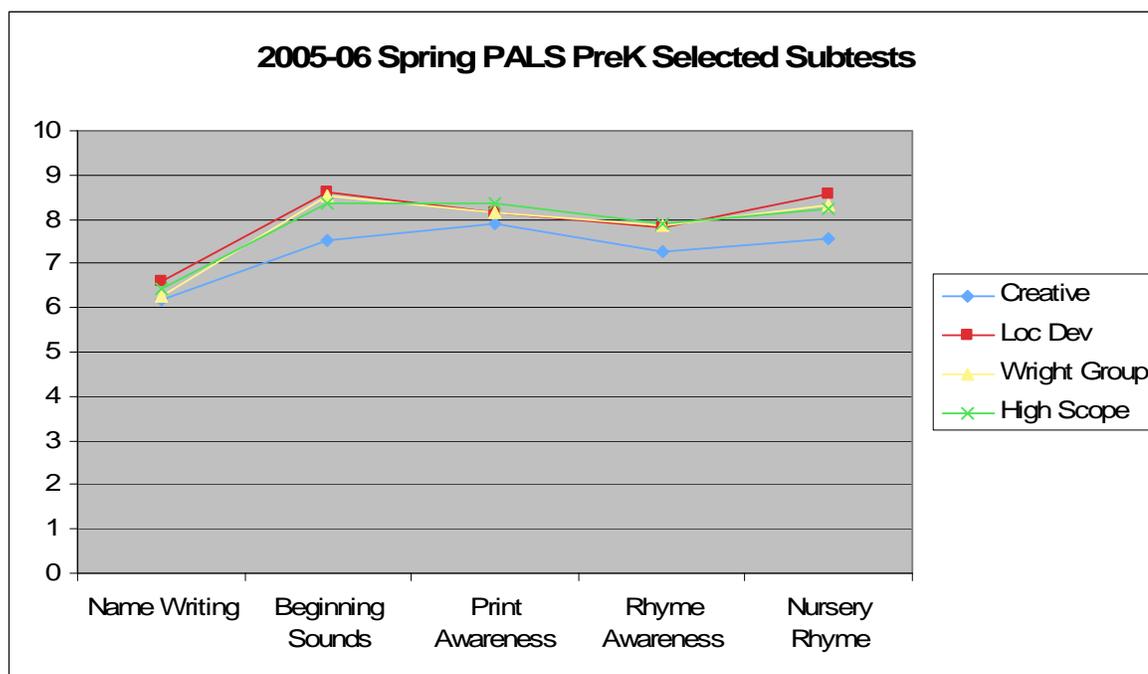


Figure 2 2005-06 Spring PALS PreK Selected Subtests

Figure 3 displays the 2005-06 PALS-PreK spring mean subtest scores for the upper and lower case alphabet recognition and letter sounds subtests. Students who participated in the Creative Curriculum had a lower mean score on the upper case alphabet recognition and letter sounds subtests than students enrolled in the Locally Developed, Wright Group, and High Scope Curriculum models. Students enrolled in all four curriculum models had a mean score of 20-21 in the lower case alphabet recognition subtest indicating a similar level performance on this subtest (see Figure 3).

