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THE RELATIONSHIP BETWEEN PROGRAM QUALITY INDICATORS AND STUDENT
ACHIEVEMENT IN A BRAIDED PREKINDERGARTEN PROGRAM

A dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at Virginia Commonwealth University.

by

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Acknowledgement

It is with sincere appreciation that I acknowledge the support and guidance from my advisor and chairperson, Dr. Charol Shakeshaft. Your patience and encouragement has been instrumental in the completion of my dissertation. I also want to thank my other committee members, Dr. Sherman-Newcomb, Dr. Sutherland and Dr. Rhodes. Your guidance and feedback were quite valuable in the completion of what has been a long process. I am grateful to my family for being understanding when I tried to balance family, school and a career. You never let me down even when I know it was difficult. Now, it is our time to enjoy! Lastly, I owe this honor to my parents who always instilled in me the value of education. Because of you, I believed I could do anything. Without your unwavering support, I could not have completed this journey.

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Abstract

The purpose of this study was to determine the relationship between prekindergarten classroom quality indicators and student achievement at the prekindergarten level. Pre-existing data on prekindergarten classroom quality measures and student achievement was utilized. Quality indicators were assessed using the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008) and student achievement was measured by the end of year results on the Phonological Awareness Literacy Screening (PALS) (Invernizzi, Meier, Swank, & Juel, 2004) and the Bracken School Readiness Assessment end of year results (Bracken, 2007).

A quantitative ex post facto correlational research design was employed to identify relationships between program quality and student achievement among the prekindergarten classrooms. An ex post facto design was chosen because the circumstances of conducting the research did not allow for an experiment.

The classrooms in this study site were rated overall as high in quality. The findings indicate that quality in classrooms established by high scores in the Emotional Support and Classroom Organizational domains, paired with scores in the middle to high range in the Instructional Support domain have no statistical correlation between high achievement related to PALS and Bracken scores, with the exception of one subgroup. For students that receive Public Assistance, there was a statistical significance in their end results for PALS and Bracken, indicating a positive relationship between classroom quality and student achievement.

It is vitally important to develop prekindergarten programs that can be easily replicated. Replicating successful programs would save time, money, and effort. Practitioners

can increase and standardize structural quality factors such as length of day, credentialing requirements of staff, and the maintenance of an organized system of in-service training and systematic curriculum oversight, while ensuring the presence of process quality, This focus will create prekindergarten programs that offer the most at risk students the highest quality possible.

CHAPTER 1. INTRODUCTION

In the past decade, federal and state efforts to raise the school readiness of children entering kindergarten have resulted in the creation of a large number of prekindergarten programs (Clifford, Bryant, & Early, 2005). In 2002, nearly three-quarters of a million 3 and 4-year olds in 38 states were being served by state-funded prekindergarten (Barnett, 2005). Many prekindergarten programs were developed to enhance the cognitive, academic, and language skills of 4-year olds before they enter kindergarten (Pianta et al., 2005). As enrollment in prekindergarten becomes a more common precursor of kindergarten for children in the United States, assessing the quality of these experiences is paramount (Rimm-Kaufman, Pianta, & Cox, 2002).

The XYZ Prekindergarten Program is an early childhood program in a large suburban school district in central Virginia. It is a targeted preschool program for children demonstrating characteristics designating them at risk of not being successful in school. While poverty is one of the risk factors considered, it is not the sole criterion for enrollment. Currently, the district maintains 53 braided preschool classrooms in 27 locations. The funding sources supporting these classrooms include Head Start, Title I, and Virginia Preschool Initiative.

Program Philosophy

The philosophy of the XYZ Prekindergarten Program in this school division is based upon the High/Scope Curriculum, which focuses on many aspects of child development through

content areas including: language, literacy, and communication; social and emotional development; physical development, health and well-being; and arts and sciences (Schweinhart, 1993). Research-based strategies are implemented throughout the curriculum to enhance children's growth in the academic fundamentals, as well as in socioemotional, physical, and creative areas. The High/Scope Curriculum emphasizes adult-child interaction, a carefully designed learning environment, and a plan-do-review process that strengthens initiative and self-reliance in children (Schweinhart, 1993). Under the High/Scope regime, teachers and students are active partners in shaping the educational experience.

In the XYZ Program, each classroom is comprised of approximately 18 students who learn under the guidance of a teacher and an instructional assistant, and all teachers are licensed by the Commonwealth of Virginia to teach prekindergarten. All instructional assistants meet the No Child Left Behind Act of 2001 definition of "highly qualified," indicating they have an associate degree, or have passed the federally mandated, state recognized paraprofessional assessment (Cowan, 2007). The XYZ program offers a full-day schedule, and operates a 180-day school calendar, with some classrooms offering summer enrichment.

The purpose of this chapter is to provide an overview and framework for the current study. First, a statement of the problem will identify trends that present a challenge. Next, a rationale and significance of the study will demonstrate why the study is important and timely, as well as possible contributions the study might offer in the future. Next, a literature and research background will identify landmark studies related to the project, followed by research questions the study will attempt to answer. Lastly, the methodology for the study will explain the procedures that will be used to answer the questions. The chapter will conclude with a brief summary.

Statement of the Problem

There are several trends that present challenges to ensuring that children enter school ready to learn. Poverty, a lack of preschool experience, and increased expectations for prerequisite skills place some students at a deficit before their formal schooling begins. A lack of consensus on what constitutes high-quality prekindergarten further compounds the challenge.

The purpose of school is to prepare students for success in life by providing the skills and knowledge to guide them from one level of learning to the next (Wertheimer & Croan, 2003). Wertheimer and Croan further assert that children entering schools today are growing up in a demanding world that is becoming increasingly complex, competitive, and technological. In school settings, the concepts 5-year olds are expected to master are becoming more demanding. According to Lara-Cinisomo (2005), children are expected to enter school with prerequisite skills such as name writing, rote counting, and letter-and-sound recognition. Children who do not possess the prerequisite skills have a diminished chance of successfully meeting the early demands of the educational system.

Diverse populations of students enter kindergarten in the United States each year (National Center for Education Statistics, [NCES], 2003). According to the NCES, the knowledge and skills children possess when starting school vary across individuals and among groups of children. Perez-Johnson and Maynard (2007) asserted that many children are not exposed to cognitively stimulating environments in the years leading up to school entry, which can impede their ability to develop to their fullest potential. An absence of emotional support, intellectual stimulation, or access to resources in a child's early years can be detrimental in terms of subsequent educational and later-life outcomes. Wertheimer and Croan (2003) further assert that children who lack prerequisite early cognitive and social skills enter school behind their

peers in these domains of readiness. In light of research showing the precipitous erosion of the effects of initial equality (Perez-Johnson & Maynard, 2007), initial inequality is a serious issue.

Poverty, School Readiness, and Prekindergarten Opportunities

According to the NCES (2003), in 1993 40% of children between the ages of 3 and 5 years, living above the poverty threshold, possessed three or four identified cognitive/linguistic school readiness skills, while only 23% of children below the poverty threshold had those same skills. By 1999, the percentage of children between the ages of 3 and 5 years above the poverty threshold possessing three to four school readiness skills had increased to 45%. However, the number of children the same age living below the poverty threshold and possessing three to four school readiness skills had decreased from 23% to 19% (NCES, 2003). As the number of children entering school unprepared increases, many governors, advocacy groups, community leaders, and educators are considering prekindergarten for 4-year olds as a viable means of closing the achievement gap (Conte, 2005).

Prekindergarten Classroom Quality

As the number of prekindergarten programs increases, a clear definition of prekindergarten quality becomes vital because children who have the opportunity to participate in higher quality preschool classrooms enter school with better language development, math skills, and reading skills, and are identified by their teachers as being more school ready (Rimm Kaufman et al., 2002). Currently, many states utilize structural indicators such as teacher credentials and teacher/child ratios to measure program quality. According to LoCasale-Crouch et al. (2006), although these structural indicators may provide useful comparative information about program offerings, research findings have not consistently validated a positive relationship between these indicators and classroom quality.

In an investigative study of prekindergarten classroom quality, Early et al. (2006) found few associations between teachers' education, college major, or credentials and child outcomes. LoCasale-Crouch et al. (2006) identified high levels of instructional and social/emotional support of children as the highest predictor of children's development and acknowledged that quality learning opportunities for children are important; however, there is little consensus concerning the indicators of classroom quality.

According to Bainbridge, Meyers, and Waldfogel (2003), studies of preschool programs that provide students with the skills necessary for kindergarten readiness, including the Perry Preschool Project, the Head Start Impact Evaluation, and state-funded programs in Georgia and Oklahoma, have demonstrated that quality preschool programs are associated with higher scores on standardized achievement tests, increased graduation rates, higher rates of job attainment, and lower rates of poverty among participants over time. According to Gormley (2005), children exposed to high-quality prekindergarten classrooms with an intentional focus on school readiness were more likely to experience success in school.

Purpose of the Study

The purpose of this study was to determine the relationship between prekindergarten classroom quality indicators observed in 43 classrooms in the XYZ Prekindergarten Program and student achievement at the prekindergarten. There are several studies whose purpose is to identify high-quality preschool experiences and their effects while utilizing achievement data of students in kindergarten and beyond. This study focused on prekindergarten student achievement data to limit the effects of other educational experiences. The study utilized the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008) to identify observable indicators of quality present in prekindergarten classrooms that are based upon child

development theory. Student achievement was measured by the end of year results on the Phonological Awareness Literacy Screening (PALS) (Invernizzi, Meier, Swank, & Juel, 2004) and the Bracken School Readiness Assessment end of year results (Bracken, 2007). The study further identified relationships between quality indicators and student achievement.

Philosophy of Child Development

By identifying indicators of quality present in the XYZ Prekindergarten Program and the relationship between these and student achievement, programs can potentially be improved based upon the findings. Identifying quality indicators that promote student achievement provides information on patterns and correlates that can inform program development (LoCasale-Crouch et al., 2007).

Constructivism

Jean Piaget is one of the founding fathers of modern constructivist theories of learning. By developing theory based on schemata, assimilation, accommodation, and equilibrium, Piaget explains the learning process (Hoover, 1996). According to Hoover (1996), from the constructivist perspective, learning depends on the learning environment, the knowledge of the learner and their interactions. Learning involves the construction of meaning, which is assimilated to or accommodated by existing knowledge. Through active construction of knowledge, meanings are then accepted or rejected as part of the process of equilibrium. Such patterns of meaning are shaped by the relationships between the learners, their experience of the world, and the language utilized to describe the experience.

According to Oates, Wood, and Grayson (1997), Piaget had a major impact on the field of early childhood education. Piaget's theory, referred to as a constructivism, recognized a child's own role in his or her development. Constructivism perceived children as discovering or

constructing knowledge about their world through their own experiences. Corsaro et al. (2001) indicated that according to the constructivist approach, children begin at a very early age to interpret, organize, and use information from their environment. From these experiences they construct knowledge about their physical and social worlds.

As children have more complex experiences, the construction of knowledge progresses (Forman & Kushner, 1983). A teacher's role is to provide students with optimal experiences and an environment which keeps pace with the child's capacity to develop and learn. According to Berk (2006), a Piagetian classroom is sensitive to children's readiness to learn. By providing learning experiences that build on children's current level of knowledge, teachers do not introduce new skills before children indicate they are interested or ready to progress to a higher level. Children are encouraged to interact with a variety of materials and activities that promote exploration. The teacher serves as an active participant in the learning process with students, encouraging students to move from one level of learning to the next. Piaget further asserts that forcing students to progress through levels of development before they demonstrate readiness could lead to superficial acceptance of adult formulas rather than true understanding (Berk, 2006).

Piaget's constructivist approach assumes that all children move through the same sequence of development, but at different rates (Woodhead, Light, & Sheldon, 1991). This assumption requires teachers in a Piagetian classroom to plan activities for individuals and small groups of children rather than just for the class as a whole. Additionally, teachers evaluate educational progress by comparing each child to his or her own previous development (Berk, 2006).

Classrooms implementing a curriculum based on constructivism focus on the intellectual, emotional, moral, and social needs of children. These programs emphasize adult-child interactions, stimulating learning environments, and processes that strengthen initiative and self-reliance in children (Mashburn, 2008).

Zone of Proximal Development

According to Berk (2006), Psychologist, Lev Vygotsky supported Piaget's assertion that children are active seekers of knowledge. Berk further asserted that Vygotsky contended that children's social and cultural circumstances profoundly affect their thinking. This belief underpinned Vygotsky's theory that learning takes place within a child's zone of proximal development; a range of tasks just above the level of what a child could master individually (Corsaro et al., 2001). Along these lines, Vygotsky indicated that preschoolers' language was broadened by participation in dialogues with more knowledgeable individuals, who encouraged the mastery of higher level tasks (Derry, 2013).

