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**FISCAL EFFORT FOR PRE-KINDERGARTEN SPENDING AND
EARLY LITERACY ACHIEVEMENT IN VIRGINIA**

By

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DOCTOR OF PHILOSOPHY

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OLD DOMINION UNIVERSITY
DECEMBER 2018

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ABSTRACT

FISCAL EFFORT FOR PRE-KINDERGARTEN SPENDING AND EARLY LITERACY ACHIEVEMENT IN VIRGINIA

**PATRICIA S. WILLIAMS
OLD DOMINION UNIVERSITY, 2018
CHAIR: DR. WILLIAM OWINGS**

There is a plethora of available early childhood education research linking participation and funding to short- and long-term benefits for individuals, society, and the economy. Educational advocates, social justice proponents, and economists agree that pre-kindergarten (Pre-K) education is the best human capital investment to spur economic growth and wealth. States are faced with choices and challenges concerning Pre-K investments as a vehicle to realizing desired literacy outcomes. Virginia, in particular, is stifled by below-average proficiency rates on national and state reading assessments, as well as declines school readiness skills and early literacy rates. For this reason, the intent of this introductory study was to investigate the impact of local fiscal effort for Virginia Preschool Initiative (VPI) on the Phonological Awareness Literacy Screening (PALS) for Pre-K achievement rates in Virginia. This study used a bivariate causal-comparative non-experimental model to compare group mean differences of PALS-PreK data from School Year (SY) 2010-2011 through 2014-2015 from participating school divisions in Region 2. The ANCOVA analysis of the findings failed to reject the null hypothesis. Although no statistically significant difference was determined on Pre-K literacy rates between divisions with high fiscal effort for VPI and divisions with low fiscal effort for VPI, the results offer an important and necessary step toward understanding the complexities of Pre-K investments and early literacy in Virginia. The strengths of this study are its originality and the ease of replication.

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DEDICATION

This dissertation is dedicated to my parents, in the loving memory of my mother, the late Clarice T. Smith, whom from my early years, taught me to love God, to aim high and strive for excellence in everything; and to my father, Thomas R. Smith, for his unwavering faith in God, calm spirit and who refused to allow me to drop out of college after Mom died.

I dedicate this dissertation to my husband, Reginald, Sr., and my two children, Reginald, Jr, and ReNaya Williams. GUYS, WE DID IT!

Finally, this dissertation is dedicated to all those who think the unreachable is just that. I challenge you to dream big, pray fervently, work hard, and stay focused on your goals, you will be amazed what you can accomplish with God on your side!

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CHAPTER 1

INTRODUCTION

In an era of reform and accountability, much early-childhood education rhetoric has shifted from play and social development concentrations to appropriate literacy instruction as a means to achieve and measure learning and student growth (Barnett & Frede, 2010; Diffey, Parker, & Atchison, 2017; Phillips, 2017). This discussion has expanded rapidly to include pre-school (birth to age three) and pre-kindergarten (age four) in both the public and private sectors. The increased emphasis on improving achievement outcomes has led to a deliberate and concerted focus on pedagogical experiences at the preschool and pre-kindergarten (Pre-K) levels (Guo, Justice, Kaderavek, & McGenty, 2012). Pre-K discourse has shifted from a “why” and “how” dialogue to a “how much” debate (Barnett & Frede, 2010).

With notable attention devoted to the development of young children, many states across the country have proposed legislation and adopted early childhood education policies, despite budget deficits. In 2017, seven states had no state-funded Pre-K program or early childhood legislation, down from thirteen states in 2002 (Barnett, Robin, Hustedt, & Schulman, 2003; Friedman-Krauss, Barnett, Weisenfeld, & Kasmin, 2018). Overall, a strong commitment to high-quality state Pre-K programs reflects remarkable progress; however, states still lag in their efforts to provide these programs. In 2002, only five states served 30% or more of their four-year-old children in a state-funded Pre-K program while two of the five served 50% of their students (Barnett, et al., 2003). In 2017, three states and Washington DC served 70% or more of their 4-year-old children, 18 states served 30% or more, and eight states served less than 5% of their 4-year-old children (Friedman-Krauss et al., 2018). According to the *State of Preschool Annual Report* (2017), state-funded Pre-K enrollment reached nearly 1.3 million 4-year-old

students, an all-time high (Friedman-Krauss et al., 2018; p. 15). Decision-makers are debating difficult choices about investment costs and increased funding. With support mounting for increased funding, it is apparent that educating our youngest citizens is a priority and critical at any cost (Barnett, Friedman-Krauss, Weisenfeld, Horowitz, Kasmin, & Squires, 2017; Friedman-Krauss et al., 2018). Over the past five years, state Pre-K spending has increased by 47% across the country, and overall total investment by the states is up to \$7.4 billion (Diffey et al, 2017); however, funding still has not reached levels before the recession of 2009. In 2016, state per-pupil spending increased to an average of \$5,000, near pre-recession levels for the first time, although many states' spending failed to keep pace with inflation (Barnett et al., 2017). With the expansion of state-funded Pre-K programs, the urgency to increase early childhood education investments became imperative (Duncan & Magnuson, 2013).

Virginia is no different from the other states which are governed by standards-based education reform. Virginia legislators grapple with a tight budget that must meet the mounting needs of its municipalities and constituents. According to Chandler (2017), education advocates blame low funding from Richmond for Virginia's slow growth efforts towards the state Pre-K programs (Chandler, 2017, p. 1). In 2015, Virginia spent an average of \$3,740 per preschool student, far below the actual cost needed to provide a quality program (Chandler, 2017). Virginia's Pre-K enrollment lags far behind the national average and even farther behind Washington DC and Maryland (Barnett et al., 2017; Chandler, 2017).

Current educational reform emphasizes standards, accountability, and outcomes (Shoup & Studer, 2010). Priority has been placed on having a standards-based curriculum that encompasses current rigorous research-based practices aligned to authentic assessments aimed to close the achievement gap, show academic growth, or outline a structured path of career and

college tracks (Guo et al., 2012; Hoxworth, 2018; Shoup & Studer, 2010). Formal or informal educational efforts can be categorized as human capital (Agarwal & Filer, 2015; Psacharopoulos, 2006; Psacharopoulos & Patrinos, 2004; Sweetland, 1996). According to Agarwal and Filer's *State of the Region* (2015) report, "for most individuals, their human capital is one of the strongest predictors of current and future economic productivity, which in turn is one of the strongest predictors of their earnings and overall economic well-being" (Agarwal & Filer, 2015, p. 94). The relationship between human capital and economic growth depends on the quality and the distribution of the education in the workforce impacts the financial and cultural dimensions and can be applied to all levels of education (Galal, 2007). Therefore, investments in high-quality state Pre-K programs yield individual, labor force, economic, and societal benefits. This assertion is validated by three landmark, large-scale cases: High/Scope Perry Preschool Study, the Abecedarian Project, and the Chicago Child-Parent Center Program (Campbell & Ramey, 1994; Gayl, 2007, 2008; Reynolds, 1991; Schweinhart, Montie, Xiang, Barnett, Belfield, & Nores, 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013). Additionally, research suggests that investments in high-quality pre-kindergarten programs outweigh the total economic debt burden of remedial reading services and criminal justice expenses, predominantly juvenile and adult incarceration and rehabilitation costs (Campbell & Ramey, 1994; Ellison, 2015; Garcia, Heckman, Leaf, & Prados, 2017; Gayl, 2007, 2008; Reynolds, 1991; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013). While no "real" formula determines the number of prisons built or spaces needed based on student achievement reading results, or third-grade reading scores, the inability to read impacts the potential for future unlawful conduct. According to Ellison (2015), educating students is an expensive endeavor, but the costs outweigh the expenses of juvenile incarceration (Ellison, 2015, p. 12). Extensive

research postulates that students who are not reading proficiently at grade level by fourth grade are four times more likely to drop out of high school, and high-school dropouts are more than 60 times more likely to be incarcerated (Duncan & Magnuson, 2013; Magnuson, Ruhm & Waldfogel, 2005; Stone, 2006). In fact, illiteracy and poor reading skills are related to unfavorable life outcomes and greater societal costs (Hernandez, 2011; Stone, 2006). Thus, public investments, beginning with pre-kindergarten, ensure benefits that lead to a smarter and stronger society (Campbell & Ramey, 1994; Gayl, 2007, 2008; Phillip et al., 2017; Reynolds, 1994; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013).

Statement of Problem

The early childhood education (ECE) field is in broad agreement that high-quality pre-kindergarten programs produce short- and long-term benefits. Most profound is the strong body of empirical research that suggests students who participate in high-quality pre-kindergarten programs have higher levels of academic achievement, graduate from high school on time, are more likely to pursue further education, obtain and keep stable employment, earn a higher salary, and are less liable to commit crimes as a juvenile or adult (Claessens, Engel, & Curran, 2014; Conner, Morrisison & Slominski, 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005; Schweinhart, 2005). States have designed Pre-K programs to meet the learning needs of their young children and budgets (Phillips, 2017). In 1995, Virginia began a state-funded ECE program (VDOE, 2017).

Currently, Virginia serves 18% of its 4-year-olds in its state-funded pre-kindergarten program, called the Virginia Preschool Initiative (VPI), leaving 18,000 students unserved. Many of these unserved students are disadvantaged, black, or Hispanic, without access to early reading and literacy interventions; they will likely enter kindergarten behind their white

counterparts in school readiness. Standards-based education reform has caused a shift in school financing priorities (Claessens et al, 2014). No easy and straightforward funding solutions exist to questions like what is fair, what is adequate or enough, what is equal, and what drives decisions for basic and appropriate educational needs to improve the citizenry. We have a less clear understanding of why there is a lack of more funding, a preponderance of unserved 4-year-olds at the initial stage of education, and if initial spending efforts are producing the desired literacy outcomes in Virginia.

In 2018, the Virginia Department of Education (VDOE) briefing document reported that many local school divisions opted not to participate in the Virginia Preschool Initiative program due to their inability to meet the grant's local in-kind match and or because they did not have space available. Furthermore, it detailed a significant number of unutilized Pre-K slots throughout the Commonwealth. There were 6,888 (28%) eligible children unserved in 2017 (VDOE, 2017, p. 8-9). There seems to be a fundamental mismatch between actual funding inputs and the desired outputs, outcomes, and expectations of Pre-K in Virginia (Regimbal, 2015). The VDOE (2018) briefing report also stated that 34% of the students entering kindergarten with no formal Pre-K experience were in need of literacy intervention and remediation (VDOE, 2018, p. 10). This presents a significant problem for the field due to the staggering number of Virginia's children who lack school readiness skills in kindergarten, the sizable percentage of students who fail to meet minimum competencies on local, state, and national reading assessments, as well as the millions of dollars spent on intervention, remediation, and prevention services (VDOE, 2017). Given the discrepancies between funding, participation and literacy outcomes, scholars in the field of education need to ask if Virginia's

current funding efforts for Pre-K spending produces satisfactory literacy results at the end of pre-kindergarten (Pre-K) as they prepare to enter kindergarten.

Research Purpose and Research Questions

The purpose of the study is to investigate the impact of local school divisions' fiscal effort for VPI on Pre-K literacy achievement rates. The following research questions will be used in this study.

1. Is there a difference in mean five-year Pre-K literacy rates between Virginia's school divisions with high fiscal effort and low fiscal effort for VPI after controlling for socioeconomic status (SES)?
2. If a significant difference exists, what is the gain in Pre-K literacy achievement rates for the divisions based on the level of fiscal effort?

Significance of Study

Early literacy instruction has been a subject of real concern and debate, as evidenced by the vast amount of research linking educational spending and academic achievement to later-life success (Campbell & Ramey, 1994; Gayl, 2007, 2008; Karoly, Kilburn, & Cannon, 2005; Reynolds, 1991; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013). Although much literature exists regarding the need, significance, and importance of formal early childhood education, there is a lack of empirical data and analyses related to the reasons for the current levels of Pre-K funding in Virginia. The Virginia Department of Education Early Childhood Special Education (ECSE) and the Individual with Disability Education Act (IDEA) provide funding for children with special needs and preschool children with disabilities through age three, while Head Start provides federal support for significantly at-risk children from birth to age five. Virginia supports its early childhood education (ECE)

initiative using revenue from the state lottery via a local match grant called the Virginia Preschool Initiative (VPI). Virginia serves 18% of eligible 4-year-old children in VPI, the Head Start program serves 7%, and the Early Childhood Special Education (ECSE) program serves 3%. This leaves approximately 72% of the Commonwealth's 4-year-old children enrolled in either private daycares, church daycares, or home-care settings with babysitters (Friedman-Krauss, 2018; VDOE, 2017).

The 2017 VDOE – VPI Actual State Budget Report for SY 2016-2017 reported 6,985 unfilled Pre-K slots and an additional 2,801 Pre-K students on waiting lists, pending enrollment (VDOE, 2017). The prior year's documentation listed 7,434 unfilled Pre-K slots and an additional 2,923 unserved Pre-K students on waiting lists for SY 2015-2016 (VDOE, 2017). There are over 1.8 million children in Virginia under age five; 21% are identified as living in poverty, and a disproportionate number are African American, Hispanic, and English as a second language (ESL) children. Of these children, 1 out of every 14 lives in extreme poverty or hardship (VDOE, 2017). On the 2015-2016 Fall Phonological Awareness Literacy Screening – Kindergarten (PALS-K) assessment, the failure rate for economically-disadvantaged students was more than double that of their non-disadvantaged peers. In the same year, the failure rates of the third-grade SOL Reading assessment were as dismal for blacks (38.9%), Hispanics (30.1%), and economically disadvantaged (36.2%) students (*Virginia Biennial School Readiness Report Card*, 2016). The achievement gap continues to widen with these groups. In fact, the *Virginia Performs Scorecard* (June 27, 2017) cites Virginia's school readiness and third-grade reading achievement scores as worsening over time; both are early indicators for school success and quality of life (*Virginia Performs*, Virginia.gov, 2017). Furthermore, it highlights that Virginia's poverty rate is not improving. These statistics are important because

the VPI aims to serve those students who are most at-risk and invests accordingly to improve school readiness skills and early literacy skills (*Virginia Performs*, Virginia.gov, 2017). As children move through elementary school, these educational deficits and learning gaps widen (Phillips, 2017). Children who lack school readiness in kindergarten tend to stay behind their peers academically and struggle to maintain grade-level skills (Hernandez, 2011; Yoshikawa et al., 2013). Taken together, this information signals an urgent need to investigate Virginia's educational spending trends and outcomes in kindergarten school readiness rates, third-grade reading achievement, grade retention, and high school drop-out rates.

Conclusion

For over 50 years, early childhood education (ECE) has been a hot topic and remains so today (Claessens et al., 2014). Samuels (2018), highlighted the long-term impact of ECE and supports the notion that Pre-K benefits last far beyond the early years. Samuels (2018) confirmed that ECE participants had fewer special education (SpEd) referrals, fewer grade retentions, and were more likely to graduate from high school as compared to those with no ECE experience (p. 9). In fact, Samuels (2017) said “given the high cost of grade retention, SpEd, and high-school drop-out prevention services on both individuals and society, research findings suggest investments in high-quality ECE programs do pay off” (p. 9). Whereas extensive early childhood research floods the field, providing a broad correlation between investments and outcomes, insufficient empirical studies examine the VPI's local fiscal effort for Pre-K spending and Virginia's early literacy rates.

Overview of the Study

This study is organized into five chapters. Chapter 1 focuses on an introduction of this study, background, and context of early childhood education, especially Pre-K, statement of

research problem, research purpose, and research questions to be answered. It is followed by the significance of this study, and human capital theory which is the study's framework. Chapter 1 closes with a brief overview of the methodology for this study. Chapter 2 provides a literature review on human capital theory and early childhood education, supported by three historical landmark cases. This section also includes Virginia's Pre-Kindergarten history, including funding, fiscal capacity, and fiscal effort. It concludes with a discussion of other prominent Pre-K studies. A descriptive methodology section is included in Chapter 3 which outlines this study's design, data collection, and data analysis. A complete analysis of the data collected to answer the research questions is described in Chapter 4. Chapter 5 details the study's findings and summary. It addresses implications for practice, funding policy, and future research. After the conclusion, references and appendices complete this study.

Definition of Terms

Early Childhood Education (ECE) – A general term used to describe any educational program that focuses on cognitive and social development of young children from birth through age eight. These programs are often used as an intervention to promote learning, academic success, and school readiness (National Association for the Education of Young Children (NAEYC), 2018 & VDOE, 2017).