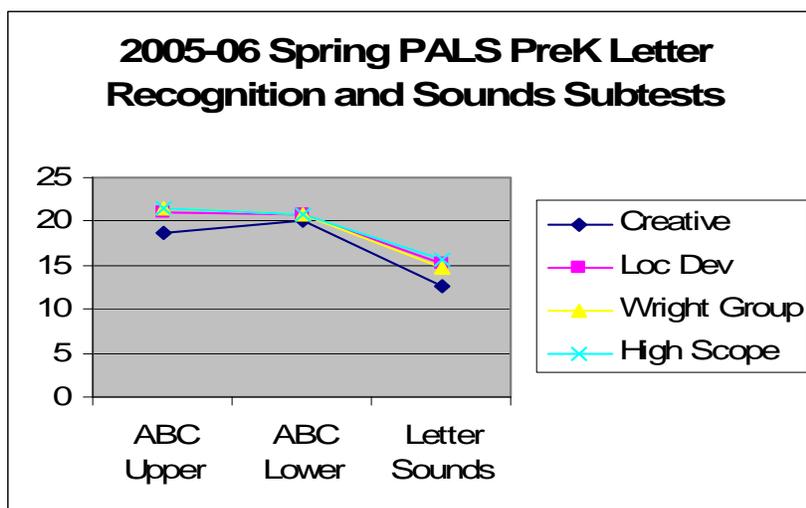


Figure 3 2005-06 Spring PALS PreK Letter Recognition and Sounds Subtests

The Tukey Honestly Significant Difference (Tukey HSD) post hoc comparison was conducted to determine where the difference exists that was indicated by the one-way analysis of variance (ANOVA). Tukey HSD was selected because the variance was assumed to be homogeneous and the conservative nature of Tukey HSD helps to control for false positive results (Statistical Analysis, 2004).

The results indicate the curriculum models are different from each other in each of the subtests. The differences varied among the subtests and it was statistically significant in each case ( $p \leq .01$ ) except in the case of the Creative Curriculum which was found to be different from at least one other curriculum in each of the subtests.

In the spring name writing test, the Creative Curriculum model's mean difference score is statistically different from the Locally Developed and High Scope curriculum models' mean difference scores ( $p \leq .01$ ). It was not statistically different from the Wright Group curriculum model at .374 ( $p \leq .05$ ). For the spring upper case alphabet letter recognition subtest, the Creative Curriculum model mean difference score was statistically different ( $p \leq .01$ ) from the Locally Developed Curriculum, Wright Group and High Scope Curriculum models. The lower case alphabet recognition subtest mean difference scores were not statistically different among the Creative, Locally Developed, and Wright Group Curriculum models. The only statistically different mean difference score existed between the Creative Curriculum model and the High Scope Curriculum Model ( $p \leq .05$ ). Interestingly, the letter sounds subtest, print and word awareness subtest, and rhyme awareness subtests indicate the same results. For each of these subtests, the Creative Curriculum mean difference score is statistically different from each of the other curriculum models. In the letter sounds and rhyme awareness subtests, the significance was .001 and in the print and word awareness subtest the significance was .017 and .041 for the Locally Developed Curriculum model and Wright Group curriculum model, respectively. For the remaining two subtests, beginning sounds and nursery rhyme awareness, the Creative Curriculum model mean difference score was statistically significant ( $p \leq .05$ ) when compared to the other three curriculum models. High Scope

and Locally Developed curriculum models were closely related for the beginning sounds and nursery rhyme awareness subtests. The mean difference score between these two models was statistically significant ( $p \leq .05$ ).

The fourth research question looked at the relationship between the program sponsoring agency and the PALS-Pre-K pre and post program summary scores. Of the 18 school divisions that agreed to participate in the study, 100% indicated that the program sponsoring agency was the public school division. From my document review, this finding mirrors the structure of the 100 school divisions that participate in the Virginia Preschool Initiative as only five (5%) of the 100 participating school divisions indicated on their applications that they partner with program sponsoring agencies other than public school divisions. These five school divisions use a combination of public, for profit, community action and non-profit schools to sponsor their preschool programs. No school division in the state of Virginia reported that they contracted 100% of their preschool programs out to agencies other than public school divisions.

### *Summary*

This study explored the relationship between four structures of the Virginia Preschool Initiative and the PALS-PreK Pre and Post Program Summary scores. The four structures (independent variables) were length of the school day, teacher certification, curriculum implemented and program sponsoring agency. The dependent variable selected for study was PALS-PreK Program Summary scores of eligible school divisions. The original research questions were:

1. What is the relationship between the length of the preschool day and pre and post-program summary scores on the Phonological Awareness Literacy Screening PreK (PALS-PreK) assessment?
2. What is the relationship between teacher certification and pre and post-test program summary scores on the PALS-PreK assessment?
3. What is the relationship between the curriculum implemented and pre and post-test program summary scores on the PALS-PreK assessment?
4. What is the relationship between the agency that sponsors the preschool program and pre and post-test program summary scores on the PALS-PreK assessment?