Much like a Piagetian classroom, a Vygotskyian classroom respects individual differences and provides opportunities for children to be active participants (Berk, 2006). However, the Vygotskyian classroom goes beyond independent discovery and promotes discovery assisted by adults and peers. Teachers guide children's learning, tailoring their interventions to each child's zone of proximal development. Children also work in groups, teaching and helping one another (Berk, 2006).

In a Vygotskyian classroom, children's level of knowledge is strengthened when teachers provide information, make connections to prior knowledge, and encourage explanations of observations (Berk, 2006). According to Berk, as a result of these interventions, children in a Vygotskyian classroom reflect on their own thought processes and shift to a higher level of

cognitive ability in which they begin to symbolize ideas in socially useful ways. In Vygotsky's understanding, as children become more adept at symbolizing ideas, they begin to manipulate and control the symbol systems of their culture (Berk, 2006). Once these connections to prior knowledge are established, children gain mastery of their current environment.

Dimensions of Quality

Hamre and Pianta (2007) were in uniformity with both Piaget and Vygotsky in so far as they asserted that interactions between students and adults are the primary mechanism of child development and learning in a child's early years. Children who experience sensitive and responsive interactions with adults, coupled with scaffolded teaching aimed at the level of learning just beyond the child's current skill level, are more likely to learn as compared to peers experiencing less supportive environments (National Institute of Child Health & Human Development, 2002).

The National Association for the Education of Young Children (NAEYC) has created developmentally appropriate guidelines based upon Piagetian and Vygotskian principles of child development to promote children's learning (Hamre & Pianta, 2007). These professional classroom standards of practice provide four dimensions of quality. The first dimension underscores the importance of a curriculum that acknowledges the multiple domains of child development. According to Hamre and Pianta (2007), a quality early childhood curriculum provides opportunities for children to be active participants in their own learning as well as taking into account the varying backgrounds of children. Secondly, in a high quality early childhood classroom, teachers utilize multiple modes of instructional delivery. They provide information, assist children in the formulation of ideas and extend learning by providing supportive feedback (Hamre & Pianta, 2007). Third, in order to optimize instruction, assessment

of student achievement is ongoing. Ongoing assessment provides opportunities for individualization as well as overall program improvement (LoCasale-Crouch et al., 2007). Lastly, positive adult-child interactions and an emotionally supportive classroom climate promote the intellectual scaffolding that young children require to learn new skills and acquire knowledge (Pianta, 1999).

Rationale and Significance of the Study

As the number of children living in poverty increases, so does the importance of identifying indicators of quality that lead to student achievement. Providing high quality programs for children considered at risk for not experiencing success is paramount. By establishing a relationship between program quality indicators and student achievement, this study provides practitioners with information to ensure they are offering an optimal prekindergarten experience.

According to Wertheimer and Croan (2003), the skills and concepts that were once a part of the first grade curriculum are now being taught in kindergarten. Consequently, they reasoned, children need a firm foundation of knowledge when they enter kindergarten in order to successfully master the skills that are currently included in the kindergarten curriculum. Wertheimer and Croan (2003) went on to point out that those who live in poverty or deprivation experience a greater risk of entering kindergarten at a deficit, and that these same children are especially vulnerable to adverse long-term outcomes. Wertheimer and Croan's (2003) assertions were supported by Perez-Johnson and Maynard (2007), who found that a child's cognitive development and educational attainment was more strongly related to family income than any other socioemotional outcome, making it difficult for children who live in poverty to enter school with a repertoire of prerequisite skills.

The Importance of Early Development

According to Perez-Johnson and Maynard (2007), children who endure poverty in their early years or over a long period of time experience greater difficulty in school than those who endure poverty in later years. Children of differing racial and socioeconomic backgrounds display virtually no differences in cognitive ability in infancy (Wertheimer & Croan, 2003). Karoly, Killburn, and Cannon (2005) indicated that according to Piaget's constructivist theory of child development, in the early years children begin to develop the skills that provide the foundation for future learning. From the Piagetian perspective, the foundational skills are important because learning occurs hierarchically (Berk, 2006). Hence, as Berk (2006) went on to maintain, as children progress and grow, the knowledge they must attain becomes more complex. If children do not experience developmentally supportive and academically challenging environments at every stage of their development, they will not develop the foundation that will allow them to acquire more complex skills (Berk, 2006). In Berk's understanding, this results in a learning gap between "mainstream" and "marginalized" children. Thus the implication is that the longer the learning gap exists without remediation the wider it will become, giving rise to the need for effective prekindergarten programs that target children living in poverty at an early stage of their development.

According to a growing body of research (Karoly et al., 2005; La Paro, Pianta, & Stuhlman, 2003; LoCasale-Crouch et al., 2007; Pianta et al., 2005), long and short-term outcomes for children improve as a direct result of participation in high-quality early childhood programs. As prekindergarten programs are increasingly considered an effective intervention in narrowing developmental gaps for at-risk children, profiles of what constitutes quality in prekindergarten become more important.

Identifying Quality Indicators

Extensive efforts have been made to identify features of early childhood classrooms that lead to student achievement (Barnett, 2005). A focus on social, emotional, and instructional interactions has been identified as a strong indicator of quality (Pianta et al., 2005). This focus has been classified, by Pianta et al., as process quality, and emphasizes the interactions among teachers, children, and materials as strong gauges of quality programs (Pianta et al., 2005). Social/emotional climate and instructional support have been identified in several process quality studies as predictors of child development (LoCasale-Crouch et al., 2006). In classrooms where teachers create positive climates and demonstrate positive interactions with students, the academic needs of individual children are better met (LoCasale-Crouch et al., 2006). According to LoCasale-Crouch et al., studies show children's performance on standardized literacy tests in prekindergarten and Grade 1 have a direct correlation with the quality of social/emotional and instructional interactions in the classroom.

Although previous studies have uncovered a disagreement amongst theoreticians about how to teach children the prerequisite skills for kindergarten, in prekindergarten classrooms where child outcomes are high, highly skilled teachers monitor students' progress and manage the classroom in a manner that ensures learning time is optimal and experiences are maximized (Pianta et al., 2005). Increased child engagement as a result of instructional support has been identified as a predictor of a child's academic functioning in literacy and general knowledge in kindergarten and first grade (Pianta et al., 2005). Lara-Cinisomo (2004) asserted that appropriate social skills, enthusiasm, and effective communication skills have been identified as critical to school success.

Access to Quality Programs

As prekindergarten program quality indicators are identified, it is important to ensure these indicators are present in classrooms, particularly those that provide services to at-risk children. Several prior studies indicate that only a small percentage of at-risk children actually experience high-quality early childhood programming (LoCasale-Crouch et al., 2006). In 2005, Pianta et al. found that prekindergarten classrooms with higher proportions of poverty were less likely to have quality programming. In an 11 state sample of 676 prekindergarten classrooms for at-risk students, only 15% of the classrooms were rated as demonstrating high levels of instructional and emotional support. This was in comparison to 85% of the classrooms that were rated as demonstrating middle or low levels of instructional and emotional support according to the CLASS (LoCasale-Crouch et al., 2006). Bainbridge et al. (2003) further found that children whose mothers did not complete high school were half as likely to attend high-quality, center-based preschool programs as those whose mothers were college educated. A similar gap was found to exist between children from low and high-income families (Bainbridge et al., 2003).

Literature/Research Background

Landmark Studies

At the level of implementation, three pioneering studies examined the effects of prekindergarten education on children living in poverty. These studies considered the immediate impact on students' cognitive development as well as implications for long-term effects including economic success, educational achievement, and avoidance of criminal activity.

Perry preschool project. The Perry Preschool Project (PPP) is one of three landmark longitudinal studies in the field of prekindergarten research. The PPP tracked the effects of prekindergarten on children who were at risk for not being successful in school. Many of the

PPP children lived in poverty in households headed by a single parent who had not completed high school. In many cases at least one parent had been incarcerated. Published results of the longitudinal study indicated that students who participated in the preschool program were less likely to be incarcerated and dependent upon welfare, and were more likely to graduate from high school, commit to marriage, and have higher earnings (Schweinhart, 2006). The results of a Perry Preschool follow-up study indicated that for every dollar invested in preschool, taxpayers receive a \$7.16 return on their investment (Schweinhart, 2006). Overall, the PPP showed that children's participation in a high-quality prekindergarten program can create a framework for success that has the potential to carry through into adulthood.

Head start impact evaluation. A second landmark study, the Head Start Impact Evaluation, was conducted in 1985 by the U.S. Department of Health and Human Services (USDHHS). This research is valuable because Head Start is a large, long-term program that operates under conditions that can be replicated. The results of the 1985 impact evaluation study indicated that children who participated in Head Start demonstrated positive gains in the areas of cognitive development, health awareness, and social behavior in kindergarten and first grade. Critics of the evaluation contend the USDHHS neglected to report further findings that indicated the positive impact of Head Start was short term (U.S. General Accounting Office, 1998). The report found that once children entered school there was little difference between the assessment scores of Head Start and control group children (U.S. General Accounting Office, 1998).

The Abecedarian Project. Another carefully controlled study, the Abecedarian Project, is viewed as premier in the field of early childhood. The project was begun by the Frank Porter Graham Child Development Institute at the University of North Carolina in 1972. The study analyzed the benefits of early childhood education for school readiness on children of poverty

(Peisner-Feinberg et al., 2000). 15, and 21. Analyses of program participants indicated higher cognitive scores on reading and math assessments from the primary grades through middle school. Significantly higher IQ scores were indicated among participants as early as age 3 until age 21. Members of the participation group were also twice more likely to attend a higher education program than those in the control group.

State-Funded Prekindergarten Studies

State funding for prekindergarten programs has increased by over 250% since 1990 (Barnett, 2005). A myriad of programming options exist to meet the needs of families and children. However, Barnett (2005) asserts the main goal of state-funded prekindergarten programs has been identified as the preparation of young children for the demands of kindergarten. As the number of state-funded prekindergarten programs grow, studies of current offerings are necessary to determine the effectiveness of programs in improving children's potential for school success.

Georgia universal prekindergarten. Georgia State University conducted a study of 63,000 children who participated in Georgia's Universal Prekindergarten Program from 2001-2004 (Henry et al., 2005). The researchers utilized the Georgia Kindergarten Assessment Program to compare the scores of Universal Preschool Program children to all children in the state. The results of the study indicated that all children scored well, but the scores of participants and nonparticipants were not significantly different (Henry et al., 2005). The findings from the study are confounded by the fact that the study only took into account end scores on the Georgia Kindergarten Assessment. It did not assess the children upon entry into prekindergarten in order to establish a baseline. By establishing baseline, the study could have looked at the progress of the children over time, thus measuring growth instead of end results.

The outcomes of the Oklahoma Universal Preschool Program, as implemented in Tulsa, were also the subject of a study on the effectiveness of prekindergarten programs. Researchers at Georgetown University administered assessments to 1,843 students from a wide variety of racial and ethnic backgrounds that participated in the Tulsa preschool program during the 2002-2003 school year. Test scores indicated an end result benefit to children from diverse income brackets and racial and ethnic groups in the areas of pre-reading, pre-writing, spelling, math reasoning and problem solving (Conte, 2005).

National Survey Data

National survey data related to the effects of preschool experience were collected from the Early Childhood Longitudinal Study-Kindergarten Cohort Class of 1998-1999. The study focused on class size and quality of instruction provided in kindergarten to determine whether students who did not attend preschool could “catch up” to their peers who did. The study indicated the long-term effects of preschool were dependent upon the classroom experiences during the first 5 years of school, not the skills that children possessed upon entering school (Magnuson, Ruhm, Waldfogel, 2007).

In 2005-2006, 38 states enrolled nearly 950,000 children in public school prekindergarten. Since 1990, funding for these programs has increased by over 250% (Barnett, 2005). With such an investment in prekindergarten, ensuring effective, high quality programs is significant. Many states have identified factors such as teacher/pupil ratio and teacher credentials as evidence of high quality; however, LoCasale-Crouch et al. (2007) caution that these identifiable markers to improve quality do not appear related to observed instruction and

interactions in classrooms and are thus not reliable measures of program effectiveness. If available resources focus on expanding availability of prekindergarten to children with little attention to identifying quality indicators, programs may not offer the skills that children need to be successful in school.

Research Questions

To determine the relationship between program quality indicators observed in the XYZ Prekindergarten Program and student achievement, two research questions were asked:

1. To what extent were indicators of quality present in the teaching of the study site classrooms as evidenced by (a) emotional support, (b) classroom organization, and (c) instructional support?
2. What was the relationship between prekindergarten program quality indicators present in the study site and student achievement as measured by (a) PALS, and (b) the Bracken School Readiness Assessment?

Methodology

The research design utilized for this study was an ex post facto quantitative study. The research-based CLASS (Pianta et al., 2008) was utilized to indicate the classroom quality indicators present in the braided prekindergarten program in XYZ school division. The Phonological Awareness Literacy Screening (PALS) (Ivernizzi et al., 2004) fall and end of year results and the Bracken Early Assessment (Bracken, 2007) end of year results were utilized to identify student achievement. Anonymity of all participants was ensured and research results were available to the school division upon completion of the study.