Early Childhood Special Education (ECSE) – A branch of education governed by Part B of IDEA that provides services for children aged two to five with an identified disability who qualify for early specialized designed instruction and interventions (Part C of IDEA) according to state and federal laws (VDOE, 2017).

Early Intervention Reading Initiative (EIRI) – An intervention created in 1997 and expanded in 2000 by the Virginia Acts of Assembly, Chapter 924, Item 140 in an effort to reduce the number

of kindergarten through third-grade children identified as having reading problems through early diagnosis and immediate intervention (VDOE, 2017).

Fiscal Effort – A simple ratio of expenditures to the tax base, specifically $E = R/TB$ where E represents fiscal effort, R represents revenue for school expenditures, and TB represents the tax base or a measure of wealth (Owings & Kaplan, 2013). For this study, fiscal effort refers to the total amount of local dollars invested above the division's required in-kind match using the city's total allocation.

High-quality early childhood education or high-quality pre-kindergarten program – While no clear and consistent definition exists, there is a checklist of characteristics or indicators to determine a high-quality program. The National Association for the Education of Young Children has established a list of 10 Standards (NAEYC, 2018) which includes a written set of age-appropriate curriculum standards implemented using research-based and brain-based strategies, state-licensed or qualified teachers and staff, on-going staff training or coaching, adequate class size, measurable learning outcomes, wrap-around and services, safe environment, management, family, and community services collaboration and support (NAEYC, 2018; VDOE, 2017).

Phonological Awareness Literacy Screening (PALS) – An early diagnostic assessment used to identify kindergarten through third-grade children as at-risk of reading failure (VDOE, 2018).

Pre-kindergarten (Pre-K) – A formal or informal program or environment preceding kindergarten designed to meet the needs of young children ages 3.5-years-old to 4-years-old (NAEYC, 2018; VDOE, 2017).

Preschool – A formal program, informal program, or environment designed to meet the needs of young children from birth to age 3.5. Preschool is sometimes called “nursery school” but precedes Pre-K (NAEYC, 2018; VDOE, 2017).

Socioeconomic Status (SES) – May refer to the total household income, educational attainment, net worth, financial stability, or social class. For the purposes of this study, SES refers to the total percentage of students receiving free and reduced-price school lunch.

CHAPTER 2

LITERATURE REVIEW

A vast amount of credible research validates and enumerates the extensive returns on the amount of money invested in early childhood education. ECE is important concerning the limited time and window of opportunity to stimulate a child's brain during learning and development (Phillips, 2017). Pre-K participation is the most effective strategy to address achievement gaps among different social and economic groups (Diffey et al, 2017). This chapter evaluates early childhood education finance literature and its relationship to reading achievement. First, human capital theory will be explained as a theoretical frame for this study. Next, the three pre-kindergarten landmark cases emphasizing the short- and long-term benefits will be summarized as relevant historical background for this study. Third, the history of Virginia's state-funded pre-kindergarten program and funding will be discussed. This section concludes with a description of VA's ECE spending and student achievement as evidence for this baseline study which seeks to examine the impact of local divisions fiscal effort for VPI and Spring PALS Pre-K literacy rates.

From the early 16th through 17th centuries or the early years of the European settlement, well-educated citizens were considered valuable resources to the welfare, vitality, and longevity of their society; consequently, education continues to remain a fundamental concern (Shoup & Studer, 2010). In 1791, the 10th Amendment to the Constitution delegated certain powers to the United States government and all others to the states (Education Law, 2018). Public education was one of these powers not specifically mentioned; therefore, it is assigned inherently to state and local governments. The first compulsory school law was established in 1852 as an equalizer in developing human capital while sustaining a growing nation (Shoup & Studer, 2010). In

1869, the 14th Amendment guaranteed all born or naturalized United States citizens the right to life, liberty and property (Education Law, 2018). Schools in 1892 were evolving and expanding to meet the changing needs of students (Shoup and Studer, 2010). In 1900, John Dewey initiated the progressive education movement accentuating the need to structure curricula around student and societal needs. Issues of equality spurred the landmark case of *Brown v. Board of Education*, which ruled segregation in public schools as inequitable and unconstitutional (Ravitch, 2010; Shoup & Studer, 2010). This sequence of educational movements resulted in a regime of policies for standards and accountability (Shoup & Studer, 2010). President Lyndon B. Johnson's 1964 State of the Union address unofficially introduced the "the war on poverty" which drew national attention towards proposed educational initiatives (Ravitch, 2010; Shoup & Studer, 2010). The Elementary and Secondary Education Act of 1965 established federal aid for programs for the disadvantaged such as Job Corps and Head Start. These programs aimed to boost the potential of targeted populations by providing academic, vocational, and social skills to enable a better life. From this time forward, the commitment to equality, equity, adequacy, and accountability has caused the most dramatic and profound shifts in education (Ravitch, 2010; Rebell & Wolff, 2012; Shoup & Studer, 2010). Although educating everyone continues to be a focus, the notion that the initial investment in education yields individual, community, and societal benefits is a relatively new idea (Owings & Kaplan, 2013). Economists and other human capital theory proponents believe that human capital theory is the best explanation that views schooling as an investment and education as a clear catalyst for economic growth (Khaemba, Sakwa, & Wachilonga, 2014).

Theoretical Framework – Human Capital Theory

Human Capital Theory underpins the structure of this study as a major theoretical construct to explain how total investments made in individuals and education can spur the creation of wealth. In the 18th century, economist Adam Smith was the first to address issues of human capital and its impact on economic growth and wealth development (Psacharopoulos, 2006; Sweetland, 1996). Smith's 1776 pioneering study, *Wealth of Nations*, introduced the concept of investments in education and said that human efforts lie at the root and sum of all wealth (Psacharopoulos, 2006). Smith's early view related human capital as fixed capital in industry, and investment in one's training and skills (human capital) would in turn increase productivity, adding value and more income to the company and industry (Sweetland, 1996). Ultimately, educated individuals become societal assets. Although primitive and limited, Smith's work led the broader context of human contributions to the field and remained for almost two centuries (Owings & Kaplan, 2013; Psacharopoulos, 2006; Psacharopoulos & Patrinos, 2004; Sweetland, 1996).

Smith's early work was expanded by economist Theodore Schultz who offered a broader perspective. In 1960, Schultz introduced human capital theory in a presidential address to the American Economic Association (Sweetland, 1996). Schultz's research concluded that the contributions and investments in education improved job opportunities and economic growth (Schultz, 1961; Sweetland, 1996). Schultz's continued his work of human capital and asserted a correlation of education to human capital theory (Sweetland, 1996). He brought an intellectual understanding to the field and listed five broad categories of human activity (investments) which would lead to improved human capabilities. The five categories of human activities are health facilities and services, on-the-job-training, formal education, adult study programs, and

migration of individuals and families to adjust to changing job opportunities (Schultz, 1961, p.9). Sweetland (1996) said “Schultz’s sound economic reasoning, clarity of presentation, and corroborative support of other economists’ human capital research were so compelling that he was credited as the father of human capital theory” (p. 349). For his notable work, he earned the 1979 Nobel Peace Prize in Economic Sciences (Owings & Kaplan, 2013; Sweetland, 1996).

Economist Gary Becker, whose work earned the 2000 National Medal of Science and the 2007 Presidential Medal of Freedom, modeled and validated the concept of investments in human capital and the measurement of its value contributing to the basic economic premise. Education has economic costs that produce economic benefits (Becker, 1993; 1994; Sweetland, 1996; Owings & Kaplan, 2013). Again, human capital means the wide range of skills, knowledge, and innate traits an individual possesses and contributes to the workforce. Recent studies of human capital theory present empirical evidence on the private and social returns of education with specific implications for educational finance (Owings & Kaplan, 2013; Psacharopoulos, 2006; Psacharopoulos & Patrinos, 2004; Sweetland, 1996). Specifically, expenditures on education treated as investments in human capital can be measured with a substantial value regarding benefits to the society and economy (Psacharopoulos, 2006; Psacharopoulos & Patrinos, 2004; Sweetland, 1996). Like other capital, human capital grows by being invested in and that investment is education. This tenet is very simple: invest resources today for returns on investment tomorrow. Given this, investments in early childhood education can be measured as dollars returned to individuals, society, and the economy (Psacharopoulos, 2006; Psacharopoulos & Patrinos, 2004; Sweetland, 1996).

The Importance of Early Childhood Education

Preparing children for academic success in school and later in life is an important outcome for early childhood education advocates, policymakers, researchers, and parents alike. The number of U.S. children attending early childhood education programs has risen drastically in recent years (Friedman-Krauss et al, 2018). In fact, according to *The State of Preschool 2017 Yearbook*, 42 states and Washington DC have invested \$7.3 billion in early childhood programs and services affecting over 1.3 million students (86% are 4-year-olds). Three states serve over 70% of their state's pre-kindergarten students, 10 states serve at least 50% of their 4-year-olds, and 14 states serve less than 10% while seven states have no formal early childhood programs, services, policy, or funding (Friedman-Krauss et al., 2018). Although preschool enrollment has almost doubled from 14% to 32% in the last 15 years, the disparity of growth in state-funded programs compared to the states with no universal initiatives is alarming (Barnett et al., 2017; Friedman-Krauss et al., 2018). While the overall preschool enrollment is increasing, and state-funded programs are increasing spending, 14 states (32%) still service fewer than 10% of their 4-year-olds (Barnett et al., 2017; Friedman-Krauss, 2018). Each year, mounting support continues to grow for early childhood access, spending, and support services because school readiness affects children's future academic successes and life achievements.

Having good third-grade reading skills is a reliable predictor and direct correlate to success in school and in the future (Hernandez, 2011). According to the 2015 National Assessment of Educational Progress (NAEP), the Nation's Report Card (U.S. Department of Education, 2016), 36% of fourth-grade students performed at or above the proficient level on the NAEP reading assessment. Although this national scholastic reading data seems dismal, the U.S. Department of Education (2016) recommends that Pre-K be an intervention, corrective action, or

possible solution to closing the achievement gap. According to the National Center for Children in Poverty (1999), early years of life are learning years, and most of the brain development occurs by age 5. Therefore, a high-quality Pre-K experience leads to short-term and long-term advantages for educational achievement outcomes and societal benefits (Conner et al., 2006; Duncan & Magnuson, 2013; Guo et al., 2012; Magnuson et al., 2005).

Short-Term Benefits

Students who attend high-quality early childhood programs show strengths and advanced cognitive growth compared to their age-appropriate peers who had no formal early education exposure (Claessens et al., 2014; Conner, et al., 2006; Duncan & Magnuson, 2013; Karoly, et al, 2005; Magnuson et al., 2005; Phillips, 2017). The Pre-K experience produces short-term benefits, such as improved school-readiness skills in kindergarten, greater cognitive mastery and retention of the alphabet, greater word recognition skills, a larger oral vocabulary, and the development of pre-reading skills. Contextually, if a fair to strong literacy curriculum was implemented, achievement outcomes were positive and favorable for students who attended regularly. Although the short-term benefits ranged from slight to significant, more profound were the long-term benefits of early childhood education (Claessens et al., 2014; Conner, et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005).

Long-Term Benefits

In addition to short-term benefits, long-term benefits result from Pre-K intervention programs (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005; Phillips, 2017). Long-term benefits of early childhood programs were tracked and sustained beyond the elementary grades through adulthood (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005; Phillips, 2017). Students who

attended high-quality early childhood education programs were noted to have a more favorable student attitude toward formal learning and schooling, reduced frequency of grade retention, reduced special education referrals, fewer juvenile criminal incidents, higher overall education attainment, better job acquisition resulting in higher income earned as adults, and lower adult criminal rates (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005; Phillips, 2017). Notable was the increased reading achievement scores and increased high-school graduation rates of early childhood program participants (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005). The short- and long-term benefits of Pre-K programs impact all accountability systems. Convincing evidence shows children who participate in a high-quality Pre-K program have a more positive and productive life trajectory than their peers who did not participate in an early childhood education experience (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Magnuson et al., 2005; Phillips et al., 2017).

Three Landmark Early Childhood Cases

Public interest in pre-kindergarten has been documented since the 1960s but has peaked in recent years (Stone, 2006). This interest is a direct result of education scholars and education advocates who have sought to link prior knowledge and current practices to student outcomes due to the outcome-based accountability paradigm. Three landmark studies, the High/Scope Perry Preschool Study, the Abecedarian Project, and the Chicago Child-Parent Center study have helped accelerate on-going interest (Campbell & Ramey, 1994; Gayl, 2007, 2008; Reynolds, 1994; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013).

David Weikart, founder of the High Scope Research Foundation, author of the High Scope Curriculum, researcher, and psychologist, and his team began work in the 1960's with the

High/Scope Perry Preschool Project in Ypsilanti, Michigan, which documented both short-and long-term achievement scores with 123 low-income, black, at-risk youth (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). The children were divided into two groups. The experiment group participated in a comprehensive Head Start preschool program and the second group, the control, received no formal early childhood education program. Both, qualitative and quantitative data were collected at ages 5, 10, 15, 27, 39, and 41 (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). The outcomes were noteworthy (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). By age five, 67% of those students in the experimental group were ready for kindergarten. They demonstrated the necessary skills to be successful at the beginning of the school year. The other significant findings were compiled at ages 10 and 14; the preschool program participants had higher intellectual performances, fewer grade retentions, fewer special education placements, and a better attitude toward school compared to their peers who had no formal pre-kindergarten schooling (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). The two most noteworthy findings were the significantly higher scores on achievement tests from first through fifth grades and high school graduation results (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). Seventy-one percent of the experimental group graduated from high school with a diploma or GED compared to the 45% from the control group. At age 27, the pre-kindergarten participants had been arrested fewer times compared to their counterparts and were four times more likely to earn \$2,000 or more per month (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). By age 40, they were three times as likely to own their own home, had higher earnings, were more inclined to hold a job, and again, committed fewer crimes (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005).

Additionally, for every dollar spent, the return benefits totaled an estimated \$7-\$10 with an average of \$8.60 per participant (Schweinhart & Weikart, 1980, 1993; Schweinhart, 2005). The greatest savings were to the criminal justice system. Because this was the first comprehensive study of its time, it gained much notoriety. It provided substantial validity, and creditability that preschool can make lasting contributions to our educational system and society (Gayl, 2007, 2008; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993;).

The Abecedarian Project was another milestone study conducted from 1972 to 1985 by researchers at the University of North Carolina. Researchers randomly selected 111 at-risk children from low-income families to participate in an early childhood program with additional support and family services (Campbell & Ramey, 1994; Gayl, 2007, 2008). Results found that partakers of Pre-K and other support interventions had higher IQ scores and higher academic achievement scores at ages 12 and 15 than their peers without preschool (Campbell & Ramey, 1994; Gayl, 2007, 2008). Their counterparts were more likely to be retained and require special education services (Campbell & Ramey, 1994; Gayl, 2007, 2008). Of the pupils who received academic support, 67% graduated from high school, 36% attended a four-year college, and by age 30 were more likely to hold a steady, full-time job (Campbell & Ramey, 1994; Gayl, 2007, 2008). The study revealed that for every \$1 spent, there was an estimated educational saving in remediation and special education programs of \$2.50 (Campbell & Ramey, 1994; Gayl, 2007, 2008). These findings further supported the idea that long-lasting benefits are associated with high-quality pre-kindergarten programs (Campbell & Ramey, 1994; Gayl, 2007, 2008).

The Chicago Child-Parent Project was another prominent early study. This early groundbreaking project began in 1967 in the high-poverty and low-income neighborhoods of Chicago (Gayl, 2007, 2008; Reynolds, 1991; Reynolds, Richardson, Hayakawa, Englund, & Ou, 2016;

Reynolds, Temple, Robertson, & Mann, 2001). This study provided a high-quality preschool program with support services as well as a parental commitment and volunteer component. Researchers evaluated 1,539 children from 1983 to 1986 as well as 15 years beyond the interventions ending in 2001 (Gayl, 2007, 2008; Reynolds, 1991; Reynolds et al, 2016; Reynolds, Temple, Robertson, & Mann, 2001). They compared them to children who did not participate in the program but did attend full-day kindergarten at age five. Their evaluation showed favorable impacts on participating Pre-K students. At age 14, they showed higher school achievement, and 100% high school completion by age 21 (Gayl, 2007, 2008; Reynolds, 1991; Reynolds et al, 2016; Reynolds, Temple, Robertson, & Mann, 2001). Additionally, the experimental group had 41% fewer special education placements, 10% fewer grade retention, and were less likely to have a criminal record compared to the students who had the full-day kindergarten experience (Gayl, 2007, 2008; Reynolds, 1991; Reynolds et al, 2016; Reynolds, Temple, Robertson, & Mann, 2001). These findings were so impressive and profound for the city of Chicago, The Chicago Child-Parent Project, now The Chicago-Parent Center, still operates today (Gayl, 2007, 2008; Reynolds, 1991; Reynolds et al, 2016; Reynolds, Temple, Robertson, & Mann, 2001).