The 2005-06 Virginia Preschool Initiative applications were analyzed to determine which school divisions were eligible to participate in this study. The analysis revealed that the 2005-06 school divisions eligible to participate in this study were more alike than different in three of the four program structures studied. School divisions in Virginia that participated in the Virginia Preschool Initiative in 2005-06 and were eligible for this study indicated that they operated their preschool programs on a full day schedule. This represents 100% of the school divisions eligible for this study. This finding mirrors the characteristics of school divisions that participated in the 2005-06 Virginia Preschool Initiative where 97% (97 out of 100) operated preschool programs on a full day schedule.

The second structure analyzed was teacher certification. The data gathered from a review of the 2005-06 Virginia Preschool Initiative applications indicated that 16 of the 18 (89%) school divisions eligible to participate in this study listed 100% of their

teachers as possessing a Bachelor's degree or higher. Two school divisions reported they hired a combination of teachers with a Bachelor's degree or higher and those with less than a Bachelor's degree (Associates or Child Development Associates degree). This is slightly less than all Virginia Preschool Initiative participating school divisions as 95 out of 100 (95%) reported that their preschool teachers have a Bachelor's degree or higher.

The third structure in this study was the curriculum implemented. There were four curriculum models implemented between the 18 school divisions who elected to participate. The four models were Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum and High Scope Curriculum. The curriculum models were not evenly distributed with five (28%) school divisions implementing Creative Curriculum, five (28%) implementing Locally Developed Curriculum, one (6%) school division implementing Wright Group Curriculum, and seven (38%) school divisions implementing High Scope Curriculum. From the document review, of the Virginia school divisions eligible to participate in this study, 23% implement Creative Curriculum, 26% implement Locally Developed Curriculum, 2% implement Wright Group Curriculum and 33% implement High Scope Curriculum. The sample size for this study was large and reflected 56% of the total eligible population (5,270 out of 9,430).

Descriptive statistics were run on the PALS-PreK student pre and post subtest scores using SPSS. There was variability in the number of students tested in each subtest both fall and spring and variability in the number of students participating in each curriculum. The largest number of students participated in the High Scope Curriculum model (57%) and the least number of students participated in the Wright Group Curriculum model (10%). There was an increase in spring subtest mean scores when

compared to fall mean scores in every subtest. The largest percent gain (45%) occurred in the upper case alphabet recognition subtest. The mean fall score was 9.17 upper case alphabet letters recognized and the spring mean score was 20.80 upper case letters recognized. The least percent growth (31%) occurred in the print awareness subtest. The mean score for the fall assessment was 5.11 and the spring mean score was 8.22.

A paired samples *t*-test was also conducted and determined that the fall and spring scores were correlated and the strength of the correlation was high ( $p \leq .01$ ) in every pair for each subtest. This means that the PALS-PreK pre and post subtest scores are related and their relationship is significant.

A second paired samples *t*-test was run on each of the curriculum models. The results indicated that there were significant correlations among each of the four curriculum models in all pre and post subtest scores ( $p \leq .01$ ). These models were Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum and High Scope Curriculum.

Another outcome in this analysis was that the paired differences in the mean scores were statistically significant for each of the four curriculum models. The paired differences in the mean subtest scores for the Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum and High Scope Curriculum were all statistically significant ( $p \leq .01$ ). The null hypothesis was rejected with these four curriculum models.

A one-way analysis of variance (ANOVA) was conducted using SPSS to investigate the relationship between the curriculum models implemented and the PALS-PreK post subtest scores. The results of the one-way ANOVA indicate strong levels of significance in each of the eight subtests indicating at least one curriculum model is

different from another. This supports the hypothesis that the four curriculum models implemented and tested in this study have a relationship with the PALS-PreK post subtest scores although it varies from one curriculum model to another. The students who participated in the Creative Curriculum model had the lowest mean scores of the four curriculum models tested in each PALS-PreK post subtest.