Summary

Children's success in school is dependent upon the quality of their early childhood experiences (USDDH, 2010a). Participation in a preschool program tends to significantly impact a child's social and emotional development as well as reading and mathematics achievement (Clifford et al., 2005). High-quality prekindergarten programs have been identified as preparing children for kindergarten as well as subsequent success in school (Hamre & Pianta, 2007). Providing a cognitively stimulating prekindergarten program during the third and fourth year of life enhances academic outcomes at school entry (Magnuson et al., 2007).

High-quality early childhood programs have been shown to benefit all children; however, much of the recent focus on early childhood programming is aimed at improving the school readiness indicators of children living in poverty (Barnett, 2005). Disadvantaged children typically experience less cognitively and developmentally supportive environments during their early stages of development, thus making it more difficult for them to attain the foundational skills necessary for school success (Perez-Johnson & Maynard, 2007).

As policy makers and educators examine the possibilities of increasing disadvantaged children's access to prekindergarten, it is important to ensure the offerings are high quality. State-funded prekindergarten programs operated within the public school system are typically designed to enhance the cognitive, academic, and language skills of children before they enter kindergarten (Hamre & Pianta, 2007). Although these programs vary considerably, several key common measures indicate that public school prekindergarten programs provide high-quality programs (NCES, 2003). Most public school prekindergarten programs have high teacher credentialing requirements, offer higher salaries, and meet or exceed the NAEYC recommendations for class size and student/teacher ratios (NCES, 2003).

Unfortunately, many poor children today may not be participating in high-quality prekindergarten programs. In 2005, approximately 1.8 million children received child-care subsidies for low-income families (USDHHS, 2010b). The majority of America's poorest 4-year olds are served in community-based child-care programs that accept child-care subsidies, but do not conform to the NAEYC-created developmentally appropriate guidelines (LoCasale-Crouch et al., 2007). Therefore, the children with the greatest need for high-quality early education may not be receiving the benefits of those programs.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

The literature review will provide an overview of early childhood theory as well as research on prekindergarten programs from a historical and program content perspective. Studies on long-term research programs, comprehensive prekindergarten and state-funded programs will be investigated to support this study.

The purpose of the literature review is to guide the premise of the study that the impact prekindergarten programs have on a child's success in school is determined by the quality of the prekindergarten program. The literature review will provide substantial support and evidence of research that indicates the presence of certain indicators in prekindergarten programs leads to increased student achievement and overall program quality.

Early Childhood Education: A Historical View

A lack of academic skills has been identified as one of the most common obstacles children face when they enter school (Rimm-Kaufman et al., 2002). This is significant, considering skills children possess upon entrance in school are predictors of later school achievement as well as success in adulthood (Rimm-Kauffman et al., 2002). Preschool is considered a means of advancing achievement for all students as well as populations of students who often lag behind their peers. Disadvantaged children are much less likely to attend high-quality preschool programs (Bainbridge et al., 2003). Children whose mothers did not complete high school are half as likely to attend high-quality, center-based preschool programs as those

whose mothers are college educated. A similar gap exists between children from low and high-income families (Bainbridge et al., 2003). As states, school divisions, and stakeholders consider offering prekindergarten programs, they must determine whether such an offering will be beneficial. A review of available preschool research could provide beneficial information concerning these assertions.

Long-Term Research Programs

Documentation of the benefits of high quality, intensive early childhood programs dates back to the 1960s. Many of these studies indicate short-term improvements in cognitive development as well as long-term increases in academic achievement and adult success. The Perry Preschool Project is the classic study in the field of preschool research. It tracked the effects of early intervention on children who were at risk for not being successful in school. The project was implemented from 1962 until 1967 in Ypsilanti, MI. One-hundred and twenty-eight African American 3-and 4-year old children living in poverty were randomly assigned to two groups. Sixty-four children were assigned to an intervention group and received a high-quality preschool education, while 64 children assigned to a control group received no preschool experience. Although the researchers identify program selection as random, three changes were made to program assignments throughout the course of the study. Approximately 10 students, whose mothers worked, were moved from the preschool group to the control group. This ensured that families of students assigned to the preschool group could participate in the home visit portion of the program. Also, children were matched into pairs based upon IQ scores. A child with a high IQ score was paired with a child with a low IQ score. Each pair was then randomly assigned to a group. Lastly, children with a sibling participating in the study were automatically assigned to the same group. Such reassigning of program participants indicates

that program selection was not completely random, therefore jeopardizing the validity of the study.

The Perry Preschool Project provided a half-day, 5 day-a-week program. A weekly home visit lasting at least 1½ hours was also provided by the teacher in the students' homes. The purpose of the home visit was to demonstrate appropriate activities for mothers to utilize with their children as well as to involve the mothers in the educational process. All teachers in the program were certified public school teachers possessing at least a baccalaureate degree. The average adult-child ratio was 6:1. According to Schweinhart (1993), the High/Scope Curriculum emphasized child engagement and active learning through problem solving and decision making. Seventy-five percent of the children were participants for 2 years, with the remaining 25% participating in the project for 1 year. Children's intellectual and social development was assessed as well as abilities, attitudes, and scholastic achievement (Schweinhart, 1993). Data were also collected on participants' backgrounds, employment, involvement in the welfare system, and delinquent behavior. Participants were assessed at the end of program enrollment and at ages 10, 15, 19, 27, and 40.

Published results of the study at the end of program participation are difficult, if not impossible to attain. According to Schweinhart (1993), the critical findings at the end of program participation pertained to intellectual performance and were inconclusive. Further results indicate that students who participated in the preschool program had significantly higher average achievement scores at age 14 and literacy scores at age 19 and performed better in school and adult education. When program participants were analyzed again at age 27, they were more likely to have graduated from high school and were less likely to be incarcerated and

dependent upon welfare and were more committed to marriage and have higher earnings (Schweinhart, 1993).

The results of a Perry Preschool Project follow-up study evaluated 97% of the participants at age 40. The findings indicated that program participants were more likely to have graduated from high school, held higher paying jobs, and had committed fewer crimes than nonparticipants. Program researchers have since asserted that for every dollar invested in preschool, taxpayers receive a \$7.16 return on their investment (Schweinhart, 2006).

Replication of the Perry Preschool Project would be complicated at best. The small-scale study was intensive, controlled, and targeted at the most disadvantaged children based on family dynamics. Generalizability of this study's findings to children currently living in poverty would prove complex. Family dynamics and demands are quite different today than they were 40 years ago. Also, the inclusion of weekly home visits is not something that preschool programs today typically offer. It is difficult to differentiate the impact of the home visits and the subsequent changes in parenting from the actual preschool effects.

The Abecedarian Project is another carefully controlled study that is viewed as premier in the field of early childhood. The project was begun by the Frank Porter Graham Child Development Institute at the University of North Carolina in 1972. The study analyzed the benefits of early childhood education for school readiness on children of poverty (Peisner-Feinberg et al., 2000).

The participants in the Abecedarian project were 111 infants born between 1972 and 1977. Program participation began at 4½ months of age and continued through age 5. Fifty-seven children were randomly assigned to the participation group and received high-quality childcare for 6 to 8 hours a day, 5 days a week. Fifty-four children were randomly assigned to

the control group and received nutritional supplements, social work services, and medical care. The caregiver to infant ratio in the center was 1:3 initially and increased to 1:6 as children got older. Each program participant was given an individualized educational plan focusing on social, emotional, and cognitive development. At school age, children from both groups were randomly assigned to either the Abecedarian K-2 Educational Support Program or a group with no support through second grade. This intervention makes it difficult to determine whether progress can be attributed to initial participation or school age assignment to a support program. Progress for participants was monitored over the course of the study with follow-up analysis at ages 12, 15, and 21.

Analyses of program participants indicated higher cognitive scores on reading and math assessments from the primary grades through middle school. Significantly higher IQ scores were indicated among participants as early as age 3 until age 21. Members of the participation group were also twice more likely to attend a higher education program than those in the control group.

As with the Perry Preschool Project, the Abecedarian Project is difficult to replicate. The longevity and extensive nature of the project would be difficult to reproduce in today's society. The transient nature of families also makes consistency of participation arduous. The intervention offered in the Abecedarian Project is far more intense than programs offered today, thus making it difficult to generalize the findings to current preschool programs.

Another study of an intensive early childhood program is the Chicago Child-Parent Center Program. The program, funded by Title I, began in 1967 in neighborhood elementary schools in Chicago. The purpose of the program was to provide school-based preschool and early school-age intervention to low-income children (Niles & Peck, 2006). A strong emphasis was placed on parental involvement and the development of literacy skills. Each center offered

preschool services, a parent resource room, school-community outreach activities, and health services. Once students completed preschool, support continued in the elementary school in the form of reduced class sizes, teacher assistants for each classroom, continued emphasis on parental involvement, and literacy and math rich classroom environments (Niles & Peck, 2007).

The Chicago Child-Parent Center study, a cost-benefit analysis, focused on 989 children who attended the preschool program between 1983 and 1986. These children were compared to a random sample of 550 students who had comparable family background measures, were found eligible for the program, but did not participate. Results of the study indicated that program participants completed more years of education, and had lower school dropout rates and arrests. The largest cost benefit was the increased earnings capacity of program participants. Because they had higher educational attainment, their earning potential was increased. Thus indicating that participation in the program was associated with economic benefits that exceeded costs.

The Chicago Child-Parent Center study, like the Perry Preschool Project and the Abecedarian Project provided encouraging results to those considering preschool as a means of addressing the school readiness gap. The results of all three programs provided short and long-term benefits for children living in poverty and considered at risk of school failure. Long-term research program results can be seen in Table 1.

When considering the positive impact of the Perry Preschool, the Abecedarian Project, and Chicago Child-Parent Center projects, it is important to determine the commonalities that could provide guidance to current preschool programs. All three programs offered developmentally appropriate, child-centered approaches to children between the ages of 3 and 4 years. Adult-child ratios did not exceed 1:6 in any program over the course of participation.

Table 1

Long-Term Research Programs

Research program	Program components	Assessment schedule	Results
Perry Preschool Project: 128 African American 3 and 4-year olds living in poverty. 1962-1967: 75% participated 2 years, 25% participated 1 year.	1/2 day preschool program. 5 days a week. Adult child ratio 6:1. Weekly home visits.	End of program participation. Ages 14, 19, 27, 40.	End of program participation findings inconclusive: Age 14 results-achievement scores. Age 19 results-higher literacy scores. Age 27 results-higher instance of graduation from high school, lower instance of incarceration, less reliance on welfare, more committed to marriage and higher earnings. Age 40 results-higher paying jobs, commitment to marriage.
Abecedarian Project: 111 infants of poverty born between 1972 and 1977, participants began at 4 1/2 months of age and continued through age 5. At school age, participants randomly assigned to Abecedarian k-2 support or no support group through 2nd grade.	High-quality childcare 6 to 8 hours a week. Infant/adult ratio 1:3. Individualized education plan for each child focusing on social, emotional, and cognitive development.	Progress monitored over the course of the study. Follow-up analysis, ages 12, 15, 21.	Higher IQ scores as early as age 3 until age 21. Higher cognitive scores on reading and math from primary grades through middle school. Twice more likely to attend higher education.
Chicago Child Parent Center Study: 989 low-income children who attended preschool program from 1983-1986.	School-based preschool. Parent resources. School-community outreach activities. Health services. Continued support in grades k-s.	Cost benefit analysis.	Participants completed more years of education. Lower dropout rates. Lower incident of arrest. Increased earning potential.

Teachers and caregivers were highly qualified and trained in program and curriculum administration. Each project maintained an organized system of in-service training and systematic curriculum supervision. Program monitoring and assessment procedures were developmentally appropriate and consistently monitored. These commonalities provide indicators for consideration by current programs or those considering program implementation.

The Perry Preschool Project, the Abecedarian Project, and Chicago Child-Parent Center offered more than preschool. Parent involvement activities played an integral role in each project. Parents were taught skills and techniques to support their children's development. They were provided opportunities to access health-related services, attend educational workshops, volunteer in the classrooms, attend field trips, participate in home visitations and actively participate in their children's educational experience. While some of these services are offered in typical preschool programs, most are not provided as extensively as they were in these three programs.

Services or support for participants in these three programs continued over time. The Perry Preschool Project offered 2 years of participation, the Abecedarian Project offered 5 years of participation, and the Chicago Child-Parent Project provided support through the third grade. Preschool offerings today do not typically provide services beyond the year of program participation. Replication of these three programs would require extensive planning as well as significant time and budget commitments.