The three groundbreaking studies above provided savings or lasting benefits at the federal, state, and local levels and validated initial investments as advantageous when compared to the savings of costly remedial services for grade retention and special education. These significant findings sparked the attention of not only the educational scholars but economists throughout the United States (Campbell & Ramey, 1994; Gayl, 2007, 2008; High/Scope Perry Project Educational Research Foundation, 2016; Reynolds et al., 2001; Reynolds et al., 2016;

Phillips et al., 2017; Reynolds, 1991; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013).

Investing in early childhood education produces short- and long-term benefits to individual children, society, and the economy as well. The payback and return on investment of ECE as an intervention overshadow the costs. Thus, many states began to turn the attention to the education of young children, including Virginia.

Virginia Preschool Initiative

History

Hudson (2015) wrote on the White House - President Barack Obama blog, “In 1964, President Lyndon B. Johnson created Head Start as a program to help meet the emotional, health, nutritional, social, and psychological needs of preschool-aged children from low-income families.” Virginia began the Head Start Program in 1965 and continues to serve low-income students throughout the Commonwealth (VDOE, 2018). Almost 25 years afterward, the issues of inequality in educational policies influenced Pre-K discourse in Virginia (VDOE, 2018). Virginia turned the magnifier on its youngest citizens. In 1993, the Commission on Equity in Public Education (a subcommittee of the Virginia State Legislature) authorized the Board of Education, the Department of Education, and the Virginia Council on Child Day Care and Early Childhood Programs to conduct a study of Virginia’s current early childhood programs for at-risk children and is recorded in the Virginia Acts of the General Assembly of the State of Virginia, Chapter 994, Item 126 (Virginia.gov, 2017). Later that year, the findings of the investigation were presented to the chairs of the Senate Finance and House Appropriations Committees. In early 1994, the Legislative Commission on Equity in Public Education recommended the establishment of a state-funded, quality preschool program for unserved at-risk

4-year-olds. The concluding research from this legislative study defined the criteria for quality programs (VDOE, 2018).

The 1995 Virginia General Assembly appropriated \$9.3 million for the at-risk four-year-old program called Virginia Preschool Initiative (VPI) to begin in Fiscal Year (FY) 1996 (VPI Briefing Document -VDOE, 2018). The Omnibus Education Act of 1995 (HB 2542) established all components of the 1994 package and funded an initiative for at-risk, 4-year-olds including the requirement of each local school division to provide an in-kind funding match. The legislative intent was to establish a high-quality preschool education program for at-risk 4-year-old children (VPI Briefing Document -VDOE, 2018). Gradually, funding for VPI increased as the program expanded to service more at-risk children. By FY 2006, 100% of eligible at-risk 4 year-olds were included in the funding formula (VPI Briefing Document -VDOE, 2018). The 2006 General Assembly created new language and presented the Appropriation Act. FY 2009 with an increase in the per-pupil rate to \$6,000, and the General Assembly capped the local match requirement at 50%, effective in FY 2010 (VPI Briefing Document -VDOE, 2018). From FY 2012 to FY 2016, many changes and modifications were implemented to ensure children who are homeless and or had a deployed parent were served; the \$6,000 per pupil rate also increased by \$125 (VPI Briefing Document -VDOE, 2018).

The Appropriation Act requires the chief administrator (county or city manager), in conjunction with the school division superintendent, to apply for annual funds on or before May 15. According to the VDOE website (2017), VPI funds are awarded via a yearly application and spending plan which should outline the total number of at-risk 4 year-old children to be served and the eligibility criteria for participation. The eligibility requirements are homelessness, a total family income at or below 200% of poverty, a total household income less than 350% of federal

poverty guidelines for students with special needs or disabilities or student's parents or guardians must be school dropouts (VPI Briefing Document -VDOE, 2018).

The Code of Virginia states the Department of Education is to compile from each school division aggregated enrollment data and information based on eligibility guidelines (VPI Briefing Document -VDOE, 2018). The VDOE reports this information annually after the application and fall participation reports are submitted. The specific data and detailed information are shared with the various stakeholders, the chairs of House Appropriations Committee and Senate Finance Committees. Also, the VDOE posts and maintains on its website the enrollment information summaries by local school divisions according to current student privacy policies (VPI Briefing Document -VDOE, 2018).

In Virginia, a local school division's spending match is determined by what is called a "composite index" (Owings & Kaplan, 2013; VDOE, 2018; VPI Briefing Document -VDOE, 2018). The composite index determines a school division's ability to pay education costs as outlined by the Commonwealth's Standards of Quality (SOQ) (Owings & Kaplan, 2013; VDOE, 2018). The composite index is calculated using three indicators of a locality's ability-to-pay: true value of real property (weighted 50%), adjusted gross income (weighted 40%), and taxable retail sales (weighted 10%) (Owings & Kaplan, 2013; VDOE, 2018; VPI Briefing Document -VDOE, 2018). In the VPI formula, the number of children being served by Head Start is subtracted from the estimated number of at-risk 4 year-olds (enrollment X free lunch %) to determine the number of VPI student slots to be funded. In some divisions/localities, the resulting number is zero; therefore, the division/locality is not eligible to participate (Owings & Kaplan, 2013; VDOE, 2018; VPI Briefing Document -VDOE, 2018).

Funding

The financing of the VPI is delineated in the Virginia General Assembly's Appropriation Act Language Document (VDOE, 2018; VPI Briefing Document -VDOE, 2018). Using the Lottery Proceeds Funds, the General Assembly makes payments directly to the Virginia Department of Education which disburses the funds to participating school divisions for providing a high-quality full- or half-day preschool program for at-risk 4-year-old children who are Virginia residents and unserved by Head Start funding (VDOE, 2018; VPI Briefing Document -VDOE, 2018). The VDOE disbursement covers a portion of each division's total preschool operating budget. The remaining portion of the budget is subsidized by a required local match of funds to be paid by each locality (VDOE, 2018; VPI Briefing Document -VDOE, 2018). Funds are distributed based on an allocation formula providing the state share of \$6,125.00 for 100% of identified at-risk students for a full-day program and \$3,062 for a half-day program (VDOE, 2018; VPI Briefing Document -VDOE, 2018). The number of VPI students served is determined by the number of unserved students in each locality based on the projected number of kindergarten students (updated once each year from figures on the Governor's biennial budget) (VDOE, 2018; VPI Briefing Document -VDOE, 2018). To determine the state and local shares of funding, the composite index of local ability-to-pay is capped at 0.5000 (VDOE, 2018; VPI Briefing Document -VDOE, 2018). This means localities with a composite index of less than 0.500 pay their actual composite index and localities with a composite index of greater than 0.500 pay only 0.500 (VDOE, 2018; VPI Briefing Document -VDOE, 2018). School divisions can meet the local match using local expenditures of at least 75% in cash and no more than 25% in in-kind contributions (VDOE, 2018; VPI Briefing

Document -VDOE, 2018). Specifically, the VDOE Appropriation Act Language Document (2017) states:

In-kind contributions are defined as cash outlays that are made by the locality that benefit the program but are not directly charged to the program. The value of fixed assets cannot be considered as an in-kind contribution. Localities shall also continue to pursue and coordinate other funding sources, including child care subsidies. Funds received through this program must be used to supplement, not supplant, any funds currently provided for programs within the locality. However, in the event a locality is prohibited from continuing the previous level of support to programs for at-risk four-year-old students from Title I of the federal Elementary and Secondary Education Act (ESEA), the state and local funds provided in this grants program may be used to continue services to these Title I students. Such prohibition may occur due to amendments to the allocation formula in the reauthorization of ESEA as the No Child Left Behind Act of 2001 or due to a percentage reduction in a locality's Title I allocation in 2016-2017 or 2017-2018. Any locality so affected shall provide written evidence to the Superintendent of Public Instruction and request his approval to continue the services to Title I students. (p. 2)

Superintendents of each participating school division must submit a detailed proposal to participate which outlines clear methods of service coordination, implementation of Virginia Foundation Blocks of Early Learning (VFBEL) – Comprehensive Standards for Four-Year-Olds, participate in measurable achievement and success (PALS-PreK), indicate the number of at-risk 4-year-old children to be served and how they will adhere to student eligibility criteria (VDOE, 2018; VPI Briefing Document -VDOE, 2018). According to the VDOE Appropriation Act Language document, VPI eligibility criteria are:

[T]he eligibility criteria for participation in this program shall be consistent with the economic and educational risk factors stated in the 2015-2016 programs guidelines that are specific to: (i) family income at or below 200 percent of poverty, (ii) homelessness, (iii) student's parents or guardians are school dropouts, or (iv) family income is less than 350 percent of federal poverty guidelines in the case of students with special needs or disabilities. Up to 15 percent of a division's slots may be filled based on locally established eligibility criteria to meet the unique needs of at-risk children in the community. (p. 3)

Superintendents are notified of approved grant applications and informed of the VDOE's intent to collect and compile aggregated demographic and eligibility information (VDOE, 2018; VPI Briefing Document -VDOE, 2018). The VDOE reports annual relevant statistical data like the number of enrolled students whose families are at or below 130% of poverty and above 130% but below 200% of poverty indicators, the number of participating school divisions, utilized and unutilized VPI slots, as well as PALS data to the chairs of House Appropriation and Senate Finance Committees in accordance with student privacy policies (VDOE, 2018; VPI Briefing Document -VDOE, 2018).

VPI funding requires each school division to contribute to the education of its 4-year-old children and ECE program (VDOE, 2018; VPI Briefing Document -VDOE, 2018). Again, the state's portion is funded using revenues from the VA Lottery and each school division is tasked with funding their portion of the total budget with a local match based on their composite index percentage (VDOE, 2018; VPI Briefing Document -VDOE, 2018). Early childhood education programs promote systemic societal growth. Localities are committed to early learning. This commitment is realized through sustained investments of the public dollars (Stone, 2006).

Fiscal Capacity

Capacity is the local, state, or federal government's ability to fund the necessary goods and services for its citizens, such as education. Those living in a locality generate capacity or revenue. The community's collective wealth or tax base is known as fiscal capacity. Fiscal capacity or measure of wealth is generated by personal income or the capability to pay taxes on real estate assessments, state, sales, and various taxes. Owings and Kaplan (2013) define fiscal capacity as "the tax base of a locality as measured by some various methods of wealth" (Owings & Kaplan, 2013, p.132). Fiscal capacity varies by city, state, and region and contingent upon a specific geographical location at a set time having implications of the range of resources for financial opportunities and economic choices. Fiscal capacity can be measured using a variety of methods, but generally, local capacity is determined by property taxes (Owings & Kaplan, 2013). Again, fiscal capacity varies depending upon the locality's levels of income determined by property tax.

Capacity is often used synonymously with effort. Owings and Kaplan (2013) assert capacity is the measure of wealth reflecting the locality's ability to fund education. Effort is the level to which the locality chooses to support education to the fullest capacity that it can afford (Owings & Kaplan, 2013, p. 126). Fiscal capacity and fiscal effort work cohesively in determining education funding (Barro, 1986).

Fiscal Effort

Relative to fiscal capacity is fiscal effort and when the two are combined, they are strong predictors of potential educational funding, regardless of the level of government (national, state, or local). Owings and Kaplan (2013) present the shared relationship of capacity and effort as a two-axis construct (Owings & Kaplan 2013, p. 132) with capacity on the vertical axis (ranging

from low to high) and effort on the horizontal axis (ranging from low to high) creating four quadrants producing four varying combinations. Quadrant 1 is high capacity/high effort, quadrant 2 is high capacity/low effort, quadrant 3 is low capacity/low effort, and quadrant 4 is low capacity/high effort (Owings & Kaplan, 2013).

What does this mean for education funding? Put simply, the availability and accessibility of school funding, educational commitment, and efforts toward education vary drastically. For example, a locality with low financial means can exert significant commitment and effort toward its educational programs, contrary to a wealthier locality which may choose to prioritize other entities over education programs (Owings & Kaplan, 2013). Relative fiscal capacity and effort are related on the state level as well. At the state level, variances exist in capacity, how capacity is measured, personal income, and cost of living. The fiscal effort concept and computing formula are simple when viewed as a ratio of school revenue to the overall tax base (Owings & Kaplan, 2013). Owings and Kaplan (2013) assert the ratio as:

$$E = \frac{R}{TB}$$

In the above equation, E = effort, R = revenue for school budget spending, and TB = tax base or collective wealth (capacity) (Owings & Kaplan, 2013, p. 154). Utilizing this formula will yield a computed local effort greater than 1.0 because localities do not spend 100% of the available tax base on education.

Localities finance school budgets from various funding sources (Owings & Kaplan, 2013). A localities' wealth is a combination of many variables. Many states, including Virginia, utilize a composite index of real estate, personal income, and sales taxes on a proportional basis to calculate and derive at a locality's ability to fund education (Owings & Kaplan, 2013).

Composite Index

Although property values tend to be inconsistent when placed in the total economic context, using property values as an effective measure of wealth and cash flow allows constant revenue to the locality (Owings & Kaplan, 2013). The composite index pinpoints a locality's potential and ability to pay.

Virginia's Composite Index or Local Composite Index (LCI) is complicated but is intended to distribute funds for education equitably (Chandler, 2010). It allows poorer school districts to receive more state funding whereas wealthier divisions receive less state support and are responsible for larger portions (Owings & Kaplan, 2013). The composite index formula is re-calculated every two years based on data adjustments of public-school enrollment, real estate values, income, and retail sales. The composite index pinpoints the shared responsibility of paying for education and specifies the exact obligation of each locality and the state. In Virginia, public school funding has become a political and social debate (Owings & Kaplan, 2013).

VPI Purpose and Literacy Achievement

Virginia decision-makers grasped the importance of an early intervention initiative for children preceding kindergarten when they established the Virginia Preschool Initiative (VPI). The purpose of the Virginia Preschool Initiative (VPI) is to provide high-quality preschool programs for at-risk, 4-year-olds who are not eligible for Early Childhood Special Education or Head Start programs (VDOE, 2017). Children receive a high-quality preschool education in classes sized no larger than 18 students, and where the child to staff ratio is 9:1 (VDOE, 2018; VPI Briefing Document -VDOE, 2018). VPI classroom teachers have certification that ranges from having a high school diploma with specialized early childhood training to state-licensed teachers who hold a bachelor's and/or master's degrees with early childhood education

endorsements. Working with each teacher is an instructional assistant, teacher's aide or paraprofessional. VPI classroom assistants must be highly qualified by either holding an associate degree, completed 48 semester credit hours at an accredited college or university, or have passed the Para Pro exam. Daily instruction and learning experiences address the learning needs of young children based on the standards called The Virginia Foundation Blocks of Early Learning (VFBEL) – Comprehensive Standards for Four-Year-Olds (VDOE, 2018; VPI Briefing Document -VDOE, 2018). The VFBEL are a measurable range of scientifically-researched early childhood standards that include indicators essential for young children to be successful in kindergarten. They reflect a consensus on children's conceptual learning, acquisition of basic knowledge, and participation in meaningful and relevant learning experiences. The Virginia Preschool Curriculum Review Rubric and Planning Tool assists localities in identifying and choosing scientific research-based curricula aligned with the VFBEL. As a monitoring tool, The Virginia Quality Indicators for Responsive Teaching: Creating a High-Quality Preschool Learning Environment checklist ensures a high-quality environment, materials, and interactions that promote optimal motivation and engagement for early learning (VDOE, 2018; VPI Briefing Document -VDOE, 2018). VPI's holistic approach includes breakfast, lunch, transportation, extension activities, family engagement opportunities, and access to health, welfare, and social services programs that support the child and family (VDOE, 2018; VPI Briefing Document - VDOE, 2018).

In 1997, Marcia Invernizzi, University of Virginia Curry School of Education professor, along with partners Amie Sullivan, Joanne Meier and Linda Swank, created an assessment tool to measure early literacy achievement called the Phonological Awareness Literacy Screening for Pre-K (PALS Pre-K). The PALS-PreK assessment was designed to identify students in need of

early additional literacy instructional and intervention beyond the delivered curriculum. This instrument became useful (Invernizzi, Sullivan, Meier, & Swank, 2004). The popularity of the original PALS assessment for kindergarten children spurred the need for an additional instrument to detect reading problems even earlier. In collaboration with University of Virginia Curry School of Education, the VDOE piloted PALS-PreK from 2000 to 2004 with state-wide implementation during SY 2004-2005 (Invernizzi et al, 2004).