The Tukey Honestly Significant Difference (Tukey HSD) post hoc comparison was conducted to determine where the differences exist that were indicated by the one-way ANOVA. A consistent finding is that the scores of students who participated in the Creative Curriculum were found to be different from at least one other curriculum in each of the subtests. The High Scope and Locally Developed Curriculum models were closely related in five of the eight subtests and were the most frequent combination of curriculum models that occurred in the Tukey HSD. The lower case alphabet recognition subtest was the only subtest where all four curriculum models were similar and did not vary significantly in mean scores. The mean scores for the four curriculum models in the lower case alphabet recognition subtest ranged from 20.20 lower case letters recognized to 20.91. This range was too small to be statistically significant. The highest mean score was in the High Scope Curriculum model at 20.91. The sample sizes in this analysis were unequal and a Harmonic Mean Sample Size was used in the Tukey HSD, therefore, the possibility of a Type I error occurring exists.

The fourth structure analyzed in this study was program sponsoring agency. According to the guidelines for the Virginia Preschool Initiative, public schools may choose to collaborate with non-public school entities such as a non-profit agency or for profit school or agency. A detailed analysis of the 2005-06 Virginia Preschool Initiative

applications was conducted. Of the 18 school divisions that agreed to participate in this study, 100% indicated that the program sponsoring agency was the public school division and no district indicated a partnership with any other program sponsoring agency. This is similar to what was discovered when all 100 participating Virginia Preschool Initiative school divisions were analyzed. Only 5% of the 100 participating school divisions reported that they partner with non-profit, for profit or community action agencies. Each of these five public school divisions indicated they partnered with one or more program sponsoring agency. No public school division in Virginia reported contracting out 100% of their Virginia Preschool Initiative funds to a program sponsoring agency other than the public school division.

A discussion of the results, findings, and recommendations of this study along with recommendations for future study are in Chapter 5. Included also are limitations for this study.

## Chapter V

### Discussion

This research study was designed to analyze the relationship of identified structural variables of the 2005-06 Virginia Preschool Initiative and the 2005-06 PALS-PreK pre and post program summary scores. The four structural independent variables were length of school day, teacher certification, curriculum implemented and program sponsoring agency. There were 92 school divisions eligible to participate in this research study. Eighteen school divisions agreed to participate and submitted student test score data. Of the 9,430 students eligible for the study, the 18 school divisions that agreed to participate represented 5,270 (56%) of the eligible population. Given the fact that three of the independent variables were uniformly found in the school divisions that elected to participate in the study, they were not analyzed. In addition, PALS-PreK Program Summary scores were not available from the school divisions that elected to participate in the study. Therefore, PALS-PreK individual student scores were analyzed which was a shift in the dependent variable.

The document review of the 2005-06 Virginia Preschool Initiative applications of all participating school divisions revealed that they are more alike than what was expected in each of the independent variables: the length of their preschool day, teacher certification and the programs sponsoring agency. The majority of participating school divisions in 2005-06 indicated on their application that they would conduct full day preschool classes, hire preschool teachers with at least a Bachelor's degree and use the public school divisions as the program sponsoring agency rather than non-profit, for profit or community action agencies. In the area of curriculum, the Virginia Preschool

Initiative guidelines require participating school divisions to select a curriculum model to implement. There were three models to select from in 2005-06 as well as one designated as “Other Curriculum”. All of the 2005-06 Virginia Preschool Initiative school divisions that were eligible to participate in this study implemented one of four curriculum models: Creative Curriculum, Locally Developed Curriculum, Wright Group Curriculum and High Scope Curriculum. The largest percentages of students were enrolled in the High Scope Curriculum model and the smallest percentages were enrolled in the Wright Group Curriculum model. A paired samples *t*-test and a one-way analysis of variance (ANOVA) were conducted to determine the relationship between the curriculum implemented and the PALS-PreK pre and post student subtest scores. A summary of findings and recommendations from this study are outlined below.

### *Findings*

- Finding: All of the school divisions who agreed to participate in the study operated their Virginia Preschool Initiative program on a full day schedule. Based on the document review, these data compare favorably with the majority (97%) of all of the school divisions that participated in the Virginia Preschool Initiative in 2005-06 which reported that they operate their preschool programs on a full day schedule. None of the school divisions who indicated they would be utilizing a half day program elected to participate in this study.