Head Start Studies

It is possible that research on Head Start can provide relevant information to current preschool offerings and considerations. Head Start was designed to improve the opportunities and achievements of children living in poverty. The overarching purpose is to ensure that the

cycle of poverty does not perpetuate itself. The Perry Preschool and Abecedarian projects were conducted under controlled circumstances with skilled researchers, highly trained staffs, and no variation in program offerings across participants. Conversely, Head Start has many of the characteristics of a large scale, public school preschool program. Head Start provides education, health, and social services to program participants and their families with the goal of ensuring the children enrolled are ready to start school. While focusing on children living in poverty, the program components provide a focus on physical health, emotional and social development, mental processes, and family quality.

The USDHHS conducted a Head Start impact evaluation in 1985. This research is valuable because Head Start is a large, long-term program that operates under conditions that can be replicated. The results of the study indicated that children who participated in Head Start demonstrated positive gains in the areas of cognitive development, health awareness, and social behavior. Critics of the evaluation contend the USDHHS neglected to report further findings that indicated the positive impact of Head Start was short term. The report found that once children entered school there was little difference between the assessment scores of Head Start and control group children (U.S. General Accounting Office, 1998). It is important to ensure that the control group's children were representative of the population of students attending Head Start. Comparisons of Head Start students to general populations of 3-and 4-year olds would not lead to accurate conclusions about the effects of Head Start.

Head Start also implemented a study of Family and Child Experiences (FACES) beginning in 1997 and continuing until 2010. The first cohort of FACES data in 1997 identified only small gains from fall to spring on most aspects of early literacy development. In other areas such as book knowledge and print awareness, no significant gains were noted. However, in the

areas of parental education, health awareness and dental care, significant gains were identified (Ludwig & Phillips, 2007).

FACES data from the 2000 cohort of students indicated a change from the initially flat or small gains from the previous FACES study. Significant gains were made in the areas of book knowledge and print awareness as well as letter recognition. However, children's scores in the area of vocabulary development showed no improvement from fall to spring (USDHHS).

In a 2005 study entitled, The Head Start Impact Study, there were indications of cognitive, health, and social gains for children during participation years. A random sample of about 5,000 3-and-4-year old Head Start applicants were included in the study. Children from the sample were randomly assigned to a treatment group that received Head Start services or a control group that did not. Participants were chosen from 84 Head Start grantees that did not have enough available slots for all eligible applicants. The applicants not enrolled in the program were placed in the control group. These students would not have had the opportunity to participate in the Head Start program whether the study was being conducted or not (USDHHS, 2010a). Creation of a control group in this manner assisted in the ethical development of the study. It should be noted that although control group children did not participate in Head Start, there is no information concerning whether they participated in other preschool programs.

Head Start students demonstrated small to moderate gains in pre-reading, pre-writing, vocabulary, and on health and parent involvement indicators. Unfortunately, even though Head Start students' scores improved, they still entered kindergarten functioning substantially below the national average on cognitive assessments (USDHHS, 2010a). According to the USDHHS, the impact was not substantial enough to close the gap between Head Start participants and the general population of 3-and 4-year olds.

The implications of the Head Start study are significant due to the fact that a large-scale program serving disadvantaged children was able to conduct a study producing measurable results. Most previous studies only included small, targeted programs. It is also encouraging that a large randomized study like this one can be ethically conducted with a control group (Barnett, 2013). Many earlier large-scale studies lacked appropriate comparison groups thus making it difficult to draw conclusions about the programs' overall impact.

When generalizing Head Start Impact Study results to other preschool programs it is important to be aware of certain nuances of the Head Start program. A set of performance standards provide guidance to all Head Start programs, however, there is variability across locations. All Head Start funded programs are required to assure compliance with the Head Start Performance Standards. In some instances, the standards are broadly written and open to interpretation. Communities are given latitude to develop their own programs. This latitude is viewed by some as positive in that it allows programs to meet the specific needs of the local population, while others contend that the variability in programs also indicates variability in quality. One such area of variability is program length. Some Head Start students attend full-day, 5 day-a-week programs, while others attend half-day or abbreviated week programs. Children who attended full-day classes in Head Start showed larger fall to spring gains in letter recognition and early writing skills than did children in half-day classes (USDHHS, 2003). Teacher credentialing is another indicator with implications for program considerations. Currently, Head Start does not require teachers to have specific teaching credentials. However, across programs, children taught by teachers with bachelor or associate degrees showed greater gains in early writing skills than those taught by teachers with lesser credentials (USDHHS,

2003). These results offer guidance for effective program implementation. Table 2 depicts studies of Head Start participation.

State-Funded Preschool

Nearly 750,000 children were enrolled in state-funded prekindergarten for the 2002-2003 school year (Clifford et al., 2005). In 1998, four states had implemented programs providing prekindergarten services to all 4-year olds, while 34 were offering targeted programs to those considered at risk, still others were offering none (Clifford et al., 2005). As the number of state-funded prekindergarten program offerings expand, information pertaining to current programs can assist in answering questions about the effectiveness of prekindergarten as well as aid in the determination of indicators of quality. Recent research indicates that state-funded programs vary considerably across program indicators such as credentials of teachers, program length, curriculum, adult to child ratio, and program environment. In 1998, 33 states offered state-funded preschool programs, however, only 13 states had evaluated the programs' impact on child outcomes (Clifford et al., 2005).

In 2000, the Yale University Child Study Center completed a meta-analysis of evaluations of the 13 state-funded prekindergarten programs that performed impact evaluations. Most of the study states reported that the purpose of their prekindergarten program was to increase school readiness (Clifford et al., 2005). Although programs had the same goal, they varied greatly in terms of their structure, accessibility, duration, classroom characteristics,

Table 2

Studies of Head Start Program Participation

Research program	Program components	Assessment schedule	Results
Head Start Impact Evaluation (1985).	Variable preschool program for 3 and 4-year olds. Family services component. Health care assistance. Dental care assistance.	End of program participation.	Increased skills in pre-reading, more access to dental care, better overall physical health, less hyperactivity, fewer behavior problems, and better parenting. No impact found on oral comprehension, phonological awareness, early math, aggressive or withdrawn behaviors, social skills, or parental safety practices.
Head Start Families and Child Experiences (FACES) (1997).	Variable preschool program for 3 and 4-year olds living in poverty. Family service component. Health care assistance. Dental care assistance.	End of program participation.	No or only small gains from fall to spring on most aspects of early literacy development. Increased dental care. Improved health care.
Head Start Families and Child Experiences (FACES) (2000).	Variable preschool program for 3 and 4-year olds living in poverty. Family service component. Health care assistance. Dental care assistance.	End of program participation.	Significant fall to spring gains in children's knowledge of book and print conventions. Significant gains from fall to spring in children's letter recognition. No gains from fall to spring in the area of vocabulary development. Head Start students still scored significantly below the national average on cognitive assessments.

Table 2 - continued

Research program	Program components	Assessment schedule	Results
Head Start Impact Study (2005). Random sample of 5,000 3 and 4-year old applicants living in poverty.	Variable preschool program for 3 and 4-year olds living in poverty. Family service component. Health care assistance. Dental care assistance.	End of program participation.	Small to moderate gains in pre-reading, pre-writing, vocabulary. Improvement on health and parent involvement indicators. Students still functioning below national average on cognitive assessments.

comprehensive services, and parental involvement component (Clifford et al., 2005). Sixty-one percent of the programs evaluated required providers to follow established guidelines such as Head Start Performance Standards or NAEYC guidelines (Clifford et al., 2005). Others only required providers to meet state child-care licensing requirements or did not stipulate any programs guidelines at all (Clifford et al., 2005). Programs also varied by teacher credentialing, adult to child ratios, and program duration.

Most states in the Yale study evaluated multiple groups of children and followed them until third grade. Some evaluations relied on individual assessment of representative samples and others utilized school-based data that existed for all students. Samples consisted of school districts that represented various regions of the state in which they were located to give a representative sample. Subjects were then randomly selected from the sample. Attrition rates varied from 10% to 25% per year, a figure that is typical for evaluations of programs serving at-risk families (Gormley, 2005).

Ten states compared program participants to a comparison group. Programs utilizing wait-list children as the comparison group provided the best test of the program (Clifford et al., 2005). Three program evaluations utilized random elementary school classmates. This method of comparison group selection could possibly underestimate program effects because the comparison group may have had lower risk initially. Other study limitations among evaluations included states utilizing tests with little or no known reliability or validity. This makes it difficult to confirm the study results. Other states' evaluation plans did not utilize standard effect sizes, which could lead to erroneous results. Interestingly, few states provided data indicating the quality of their programs. Evaluations should measure program implementation and quality as an essential indicator or program impact (Clifford et al., 2005). When program quality is not

included in an outcome evaluation, results are often misleading and difficult to interpret (Clifford et al., 2005). Despite the methodological limitations of the states' evaluation plans, results were rather consistent in the areas of reduced grade retention, improved developmental competence, improved assessment scores, and school attendance. These findings are encouraging, but due to the methodological limitations, further study is warranted before generalizing results or considering the programs as prescriptions or models for others.

In order to determine the impact of Georgia's Universal Prekindergarten Program on participants' school readiness, Georgia State University conducted a study of 63,000 students who participated in the program from 2001 to 2004 (Henry et al., 2005). The Georgia Prekindergarten Program was created in 1993 as a state-funded, voluntary program and is offered to all 4-year olds in the state. The purpose of the program is to provide 4-year olds with high-quality prekindergarten in order to prepare them for school. Programs are offered through Head Start, center-based child-care programs, and prekindergarten programs in public schools. Providers must adhere to detailed guidelines established by Georgia's Office of School Readiness (Henry et al., 2005). Guidelines include criteria regarding specific educational experiences, program length and duration, class size, teacher credentials, professional development, and curriculum. Currently, teachers with associate degrees are allowed to teach in the program, however, the state is requiring teachers with these qualifications to participate in degree programs (Henry et al., 2005).

The Georgia Kindergarten Assessment Program was utilized to compare the scores of students who had participated in the prekindergarten program to all students in the state. The assessment was administered at the end of the kindergarten year to all kindergarteners in the state. The results of the assessment indicated that all students scored well, but the scores were

impossible to tell apart (Henry et al., 2005). These results could be viewed as negative, because program participants did not outscore nonparticipants. However, the results could also be viewed as positive depending upon the skills the students possessed when they entered the program. Unfortunately, this study only took into account end scores on the Georgia Kindergarten Assessment. It did not assess the students upon entry into prekindergarten in order to establish a baseline. This would have allowed the study to determine individual growth of children as well as program benefits. By utilizing an assessment administered at the end of kindergarten, it is also difficult to determine whether gains or deficits are the result of prekindergarten or kindergarten experiences.

The Tulsa, Oklahoma Universal Preschool Program was also the subject of a study on school readiness. Oklahoma offers all school districts the opportunity to participate in a voluntary universal prekindergarten program. As of 2002-2003, 91% of school divisions were participating (Gormley, 2005). Programs vary by duration, but require all teachers to have a baccalaureate degree and adult-child ratio of 1:10.

Researchers at Georgetown University utilized a quasi-experimental regression-discontinuity design to determine the overall effects of exposure to Oklahoma's Universal Prekindergarten program. Three subtests of the Woodcock-Johnson Achievement Test were administered to 1,843 students from a wide variety of racial and ethnic backgrounds that participated in the preschool program during the 2002-2003 school year. Participants included prekindergarten and kindergarten students enrolled in the Tulsa, OK public schools. The control group was comprised of students just entering the prekindergarten program while the treatment group consisted of kindergarten children who were enrolled in the prekindergarten program the year before.

The purpose of this research design was to estimate the treatment-on-the treated effect (Gormley, 2005). By comparing students who attended the prekindergarten program to students that had not experienced any prekindergarten program, the differences in scores could be attributed to the prekindergarten experience or treatment. The subtests were letter-word identification, spelling and applied problems. Results were disaggregated for children who vary in their race/ethnicity and family income (Gormley, 2005).

Test scores indicated a benefit to children from diverse income brackets and racial and ethnic groups in the areas of pre-reading, pre-writing, spelling, math reasoning, and problem solving across all racial/ethnic groups (Conte, 2005). Increases were also shown regardless of the free lunch eligibility status (Gormley, 2005). The largest impact was on the letter-word identification subtest, which assesses pre-reading abilities. Project researchers indicate these effects may be the result of extensive training teachers received on Tulsa Reads, which was implemented in 2001 (Gormley, 2005). More specifically, the prekindergarten program was shown to provide a greater benefit to Hispanics and Blacks than Whites. However, the researchers caution that these findings could be due to “ceiling effects” associated with the assessment instrument (Gormley, 2005).

When considering replication and generalizability of the Oklahoma prekindergarten study, it is important to consider several nuances of the program. Teacher credentials have been identified as an indicator of prekindergarten program quality (Pianta et al., 2005). Teachers in Oklahoma are required to possess a baccalaureate degree and are compensated at the same level as K-12 education teachers. Other programs utilizing lesser licensing criteria for teachers may experience diminished results. In order to learn more about other indicators that have impacted

the school readiness of Oklahoma students, it would be beneficial to evaluate the process quality of the prekindergarten program (Pianta et al., 2005).