PALS Pre-K was field tested from 2000 to 2004 with 663 students varying in gender, ethnicity, and socioeconomic statuses (Invernizzi, et al, 2004). PALS proved to have technical adequacy, reliability, and validity (Invernizzi et al., 2004). Spring developmental ranges were established as target expectations to measure 4-year-old program students' progress. The Phonological Awareness Literacy Screening (PALS) assessment instrument for pre-kindergarten students (PALS-PreK) for literacy screening is administered during early fall and late spring of each school year. The results of PALS-PreK assessments, both fall and spring, are reported to the PALS office. PALS-PreK is a criterion-referenced instrument intended as a tool to guide instruction and to measure Pre-K emergent literacy abilities through eight subtests (see Table 1). Townsend and Konold (2010), suggest that PALS Pre-K instrument effectively measures the most important precursors to successful literacy acquisition, pre-reading skills, and later literacy success (Townsend & Konold, 2010, p. 115). Assessment of more than 60,000 students at 1,000 public schools across Virginia has established that children who participate in Pre-K programs funded by through the VPI improve performance in kindergarten and first grade (Huang & Invernizzi, 2012).

Table 1

PALS Pre-K Spring Developmental Ranges

	PALS Pre-K Tasks	Spring Developmental Range	Max. Score
Section I	Name Writing	5-7	7
Section II	Upper-Case Alphabet	12-21	26
	Lower-Case Alphabet	9-17	26
	Letter Sounds	4-8	26
Section III	Beginning Sounds	5-8	10
Section IV	Print and Word Awareness	7-9	10
Section V	Rhyme Awareness	5-7	10
Section VI	Nursery Rhyme Awareness	6-10	10

Note: Data Source: PALS-PreK Manual (Invernizzi, et al, 2004).

PALS Pre-K is an assessment, not paper and pencil test. It includes a developmentally appropriate series of tasks to perform as a measure of a child's early literacy acquisition (Invernizzi, Sullivan, Meier, & Swank, 2004). Each task has a developmental range with a minimum score and a maximum score. The developmental ranges provide a consistent frame of reference to 4-year-old developmental expectations for curriculum development and instructional pacing. The maximum score denotes full accuracy and competency of that skill. The PALS-PreK assessment is administered in the fall, mid-year, and spring of each year. Student performance on the Spring PALS-PreK is used to determine school readiness. The VDOE has adopted the Pre-K PALS as its early literacy assessment to help guide Pre-K instruction (planning and delivery). The Spring Pre-K PALS scores are used to target students for Early Reading Intervention and later reading success (Invernizzi, Sullivan, Meier, & Swank, 2004).

Notable research developments continue to highlight the value of Pre-K participation and literacy success. Importantly, the impact of Pre-K programs can be seen through fifth grade

reading achievement (Diffey et al., 2017). Virginia assesses students using the PALS assessment from Pre-K through Grade 3 as a literacy predictor but formally administers state-mandated reading tests in Grade 3 through Grade 12 on the Virginia Standards of Learning (SOL) English Tests.

Summary of Literature

Research indicates that literacy preparation is crucial during the first four years of life. Preschool is viewed as a valuable time for children to gain prerequisite skills that foster and support future literacy, reading development, and other important school and life outcomes. Significant reading achievement gaps and delays can be detected before a student enters kindergarten (Invernizzi, Sullivan, Meier, & Swank, 2004). If a third-grade student continues to lack the minimum literacy competencies for school success, other adverse effects may develop such as inappropriate behaviors, attendance problems, or low-self concepts along with the literacy deficit; all of which are costly to school systems and localities (Huang, 2017; Huang, Invernizzi, & Drake, 2012). Pre-K is viewed as the best intervention to combat this trend. Study after study prove Pre-K can be costly but the benefits outweigh the initial investments. Shorb, Phebus, Spurlock, and Baldwin (2012) provided quantifiable evidence that aside from the compelling individual benefits, Pre-K spending return on investment affects not only the community but the local, state, and federal government as well. In fact, the report stated, “for every dollar invested in Pre-K programs, the return of total saving to citizens is about \$5.12 in benefits to the community, state, and federal governments” (Shorb et al., 2012, p.2). It concluded that Pre-K has a long-term effect on the vitality of the community by producing citizens who perform better in school and have higher education attainment which yields a more educated workforce. A more educated workforce, in turn, earns a higher income which means

more public revenue from taxes, less poverty, and less crime, making a city or locality more attractive for jobs and other businesses. Pre-K spending is pivotal to boosting the economy. In 2015, the U.S. Department of Education validated this notion with a report entitled, *A Matter of Equity: Preschool in America*. The report suggested expanding Pre-K access because Pre-K provides a societal return on investment of \$8.60 for every \$1 spent. The report posited that providing children with quality early education experiences was not only right for the individual child but imperative for strengthening our nation's economy.

Across the literature, we see two primary ECE trends related to school finance and student achievement. The first major trend is the positive relationship between general school spending and student achievement. The second trend is early childhood education, specifically connecting pre-kindergarten investments to lasting academic benefits and life attainment.

The first major trend links school spending and student achievement. There is a considerable amount of literature that systematically associates school spending, student achievement, and labor market outcomes.

Hanushek (1971) fashioned a persuasive synthesis of literature examining the relationship between school inputs and student performance. The study was criticized because of the small sample and the failure to show a relation between school inputs and student outcomes. The study gained notoriety for the data analysis, synthesis of interpretation, and validity of the problem investigated. It has been hailed as prototype influential study to the field of school inputs including resources and student performance (Hedges et al, 1994).

Hedges, Laine, and Greenwald (1994) replicated Hanushek's (1971) landmark research study. The key research question was whether Hanushek's conclusions would be supported by using a more complex statistical and analytic method. The re-analyses determined a positive

pattern in the relations between educational resource inputs and student outcomes. It validated that money matters.

In 1996, Greenwald, Hedges, and Laine continued to examine a more comprehensive collection of studies utilizing a meta-analytic approach to assess the magnitude of the relationship between school inputs and student achievement. Their results reinforced their previous study's finding that money is positively related to student achievement and these relationships are large enough to warrant attention in education.

Verstegen and King (1998) compiled a review and analysis of 35 years of research studies focused on the positive correlation school spending has with student achievement. This study tracked participants in various states over three decades from the primary level and then into the labor force. They found a positive relationship between school funding, school spending, and individual achievement. In conjunction with the Washington State Institute for Public Policy, Aos and Pennucci (2012) updated their findings on a key public policy question: does spending more money on the K–12 school system lead to better student outcomes? Their work evaluated 40 credible evaluations of K–12 per-pupil expenditures and the cause-and-effect relationship with student outcomes, including scores on standardized math and reading tests, drop-out rates, and high school graduation rates. Overall, the results verified a positive correlation between K–12 per-pupil expenditures and student outcomes. Strong evidence shows a positive link between school spending and student achievement. Although money alone is not everything, it is critical, and it matters.

Jackson, Rucker, and Persico (2016) studied the effects of changes in school spending in the United States as the result of court mandated school finance reform and the effects on long-term adult outcomes. Using nationally representative data on children born between 1955 and

1985 and followed through 2011, the investigators found that a 10% increase in per pupil spending each year for all 12 years of public schools led to more completed years of education, about 7% higher wages, and a 3.2 percentage point reduction in the annual incidence of adult poverty. Effects were much stronger for children from low-income families. Investigators also found that the spending increases included reductions in student-teacher ratios, increases in teacher salaries, and longer school years (Jackson, Johnson, & Persico, 2016).

In a Johns Hopkins University's commentary, Bjorklund-Young (2017) reviewed the studies that found significant correlation between school funding and educational outcomes. She concluded the funding debate will continue, and educational advocates and policy-makers should focus their concerted attention toward better understanding which specific interventions produce stronger outcomes because any money spent on education is well.

The second trend connects children's Pre-K participation and Pre-K investments to lasting academic benefits and life attainment. A growing body of literature has investigated the nexus of pre-kindergarten participation, spending, and long-term outcomes (Diffey et al, 2017; Phillips, 2017). DeAngelis, Holmes, Erickson, and Ritter (2017) drew attention with a large-scale examination of over 2,000 trustworthy publicly-funded pre-kindergarten studies and inquiry articles. Their systematic review supports significant positive connections between pre-kindergarten participation and spending to short- and long-term cognitive achievement, reading and math achievement, reduced retention, special education referrals, and costs associated with remedial reading programs and services. Barnett (2008), Duncan & Magnuson (2013), and other early childhood scholars concur that the strongest evidence suggests economically disadvantaged 4-year-olds who attend a high-quality pre-kindergarten program reap the greatest long-term benefits as stated above. Additionally, children who participate in pre-kindergarten programs

improve school readiness, gain greater school success, earn higher academic scores, and exhibit reduced delinquency and crime in childhood and adulthood. McCoy et al. (2017) analyzed data for comprehensive studies of ECE programs from 1960 to 2016. They aggregated and disaggregated estimates of ECE's impacts on three discrete educational outcomes. The findings stated, "given the high costs that special education placement, grade retention, and dropout place on both the individual and taxpayers, our results suggest that further investments in ECE programming may be one avenue for reducing educational and economical burdens and inequities" (McCoy et al., p. 476).

An immense amount of early childhood literature substantiates the notion that financial investments in human capital have direct implications for young children and our future. High quality ECE programs do produce short- and long-term benefits for individuals and society due to the association with reduced juvenile delinquency and adult crime activity (Barnett, 2008). Studies suggest favorable outcomes to Virginia's Pre-K students on the early literacy predictor assessment (Huang, 2017; Huang et al., 2012; Moyle, Heilmann, & Berman, 2013) but studies explicit to Virginia's Pre-K spending compared to student achievement are limited.

The 2016 enrollment in Virginia's public pre-kindergarten programs (18%) hovered below the national average of 32% and even further behind Maryland (36%) and Washington DC (81%), according to a recently released report by the National Institute for Early Education Research at Rutgers University (Barnett et al., 2017; Chandler, 2017). Nationally, Pre-K enrollment is at an all-time high. More than 25,000 state-eligible 4-year-olds were not given the opportunity to access state-funded pre-kindergarten because they came from households at or below 200% of the poverty level (Chandler, 2017). Virginia ECE advocates blame low state Pre-K funding and local school divisions inability to meet the matching dollar in-kind amount

(Chandler, 2017). Because more than a quarter of state-funded pre-kindergarten seats went unfilled, ECE advocates say many poor and disadvantaged children will start kindergarten without the socialization and basic English proficiency skills needed to be successful (Chandler, 2017).

Virginia's Biennial School Readiness Report Card (2013) reports that statewide, 10,517 Virginia kindergartners entered school in the Fall of 2012 without the necessary literacy skills to be successful. Fall 2010 and Fall 2011, over 10,000 kindergartners and over 9,900 kindergartners, respectively needed literacy intervention at the beginning of kindergarten because they failed to meet the minimum benchmarks on the Fall PALS assessment. During the same two years, 17% & 15% of third-graders failed to meet the basic pass score on the Grade 3 Reading SOL tests and nearly 8% of children from the kindergarten class of 2008-09 were not promoted on-time to third grade. These data represent 6,198 children and potentially more than \$67 million in intervention costs and remedial services (Virginia Early Childhood Foundation, 2013). The lack of Pre-K investments deprives children of critical support in their early years, reduces school readiness, reduces academic success, limits opportunities for a better life, and blocks their way out of poverty (Diffey et al, 2017; Stone, 2006). Children who participated in the VPI program for SY 2013 – 2017 outperformed their counterparts who were identified as having an unknown ECE experience or no Pre-K participation when they entered kindergarten (Duncan & Magnuson, 2013; Gayl, 2007 & 2008; Magnuson et al., 2005; Phillips et al., 2017).

The FALL PALS K assessment was used to determine which students would be targeted for intervention services. Table 2 reveals a comparison of students who were identified as needing PALS intervention services at the beginning of kindergarten based on their FALL PALS score.

Table 2

Fall PALS Kindergarten Statistics

	VPI Students Not Needing Intervention		VPI Students Needing Intervention		Students with Unknown ECE Participation Needing Intervention		Students with NO ECE Participation Needing Intervention		Non – VPI Participating Students Needing K Intervention Services	
Year	Total	%	Total	%	Total	%	Total	%	Total	%
2013	10,540	94	719	6	2,483	16	3,723	26	6,206	42
2014	10,878	94	824	7	2,067	13	3,847	28	5,914	41
2015	11,358	92	1,035	8.4	1,890	14	4,063	31	5,953	45
2016	10,940	91	1,082	9	4,379	17	3,012	35	7,391	52
2017	13,157	90	1,537	10	629	12	5,797	34	6,426	46

Note: Data Source: VPI Briefing Document, VDOE, 2017

Children entering kindergarten without the necessary school and reading-readiness skills often fall further behind their peers (Diffey, 2017). The achievement gap widens despite remedial and intervention efforts and instruction to help them catch up. In 2017, Virginia invested \$68 million on the VPI budget, \$17.5 million for Early Intervention Reading Initiative (EIRI) and an addition \$100 million for prevention, intervention, and remediation services for grades K-12 (VDOE, 2017). The data in Table 2 show that a total of 6,429 of Virginia's children who enrolled in kindergarten had an unknown ECE experience or no formal Pre-K experience in 2017. Given what the research says about human capital investments and ECE benefits, why not invest a large portion of the \$17.5 million from the EIRI fund and a larger share of the \$100 million from prevention, intervention, and remediation services budget for grades K-12 as an early intervention to increase Pre-K access? Prevention is less expensive than intervention. Young children benefit from early learning experiences that are essential to stronger futures, a more productive life, a stronger society, and a stronger economy (Phillips, et al., 2017). Research clearly connects early childhood education to kindergarten readiness, third-grade

literacy, later-school achievement, high-school graduation, and life's attainment (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Gayl, 2008; Magnuson et al., 2005; Phillips et al., 2017).

Summary

Human capital is one of the strongest predictors of current and future economic productivity, which is, in turn, one of the strongest predictors of overall economic well-being (Agarwal & Filer, 2015; Lynch & Vaghul, 2015; Virginia Early Childhood Foundation, 2013). For Virginia to propel upward from its current economic growth pattern, something must be done differently. According to the *State of the Region Report* (2015), an important place to start—perhaps the most important place to start—is examining pre-kindergarten investments and early childhood education because these programs generate higher rates of return on public dollars than conventional economic development programs that emphasize attracting new firms, businesses, or public-private partnerships to build arenas and hotels (p. 1). Whereas extensive early-childhood research floods the field providing a broad scope for the correlation between investments and outcomes, insufficient empirical studies examine Virginia's initiative for Pre-K VPI. The goal of this study is to examine Virginia's Pre-K spending and early literacy achievement.

CHAPTER 3

METHODOLOGY

Nationally, the expansion of state-funded Pre-K programs generates debate about comparing educational investments to program outcomes (Diffey, 2017; Friendman-Krauss, 2018). In 2017, Virginia ranked 29 out of 43 states in Pre-K spending and access with \$7.3 billion of direct aid going towards public education. Sixty-eight million dollars was earmarked for the VPI budget, \$17.5 million for Early Intervention Reading Initiative (EIRI), and \$100 million for prevention, intervention, and remediation services (VDOE, 2017). In May 2018, Virginia Education Association advocates postulated that Virginia's economy is improving but school spending is slowly increasing, and per-pupil spending remains flat and below the national average given inflation adjustments (Pope, 2018). During this time, an article in *Education Week* promoted the tenets of Pre-K investments and sustained outcomes for Virginia (Samuels, 2018). It stated that a University of Virginia study proved that high-quality Pre-K programs as an intervention (not one-shot inoculations) produce positive short; and long-term benefits; but the focus needs to be on the actual Pre-K learning experience (Samuels, 2018). Further, Samuels, 2018 said, "children who had the long-term, high-quality education performed measurably better on tests of literacy and math compared with children whose elementary school classrooms were of moderate or poor quality" (p. 7).

In 2005, the VDOE officially began collecting its initial Pre-K literacy achievement data since the VPI program began in 1995 (Huang, 2017; Huang, Invernizzi, & Drake, 2012; Invernizzi, 2004). According to ESSA for SY 2018-2019, each school division will be required to track and report student cohorts for testing and per-pupil spending per grade level (USDOE, 2017). Specifically, localities are required to do the following: give each Pre-K student a state-

testing identification number; for the first-time record and report to the state and U.S.