- Finding: Eighty-nine percent of the school divisions that agreed to participate in this study indicated that 100% of their preschool teachers possessed a Bachelor’s degree or higher in 2005-06. From the review of applications, it was determined that the majority of school divisions in Virginia that participated in the Virginia Preschool

Initiative (95%) in 2005-06 indicated on their Virginia Preschool Initiative application that 100% of their preschool teachers would possess a Bachelor's degree or higher.

· Finding: Preschool students in all curriculum models demonstrated growth from fall to spring in each of the subtests on the PALS-PreK. The largest percent growth was in upper case alphabet recognition, followed by letter sounds, and then lower case alphabet recognition. The least percent of growth was seen in the print awareness subtest.

· Finding: Students who participated in the Creative Curriculum obtained the lowest mean score of all four curriculum models in each of the eight PALS-PreK subtests.

· Finding: Students in all four curriculum models scored less than a perfect score on the name writing subtest in the PALS-PreK spring assessment.

· Finding: No curriculum model resulted in students scoring at 100% proficiency in any of the PALS-PreK subtests.

· Finding: All of the school divisions that agreed to participate in the study indicated that the program sponsoring agency was the public school division. Based on the review of applications, 95% of all school divisions that participated in the Virginia Preschool Initiative in 2005-06 reported that the program sponsoring agency was the public school division. This trend in Virginia is similar to the model used in the Chicago Child Parent Center. At-risk preschool students were enrolled in preschool classes that were housed in public school settings. This research indicated that at-risk preschool students who attended a preschool housed in a public school setting showed significant growth in academic achievement (Reynolds, 1991; Reynolds, 1998).

· Finding: The 2005-06 Virginia Preschool Initiative was designed and funded to serve 17,329 at-risk four-year-old children. Based on a review of the applications, school divisions reported that only 11,513 (66%) were actually served indicating that at-risk four-year-olds were underserved in 2005-06.

#### *Recommendations*

· Recommendation: School divisions that participate in the Virginia Preschool Initiative need to continue to focus on pre-literacy skills in Virginia Preschool Initiative classrooms. In order to close the achievement gap that exists when students start kindergarten, at-risk students must be on a level playing field when they begin kindergarten. Students must have a good grasp of recognizing letters and letter sounds in order to have the skills needed for early reading instruction (National Research Council, 1998). Additional training for staff and parents of at-risk preschool children will also help improve pre-literacy skills.

· Recommendation: School divisions that participate in the Virginia Preschool Initiative should supplement the curriculum model selected. Since no curriculum model resulted in students scoring 100% proficiency in any of the PALS-PreK subtests, additional curriculum materials should be implemented that will strengthen student performance and result in at-risk preschool students beginning kindergarten better prepared for literacy instruction. Frede and Ackerman (2007) agree in their policy brief, *Preschool Curriculum Decision-Making: Dimensions to Consider*. In this document they outline several considerations school divisions should follow when selecting preschool curriculum models to implement including not limiting a preschool program to any one curriculum model.

· Recommendation: Although students who participated in the Creative Curriculum scored within an acceptable range for each of the subtests, it underperformed when compared to the other three models. This difference in performance is not statistically significant, however, at-risk children must start kindergarten with the background experiences and pre-literacy skills equal to or exceeding those of children not considered at-risk if they are to be successful in kindergarten and beyond (Reynolds, 1991; National Research Council, 2001). The Creative Curriculum meets the PALS-PreK benchmark for acceptable performance. School divisions that use this curriculum may want to consider ongoing teacher training on implementing the curriculum along with monitoring of its operation or implementation as should be the case with all curriculum models implemented.

· Recommendation: School divisions that participate in the Virginia Preschool Initiative should provide additional support in instructional materials and training for teachers so that all students who exit the Virginia Preschool Initiative at the end of the school year are able to write their name 100% of the time. This skill is an important first step in early literacy development and at-risk students must have this skill mastered so they can move beyond name writing to writing words, recognizing letter sounds, etc.