In an attempt to learn more about the quality of state-funded prekindergarten programs the NCEDE studied 240 state-funded prekindergarten sites in six states. Most of the programs in the study offered prekindergarten to children living in poverty or those at risk of cognitive delays (Clifford et al., 2005). Program duration varied with some offering part-day and others offering full-day programs lasting approximately 5 hours. Teacher credentialing also varied across programs. Fifty-one percent of study teachers held baccalaureate degrees and state certifications, while 16% had no formal education past high school (Clifford et al., 2005).

Study results indicate that classrooms with higher concentrations of students from low-income backgrounds were taught by teachers who did not have a degree (Clifford et al., 2005). Children with the lowest level of school readiness skills were being taught by less qualified teachers. The average classroom had an adult-child ratio of 1:8, 96% offered a formal curriculum, and 50% offered a formal parent education component (Clifford et al., 2005).

A major strength of this study was the evaluation of process quality indicators such as instructional climate, adult-child engagement, and classroom environment. The Early Childhood Environment Rating Scale-Revised (ECERS-R) and the Classroom Assessment Scoring System (CLASS) were utilized to rate the classrooms instructional climate. The scores on both instruments were lower than had been found in other large-scale studies of early childhood programs (Clifford, et al., 2005). Low scores in the area of instructional climate indicated that teachers did not consistently engage in focused instruction or encourage higher level thinking amongst their students. The project researchers hypothesized the low quality scores in some areas could be related to the program duration. Much of the time in half-day programs is

absorbed in routines, leaving little time for directed instruction and other learning activities. On cognitive measures, program participation appeared to have helped at-risk students catch up with their peers. On standardized measures of language and math, students made meaningful gains (Clifford et al, 2005). Comparatively, state funded pre-kindergartens are maintaining high structural quality, but need increased attention to process quality in order to attain the goal of increasing the school readiness skills of at-risk students. Table 3 summarizes state-funded prekindergarten studies with assessment schedule and results.

Prekindergarten Program Quality

As the number of state-funded prekindergarten programs increases, a clear definition of effectiveness or quality programs becomes paramount. In 1999, a study was implemented to investigate early childhood program quality as determined by program evaluations. The purpose of the study was twofold: (a) to determine definitions of quality previously utilized in early childhood program evaluations, and (b) to gain an understanding of the social and cultural conditions of quality definitions through the lens of program evaluators and stakeholders (Lee & Walsh, 2004).

From 1999 through 2002, researchers utilized a variety of methods to evaluate the nature of early childhood program quality. One hundred-forty evaluation reports of programs serving children ages 3-to-5-years since 1970 were reviewed. Questionnaires were sent to 105 early childhood program evaluators and semistructured interviews were conducted with 15 early childhood program directors and 15 teachers in various types of programs in Illinois. The questionnaires were targeted at gaining the evaluators' perspective on program design, criteria

Table 3

State-Funded Prekindergarten Studies

Research study	Assessment schedule	Results
Yale University Child Study Center, 2000 Meta-analysis of 13 state-funded prekindergarten programs.	Variable: Some states evaluated students before, during, and after prekindergarten experience. Some states followed children into subsequent grade levels.	Results consistent in the areas of: reduced grade retention, improved developmental competence, improved assessment scores, and improved school attendance.
Georgia's Universal Prekindergarten Program Study. Participation years, 2001-2004, 63,000 students.	End of kindergarten year.	All students scored well on the kindergarten assessment. Program participants were impossible to distinguish from those that did not participate in the prekindergarten program.
Tulsa Oklahoma Universal Preschool Program Study.	Beginning of prekindergarten kindergarten year.	Results indicated a benefit to children from diverse Income, racial, and ethnic groups in areas of pre-reading, pre-writing, spelling, math reasoning, and problem solving. Significant impact on letter-word identification subtest. Greater improvements for Hispanics and Blacks than Whites.
National Center for Early Development and Learning Study. 240 state-funded prekindergarten sites in six states. Observational study.	During program participation.	Findings: classrooms with higher concentrations of low-income students are taught by teachers without degrees; average adult-child ratio 1:10; 96% offered formal curriculum; 50% offered formal parent education; low indication of classroom instructional climate; meaningful gains on measures of language and math.

for determining quality, strengths and weaknesses of widely accepted criteria, roles of program evaluation, and challenges of program evaluation (Lee & Walsh, 2004).

The purpose of the interviews was much the same—to learn about evaluators' experiences with evaluations, their views on program quality, and their perceptions of program evaluations (Lee & Walsh, 2004). Although the purposes of the surveys and interviews were the same, the information gleaned from the interviews was much more in-depth. When examining the results of program evaluations, most evaluations were based on program outcomes. Although emphasis on program outcomes is not identified as an indicator of process quality in early childhood, it continues to be the dominant practice in the reviewed evaluations (Lee & Walsh, 2004).

Interestingly, results of the questionnaires and interviews yielded similar results. Most evaluators did not provide clear indications of quality, but rather focused on how to measure program outcomes and their effect on children. In short, over the last 30 years the majority of early childhood program evaluations have focused on program outcomes as an indicator of success, yet research does not identify outcomes as a quality indicator for early childhood programs.

Although program outcomes was the predominant result of the study, standards-based quality and quality as developmental appropriateness were also identified as important indicators (Lee & Walsh, 2004). Standards-based quality placed a focus on complying with existing or external criteria. Most evaluators indicated they felt it was valuable to utilize existing criteria such as the ECERS-R to evaluate program quality, but due to variability in programs indicated limitations placed on programs by such criteria. Teachers interviewed indicated following standardized criteria as problematic to meeting the specific needs to their programs and children

(Lee & Walsh, 2004). The overall implications of this study are related to the utilization of program outcomes as indicators of quality. When utilizing time, effort, and money to evaluate early childhood programs, it is important that the results are meaningful. While program outcomes may provide superficial findings about a program, they do not provide an in-depth understanding about the programs themselves. Outcomes do not identify which facets of the program are of high quality and which need further support. The researchers of this project conclude that the high value placed on outcome-oriented evaluations may lead to under diversified evaluation approaches which will in turn lead to a lack of early childhood program quality.

Children who have the opportunity to participate in preschool programs, which have been identified as high quality, enter school with better language development, math skills, and reading skills and are identified by their teachers as being more school ready (Pianta et al., 2005). Currently, many states utilize structural indicators such as teacher credentials and teacher-child ratios to measure program quality. Although these markers may provide information about program offerings, research is inconsistent in identifying the relationships between these indicators and classroom quality (LoCasale-Crouch et al., 2007). It is acknowledged that quality learning opportunities for children are important, however, the indicators of quality are in dispute. If prekindergarten programs are expanded without a clear definition or attention to classroom quality, the programs may not effectively prepare children for school.

In a review of the NCEDE multistate investigative study of prekindergarten quality, Early et al. (2006) identified high levels of instructional and emotional support of children as the highest quality profile. Data such as classroom observations, child assessments, teacher

credentials and teacher questionnaires were collected from the 237 prekindergarten classrooms involved in the study. Although the study revealed a correlation between teachers' education and children's gains in math, there were no consistent associations between education, training and credentials, and child outcomes (Early et al., 2006). These results are consistent with studies of compensatory education (Early et al., 2006). Structural indicators such as credentials and adult-child ratios do not provide consistent evidence of impacting child outcomes.

In another study utilizing data collected from the NCEDL multistate investigative study process indicators such as social and emotional climate and instructional support were evaluated to determine the impact on child outcomes. The CLASS was used to assess nine dimensions of the social and instructional classroom processes. The CLASS was chosen because of its ability to maintain information on very distinct indicators instead of the categories collapsing on one another (Pianta et al., 2008).

The CLASS allows the researcher to determine the effects of each individual indicator rather than a summation of indicators. The assessment includes five indicators for social and emotional climate with each indicator being rated between 1 and 7. Climate measures include teacher-child interactions, teacher sensitivity, classroom structure, and behavior management. Instructional quality is measured along four indicators: productivity, concept development, instructional learning format, and quality feedback (LoCasale-Crouch et al., 2007).

For the purpose of this study, each classroom was observed for 2 days. All nine indicators on the CLASS were scored every 30 minutes over the 2-day period. Teachers also completed questionnaires related to structural indicators such as credentials, ratios, and program duration. A 3-stage cluster analysis was used to establish core profile types among the process quality indicators.

The results indicated that 15% of the classrooms demonstrated high levels of instructional and emotional support for children. Conversely, 19% of classrooms evaluated were found to have low levels of both emotional and instructional support. While the majority of the classrooms fell in the mid-range, some demonstrated high levels of one indicator and low levels of another interchangeably (LoCasale-Crouch et al., 2007). Interestingly, classrooms identified as high quality and low quality on process indicators did not differ from one another on structural indicators such as teacher credentials and adult-child ratios (LoCasale-Crouch et al., 2007).

It is important to investigate the findings involving programs with indicators characterized as poorest quality. Classroom observations indicated that children in these programs are not exposed to practices associated with social, emotional, and academic gains for children (LoCasale-Crouch et al., 2007). Thus, suggesting that the practices in these classrooms are not providing children with the needed school readiness skills. Given the purpose of the majority of state-funded prekindergarten programs is to enhance the school readiness skills of at-risk children, these findings are cause for concern. The results should further caution the associations made between structural indicators and child outcomes. As prekindergarten programs are developed and evaluated, the results of this study would indicate a need for more intense focus on process indicators such as social and instructional classroom processes.

Many of the researchers involved in the previous project further investigated the concept of quality in prekindergarten programs. Pianta et al. (2005) examined the features of prekindergarten programs, classrooms, and teachers and determined their effect on program quality and child-teacher interactions. The NCEDEL multistate investigative study on state-funded prekindergarten was utilized to uncover information related to the extent to which

program, classroom, and teacher attributes predict process quality in prekindergarten classrooms (Pianta et al., 2005)

Three distinct measures were utilized to evaluate the process quality evident in the study classrooms. The ECERS-R was used to evaluate the physical environment, adult-child interactions, responsiveness of teachers, and children's reaction to teachers. Secondly, the CLASS was utilized to measure the emotional and instructional climate of the classroom. Lastly, the Emerging Academics Snapshot was used to determine elements of classroom quality that could be altered by policy or training such as nature and variety of activities, variation of whole group and small group activities, and curricular implementation (Pianta et al., 2005). The ECERS-R and CLASS provided evidence of global quality and the Emerging Academic Snapshot evaluated teaching practices that reflected quality.

The observers for all three instruments were trained by an expert coder whose codes were assessed as the "gold standard" (Pianta et al., 2005). Results of the study indicated that children of poverty were more likely to be attending programs of low process quality and taught by teachers with lesser credentials. Coincidentally, teachers with a teacher certificate in early childhood education were found to provide a more positive emotional climate and were more responsive and stimulating in interactions with children than those with no formal training (Pianta et al., 2005). Teacher's wages did not significantly contribute to the quality of the classroom. Overall, teacher attributes and program climate are significant indicators of program quality. When viewing results by state, there are indications of differences among states on factors not related to process quality. Although many states had similar regulations, it appears that the extent to which state regulations were enforced and professional development actually provided that influenced the results (Pianta et al., 2005).

Summary

Early childhood theory based on constructivism supports an actively engaging classroom. Learning outcomes are determined by the environment, the experiences children have with the environment, and their previous knowledge. Constructivist environments should stimulate a child's social, emotional, moral, and intellectual development. It is important that teachers in these classrooms support students' self-reliance and active engagement in the learning process.

Long-term research programs such as the Perry Preschool Project, the Abecedarian Project, and the Chicago Parent-Child study provide a foundation for the assertion that child outcomes are increased when the social, emotional, moral, and intellectual needs of students are supported. The Head Start studies also offer evidence of increasing child outcomes when programs are implemented with the goal of meeting the needs of the whole child. Although less is known about the comprehensive services provided by state-funded prekindergarten programs, the Georgia and Tulsa, OK prekindergarten programs have also been shown to positively impact outcomes for children. The NCEDEL multistate investigative study also indicated positive results for students participating in state-funded prekindergarten programs; however, the focus of the study was on quality indicators rather than comprehensive services or program outcomes.

The overarching results of the studies on prekindergarten program quality suggest that quality appears to be influenced more by process indicators and less by structural indicators. Process quality consists of all interactions in a classroom including those with individuals, environment, and materials. Process quality is assessed primarily through observation and has been found to be more predictive of child outcomes than structural indicators such as staff to child ratio, group size, cost of care, and type of care (Pianta et al., 2005).