Department of Education whether each kindergarten student had an early childhood experience or not; and report the amount of money spent per student (USDOE, 2017). The purpose of this policy change for tracking and targeting cohorts of students is to promote transparency (USDOE, 2017). Previously, there was no state or federal mandates for accurate data collection for Pre-K – 12 grades. This mandate will be ground-breaking for future students of Pre-K cohort tracking for per pupil expenditure and achievement. As stated, the aim of this study is to investigate the impact of Virginia's school divisions fiscal effort for Pre-K spending compared to PALS-PreK literacy rates from SY 2010-2015. Increased investments signify a high level of prioritization of and commitment to preschool. Although the VDOE continues to commit Pre-K funding, total program expenses are calculated to include each school divisions local in-kind match. While some school divisions support their Pre-K commitment by investing more than the required local match funds, others just devote the minimum funding required. This study will address questions concerning the impact of fiscal efforts as it relates to early student literacy achievement in Virginia. Is early literacy achievement impacted by the level of Pre-K investment spending above the required VPI local grant match?

This chapter will outline the specifics used to conduct this research study, including the participants, data design, procedures, collection, analyses, and limitations, followed by a summary. This quantitative study will serve as an initial study to explore any difference in mean PALS-PreK scores based on the level of local fiscal efforts for Pre-K spending.

Research Purpose and Research Questions

The purpose of the study is to investigate the impact of divisions fiscal effort for Pre-K spending and Pre-K literacy rates. The following research questions will be used in this study.

1. Is there a difference in mean five-year Pre-K literacy rates between Virginia's school divisions with high fiscal effort for VPI and those with low fiscal effort, after controlling for SES?
2. If there is a significant difference, what is the gain in Pre-K literacy achievement rates for the divisions based on the level of fiscal effort?

Participants

Region 2 was the target of this study because this is the area in which the researcher lives and works. There are 15 public school divisions identified by the VDOE in Region 2; Accomack, Chesapeake, Franklin, Hampton, Isle of Wight, Newport News, Norfolk, Northampton, Portsmouth, Poquoson, Southampton, Suffolk, Williamsburg (James City), Virginia Beach and York. All these local school divisions are located on the eastern seaboard of Virginia and participate in the VPI program which serves about 6,700 Pre-K students each year. The preliminary sample identified for this study included a subset (<10) of Region 2 school divisions. Initially, the researcher sent a short questionnaire to all division superintendents asking if the PALS-PreK data were available and their willingness to participate in the study. At that time, seven superintendents responded which provided ample participation to proceed with the study. However, upon research implementation, only five local school divisions voluntarily submitted all the requested data for this study. Participating school divisions are diverse and vary in number of schools, total enrollment, demographics, achievement, budget, and local fiscal effort as verified by the information outlined on the VDOE School Quality Profiles (VDOE, 2017).

School Division A Profile

School Division A is an urban school division with 23 schools (3 high, 3 middle, 13 elementary, 3 preschools and 1 alternative) and an operating budget of about \$193 million. Total enrollment is 14,339 students of whom 72% are African-American, 20% are White, 3% Hispanic, 1% Asian and the other 4% are American Indians, Native Hawaiian, and two or more races. Of the students, 68.84% qualify for free and reduced-price lunch. Achievement data includes 68.84% of its schools are fully accredited, and the Federal Graduation Rate Index is 83%, which is slightly below the state average of 87%. The overall attendance rate is 93.73%. The Pre-K enrollment is 639 with a total VPI budget of about \$3.4 million.

For SY 2010-2015, this school division had an average of 648 VPI participating students with 687 being the highest year and in 2014 serving its lowest number of students, 616. The mean PALS-PreK score was 97.32. The mean SES percentage was 63.59 and the average composite index was 0.23 for the 5 years. This school division invested more than \$10,000-\$13,000 above the required VPI in-kind match for all years. For this study, this school division is categorized as having a high fiscal effort (School Quality Profile, VDOE, 2017). Table 3 details the specific data relevant to this study.

Table 3

School Division A Data

SY	# of PK Students	# of Students Passed PALS	# of Students Failed PALS	Total PALS % Average	SES %	Composite Index	VPI Fiscal Effort
2010-2011	678	653	25	96.3	60.48	0.2497	High-1
2011-2012	687	670	17	97.5	68.02	0.2497	High-1
2012-2013	621	611	10	98.3	62.12	0.2755	High-1
2013-2014	638	624	14	97.8	63.07	0.2755	High-1
2014-2015	616	596	20	96.7	64.28	0.2678	High-1

Note: Data Source: School Division Self-Reported and VDOE.

School Division B Profile

School Division B is an urban school division with 33 schools (4 high, 5 middle, 20 elementary, an early childhood center, a gifted center, a special center, and an alternative center) and an operating budget of about \$200 million. Total enrollment is 19,911 students of whom 60% are African-American, 24% are White, 7% Hispanic, 8% two or more races and 1% Asian, American Indians, and Native Hawaiian. Of the students, 58.19% qualify for free and reduced-price lunch. Achievement data includes 65.5% of its schools are fully accredited and the Federal Graduation Rate Index is 85%, which is slightly below the state average of 87%. The overall attendance rate is 95%. The Pre-K enrollment is 728 students with a total VPI budget of about \$3.9 million

For SY 2010-2015, this school division has an average of 604 VPI participating students with 616 being the highest year and in 2014 serving its lowest number of students, 591. The mean PALS-PreK score was 91.96. The mean SES percentage was 55.79 and the average composite index was 0.29 for the 5 years. This school division invested more than \$100,000-

\$677,000 above the required VPI in-kind match for all years. For this study, this school division is categorized as having a high fiscal effort (School Quality Profile, VDOE, 2017). Table 4 provides the specific data relevant to this study.

Table 4

School Division B Data

SY	# of PK Students	# of Students Passed PALS	# of Students Failed PALS	Total PALS % Average	SES %	Composite Index	VPI Fiscal Effort
2010-2011	611	553	58	90.5	50.36	0.2690	High-1
2011-2012	616	569	47	92.3	54.68	0.2690	High-1
2012-2013	606	568	38	93.7	57.68	0.2912	High-1
2013-2014	596	551	45	93.4	58.11	0.2912	High-1
2014-2015	591	531	60	89.9	58.12	0.2878	High-1

Note: Data Source: Local School Division Self-Reported and VDOE.

School Division C Profile

School Division C is an urban school division consisting of 51 schools (6 high, 8 middle, 23 elementary, 5 early childhood centers, and 9 adult alternative and other programs) and an operating budget of about \$300 million. Total enrollment is 28,806 students of whom 53% are African-American, 24% are White, 13% Hispanic, 7% two or more races and 3% Asian, American Indians, and Native Hawaiian. Of the students, 64.14% qualify for free and reduced-price lunch. Achievement data includes 55.3% of its schools are fully accredited, and the Federal Graduation Rate Index is 88%, which is slightly above the state average of 87%. The overall attendance rate is 95%. The Pre-K enrollment is 1,585 students with a total VPI budget of about \$6.2 million.

For SY 2010-2015, this school division has an average of 1,379 VPI participating students with 1,536 in 2011 being the highest year and in 2010 serving its lowest number of students, 1,235. The mean PALS-PreK score was 83.64. The mean SES percentage was 58.9 and the average composite index was 0.29 for the 5 years. This school division invested more than \$2 million above the required VPI in-kind match for all years. For this study, this school division is categorized as having a high fiscal effort (School Quality Profile, VDOE, 2017). Table 5 outlines the specific data relevant to this study.

Table 5

School Division C Data

SY	# of PK Students	# of Students Passed PALS	# of Students Failed PALS	Total PALS % Average	SES %	Composite Index	VPI Fiscal Effort
2010-2011	1,235	1,194	117	85.6	54.00	0.2778	High-1
2011-2012	1,536	1,276	260	83.0	55.59	0.2778	High-1
2012-2013	1,44	1,179	262	81.8	60.40	0.2934	High-1
2013-2014	1,337	1,138	199	85.1	60.72	0.2934	High-1
2014-2015	1,348	1,115	233	82.7	63.61	0.2908	High-1

Note: Data Source: Local School Division Self-Reported and VDOE.

School Division D Profile

School Division D is an urban district containing 54 schools (5 high schools, 5 middle schools, 31 elementary schools, 3 early childhood centers, and 10 adult alternative and other programs) and an operating budget of about \$300 million. Total enrollment is 30,787 students of whom 60% are African-American, 22% are White, 9% Hispanic, 6% two or more races, 2% Asian and 1%, American Indians, and Native Hawaiian. Of the students, 70.26% qualify for free and reduced-price lunch. Achievement data includes 61.4% of its schools are fully accredited,

and the Federal Graduation Rate Index is 81%, which is below the state average of 87%. The overall attendance rate is 94%. The Pre-K enrollment is 1,929 students with a total VPI budget of about \$8.5 million.

For SY 2010-2015, this school division has an average of 1,703 VPI participating students with 1,793 in 2011 being the highest year and in 2014 serving its lowest number of students, 1,592. The mean PALS-PreK score was 94.24. The mean SES percentage was about 66 and the average composite index was 0.31 for the 5 years. For 2 years, this school division invested more than \$600,000 above the required VPI in-kind match and for 3 years spent less than the required local match. For this study, this school division is categorized as having a high fiscal effort for 2 years and low fiscal effort to 3 years (School Quality Profile, VDOE, 2017). The specific data relevant to this study is presented in Table 6.

Table 6

School Division D Data

SY	# of PK Students	# of Students Passed PALS	# of Students Failed PALS	Total PALS %	SES %	Composite Index	VPI Fiscal Effort
2010-2011	1,721	1,579	142	91.7	64.43	0.3004	High-1
2011-2012	1,793	1,682	111	93.8	65.16	0.3004	Low-2
2012-2013	1,717	1,680	37	97.8	66.05	0.3102	Low-2
2013-2014	1,691	1,601	90	94.6	66.96	0.3102	Low-2
2014-2015	1,592	1,486	106	93.3	66.83	0.3123	High-1

Note: Data Source: Local School Division Self-Reported and VDOE.

School Division E Profile

School Division E is a rural school district with 9 schools (2 high, 2 middle, 5 elementary) and an operating budget of about \$60 million. Total enrollment is 5,476 students of

whom 63% are White, 27% are African-American, 3% Hispanic, 5% two or more races, and 2% Asian, American Indians, and Native Hawaiian. Of the students, 33.70% qualify for free and reduced-price lunch. Achievement data includes 100% of its schools are fully accredited, and the Federal Graduation Rate Index is 89%, which is above the state average of 87%. The overall attendance rate is 96%. The Pre-K enrollment is 113 students with a total VPI budget of about \$600,000.

For SY 2010-2015, this school division has an average of 87 VPI participating students with 89 in 2011 & 2014 being the highest years and in 2013 serving its lowest number of students, 86. The mean PALS-PreK score was 91.72. The mean SES percentage was about 35.7 and the average composite index was 0.41 for the 5 years. This school division invested no additional funds beyond the required VPI in-kind match for all years. For this study, this school division is categorized as having a low fiscal effort (School Quality Profile, VDOE, 2017). Table 7 highlights the specific data relevant to this study.

Table 7

School Division E Data

SY	# of PK Students	# of Students Passed PALS	# of Students Failed PALS	Total PALS % Average	SES %	Composite Index	VPI Fiscal Effort
2010-2011	86	77	9	89.5	33.36	0.3926	Low-2
2011-2012	89	85	4	95.5	34.55	0.3926	Low-2
2012-2013	87	84	3	96.5	36.09	0.4258	Low-2
2013-2014	86	79	7	91.8	37.33	0.4258	Low-2
2014-2015	89	76	13	85.3	37.25	0.4195	Low-2

Note: Data Source: Local School Division Self-Reported and VDOE.

Although diverse in size, composition, and finance, the participating school divisions are governed by elected school boards who are committed to ensuring their students are provided a world-class education as preparation for the future. This study includes a 5-year span of SY 2010 – 2011 through SY 2014-2015 and total Pre-K participation averaged 4,422 students per year and totaled 22,108 students for all 5 years. Again, an invitation to participate was extended to all 15 local school divisions in Region 2; however, only five local school divisions volunteered to participate and submitted all requested data.

Variables

This initial study seeks to explore local effort for Pre-K spending and early literacy rates in Virginia using two relevant variables, local fiscal effort, and mean PALS-PreK pass percentages to answer the research questions.

Independent Variable: Local School Divisions Fiscal Effort

In Virginia, each local school division's total VPI spending includes an in-kind match determined by the locality's composite index. The composite index determines a school division's ability to pay education costs as outlined by the Commonwealth's Standards of Quality (SOQ). The composite index is calculated using three indicators of a locality's ability-to-pay; first, the true value of real property (weighted 50%), adjusted gross income (weighted 40%) and taxable retail sales (weighted 10%). In the VPI formula, the number of children being served by Head Start is subtracted from the estimated number of at-risk 4-year-olds (enrollment X free lunch %) to determine the number of VPI student slots to be funded (VPI Briefing Document -VDOE, 2018). In some divisions/localities, the resulting number is zero; therefore, the division/locality is not eligible to participate (Owings & Kaplan, 2013; VDOE, 2017).

According to VPI, each participating school division's in-kind match combined with the VPI's funded portion is adequate funding to operate a high-quality Pre-K program based on its allotted student slots. Using a dichotomous method, this study sorted each school division's fiscal effort into 2 categories; high fiscal effort and low fiscal effort based on school division's self-reporting for each school year. "High fiscal effort" for the intent of this research means the school division invested additional funds above the required in-kind match towards the total expenses of its Pre-K program. "Low fiscal effort" means the school division only invested the in-kind required match or less than the identified in-kind match towards the total expenses of its Pre-K program. Divisions self-reported local fiscal effort for Pre-K spending. Participating school divisions reported fiscal effort for VPI that ranged from spending less than the required in-kind local match to amounts of more than \$2.7 million.

Dependent Variable: PALS-PreK

The PALS-PreK assessment – spring results are used to determine student success. These results also inform the need for further early reading intervention and later reading success. Each division self-reported the Spring PALS-PreK results for SY 2010-2011 through SY 2014-2015. The pass percentages include a count of each student who achieved the minimum overall summed score of 53–125.

Control Variable (Co-variate): SES

SES may refer to total household income, educational attainment, net worth, financial stability, or social class. For this study, however, SES refers to the total percentage of students receiving free and reduced-price lunch. Virginia participates in the National School Lunch Program called the Virginia School Breakfast and Lunch Programs (VDOE, 2018). The Virginia School Breakfast and Lunch Program is a federally-assisted meal program that provides well-

balanced meals to students of families who cannot afford school breakfast and/or lunch.

Students are eligible for free and reduced-price lunch based on the family's total income being below the 130% of federal poverty guidelines. Schools with higher SES percentages are interpreted as having higher poverty students (VDOE, 2018).

This study controls for SES to even the analysis since fiscal effort is based on the locality's ability to pay. The percentage of students who received free and reduced-price lunch is publicly available on the VDOE website.

Research Design

The research design was a causal-comparative ex post facto non-experimental study (McMillan & Schumacher, 2010) aiming to compare group mean differences in pre-existing early-childhood literacy achievement. Specifically, it explored the difference in mean Pre-K literacy rates between school divisions that spent above the in-kind base funding for VPI and those that spent at or below base funding after controlling for SES (the percentage of students receiving free and reduced-priced lunch). For this study, pre-existing data from SY 2010–2011 to 2014–2015 were used to assess the stability of these mean differences over time. The variables identified were selected because in all cases these are common factors among schools participating in VPI funding. The selection of the PALS-PreK assessment as the dependent variable was a reasonable choice given it is the first formal assessment administered in Virginia's public schools as an early literacy indicator. The contribution of the state's VPI funds and each school division's monetary input were the only two choices for the independent variable. Since this quantitative study seeks to explore local fiscal effort, it was most productive to examine the investment beyond the required in-kind match as the independent variable.

The use of pre-existing data collected from multiple sources, including the self-reporting by school divisions, set the stage for this causal-comparative non-experimental study. All data reported are mean district-level data; that is, none of the datasets include student-level or school-level data. The PALS-PreK average for each of the five years represents the early literacy achievement for participating school divisions based on the level of fiscal effort provided, high fiscal effort versus low fiscal effort.