· Recommendation: Ongoing evaluations of Virginia Preschool Initiative programs in school divisions should be conducted to determine their effectiveness. As noted by Gilliam and Zigler in 2004, there were many states that had not conducted formal evaluations of their preschool programs between 1977 and 2003 to determine if they were effectively meeting established goals. Virginia had not conducted a formal comprehensive evaluation of the Virginia Preschool Initiative at that time.

· Recommendation: A follow-up study should be conducted to determine the reason(s) why there is a difference in the number of at-risk four-year-olds served in the Virginia Preschool Initiative and the number of at-risk four-year-olds identified by the Virginia Department of Education to participate in the Virginia Preschool Initiative.

· Recommendation: In conversations with preschool coordinators in school divisions in Virginia, I was told that there were larger numbers of at-risk four-year-olds in the locality than what were identified by the Virginia Department of Education. The Virginia Department of Education, Office of Early Childhood, should work closely with non-participating as well as participating school divisions to determine what changes are needed to fully implement preschool programs in Virginia and to enroll 100% of the at-risk four-year-olds in Virginia in preschool programs. These changes should be worked into the guidelines for the Virginia Preschool Initiative or possibly sent to the General Assembly for legislative action. It is senseless to return funds to the Commonwealth that are desperately needed to educate our youngest and neediest citizens and to not serve all at-risk four-year-olds. According to Barnett, et al (2006) the Commonwealth of Virginia ranked 22 out of the 50 states for providing preschool access to all four-year-olds including at-risk four-year-olds. This means 11.1% of all four-year-olds in Virginia are served and contrasts sharply with the state of Oklahoma which serves 70.2% of its four-year-olds in a universal preschool model (Barnett et al., 2006). According to Barnett and Belfield's research (2006), children from low-income or at-risk families have more access to preschool than children considered not at-risk, but are under enrolled in preschool programs. Increasing the number of at-risk children who attend preschool as

well as improving the quality of the preschool program has the potential to improve the student's upward mobility later in life (Barnett & Belfield, 2006).

### *Limitations*

The limitations of this study include the variability of sample sizes for each of the subtests of the PALS-PreK. There were wide disparities in the numbers of students who took the pre and post assessments. The number of students who took the post assessment was higher than the number that took the pre-assessment. This variability in the sample increases the chance of a Type I error.

Another limitation of this study is the uneven development of the preschool child. Preschool children develop at different rates and grow and mature in uneven increments. The PALS-PreK assessment is given in the fall and in the spring of the preschool year and much physical, social and emotional growth occurs during that timeframe. Although the sample consisted of all at-risk students, the uneven growth pattern of preschool students serves as a limitation in this study.

A third limitation of this study is that although all students in the sample were considered at-risk, the definition of at-risk varies from locality to locality. School divisions that participate in the Virginia Preschool Initiative determine what factors define a child as being at-risk. These factors may include poverty, single parent household, limited English proficient, homelessness, etc. This disparity in at-risk factors may impact student performance on the PALS-PreK assessment and thus impact the outcomes of this study.

### *Recommendations for Further Study*

There is much to study in the realm of preschool education in Virginia. Although the Virginia Preschool Initiative has been in existence since 1995, there is no published research on this program. There are several possibilities for further study in this area.

They include:

- A longitudinal study of an urban, rural and suburban district using PALS-K fall student scores to determine the readiness level of at-risk children for literacy instruction after participating in the Virginia Preschool Initiative.

- A study of PALS-K fall student scores for all kindergarten students disaggregated by their preschool experience including the Virginia Preschool Initiative. This would give insight into the various effects of differentiated preschool experiences on a child's readiness for literacy instruction. The researcher would need to control for various external factors such as socio-economic status and other at-risk characteristics.

- A qualitative study of the kindergarten teacher's perception of a child's readiness for kindergarten immediately following the preschool year experience in the Virginia Preschool Initiative.

- More research is needed on the long term effects of the Virginia Preschool Initiative on students' academic achievement. A study can be conducted on children who participated in the Virginia Preschool Initiative as at-risk four-year-olds and are now in third grade and have taken the Grade 3 Standards of Learning assessments. This study will help to determine if the benefits of attending preschool in the Virginia Preschool Initiative are long lasting. An analysis of student attendance and discipline records would

provide additional information on the impact of attending preschool in the Virginia Preschool Initiative.