CHAPTER 3. METHODOLOGY

Introduction

A strong movement exists to offer public school prekindergarten programs that provide high-quality experiences for children. An equally vocal movement has expressed concern for the mis-education of youth and the lack of attention to the developmental needs of young children. An increasing body of research indicates that child outcomes are directly impacted by early education experiences in high-quality classrooms. As programs expand, definitions of classroom quality and associations of quality to various programs can provide clear guidance in efforts to develop or improve programs (LoCasale-Crouch et al., 2007).

The purpose of this study was to identify and describe the relationship between identified prekindergarten program quality indicators and student achievement in a braided prekindergarten program in a school division. Prekindergarten program quality indicators were identified through observations utilizing the Classroom Assessment Scoring System (CLASS). Student achievement was operationally defined as outcome by the Phonological Awareness Literacy Screening PreK (PALS) (Ivernizzi et al., 2004) and the Bracken School Readiness Assessment (PreK) (Bracken, 2007).

Research Questions

Two questions were examined to guide the study:

1. To what extent were indicators of quality present in the teaching of the study site classrooms as evidenced by (a) emotional support, (b) classroom organization, and (c) instructional support?
2. What was the relationship between prekindergarten program quality indicators present in the study site and student achievement as measured by (a) PALS, and (b) the Bracken School Readiness Assessment?

Setting

The setting selected for this study was a large, suburban, school division in central Virginia. The district was comprised of 46,000 students in grades PreK-12. The prekindergarten program in the division was designed to provide high-quality preschool learning experiences for 4-year-olds who need additional support to be successful in kindergarten. Participation in the program was based on specific risk factors and other required enrollment procedures such as a current health exam dated within the last year. At the time of the study, there were 53 prekindergarten classes serving 954 students. Prekindergarten classrooms were located in division elementary schools with an economic deprivation rate of at least 35%.

Program Description

The philosophy of the program was guided by the High/Scope Curriculum that focused on many aspects of child development. Research-based strategies were implemented through the curriculum to enhance students' growth in the foundations of academics as well as in social emotional, physical, and creative areas. The program emphasized adult-child interaction, a carefully designed learning environment, and a plan-do-review process that strengthened

initiative and self-reliance in children (Schweinhart, 1993). Teachers and students were active partners in shaping the educational experience. Each classroom was comprised of 18 students as well as one teacher and one instructional assistant. All teachers were licensed by the Commonwealth of Virginia to teach prekindergarten. All instructional assistants met the No Child Left Behind definition of highly qualified, indicating they possessed an associate degree or had passed the state sanctioned “para pro” assessment. The program followed a full-day schedule and operated a 180- day school calendar with some programs offering summer enrichment.

Design

For the purpose of this study, a quantitative ex post facto correlational research design was employed to identify relationships between program quality and student achievement among prekindergarten classes in the XYZ school division. An ex post facto design was chosen because the circumstances of conducting the research did not allow for an experiment. The independent variable of classroom quality was studied after the fact to determine its relationship to the dependent variable of student achievement. Ex post facto studies are particularly useful in educational settings where it is not possible to conduct an experiment (McMillan, 2004). This allows the researcher to identify and study the independent variable and its effect on the dependent variable. In this case, the study determined the effect of a high or low-quality preschool experience on student achievement without having to conduct an experiment, which is not possible in this study.

Data Set

Information rich, pre-existing data were collected on all classrooms and students in the study site, therefore all were included in the study. The quality indicator data set included

CLASS observations on 54 study site classrooms for the 2014-2015 and 2015-2016 school years. The student achievement data set included individual PALS scores on all participating students for the 2014-2015 and 2015-2016 school years.

Quality Indicator

Classroom quality was measured by the CLASS, which is an observational instrument utilized in preschool through third grade classrooms. For the purpose of this study, the PreK version of the tool was utilized. CLASS observations consisted of four cycles broken into 20-minute periods of intense observation and note taking followed by 10 minutes of coding. Following each cycle, the observer assigned a score between 1 and 7 to each dimension. A score of 1 would reflect that an indicator would be minimally characteristic. A composite score is the average of the scores for each dimension across all domains. The CLASS framework is organized into three domains focusing on adult and child interactions in the classroom: emotional support, classroom organization, and instructional support. The three domains served as the input variables for this study.

1. Emotional support: Classrooms exemplifying high levels of emotional support provide demonstrations of respect and enjoyment between adults and students. Adults are responsive to student's emotional and cognitive needs while placing a high regard on student perspective (Pianta et al., 2008).
2. Classroom organization: The classroom organization domain recognizes that effective teachers monitor and redirect behavior. Classrooms organized for instructional efficiency follow strong routines thereby ensuring students remain engaged while learning is maximized.

3. Instructional support: The instructional support domain examines the instructional strategies and activities that are utilized to promote higher-order thinking skills. Adults in classrooms high in instructional support extend students' learning as they facilitate and encourage students' language.

The CLASS domains are further organized into nine dimensions based upon developmental theory and research indicating interactions between children and adults are the primary mechanism of student development and learning (Hamre & Pianta, 2007). The nine quality dimensions are represented in Figure 1.

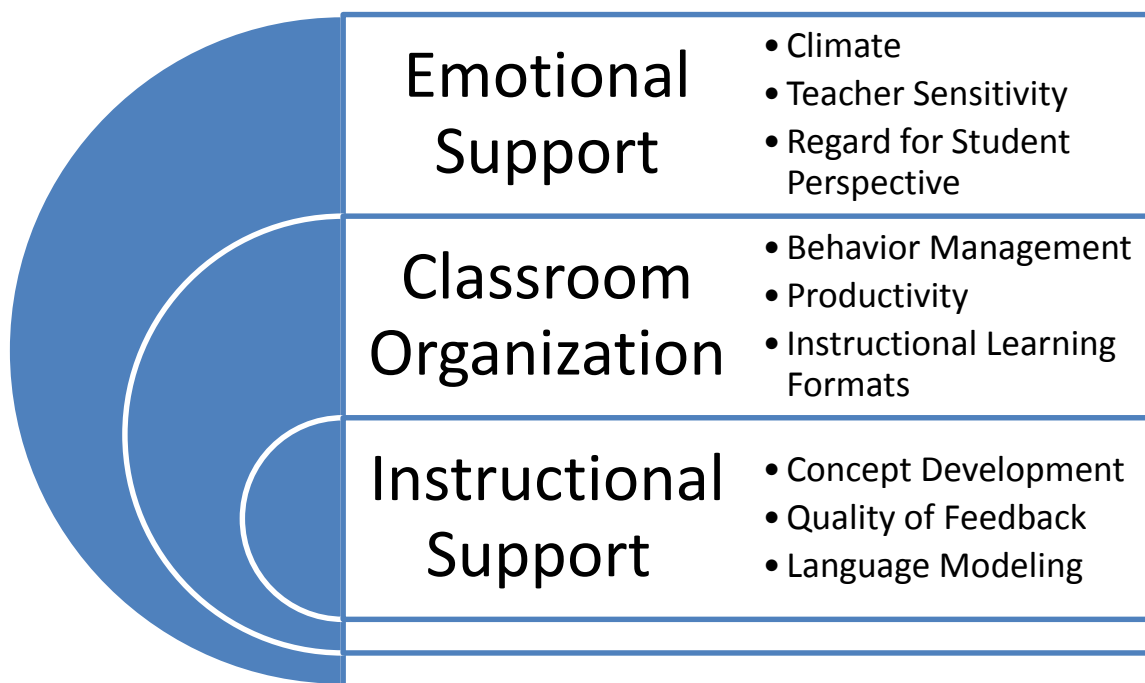


Figure 1. Nine dimensions—CLASS domains.

Adapted from “Learning Opportunities in Pre-school and Early Elementary Classrooms,” by B. Hamre & R. Pianta, 2007, in R. C. Pianta, M. J. Cox, & K. L. Snow (Eds.), *School Readiness and the Transition to Kindergarten in the Era of Accountability* (pp. 49-83), Baltimore, MD: Paul H. Brookes Publishing.

Scores derived from the CLASS, which assesses the social and instructional processes present, will allow me to determine whether quality is high or low in these sites. Each domain included in the CLASS is rated with a 1 to 7 scale where 1 or 2 indicates *low quality*; 3, 4, or 5 indicates *mid-range of quality*, and 6 or 7 indicates *high quality*. The results represent the quality of emotional and instructional support between adults and children in the classrooms (La Paro et al., 2004)

The CLASS was developed based on an extensive literature review on classrooms practices and has been used to observe more than 4,000 classrooms across the United States. It is one of the most extensively used observational measures for preschool through the elementary years with dimensions derived from a review of constructs assessed in classroom observation instruments used in childcare and elementary school research (Pianta et al., 2008). CLASS is a well validated tool with a standard training procedure and assessment to ensure observer reliability. Potential observers view multiple videotaped segments that have been consensus coded by at least three master CLASS coders. The potential observer's ratings are compared with the master coders to identify consistency or need for additional training. At the conclusion of training, potential observers take a reliability test, which has previously achieved an average inter-rater reliability of 87%.

Student Achievement

The PALS PreK end of year results and Bracken School Readiness Assessment end of year results provided student achievement results for prekindergarten students and served as the outcome variables for the study.

PALS PreK. PALS PreK is a scientifically based phonological awareness literacy screener that measures the developing literacy skills of prekindergarten students (Townsend &

Konold, 2010). Screening results are predictors of a student's future reading success, thus providing teachers' guidance as to students' specific instructional needs. PALS PreK measures student ability in the following areas: name writing, upper-case and lower-case alphabet recognition, letter sound and beginning sound production, print and word awareness, rhyme awareness, and nursery rhyme awareness. Scores in each area are indicative of a student's strengths and areas of weakness. The screener is designed to be administered individually to students in the fall of the prekindergarten year to guide instruction, and again in the spring to evaluate student progress. The data set utilized for this study were previously administered individually by the classroom teacher to students at the end of their program participation year. Scores were given for each of the six skills that were assessed. Successful scores fall into developmental ranges for each skill that has been predetermined by the University of Virginia, Curry School of Education (Townsend, 2010).

Bracken school readiness assessment preK. This is a research-based assessment focusing on skills identified as predictive of the academic readiness of preschool age students. The Bracken School Readiness Assessment PreK evaluates students' understanding of prekindergarten foundational skills in six areas: colors, letters, numbers/counting, sizes, comparisons, and shapes. The Bracken data utilized for this study were previously individually administered by the classroom teacher to students in the study site at the end of their program participation year. Students received scores on a six area subtest. The raw scores from the subtest were then added together for a composite score. For the purpose of this study, students scoring above 70 were considered to have the prerequisite skills expected at the end of the prekindergarten year.

Procedure

CLASS observations completed over the last 2 years were utilized for this study. It was ensured that the CLASS observations were free from random error associated with the observation process, as the observers participated in extensive training and coding exercises. They also took a reliability test in which they watched and coded classroom segments. According to Pianta et al. (2008) these reliability test have achieved an average inter-rater reliability (within 1 point of master codes) of 87%.

PALS PreK and the Bracken School Readiness Assessment PreK pre and posttests previously administered over the last 2 years were obtained by the division. Pre and posttest data assisted in identifying the level of achievement attained during the participation year.

Data Analysis

Hierarchical linear modeling (HLM) was utilized as the primary test for data analysis. HLM is a useful technique for dealing with nested data, or data that are grouped into a hierarchical structure (Ciarleglio & Makuch, 2007). For this study, multilevel modeling was utilized with a bifactor approach where the general unit of students were nested within classrooms, which were nested within schools, which were nested within the district. According to Draper (1995), the outcome for a student can be described as a compilation of the effects of the student, class, school, and district. Therefore, students, classes, schools, and districts all have certain characteristics that are common to their individual groups and should not be analyzed as independent of their groups. Utilizing HLM allowed me to understand how the group variables affect individual outcomes.

Limitations

The prekindergarten program in this large suburban school division was chosen because I was familiar with the school district and the prekindergarten program. I coordinate the program and have explicit knowledge of the program goals and standards. However, I was not directly responsible for classroom observations.

The settings observed in this project were selected because the levels of economic deprivation, ethnic and cultural composition, and location in the division provided a representation of what constitutes a typical program. I purposefully chose the locations to represent the diverse offerings of the programs.

I worked diligently to ensure no shortcuts in this study. Bearing in mind that opinions and bias can affect internal validity, I only utilized data collected by reliable observers.

Observer effects were possible in this study as I worked in the prekindergarten program in the selected school division. I had knowledge of the teachers in the division. However, I did not perform any of the observations personally and relied solely on information derived from previous observations by reliable observers.

Student achievement data collected for this study, was end of the year data and not pre and post data. This limited the study by only providing the students level of achievement at one point in time, thereby making it impossible to determine growth. Conversely, utilizing pre and post assessment data would limit the data set to only students who were enrolled for both assessments, creating a much smaller data set. Future studies should consider the advantages and disadvantages of utilizing pre and post data.

Data Security and Confidentiality

All data were coded with numbers during the data collection phase. Numbers were assigned at random and did not provide identifying information about the observation sites. During the study, all paper data was kept in a locked off-site location. At the conclusion of the study the paper data was shredded and destroyed.