The ANCOVA includes one or more variables that predict the outcome (dependent variable). Co-variables are not part of the main experimental manipulation but have an influence on the dependent variable and are included in the ANCOVA analysis. According to Gamst, Meyers, and Guarino (2008), “ANCOVA is used to reduce the within-group error variance and eliminates the unmeasured variable that impacts the results and ANCOVA removes the bias of the co-variate” (Gamst et al., 2008, p. 453). For this study, the use of ANCOVA procedures is threefold: use SES to predict the PALS-PreK rates, adjust the PALS-PreK to remove the effects of SES, and perform an ANOVA analysis on the adjusted PALS-PreK rates (Gamst et al., 2008).

For the main research question, the mean five-year PALS-PreK rates are grouped based on the level of fiscal effort for that year. The two groups are compared to determine the difference in PALS-PreK results. The covariate is the poverty level or socioeconomic status (SES), as measured by the percent of students who receive free and reduced-priced lunch. McMillan and Schumacher said (2010), “this design will provide statistical conclusion validity to address the mean difference and relationship between the school divisions investing choices, as well as help identify variables that need further investigation” (McMillan & Schumacher, 2010, p. 263).

Data Collection

Unlike K–12 achievement data, the VDOE does not publicly report or publish early-childhood achievement statistics; therefore, each participating local school division provided the requested information. The goal of this research was to include all 15 VPI-participating school divisions. At the commencement of this study, an invitation to participate was extended to all Region 2 school localities; however, seven divisions responded favorably. Upon study implementation, five local school divisions voluntarily submitted all the requested information.

Financial figures (total amount invested in VPI program beyond required match), PALS-PreK data (number of students and results), and K PALS cohort reports for SY 2010-2011 through 2014-2015 were submitted by each school division from their archival records. The VDOE provided general information like SES percentages (total % of students who received free and reduced-price lunch), the composite index, and general VPI information from annual reports.

Data Analysis

All data collection efforts were completed, data were verified, cleaned, and processed in preparation for analysis. Local fiscal effort was categorized in two groups, high fiscal effort for the school divisions who invested or spent additional funds above the required in-kind match and low fiscal effort for the school divisions who invested their in-kind required match or less the identified in-kind match towards the total expenses of their Pre-K program. The mean PALS-PreK percentage scores were verified and checked. The means were adjusted for the differences in socioeconomic status or SES. The relationship between the local fiscal effort and PALS-PreK averages were analyzed. Each variable was reviewed for reliability and consistency.

The difference in the mean Pre-K literacy results between divisions with high fiscal effort for Pre-K spending and those with low fiscal effort, after controlling for SES (poverty), will be

examined through analysis of covariance, ANCOVA (Gamst et al., 2008). The analysis included all five years of data to determine the stability of those differences over time.

The above analysis of the data was used to address the first research question:

Is there a difference in mean five-year Pre-K literacy rates between Virginia's school divisions with high fiscal effort for Pre-K spending and those with low fiscal effort, after controlling for SES? The null hypothesis is there is no statistically significant difference on the PALS-PreK results among school divisions with high fiscal effort and the school divisions with low fiscal effort for VPI.

$$\text{Predicted Y} = b_0 + b_1 * X + b_2 * \text{Cov}$$

In the formula, "Y" represents the mean 5-year PALS-PreK percentages, "b" represents the bivariate model, "X" represents the dichotomized fiscal effort for Pre-K spending (i.e., 1-high fiscal effort versus 2-low fiscal effort, and "cov" represents the covariate SES). The F test of b1 with the null hypothesis of b1 being equal to 0 in the data set. A computation of the variables for fiscal effort and PALS-PreK rates was conducted using this bivariate correlation to determine the strength of the relationship.

Research question two asks: If there is a significant difference, what is the gain in Pre-K literacy achievement rates for the divisions based on the level of fiscal effort?

$$\text{Predicted Y} = b_0 + b_1 * Z$$

In this formula, "Y" represents the mean 5-year PALS-PreK percentages and "Z" represents the continuous fiscal effort for Pre-K spending (i.e., high vs. low). F test of b1 with the null hypothesis of b1 being equal to 0 in the data set. If a statistically significant difference is found during the ANCOVA, it would signify a correlation between fiscal effort and PALS-PreK literacy rates.

Study Limitations

Limitations to this study exist. Having a small sample size of the participating school division impacted this study. Region 2 has 15 public school divisions and all were invited to participate, but only five or one-third of the school divisions voluntarily participated by submitting all the requested data. An initial communication was emailed and mailed to the division superintendents. At that time, 10 responded favorably. Additional contact was made to school divisions via superintendents or their designee at the commencement of the study and at that time seven school divisions were still interested but 5 actually complied. The external validity may be threatened due to the small sample of Region 2 local school divisions willing to participate (5 local school divisions) which limits the ability to generalize results beyond this study. Each locality is different; each has myriad needs and financial priorities.

Lastly, Region 2 schools are not representative of all school divisions in Virginia, specifically western and northern Virginia.

Summary

In Chapter 3, the methodology selected to create a statistical technique to answer the research questions and analyze the impact of fiscal effort has on early literacy achievement in Virginia in a causal-comparative ex post facto non-experimental design. The comparison of high fiscal effort and low fiscal effort to PALS-PreK provides a perspective on how school districts are investing funds and the impact on early literacy achievement. The research questions, specific research design, and description of participants and analysis methods were explained. The variables that were used, fiscal effort and PALS-PreK results, were collected and verified for accuracy. Although no study has attempted to examine fiscal effort on PALS-PreK score, the strength of this study is the ease of replication. All Virginia's VPI participating school divisions

will either fall into one of the two local fiscal effort categories, “high fiscal effort” or “low fiscal effort,” and all are required to administer the PALS-PreK Spring assessment. Therefore, this study could replicated or extended to include all 15 school districts in Region 2 or all school divisions in the eight regions in Virginia identified by the Virginia Department of Education.

CHAPTER 4

RESULTS

A high-quality Pre-K experience affects everything that follows in a child's life (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Gayl, 2008; Magnuson et al., 2005; Phillips et al., 2017). Providing at-risk young children with the tools to be successful in school has short- and long-term benefits for individuals and society as well. Pre-K access and funding have increased (Diffey, 2017; Friendman-Krauss, 2018). This quantitative study explored the difference in mean PALS-PreK scores from SY 2010-2011 through SY 2014-2015 based on fiscal effort for VPI. Using a dichotomous approach, five participating school divisions were categorized as either high fiscal effort or low fiscal effort based on their Pre-K investments beyond the VPI local match. After controlling for SES, this study compared the two fiscal effort groups to determine if a statistically significant difference existed and if there was a difference in mean PALS-PreK scores.

Chapter 4 will present this study's findings in narrative format with tables and charts. The results of this study are discussed by each research question which is divided into two main sections: descriptive findings and inferential analysis. SPSS v.22.0 was used to determine descriptive findings and inferential analysis for Research Questions 1 and 2. All inferential analyses were tested at the 95% level of significance. The results of this statistical analysis will support a discussion in the final chapter of fiscal effort for VPI and early literacy achievement in Virginia. This chapter presents the findings of the following research questions:

1. Is there a difference in mean five-year Pre-K literacy rates between Virginia's school divisions with high fiscal effort for VPI and those with low fiscal effort, after controlling for SES?

2. If there is a significant difference, what is the gain in Pre-K literacy achievement rates for the divisions based on the level of fiscal effort?

The dataset was investigated, reviewed, and checked for validity and reliability. Regression and ANCOVA analyses were performed to address the research questions.

Findings

Research Question One

The first research question investigated the difference in mean five-year PALS-PreK scores between Virginia's selected school divisions based on fiscal effort for VPI for a five-year period, SY 2010-2011 through SY 2014-2015. The analysis included a data set of mean PALS-PreK scores provided by participating school divisions. The PALS-PreK subset was $N = 25$; five school divisions each reported district-level mean PALS-PreK scores for five years. The fiscal effort for VPI data was categorized into two groups using the submitted district budget figures. Group 1 – high fiscal effort for VPI had a data set of $N = 17$ entries and Group 2 – low fiscal effort for VPI had a data set of $N = 8$. Again, Group 1 represented the participating school divisions that invested or spent additional funds above the VPI identified local in-kind match and Group 2 represented the participating school divisions that spent no additional funds or less than their local match. SES figures were gathered from the National School Lunch Program Free and Reduced Lunch Price Eligibility reports from the VDOE's website.

A comparative analysis of the two groups for fiscal effort for VPI was calculated based on mean PALS-PreK scores after controlling for SES, which yielded a difference. In fact, the low fiscal effort for VPI group had a higher mean PALS-PreK score than the high fiscal effort group.

This study, based on ECE research, was constructed upon the notion that more money invested in VPI would show improved mean PALS-PreK scores; yet, the results based on the data show the opposite, due in part to the small sample size. This study contained a small sample size of five participating school districts and a dataset of 25 points. If all the school divisions in Region 2 would have participated, the sample size would have been fifteen, $N = 15$ and the study would have had a set of 75 data points, $N = 75$. Additionally, if all the VPI participating school divisions would have submitted data, the sample size would have ranged from 113 to 121 ($N = 113-121$) and the data set would have ranged from 565 to 605 data points ($N = 565-605$). Because this study had a small sample size, the findings revealed that the high fiscal effort for VPI group had lower mean PALS-PreK scores than the low fiscal effort for VPI group. The small sample size is due to the lack of school divisions' participation and explains why the findings do not coincide with the literature review that suggests increased fiscal effort for VPI produces higher early literacy rates.

From the commencement of this study, numerous attempts were made to increase the sample size. Initially, all Region 2 school superintendents received a self-explanatory, initial research letter soliciting the availability of the pre-existing PAL-Pre-K data and their willingness to participate. Ten out of the 15 divisions responded favorably. The researcher sent another communication via email and regular mail of additional research clarifications, and a form with instructions for submitting specific data by school years. At that time, seven superintendents and/or designees replied with a contact person and that someone would be gathering the data which provided ample participation to proceed with the study. However, upon research implementation and numerous letters, emails, and phone calls, only five local school divisions voluntarily submitted all the requested data.

Three possible reasons for this study's small sample size or lack of participation by school districts may have been but not limited to: (1) the lack of interest in the study's purpose by the superintendent/assistant superintendent, the research and testing department director, the VPI coordinator, and/or the budget and finance department staff; (2) insufficient personnel to extract the pre-existing data from the state's PALS website and/or school's financial database; and (3) the study's timing—early to late Spring is Virginia's state-wide Standards of Learning (SOL) Assessment testing window and state testing takes precedence over everything else. Likewise, early June to mid-summer may not have been an ideal time to request data because many school district staff are 10-month and not 12-month employees. The researcher made numerous attempts to solicit additional participation.

The small sample size was given consideration but was determined statistically as an adequate sample size (McMillan & Schumacher, 2010). First, the F Test procedure for assumption checking revealed that the test of between-subjects effects had an observed F (F_o) test value of 1.056 and a critical F (F_c) test value of 3.47. The observed F (F_o) is less than critical F (F_c). Therefore, the null hypothesis is no violation of the homogeneity of regression assumption and the variables do influence each other. The findings denoted a failure to reject the null hypothesis of no violation of the homogeneity of regression assumption. Additionally, the observed p value is 0.316 which is greater than the alpha level of 0.05, signifying a failure to reject the null hypothesis. The n^2 is the strength or magnitude of the study's findings. For this research question, n^2 is 0.0418. The conclusion is the results did not suggest the violation of homogeneity of regression assumption, $F(1,21) = 3.47$, $p > 0.05$, $n^2 = 0.04$, see Table 8. This means a relationship exists between SES, covariate, and mean PALS-PreK scores, dependent

variable, based on fiscal effort for VPI and this study's research conclusions; and interpretations can proceed as normal and the strength of the findings were adequate.

Table 8

Descriptive Statistics

Dependent Variable: PALS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	108.079 ^a	3	36.026	1.402	.270
Intercept	2075.149	1	2075.149	80.760	.000
FisEff	40.626	1	40.626	1.581	.222
SES	86.904	1	86.904	3.382	.080
FisEff * SES	27.125	1	27.125	1.056	.316
Error	539.599	21	25.695		
Total	211163.470	25			
Corrected Total	647.678	24			

After these tests, the F Test procedure for the analysis of covariance (ANCOVA) was performed. The null hypothesis is there is no difference in mean five-year PALS-PreK results between school divisions with high fiscal effort for VPI compared to those with low fiscal effort for VPI, after controlling for SES. Table 9 is the ANCOVA descriptive results of the test of between-subjects effects that revealed the observed F test value of 2.505 and a critical F test value of 3.44. The observed F (F_o) is less than critical F (F_c). The prediction was that there would be no difference in average PALS-PreK scores between school divisions with high fiscal effort compared to school divisions with low fiscal effort for VPI. These findings denoted a failure to reject the null hypothesis which indicated a difference in mean PALS Pre-K scores. Additionally, the observed p value (0.128) is greater than the alpha level of 0.05 signifying a failure to reject the null hypothesis. The n^2 is 0.1138. The conclusion is the results did not support any difference on PALS-PreK scores between school divisions with high fiscal effort

compared to the school divisions with low fiscal effort for Pre-K spending after controlling for SES, $F(1,22) = 2.505$, $p > 0.05$, $n^2 = 0.11$.

Table 9

Descriptive Statistics for the Analysis of Covariance Procedure

Dependent Variable: PALS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	80.954 ^a	2	40.477	1.571	.230
Intercept	4876.724	1	4876.724	189.313	.000
FisEff	64.538	1	64.538	2.505	.128
SES	61.117	1	61.117	2.373	.138
Error	566.724	22	25.760		
Total	211163.470	25			
Corrected Total	647.678	24			

The school divisions with high fiscal effort for VPI had lower mean PALS-PreK scores, although they had invested additional funds. The school divisions with low fiscal effort for VPI had higher mean PALS-PreK scores while investing no additional dollars, or, in some cases, less than the required VPI in-kind match. An in-kind match towards the total operating VPI budget is required for all participating school divisions. Additional financial investments beyond the VPI match is relative to the school division's commitment and student needs for the ECE program. Unexpectedly, participating school divisions with the highest composite index—ability to pay and lowest SES percentage of students receiving free and reduced-price lunch—invested no additional financial resources but earned a higher mean PALS-PreK score.

Based on the analysis, the mean PALS-PreK score for the high fiscal effort for VPI group was lower than the low fiscal effort group. Figure 1 reveals the two school divisions serving the second and third largest number of VPI students invested additional funding into their ECE program.

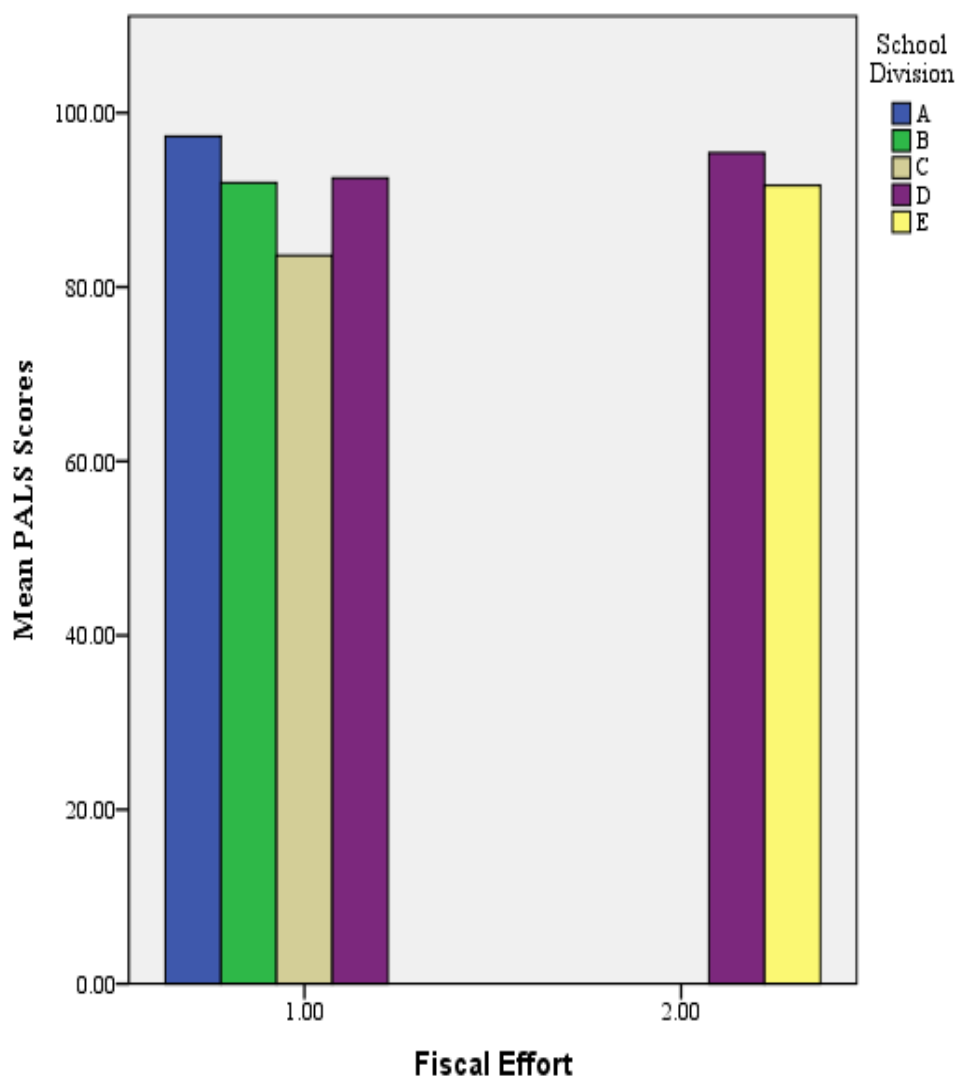


Figure 1. Chart of School Divisions by Fiscal Effort for VPI.