- It is important to know more about school divisions that do not participate in the Virginia Preschool Initiative and those who do not serve the number of at-risk four-year-olds identified for their locality if the Commonwealth of Virginia is to strengthen its at-risk preschool programs. It would also be beneficial to have a more complete picture of the number of at-risk four-year olds in school divisions so that all school divisions would be eligible to participate. Focus groups and surveys would provide more information in this area. The results might help legislators and state policymakers determine what changes need to be made to serve larger numbers of at-risk students.

- Professional development for preschool educators is a requirement for the Virginia Preschool Initiative for 2006-07. A study of which professional development activities and training best help teachers improve their teaching would be beneficial to school divisions and state education officials who are managing and implementing the Virginia Preschool Initiative.

### *Reflections*

Each step of this dissertation process has helped me to gain a broader perspective on preschool education for at-risk children. The extensive reading for the literature review taught me how extensive the topic of preschool education is and how little information exists about the Virginia Preschool Initiative programs in the Commonwealth of Virginia.

I was surprised that the majority of school divisions who participate in the Virginia Preschool Initiative hire teachers who possess at least a Bachelor's degree. Since

this is not a requirement of the Virginia Preschool Initiative in all settings, I thought fewer school divisions would hire preschool teachers with at least a Bachelor's degree due to the expense that accompanies hiring degreed teachers. I was also surprised to learn that more school divisions do not offer half-day programs. There is no requirement to provide full day preschool programs in the Virginia Preschool Initiative and I thought that more school divisions would offer half-day programs due to the expense of full day programs.

Conducting this research study has helped me fully comprehend the value of investing in preschool programs for at-risk four-year-olds. At-risk children come to school well behind other children who are not considered at-risk. Their first experience with books, words, numbers, and relationships with other children is often at school. When that first experience is kindergarten, at-risk children are already behind and get further behind as they move on to grade one and beyond. Intervening early with quality preschool programs for at-risk learners helps to close the gap that exists between at-risk children and those considered not at-risk.

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## Appendix A

## 2005-06 Virginia Preschool Initiative Eligible School Divisions

School Divisions			
Accomack	Charles City	Greene	*Middlesex
Albermarle	Charlotte	Greensville	Montgomery
Alleghany	*Chesterfield	Halifax	Nelson
Amelia	Clarke	*Hanover	*New Kent
Amherst	Culpeper	Henrico	Northampton
Appomattox	Cumberland	Henry	Northumberland
Arlington	Dickenson	Highland	Nottoway
Augusta	Dinwiddie	Isle of Wight	Page
Bath	Essex	James City	Patrick
Bedford	Fairfax	*King George	Pittsylvania
*Bland	Fauquier	King & Queen	*Powhatan
Botetourt	Floyd	King William	Prince Edward
Brunswick	Fluvanna	Lancaster	Prince George
Buchanan	Franklin	*Loudon	Prince William
Buckingham	*Frederick	Louisa	Pulaski
Campbell	*Gloucester	Lunenburg	Richmond
Caroline	Goochland	*Madison	Roanoke
Carroll	Grayson	Mecklenburg	Rockbridge

\*Eligible school divisions that did not participate in 2005-06

(table continues)

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 2005-06 Virginia Preschool Initiative Eligible School Divisions (continued)
 

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 School Divisions
 

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Rockingham	Wythe	Fredericksburg	Portsmouth
Russell	Alexandria	*Galax	Richmond City
Shenandoah	*Bedford City	Hampton	Roanoke City
Smyth	*Bristol	Harrisonburg	*Salem
Southampton	Charlottesville	Hopewell	Staunton
Spotsylvania	Chesapeake	Lynchburg	Suffolk
Surry	*Colonial Beach	*Manassas	Virginia Beach
*Sussex	*Colonial Heights	Manassas Park	Waynesboro
Tazewell	Covington	Martinsville	West Point
Warren	Danville	Newport News	Williamsburg
Washington	*Fairfax City	Norfolk	Winchester
Westmoreland	*Falls Church	Petersburg	
Wise	Franklin City	*Poquoson	

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 \*Eligible school divisions that did not participate in 2005-06

## Appendix B

## Initial Request

(e-mail)

From: pleary@vt.edu  
Sent: Wednesday, December 6, 2006 10:48 p.m.  
To: VPI Coordinators  
Subject: VPI Request

My name is Patricia Leary and I am a doctoral student at Virginia Tech. I am working on my dissertation and am studying the relationship of selected features of the Virginia Preschool Initiative (VPI) to PALS PreK Pre and Post Program Summary scores for the 2005-06 school year throughout the state of Virginia.