Research studies involving children as subjects require review and approval. The Virginia Commonwealth Institutional Review Board (IRB) reviews all research proposals involving human subjects to ensure compliance with federal, state, and local regulations. All information pertaining to this proposal was reviewed for approval by the IRB before data was gathered and analyzed.

Summary

The braided prekindergarten classrooms in XYZ school division provided an information-rich environment for this quantitative ex post facto research study. Through previously performed observations and student achievement data, I gained a thorough understanding of the prekindergarten quality indicators present in the observation site and their impact on student achievement. The observed indicators provided information related to program quality as well as support for replication in other sites to the school division. Those indicators not present offered recommendations for professional development or other methods of improving program quality.

CHAPTER 4. ANALYSIS

The purpose of this chapter is to present the findings of my study that examined the relationship between prekindergarten classroom quality indicators observed in classrooms in the XYZ Prekindergarten Program and student achievement at the prekindergarten level during a two year period. The study focused on prekindergarten student achievement data to limit the effects of other educational experiences. The Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008) was utilized to identify observable indicators of quality that are based upon child development theory present in prekindergarten classrooms. Student achievement was measured by the end of year results on the Phonological Awareness Literacy Screening (PALS) and the Bracken School Readiness Assessment end of year results. The study further identified relationships between quality indicators and student achievement.

The sample for this study consisted of 79 prekindergarten classrooms in 27 elementary schools. Each classroom was staffed by a teacher and an instructional assistant. Teachers were licensed by the Commonwealth of Virginia in elementary education and instructional assistants were highly qualified as defined by the United States Department of Education. The student sample size consisted of 1501 prekindergarten students identified as “at risk” for not being successful in a typical kindergarten environment. Enrollment in the prekindergarten program was based on specific risk factors and other requirements such as current health exam data within the previous year.

Prekindergarten classrooms were located in division elementary schools with an economic deprivation rate of at least 35%. There were 660 participants during the 2014-2015

school year and 841 participants for the 2015-2016 school year. The sample was 49% (728) male and 51% (773) female. The racial groups included in the sample were American Indian or Alaska Native, Asian, Black or African American, Multi-racial/Biracial, Native Hawaiian/Other Pacific Islander and White. The prevalent racial group was Black or African American at 63% (948) followed by White at 26% (383).

The socioeconomic status of each student's family was also collected. Families could potentially have qualified for more than 1 socioeconomic category, but students' risk factors were prioritized and the student enrolled under the most significant category for which they qualified. As an example, a student may have been homeless and received Medicaid. Such a student would have been enrolled as homeless, because homeless was the most significant category. One thousand and forty three families were considered to be below the federal poverty level and 458 were over the federal poverty level. The 1,043 under income families were comprised of 4 categories that indicate the families are living in poverty. Seven hundred and thirty three families were below the Federal Poverty Level as well as an additional 217 families that were receiving Medicaid. Six families were denoted as homeless, 9 students were residing in foster homes and an additional 78 families were receiving public assistance. Lastly, although 80% (1,207) of the students were English language speakers, 29 additional languages were first languages for the remaining 20% of the sample.

Table 4

Demographic Characteristics of Participants (n =1,501)

Characteristic	<i>n</i>	%
Participation Year		
2014-2015	660	44.0
2015-2016	841	56.0
Gender		
Male	728	48.5
Female	773	51.5
Race		
Black or African American	948	63.2
White	383	25.5
Asian	87	5.8
Multi-racial/Biracial	57	3.8
American Indian or Native	26	1.7
Hawaiian		
Socioeconomic Status		
Below Poverty Level	1,043	69.5
Over Poverty Level	458	30.5
English Language Learner (ELL)		
ELL	1,207	80.4
Non ELL	294	19.6

Question 1 - To what extent are indicators of classroom quality present in the teaching of the study site classrooms as evidenced by (a) emotional support, (b) classroom organization, and (c) instructional support?

Classroom quality was measured by the PreK CLASS. The CLASS framework is organized into three domains focusing on adult and child interactions in the classroom: emotional support, classroom organization, and instructional support. A composite score is the average of the scores for each dimension across all domains.

In the study site, observers who are educational coordinators for the study site completed training and reliability testing before implementing the CLASS. They also completed regular checks on reliability after training was complete; scoring a minimum of 87% reliability in coding. Observers performed a minimum of four 20 minute observation cycles on each classroom which were followed by 10 minutes of recording and scoring. Dimensions were given a score for each observation cycle and then averaged upon completion of the four cycles for a total score.

Emotional Support

This domain included four dimensions: positive climate, negative climate, teacher sensitivity and regard for student perspectives. Positive climate is the emotional connection among students as well as between students and teachers. Conversely, negative climate is identified by any level of negativity demonstrated in the classroom. For the purpose of this study, negative climate was reverse scored. Responsiveness of teachers to students' needs comprise the measure of teacher sensitivity and the emphasis placed on students' interest, perspectives and goals, make up regard for student perspectives. These four dimensions combined present an overall picture of children's social and emotional functioning, identified as the emotional support domain.

Table 5, provides the means and standard deviations for the emotional support dimensions and domain. The lowest mean is regard for student perspective, which also has the largest standard deviation, indicating more variation across classrooms.

Table 5

Means and Standard Deviations of Quality Indicators for Emotional Support Domain (n=78)

Characteristic	<i>M</i>	<i>SD</i>
Negative Climate	6.91	.22
Positive Climate	6.56	.57
Teacher Sensitivity	5.86	.76
Regard for Student Perspective	5.41	1.01
TTAL Emotional Support	6.19	.49

Scale: 1 =low quality 7 = high quality

Differences in Emotional Support by Classroom

Classroom comparisons. Table 6 shows a statistically and practically significant difference for the Emotional Support Domain by classroom. The Emotional Support Domain means by classroom can be found in Appendix A. There were 78 classrooms. As a result of the large number of classrooms, I was unable to do post hoc analyses by classroom.

A one-way analysis of variance (ANOVA) was calculated comparing Emotional Support across classrooms. The differences were statistically significant, $F(78,1,499) = 138.309, p < .05$ ($p = .000$). The effect size, eta-square = .940, indicating that 90% of the variance across scores is

accounted for by classroom. As a result of the large number of classrooms, I was unable to do post hoc analyses by classroom.

Table 6

Summary of ANOVA for Emotional Support by Classroom

Source	Sum of Squares	df	Mean Square	F	η^2
Factor	320.080	78	4.104	138.309*	.940
Within Groups (Error)	1059549.22	1,499	706.84		
Total	1066475.07	1,500			

* $p < .05$; $p = .000$

Differences in Emotional Support by School

School comparisons. A one-way analysis of variance (ANOVA) was calculated to determine if there were differences on the Emotional Support Rating by School. The analysis was statistically significant, $F(26,1,474) = 34.34$, $p < .05$ ($p = .000$). The eta-square of .61 indicates that 60% of the variance in the emotional support rating can be accounted for by school.

Table 7
Summary of ANOVA for Emotional Support by School

Source	Sum of Squares	df	Mean Square	F	η^2
Factor	136.65	26	5.256	34.34	.614
Within Groups (Error)	225.63	1,474	.153		
Total	362.271	1,500			

* $p < .05$; $p = .000$

Appendix B compares the means among schools. For instance, school 1 mean on emotional support is statistically significantly different than the emotional domain means for schools 23, 24, 25, and 27. The means and standard deviations by school can be found in Appendix C

Classroom Organization

This domain includes three dimensions: behavior management, productivity and instructional learning formats. Behavior management is the effectiveness of teachers to monitor and redirect behavior. Maximizing instructional time, organization of activities and established routines were included in the productivity domain. Instructional learning formats captured the level at which teachers engaged students and maximized learning opportunities in the classroom. These three dimensions together demonstrated the associations between teachers who provided high quality learning formats, student engagement and active participation in the learning environment. The combination of these three classroom regulation dimensions comprised the classroom organization domain.

The means and standard deviations for the classroom organization dimensions and domain are in Table 8. Analyzing the three dimensions for the classroom organization domain, the lowest mean is instructional learning formats.

Table 8

*Means and Standard Deviations of Quality Indicators for Classroom Organization Domain**(n=78)*

Characteristic	<i>M</i>	SD
Behavior Management	6.18	.96
Productivity	6.08	.95
Instructional Learning Formats	5.21	1.08
TOTAL Classroom Organization	5.82	.84

Scale: 1 =low quality 7 = high quality

Differences in Classroom Organization by Classroom

Classroom comparisons. Table 9 shows the strength of differences among classrooms for the domain of classroom organization. I found a statistically and practically significant difference among classrooms for the Classroom Organization Domain. The Classroom Organization means of the 78 classrooms can be found in Appendix D. As a result of the large number of classrooms, I was unable to do post hoc analyses.

A one-way analysis of variance (ANOVA) was calculated on Classroom Organization of each classroom. The analysis was statistically significant, $F(78,1,422)=176.618, p<.05$ ($p=.000$). The effect size, eta-square = .900, indicates that 90% of the variance across scores is accounted for by classroom.

Table 9

Summary of ANOVA for Classroom Organization by Classroom

Source	Sum of Squares	df	Mean Square	F*	η^2
Factor	968.164	78	12.412	176.618	.900
Within Groups (Error)	99.935	1,422	.070		
Total	1068.099	1,500			

* $p < .05$; $p = .000$

Differences in Classroom Organization by School

School comparisons. A one-way analysis of variance (ANOVA) was calculated to determine if there were differences on the Classroom Organization Rating by school. The analysis was statistically significant, $F(25,1,475) = 25.73$, $p < .05$ ($p = .000$). The eta-square of .55 indicates that 55% of the variance in classroom organization rating can be accounted for by school.

Table 10

Summary of ANOVA for Classroom Organization by School

Source	Sum of Squares	df	Mean Square	F*	η^2
Factor	325.31	25	12.97	25.73	.551
Within Groups (Error)	743.79	1,475	.504		
Total	1068.10	1,500			

* $p < .05$; $p = .000$

In Appendix E, wherever there is an X in the cell, there is a statistically significant difference in the Classroom Organization domain means between the two schools. For instance, school 1 mean on Classroom Organization is statistically significantly different than the Classroom Organization domain means for schools 12 and 20. The means and standard deviations by school can be found in Appendix F.

Instructional Support

This domain included 3 dimensions: quality of feedback, language modeling, and concept development. Teachers extend students ideas and thinking by the quality of feedback they provide. Language modeling is when teachers facilitate and encourage the development of students' language. A focus on higher-order thinking skills is indicative of concept development.

Table 11, provides the means and standard deviations for the instructional support dimensions and domain. Analyzing the three dimensions for the instructional support domain, the highest mean is quality of feedback.

Table 11

Means and Standard Deviations of Quality Indicators for Instructional Support Domain (n=78)

Characteristic	<i>M</i>	<i>SD</i>
Quality of Feedback	4.00	1.19
Language Modeling	3.78	1.06
Concept Development	3.75	1.15
TOTAL Instructional Support	3.84	1.05

Scale: 1 =low quality 7 = high quality

Differences in Instructional Support by Classroom

Classroom comparisons. There were significantly and practically significant differences by classroom in the dimension of Instructional Support (Table 12). The Instructional Support domain means of the 78 classrooms can be found in Appendix G.

A one-way analysis of variance (ANOVA) was calculated on Instructional Support of each classroom. The analysis was statistically significant, $F(78, 1,422) = 123.393, p < .05$ ($p = .000$) The effect size, eta-square = .871, indicates 80% of the variance across scores is accounted for by classroom. As a result of the large number of classrooms, I was unable to do post hoc analyses by classroom.

Table 12

Summary of ANOVA for Instructional Support by Classroom

Source	Sum of Squares	df	Mean Square	F*	η^2
Factor	1452.911	78	18.627	123.393	.871
Within Groups (Error)	214.661	1,422	.151		
Total	1667.572	1,500			

* $p < .05$; $p = .000$

Differences in Emotional Support by School

School comparisons. There were 27 schools. I examined differences in instructional support by school (Table 13) A one-way analysis of variance (ANOVA) indicated statistically significant and practically significant differences in Instructional support across schools

$F(25,1,475) = 38.00, p < .05 (p = .000)$. The effect size, eta-square = .626, indicates 60% of the variance across scores is accounted for by classroom.

Table 13

Summary of ANOVA for Instructional Support by School

Source	Sum of Squares	df	Mean Square	F*	η^2
Factor	653.22	25	26.13	38.00	.626
Within Groups (Error)	1014.35	1475	.688		
Total	1667.572	1500			

* $p < .05$; $p = .000$

In Appendix H, wherever there is an X in the cell, there is a statistically significant difference in the Instructional Support domain means between the two schools. For instance, school 1 mean on Instructional Support is statistically significantly different than the Instructional Support domain means for schools 4, 10, 11, 20 and 25. The means and standard deviations by school can be found in Appendix I.