Note: Fiscal Effort Groups –1.00 represents the high fiscal effort for VPI group and 2.00 represents the low fiscal effort for VPI group.

The school division serving the largest number of VPI students invested additional money for two school years and no additional funds for three school years, denoting the only district with “split” fiscal effort for VPI for the five-year period. The school division that served the fewest VPI students invested no additional funds towards the ECE programs for all five years. Table 10 shows the descriptive statistical by variables by School Divisions according to the fiscal effort for VPI.

Table 10

Descriptive Statistical Data of Variables by School Divisions

School Division		PALS Scores		Socio-economic Status		N	
		Fiscal Effort		Fiscal Effort		Fiscal Effort	
		1.00	2.00	1.00	2.00	1.00	2.00
A	N	5		5		5	
	Minimum	96.30		60.48			
	Maximum	98.30		68.02			
	Mean	97.3200		63.5940			
	Std. Deviation	.81363		2.83744			
B	N	5		5		5	
	Minimum	89.90		50.36			
	Maximum	93.70		58.12			
	Mean	91.9600		55.7900			
	Std. Deviation	1.70235		3.35784			
C	N	5		5		5	
	Minimum	81.80		54.00			
	Maximum	85.60		63.61			
	Mean	83.6400		58.8640			
	Std. Deviation	1.63187		3.95936			
D	N	2	3	2	3	2	3
	Minimum	91.70	93.80	64.43	65.16		
	Maximum	93.30	97.80	66.83	66.96		
	Mean	92.5000	95.4000	65.6300	66.0567		
	Std. Deviation	1.13137	2.11660	1.69706	.90002		
E	N		5		5		5
	Minimum		85.00		33.36		
	Maximum		96.50		37.33		
	Mean		91.6600		35.7160		
	Std. Deviation		4.66937		1.73265		

Research Question 2

The second research question explored any significant difference between the high- and low fiscal effort for VPI groups, and what the gain was in PALS-PreK achievement scores for the divisions based on the level of fiscal effort for VPI. The mean score for the high fiscal effort for VPI group was 91.15 with a *SD* of 5.62. This group had a wide dispersion of the PALS-PreK scores. The minimum PALS-PreK score was 81.80 and the maximum score reported score was 98.30, with a range of 16.50 points. Whereas the mean score for the low fiscal effort group was 93.06, with a *SD* of 4.18. The lowest mean PALS-PreK score reported by a participating school district was 85.00 and the highest mean PALS-PreK score was 97.80, with a range of 12.80. The mean score for both fiscal effort groups was 91.76 with a *SD* of 5.19. This indicates that the average PALS-PreK score for the divisions with high fiscal effort was lower than the group with low fiscal effort for the initiative. The average PALS-PreK score was 91.76 with a (*SD* = 5.19), see Table 11.

Table 11

Descriptive Data of Mean PALS-PreK scores

Dependent Variable: PALS

Fiscal Effort	Mean	N	Std. Deviation	Minimum	Maximum	Range	Grouped Median
1.00	91.1529	17	5.62051	81.80	98.30	16.50	92.30
2.00	93.0625	8	4.18157	85.00	97.80	12.80	94.20
Total	91.7640	25	5.19486	81.80	98.30	16.50	93.30

The descriptive data revealed a non-statistically significant difference in the mean PALS-PreK scores between the high fiscal effort for VPI group and the low fiscal effort for VPI group. The low fiscal effort for VPI group had a 1.90 higher mean PALS-PreK score compared to the high fiscal effort for VPI group. The high fiscal effort group had a greater *SD* in mean PALS

Pre-K scores compared to the low fiscal effort for VPI group but only a 1.43 difference. The maximum score for the high fiscal effort group was 98.30 and the maximum score for the low fiscal effort group was 97.80. The difference in maximum PALS-PreK scores was only 0.5 variance meaning the scores were almost the same unlike the minimum PALS-PreK scores which had a range of 4.0. The high fiscal effort for VPI group had a wider spread of mean PALS-PreK scores than the other group. The low fiscal effort for VPI group's average PALS-PreK scores fell closer in distribution.

This study examined local fiscal effort for VPI beyond the in-kind grant match. Again, each year of VPI funding, school divisions are required to contribute an in-kind grant match based on the division's composite index. While this study did not examine the composite index per say, it is important to note the varied composite indexes for the participating divisions. For SY 2010-2011 through SY 2014-2015, School Divisions A, B and C, all had composite indexes below 0.2934 denoting they were required to contribute less than 29% of the total VPI budget. Three divisions were in the high fiscal effort for VPI group meaning additional dollars beyond the in-kind match were invested in VPI. The other two school districts, School Division D and E had composite indexes from 0.3004 through 0.4258. School Division D's fiscal effort for VPI was categorized as both low and high fiscal efforts, two years of high fiscal effort and three years of low fiscal effort. School Division E had the highest composite index ranging from 0.3926 to 0.4259 for each year of this study and had low fiscal effort for VPI all five years. Taken together, what we know about each locality's composite index, it can be concluded that School Division D and School Division E were in the wealthiest areas among the participating school divisions for this study.

Summary

The descriptive and inferential findings were described in Chapter 4. Overall, the data submitted by participating school divisions revealed a difference in PALS-PreK scores between school divisions with high- and low VPI fiscal effort for SY 2010-2011 through SY 2014-2015. Although the analytical calculations presented a difference in mean PALS-PreK scores, it was not a statistically significant difference. The school divisions with low fiscal effort for VPI had slightly higher mean PALS-PreK scores. Although this was an unexpected finding, the study's small sample size is the most likely explanation. Chapter 5 will list and discuss this study's findings, present implications relating to the literature, recommendations for future studies and conclusion.

CHAPTER 5

DISCUSSION

In recent years, funding continues to increase as Pre-K is identified as the best intervention option to boost school readiness and literacy (Barnett et al., 2017). The primary purpose of educational systems is to build a prosperous society by ensuring all children have the necessary literacy skills and general knowledge to ensure school and life success; the main purpose of Pre-K is to ensure young children have a solid early literacy foundation (Lynch & Vaghul, 2015; Phillips, 2017). The VPI provides early childhood education experiences to many at-risk students. For SY 2010-2011 through SY 2014-2015, VPI served an average of 17,600 at-risk 4-year-old children, with an annual investment of about \$68 million per year. These students are administered the PALS-PreK assessment three times each year as a measure of tracking literacy progress and school-readiness skills. Children who participate in VPI are more likely to be prepared for kindergarten and less likely to be retained by third grade (Virginia School Readiness Report, 2017). At the end of the 2017 school year, 10% of the kindergarten students who completed the VPI program needed further literacy intervention and phonemic awareness support, compared to 46% of the kindergarten students who had unknown ECE experience or did not attend any formal Pre-K program (VDOE, 2017). Data like these continue to substantiate the need for further research on fiscal effort for VPI and early literacy achievement in Virginia.

The purpose of the study was to investigate the impact of school divisions' fiscal effort for VPI on PALS-PreK achievement rates. The study answered the following research questions:

1. Is there a difference in mean five-year Pre-K literacy rates between Virginia's school divisions with high fiscal effort for VPI and those with low fiscal effort, after controlling for SES?
2. If there is a significant difference, what is the gain in Pre-K literacy achievement rates for the divisions based on the level of fiscal effort?

The research questions were answered statistically using ANCOVA procedures and the statistical data were presented in Chapter 4. Chapter 5 will list the findings, provide a discussion for each finding, highlight the study's implications, and offer recommendations for future research, followed by the conclusion.

Findings and Discussion of Findings

This study found four interesting results that will be discussed. First, the results suggest there was a difference, but not a statistically significant difference, in mean PALS-PreK scores between the high fiscal effort group compared to the low fiscal effort group. Second, this study had a small sample size of five of fifteen participating school divisions from Region 2. Third, disparate school divisions were among the participating districts. Fourth, possible suspect data were reported. The literature suggests that increased fiscal effort for the preschool initiatives results in higher literacy scores but, in this case, the findings were the opposite.

First, the results showed a difference, but not a statistically significant difference, in mean PALS-PreK scores between the high fiscal effort for VPI group compared to the low fiscal effort group. In fact, the low fiscal effort group had a 1.90 percentage higher mean PALS-PreK score than the high fiscal effort group. This finding was unexpected because the low fiscal effort group invested no additional funds or less than the required dollar match toward its Pre-K programs. The finding suggests that the funding of these programs does not make a significant

difference in student preliteracy outcomes, which is contrary to the evidence provided in the literature. This literature shows a strong correlation between school funding (ECE funding) and educational outcomes, like student achievement (Bjorklund-Young, 2017; Garcia et al., 2017; Gayl, 2007, 2008; Shorb et al., 2012). One apparent explanation for this puzzling finding is to consider the contributing school division's composite index and SES. Although actual student demographic data were not requested or measured from the information submitted and collected, it can be inferred that the low fiscal effort group had a higher ability to contribute to the ECE based on the composite index and the percent of students receiving free and reduced-price lunch, compared to the other group (see Tables 3-7). By examining the composite index and SES of the low fiscal effort school division's profiles, it can be inferred that these districts are the wealthiest among the participating school divisions (Owings & Kaplan, 2013). The low fiscal effort for VPI group had the largest composite index and the lowest percentage of students receiving free and reduced-price lunch. Both the composite index and SES denoted the wealth of the locality (Owings & Kaplan, 2013). Although VPI serves the most at-risk students, the localities' wealth serves as a possible explanation for this surprising finding.

Second, this study had a small sample size of five participating school divisions limiting its statistical power. This could also explain why the findings do not coincide with evidence-based expectations that increased fiscal effort for VPI produces higher early literacy rates. In 2017, there were 135 school divisions in Virginia grouped by regions. There were 128 divisions identified as eligible to participate in VPI but only 124 divisions participated (VDOE, 2017). This research study was performed in Region 2, which has 15 local school divisions who all participate in VPI. Again, from the beginning of this study, numerous attempts of varied methods were used to increase the sample size of participating school districts; and even after

agreeing to participate, only five districts contributed. If all the fifteen school divisions in Region 2 had participated, the findings may have been different. This study's sample size of one-third or 33% of the possible sampling may have been too small to yield a more accurate outcome.

Third, possible disparate school divisions were among the sampling and may have been a reason for this study's findings to be different from what was expected. The included school divisions (one rural and four urban) varied in total student enrollment Pre-K enrollment, total operating budget (VPI budget), location and composite index. This accounted for the inequality in the number of data entries for the high fiscal effort group ($N = 17$) versus the low fiscal effort group ($N = 8$). It is feasible to suggest that if both fiscal effort groups had an even or almost equal number of data points, the findings may have supported the literature reviewed on the topic.

Finally, possible suspect data reporting may have skewed the findings. One school division reported a "split" in VPI fiscal effort for the SY 2010-2011 through SY 2014-2015. That school system reported two years of high fiscal effort and three years of low fiscal effort. This "split" appears "abnormal", but it is not impossible. Budgeting constraints, changes in priorities or changes in administration may explain this irregularity. The other four divisions submitted five years of fiscal effort for VPI that were either all low fiscal effort or all high fiscal effort. The reported "split" in fiscal effort caused a concern simply because it was unlike the other submitted data. To ensure data integrity and verify the "split" fiscal effort data, the researcher compared the data submission with the school division's posted operating budgets from their website and the VPI budget reports from the VDOE. The operating budget report figures, amounts, and line items were not detailed and explicit enough to allow actual

verification of the data submission; however, the clustered totals on the budget reports were in alignment with amounts submitted by the school division. Therefore, the “split” was accepted as true reported data. Additionally, another school division reported fiscal effort dollar amounts beyond the grant match that seemed extremely large in comparison to the other school division’s amounts reported. The data submissions were investigated and verified for accuracy to ensure that the amounts only contained dollars invested in VPI beyond the local match and not the total VPI budget which encompasses the state’s portion. Again, the suspect figures were compared to the school division’s operating budget documents posted online from their website and the VPI budget reports from the VDOE. The data submissions were accepted as true. In both cases, the suspect data were questioned but accepted as true given the nature and structure of this dichotomous study. The submitted VPI fiscal effort totals were used to categorize the division’s investments as either high fiscal effort or low fiscal effort but no actual dollar amounts were used in the ANCOVA statistical procedures and calculations.

The purpose of the study was to investigate the impact of school divisions’ fiscal effort for VPI on the PALS-PreK achievement scores. To achieve this, the following research questions were addressed in this study. First, is there any difference in mean five-year PALS-PreK score between participating school divisions in Region 2 with high fiscal effort for VPI and those with low fiscal effort for VPI? Second, if a difference exists, what was the gain in PALS-Pre-K scores based on the level of fiscal effort? The results found a difference, but not a statistically significant difference, in mean PALS-PreK scores between the high fiscal effort for VPI group compared to the low fiscal effort group. Surprisingly, the low fiscal effort group had a 1.90 percentage higher mean PALS-PreK score than the high fiscal effort group. Research supports making greater investments ECE for young children yield greater returns in education,

life, and society (Bjorklund-Young, 2017; Friedman-Krauss et al., 2018; Garcia et al., 2017; Gayl, 2007, 2008; Shorb et al., 2012). While the data from this study do not provide direct support for that conclusion, the reader should be cautioned not to be dismissive of these findings due to the complexity of the variables involved in this study.

Implications

An examination of the link between local fiscal effort for VPI and the PALS-PreK scores has never been attempted. Although the findings were opposite of what the ECE literature would predict, this initial study has several implications for Pre-K and early childhood education policy at the local, state, and national levels. Based on the literature review, any investment in early childhood education translates to a good investment because of the short- and long-term benefits for individuals and society (Campbell & Ramey, 1994; Ellison, 2015; Gayl, 2007, 2008; Reynolds, 1994; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013). Possible implications will be discussed in this section.

The goal of the study was to explore the impact of local fiscal effort for VPI on PALS-PreK scores. This study investigated a vastly complex topic and the lack of measurable impact is likely the result of Pre-K spending being too finely grained to capture the nuances of all the other variables that affect literacy achievement such as the child's prior exposure to print, prenatal through birth history, parental participation, other extreme risk factors, quality of the program, and experience of the teacher and assistant, among others. Education alone is a dynamic and complex paradigm and teaching the very young adds to the complexity (Shoup & Studer, 2010).

Pre-K is a one-year intervention to help children progress successfully through the academic years. Thoughtful deliberations could advance Pre-K to a two-year intervention – Pre-K3 and Pre-K4 for at-risk children. VPI serves Virginia's at-risk 4-year-old children as an

intervention to provide a foundation for school readiness to close any learning gaps before kindergarten. Poverty and adversity compromise growth development and school success. At-risk children are often exposed to multiple risks factors, such as parents with no high school diploma, poor neighborhoods with high crime, health issues, single parents, and negligent and abusive environments that inhibit school success. Pre-K education is essential to closing the gap between the affluent and the at-risk children. Educating the most at-risk students requires additional resources. Often, at-risk children require more than one intervention to ensure equal opportunities for learning (Carey, 2002; Chandler, 2017; Virginia Early Childhood Foundation, 2013). ECE experiences provide an early opportunity for children to be able to reach their full potential by shaping their academic, cognitive, and social skills (Gayl, 2007, 2008; Reynolds, 1991; Reynolds et al, 2016; Reynolds, Temple, Robertson, & Mann, 2001). One year of a high-quality Pre-K program as a foundation to boost reading proficiency can change the trajectory of a child's life (Claessens et al., 2014; Conner et al., 2006; Diffey et al., 2017; Duncan & Magnuson, 2013; Magnuson et al., 2005; Phillips et al., 2017).