My study has been approved by the Institutional Review Board at Virginia Tech and my dissertation committee.

I am requesting permission to use the 2005-06 PALS PreK Pre and Post Program Summary scores for students who participated in VPI in your school division. Your school division and/or organization will not be identified in the study.

PALS PreK Pre and Post Program Summary scores were available during the 2005-06 school year on the PALS website. If you are unable to locate the Program Summary scores for 2005-06 in your files, you can go to the PALS website and download the two files that contain student data (pre and post). I am willing to compute the program summary scores from the raw data file if you will send them to me electronically or via hard copy.

Please feel free to contact me via e-mail or phone. My cell phone number is 757-876-3688. My e-mail address is pleary@vt.edu.

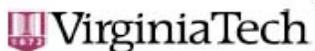
Thank you, in advance, for your participating in this worthwhile study. I look forward to hearing from you.

## Appendix C

## PALS PreK Post Test Only By Curriculum Descriptives

Subtest		N	Mean	SD	SE
Name	Creative	1161	6.16	1.35	.040
	Loc Dev	559	6.54	1.01	.043
	Wright Group	513	6.26	1.31	.058
	High Scope	3020	6.45	1.13	.058
ABC Upper	Creative	1160	18.69	8.33	.245
	Loc Dev	572	20.51	7.64	.319
	Wright Group	512	21.58	6.90	.304
	High Scope	3023	21.53	6.93	.126
ABC Lower	Creative	830	20.20	5.83	.202
	Loc Dev	495	20.90	7.01	.315
	Wright Group	445	20.69	6.15	.291
	High Scope	2718	20.91	6.76	.130
Letter Sounds	Creative	820	11.83	7.54	.263
	Loc Dev	495	15.30	8.39	.377
	Wright Group	436	14.80	7.48	.358
	High Scope	2675	15.76	7.80	.151
Beginning Sounds	Creative	1157	7.50	3.04	.089
	Loc Dev	570	8.72	2.96	.124
	Wright Group	507	8.52	2.35	.105
	High Scope	3017	8.37	2.54	.046
Print Awareness	Creative	1164	7.89	2.06	.060
	Loc Dev	571	8.18	1.86	.078
	Wright Group	515	8.16	1.66	.073
	High Scope	3020	8.37	1.88	.034
Rhyme Awareness	Creative	1161	7.28	2.77	.081
	Loc Dev	571	7.81	2.70	.113
	Wright Group	510	7.86	2.52	.111
	High Scope	3014	7.89	2.54	.046
Nursery Rhyme Awareness	Creative	1162	7.54	2.32	.068
	Loc Dev	571	8.54	1.84	.077
	Wright Group	515	8.34	2.039	.090
	High Scope	3003	8.23	1.99	.036

## Appendix D



Office of Research Compliance  
 Institutional Review Board  
 1880 Pratt Drive (0497)  
 Blacksburg, Virginia 24061  
 540/231-4991 Fax: 540/231-0959  
 E-mail: moored@vt.edu  
 www.irb.vt.edu

FWA0000573, expires 7/20/07  
 IRB # is IRB0000567.

DATE: November 28, 2006

## MEMORANDUM

TO: Travis W. Twiford  
 Patricia Leary

FROM: David M. Moore 

SUBJECT: **IRB Exempt Approval:** "An Analysis of the Impact of Selected Structures of the Virginia Preschool Initiative of PALS-PreK Program Summary Scores for At-Risk Preschool Students in Virginia", IRB # 06-669

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of November 28, 2006.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File

*Invent the Future*

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 An equal opportunity, affirmative action institution