VPI's Pre-K access is limited. In 2017, Virginia ranked 29th out of the 43 states offering Pre-K or a state-funded early childhood experience (Friedman-Krauss et al., 2018). Moreover, Virginia serves only 18% of eligible at-risk 4-year-old children with VPI. This represents only a subset of those in need of a high-quality ECE experience (VDOE, 2017). In 2016, VPI served 14,694 students and at the beginning of kindergarten (Fall 2017) 90% were kindergarten-ready as identified by the PALS-K assessment, while 10% were identified as needing additional literacy intervention (VPI Briefing Document -VDOE, 2018). That same fall, an additional 22,480 children enrolled in kindergarten and of the children identified as having an unknown ECE participation, 649 or 12% were identified as needing literacy intervention based on the PALS-K

Fall screening. Also, 5,797 children (34%) were identified as having no formal Pre-K experience were identified as needing additional literacy intervention based on the PALS-K Fall screening. These two groups represented a total of 6,446 children (46%) of the kindergarteners who were targeted as needing literacy intervention services (see Table 2 on page 40). In 2017, the VDOE invested \$68 million towards the VPI budget, \$17.5 million for Early Intervention Reading Initiative (EIRI), and an additional \$100 million for prevention, intervention, and remediation services for grades K-12 (VDOE, 2017). Children entering kindergarten without the necessary school and reading readiness skills often fall further behind their peers. The achievement gap widens despite remedial and intervention efforts and instruction provided to catch them up. Pre-K is crucial to enable young children to have academic success, brighter futures, more productive lives, and to ensure a strong economy. Prevention is less expensive and more effective than intervention and remediation (Phillips, et al., 2017).

Research clearly connects early childhood education to kindergarten readiness, third-grade literacy, later-school achievement, high-school graduation, and life attainment success (Claessens et al., 2014; Conner et al., 2006; Duncan & Magnuson, 2013; Gayl, 2008; Magnuson et al., 2005; Phillips et al., 2017). As an investment in human capital, Pre-K is the strongest predictor of individual achievement, future economic success, and is less expensive than intervention and remediation (Agarwal & Filer, 2015; Campbell & Ramey, 1994; Ellison, 2015; Garcia et al., 2017; Gayl, 2007, 2008; Karoly, et al, 2005; Reynolds, 1991; Schweinhart et al., 2005; Schweinhart & Weikart, 1980, 1993; Yoshikawa et al., 2013).

The trend in Pre-K education is to allocate more resources and provide greater access for at-risk children. However, the “big picture” is the quality of the actual ECE experience and instruction that makes the difference. Simply put, the fidelity of practice based on scientifically-

researched early childhood standards that ensure a high-quality environment, materials, and interactions that promote optimal motivation and engagement for early learning as well as adequate financial investments are important. The aim of VPI is to provide high-quality early-childhood experiences for at-risk 4-year-olds. Nevertheless, VPI allows school divisions to hire teachers and staff with a wide variance of preparation, training, and experience. For example, some school divisions require VPI teachers to have earned a university degree and obtained state licensure, whereas other divisions hire teachers with a high-school diploma, some college courses, as well as some teaching experience. This wide range of teacher expertise means highly variable quality in Pre-K learning experiences for their students.

Fidelity of practice is pertinent because it refers to the caliber of services acquired for the cost investment. Some teachers earn credentials that label them as teachers, but their teaching is ineffective. To understand the extent of the fidelity in practice, schools must evaluate the quality of the delivery of ECE classroom instruction and evaluate *teacher* quality and *teaching* quality. Teacher quality is what the teacher brings to the classroom, including college matriculation, teacher licensure, demographic background, attitudes, beliefs, and experiences to name a few (Kaplan & Owings, 2001). Teaching quality is what teachers do in the classroom; promoting learning, stimulating creative and collaborative thinking, delivering effective content, demonstrating good management skills, and creating an environment conducive to learning (Kaplan & Owings, 2001). When teacher quality is combined with teaching quality, the experience is maximized, and resources invested to yield a high-quality Pre-K experience. This study did not include the variables to help understand the fidelity of practice for PALS-PreK scores based on the fiscal effort for VPI.

Recommendations for Further Research

Findings from this research conflict with the literature review but merit contribution to the field because the study investigates the impact of fiscal effort for VPI and PALS-PreK scores, which has never been attempted before. The strength of this study is the ease of replication. All Virginia's VPI participating school divisions will fall into one of two local fiscal effort groups—high fiscal effort or low fiscal effort—and all are required to administer the PALS-PreK Spring assessment. Therefore, this study could be replicated with the participation of all 15 school districts in Region 2 or all 128 school divisions that participate in VPI. Furthermore, this study could be replicated by adding additional variables like teacher-preparation, experience, gender, race, and other pertinent variables. Furthermore, it could be replicated by exploring the differences in research-based curricula used for instruction.

Future research may consider adding a qualitative element to this study. Interviewing the division superintendent and/or the chief financial officer can provide additional insights into the district's financial priorities of Pre-K investments. The use of surveys or questionnaires about specific budget line items such as instructional materials, technology or salaries as specific measures of investments compared to the PALS-PreK assessment can provide as a deeper dive into unanswered questions about fiscal effort for VPI. Additional studies may consider classroom observations of various teaching methods and their impact on the PALS-PreK assessment compared to fiscal effort.

The Every Student Succeeds Act now requires school districts to track per-pupil spending and to establish and maintain student identifiers for tracking purposes effective SY 2019-2020. This provide a vehicle for future studies using student cohort tracking examining fiscal effort and literacy achievement. This may prove beneficial to future ECE investments and

funding when examining fiscal effort categorically (where the money is being spent) not just in the aggregate.

Finally, this study could be replicated by other states that have state-funded Pre-K programs. The possibilities for extension are limitless and unexplored.

Conclusion

No empirical research comparing fiscal effort for VPI and PALS-PreK achievement in Virginia beyond this study exists. This initial study serves as a launching pad for further research and discussions. Although the findings did not prove that investing additional financial resources yielded higher PALS-PreK scores, this study proved valuable and contributes to the literature. These findings provide only a partial glance into the complexities of fiscal effort for VPI and its effects on PALS-PreK achievement in Virginia. This study has two strengths, the ease of replication and the fact that an investigation of fiscal effort for VPI and PALS-PreK scores has never been attempted before. The suggestions found in this chapter may provide significant insights into future spending proprieties for school districts across the country. This study is an important and necessary step to understanding fiscal effort and ECE because Pre-K effects everything else in individual students' lives that follow, from formal schooling to future success (Hoxworth, 2018).

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Appendix A
Descriptive Data

Table 12

Correlation Statistics

		PALS Scores	Socio-economic Status
PALS Scores	Pearson	1	.159
	Correlation		
	Sig. (2-tailed)		.447
	N	25	25
Socio-economic Status	Pearson	.159	1
	Correlation		
	Sig. (2-tailed)	.447	
	N	25	25

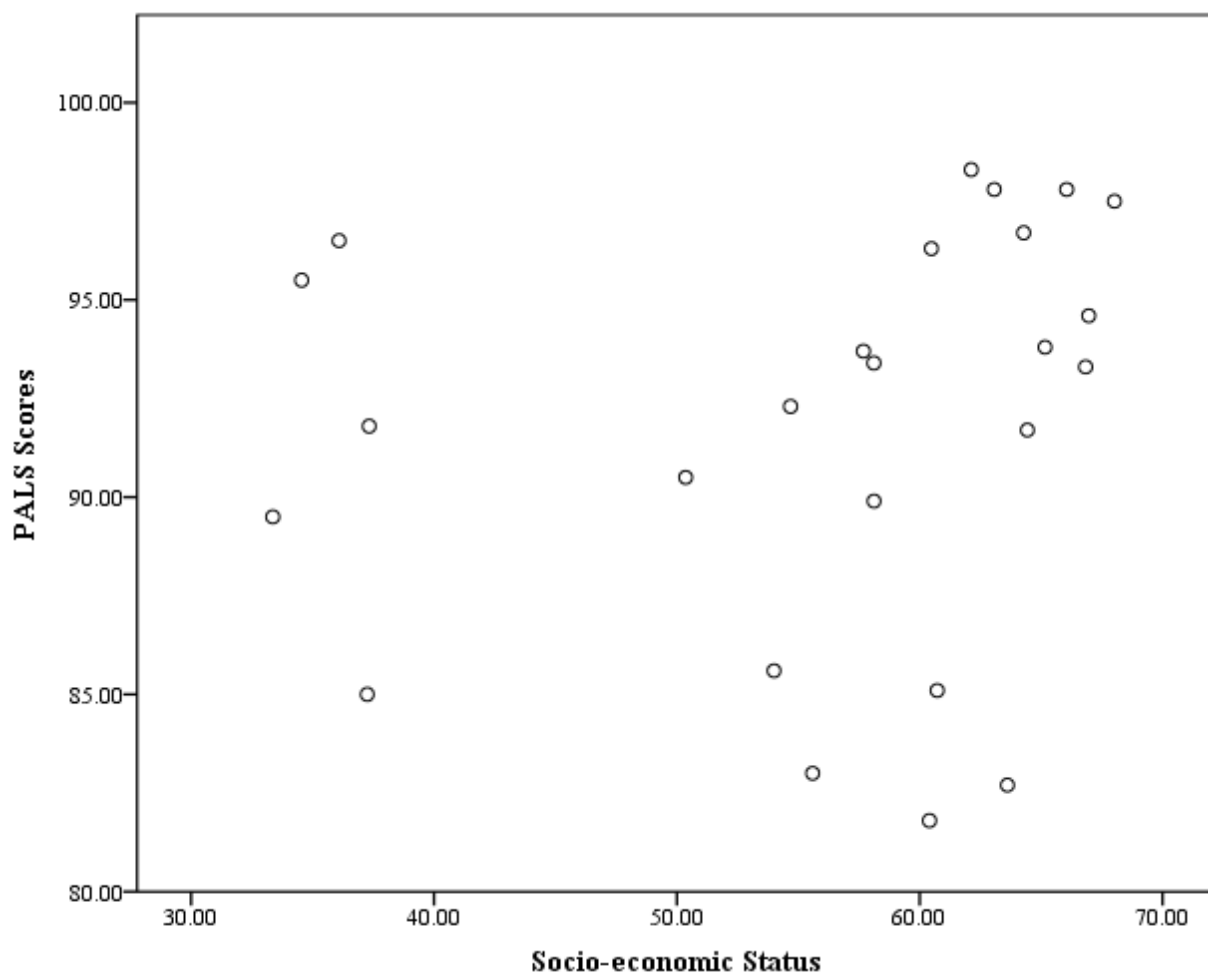
Appendix B***Scatter Plot***

Figure 2. Scatter Plot of SES and PALS-PreK Scores.

Source: [include source here]

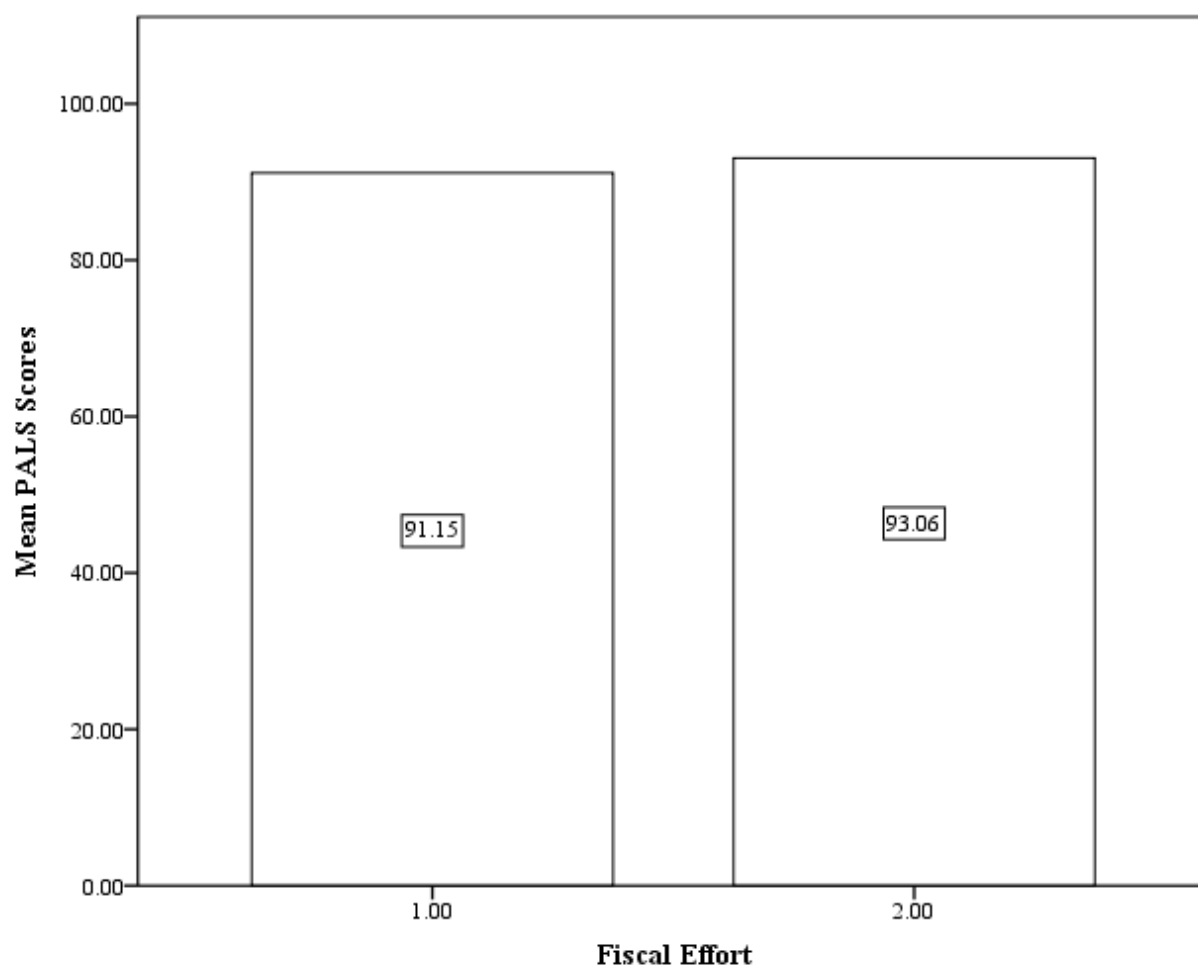


Figure 3. Mean PALS-PreK Scores by Fiscal Effort for VPI

Source: [include source here]

VITA

Patricia S. Williams

Education:

Doctor of Philosophy in Educational Foundations and Leadership	
Old Dominion University, Norfolk, VA	December 2018
Education Specialist in Administration and Supervision	
George Washington University, Washington DC	May 2000
Master of Science in Elementary/Middle Education Curriculum & Instruction	
Old Dominion University, Norfolk, VA	May 1998
Bachelor of Science in Elementary/Middle Education	
Old Dominion University, Norfolk, VA	December 1992

Professional Certification:

Post Graduate Professional License	
Administration & Supervision (PreK-12); Early Education (PreK-3); Elementary Education (Grades 3-6) and Middle Education (Grades 4-8)	
National Certified Principal Mentor – NAESP	

Professional Experience:

Portsmouth City Public Schools

Principal

Mt. Hermon Preschool Center - 3000 North Street	2014 – Present
Westhaven Elementary - 3801 Clifford Street	2005 – 2014
Emily Spong Preschool Center, 2200 Piedmont Ave	2004 – 2005

Assistant Principal

Churchland Elementary, 5601 Michael Lane	2000 – 2004
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Norfolk City Public Schools

Teacher

W. H. Taylor Elementary (Grade 5)	1999 - 2000
Fairlawn Elementary (Grades 2-5)	1993 – 1999

Long-Term Substitute Teacher

Lake Taylor Middle School (Grade 6)	1992 – 1993
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Awards and Honors:

Portsmouth's Elementary Principal of the Year – May 2013
PTA Outstanding Leadership Award – May 2012
Exemplar Educator Award (Hampton University) – June 2011
Teacher of the Year (Fairlawn Elementary-NPS) – 1997 – 1998