Class and Domain Totals

Table 14, provides the means and standard deviations for the CLASS Sum and Domain Sums. The lowest mean score (3.84) while in the middle range, was in the Instructional Support Domain. The Classroom Organization Domain mean was also in the middle range (5.82). This indicated that while the teacher was proactive and anticipated problems, there may not have efficient redirection provided or consistently demonstrated explicit follow through or learning opportunities within all transitions or activities. The domain of Emotional Support scored in the high range (6.19). This is indicative of environments where there were multiple instances of

positive affect between teachers and students. Students were able to seek support and guidance freely, and were included in sharing their ideas, abilities and leadership throughout all classroom activities. The overall CLASS sum mean (63.79) was in the high range. This overall mean score indicated classroom environments with shared affect among students and adults, frequent compliance and learning embedded across subject areas and routines. Students in these high quality environments were provided opportunities for leadership, frequent conversations, a depth of vocabulary and a variety of materials and focused attention on student's interests and points of view.

Table 14

Means and Standard Deviations of Quality Indicators CLASS Sum and Domain Sums (n=78)

Characteristic	<i>M</i>	SD
Emotional Support	6.19	.49
Classroom Organization	5.82	.84
Instructional Support	3.84	1.05
TOTAL CLASS Sum	63.79	8.81

Scale: 1 =low quality 7 = high quality

Summary Question 1. Question 1 analysis indicated an overall significant difference by classroom and school in the mean scores for all three CLASS Domains. The program sum scores for each domain averaged in the middle to high range. The program overall sum score was in the high range indicating while there is variance among classroom and school scores, it is not a significant deviation. Once the quality indicators present in the study site were identified, it was necessary to determine their relationship to student achievement.

Question 2 - What was the relationship between prekindergarten program quality indicators present in the study site and student achievement as measured by (a) PALS, and (b) the Bracken School Readiness Assessment?

To answer question 2, the quality scores derived from The Classroom Assessment Scoring System (CLASS) were correlated with student achievement. Student achievement was measured by end of year results on the Phonological Awareness Literacy Screening (PALS) and the Bracken School Readiness Assessment end of year results. The PALS and Bracken were administered to all students participating in the XYZ Prekindergarten program by classroom teachers. The tool was administered in a 1 to 1 environment. PALS end of year benchmark is 53. Bracken end of year benchmark score is 74 and above. To determine the relationship between quality indicators and student achievement, correlations were utilized.

Relationship between CLASS and Bracken Performance

A Pearson correlation was carried out on Bracken Colors and Bracken Letters. The test revealed that there was a moderately significant correlation between the variables, $r(1,498) = .401, p < .05$ (computed $p = .000$). Therefore, Bracken Colors is positively associated with Bracken Letters. Bracken Colors was also correlated with Bracken Numbers, $r(1,498) = .409, p < .05$ (computed $p = .000$). Therefore, Bracken Colors is positively associated with Bracken Numbers. Bracken Colors was also correlated with Bracken Sizes, $r(1,498) = .250, p < .05$ (computed $p = .000$). Therefore Bracken Colors is positively associated with Bracken Sizes. Bracken Colors was also correlated with Bracken Shapes, $r(1,498) = .287, p < .05$ (computed $p = .000$). Therefore, Bracken Colors is positively associated with Bracken Shapes. Bracken Letters was also correlated with Bracken Numbers, $r(1,498) = .684, p < .05$ (computed $p = .000$). Therefore, Bracken Letters is positively associated with Bracken Numbers. Bracken Letters was

also correlated with Bracken Sizes, $r(1,498) = .458, p < .05$ (computed $p = .000$). Therefore, Bracken Letters is positively associated with Bracken Sizes. Bracken Numbers was also correlated with Bracken Shapes, $r(1,498) = .491, p < .05$ (computed $p = .000$). Therefore, Bracken Numbers is positively associated with Bracken Shapes. Bracken Sizes was also correlated with Bracken Shapes, $r(1498) = .542, p < .05$ (computed $p = .000$). Therefore, Bracken Sizes is positively associated with Bracken Shapes.

Table 15 *Intercorrelations among the CLASS Sum and Bracken Subcategory (n=1,498)*

Measure	1	2	3	4	5	6
1. Class Sum	–	-.003	.021	-.021	.031	.002
2. Bracken Colors	-.003	–	.401*	.409*	.250*	.287*
3. Bracken Letters	.021	.401*	–	.684*	.328*	.383*
4. Bracken Numbers	-.021	.409*	.684*	–	.458*	.491*
5. Bracken Sizes	.031	.250*	.328*	.458*	-	.542*
6. Bracken Shapes	.002	.297*	.383*	.491*	.542*	–
M	63.79	9.80	12.89	14.05	14.62	15.09
SD	8.81	1.05	3.24	4.66	4.20	4.08

* $p < .05$

Table 16 shows the correlation between Bracken sum and CLASS Dimensions. The results show no significant relationship between Bracken Sum and CLASS Dimensions.

Table 16

Intercorrelations among the Bracken Sum and CLASS Domains (n=1,498)

Measure	1	2	3	4
1. Bracken Sum	-	.007	.017	-.002
2. Emotional Support	.007	-	.773**	.655
3. Classroom Organization	.017	.773**	-	.641
4. Instructional Support	.002	.655**	.641**	-
M	66.32	6.19	5.83	3.84
SD	13.50	.491	.844	1.054

* $p < .05$

Relationship between CLASS and PALS Performance

Table 17 demonstrates the correlation between CLASS Sum and PALS subcategories. There is only one relationship that is statistically significant. The relationship between CLASS Sum and name writing is $r=.084$, $p=.001$. However the $r^2=.007$ indicating that only 1% of the variance in name writing ability can be explained by quality indicators, a meaningless finding.

Table 17

Intercorrelations among the CLASS Sum and PALS subcategories (n=1,498)

Measure	1	2	3	4	5	6	7	8	9
1. Class Sum	–	-.084**	.009	-.002	.019	.039	.036	-.004	-.028
2. PALS Name Writing	.325**	.282**	.194**	.084**	-	.336**	.325**	.282**	.194**
3. PALS Uppercase	.009	.336**	–	.948**	.785**	.300**	.295**	.356**	.281**
4. PALS Lowercase	-.002	.325**	.948**	–	.819**	.299**	.295**	.370**	.302**
5. PALS Letter Sounds	.019	.282**	.785**	.819**	-	.358**	.353**	.399**	.392**
6. PALS Beginning Sound	.039	.194**	.300**	.299**	.358**	-	.353**	.399**	.392**
7. PALS Print Word Awareness	.036	.187**	.295**	.295**	.353**	.995**	-	.187**	.295**
8. PALS Rhyme Awareness	-.004	.194**	.356**	.370**	.399**	.300**	.301**	-	.398**
9. PALS Nursery Rhyme Awareness	-.028	.193**	.281**	.302**	.392**	.284**	.282**	.398**	-

Measure	1	2	3	4	5	6	7	8	9
M	63.79	6.49	20.81	18.94	14.77	8.74	8.72	7.80	8.55
SD	8.81	1.31	7.08	7.58	7.44	3.33	3.32	2.53	1.89

* $p < .05$

Table 18 shows the correlation between PALS sum and CLASS Domains. The results show no statistically significant relationship between PALS Sum and CLASS Dimensions.

Table 18

Correlations of PALS Sum and CLASS Domains (n=1,498)

Measure	1	2	3	4
1. PALs Sum	-	.020	.048	-.007
2. Emotional Support	.020	-	.773**	.655**
3. Classroom Organization	.048	.773**	-	.641**
4. Instructional Support	-.007	.655**	.641**	-
M	94.63	6.19	5.83	3.84
SD	26.66	.491	.844	1.054

* $p < .05$

Table 19 identifies the mean and standard deviation between correlations and Table 20 shows the correlations between bracken and class sum by poverty level. Table 20 identifies a positive relationship between Bracken Sum and CLASS Sum is indicated for the socioeconomic category of Public Assistance.

Table 19

Demographic Characteristics of Participants

Characteristic	<u>Bracken Sum</u>		<u>Class Sum</u>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
1. Over Income (O)	69.62	13.17	63.40	9.01
2. Public Assistance (P)	65.08	15.92	64.08	9.30
3. Medicaid (M)	63.81	13.71	63.48	8.97
4. Homeless (H)	65.33	21.38	65.69	9.35
5. Foster Care (F)	70.00	13.38	61.08	9.81
6. Eligible (E)	65.09	12.94	64.11	8.57

Table 20

Intercorrelations of Bracken Sum and CLASS Sum (n = 733)

Measure	E Class Sum	M Class Sum	O Class Sum	P Class Sum	F Class Sum	H Class Sum
E Bracken Sum	-.002					
M Bracken Sum		-.002				
O Bracken Sum			.005			
P Bracken Sum				.213		
F Bracken Sum					.251	
H Bracken Sum						-.479

* $p < .05$

Table 21 identifies the mean and standard deviation between correlations and Table 22 shows the correlations between PALs and class sum by poverty level. Table 22 identifies a positive relationship between PALS Sum and CLASS Sum is indicated for the socioeconomic category of Public Assistance.

Table 21

Demographic Characteristics of Participants

Characteristic	<u>PALs Sum</u>		<u>Class Sum</u>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
1. Over Income (O)	101.91	24.16	63.40	9.01
2. Public Assistance (P)	89.71	30.66	64.08	9.30
3. Medicaid (M)	90.21	28.97	63.48	8.97
4. Homeless (H)	101.83	23.58	65.69	9.35
5. Foster Care (F)	102.33	20.30	61.08	9.81
6. Eligible (E)	91.76	26.20	64.11	8.57

Table 22

Correlation of CLASS Sum and PALS Sum (n = 733)

Measure	E Class	M Class	O Class	P Class	F Class	H Class
	Sum	Sum	Sum	Sum	Sum	Sum
E PALS Sum	.006					
M PALS Sum		-.015				
O PALS Sum			.032			
P PALS Sum				.212		
F PALS Sum					.355	
H PALS Sum						-.474

* $p < .05$

Summary, Question 2. There were no overall meaningful relationships between classroom quality and student outcomes on PALS and Bracken. The socioeconomic group of public assistance demonstrated a positive relationship between classroom quality and student achievement on both PALS and Bracken sum scores.

CHAPTER 5. SUMMARY

In this chapter I assess the results of the analysis and review literature discussed previously that either supports or rebuts my findings. Additionally, I provide recommendations for policy and practitioners. Lastly, recommendations for further research are suggested.

The purpose of this study was to determine the relationship between prekindergarten classroom quality indicators and student achievement at the prekindergarten level. I reviewed several studies whose purpose was to identify high-quality preschool experiences and their effects as measured by achievement data of students in kindergarten and beyond.

For this study I analyzed pre-existing data on prekindergarten classroom quality measures and student achievement. Quality indicators were assessed using the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008). Classroom observations had previously been completed by reliable observers as part of the personnel evaluation system employed by the school division. Student achievement was measured by the end of year results on the Phonological Awareness Literacy Screening (PALS) (Invernizzi, Meier, Swank, & Juel, 2004) and the Bracken School Readiness Assessment end of year results (Bracken, 2007). These results had been collected by the school division over a two year period. My analysis focused on relationships between quality indicators and student achievement.

Analysis Implications

The classrooms in this study site were rated overall as high in quality and there were no classrooms rated as low in quality. My findings indicate that quality in classrooms established by high scores in the Emotional Support and Classroom Organizational domains, paired with scores in the middle to high range in the Instructional Support domain have no statistical correlation between high achievement related to PALS and Bracken scores, with the exception of one subgroup. For students that receive Public Assistance, there was a statistical significance in their end results for PALS and Bracken, indicating a positive relationship between classroom quality and student achievement.

For the 78 students in the Public Assistance subgroup demonstrating a statistically significant relationship between process quality and achievement; there is much to be discovered. Several factors may have contributed to this finding; including social and community factors, and individual resiliency. Students identified as receiving public assistance are members of households who may be accessing food stamps, temporary assistance for needy families (tanf), medical assistance programs supplemental nutrition assistance programs (snap), energy assistance and section 8 housing vouchers. These resources assist families in meeting the physiological and safety needs of the child. When basic needs are satisfied, children can engage in supportive relationships with peers and adults and access learning opportunities provided in the high quality environment. Children exposed to environments that promote connections to others in the early years are much more likely to establish positive social and emotional relationships in later years (Pianta, 1999). Children in these circumstances may find it easier to

create bonds with new adults (teachers), readily accept help and instruction, and feel a sense of safety and security sooner than peers in other subgroups. Additionally, preschoolers in this subgroup may have been able to observe significant adults engage in behaviors that promote health, financial stability, and acceptance of resources as various social services are accessed. I hypothesize that children, defined by this category may have internalized organizational behaviors such as managing belongings in a backpack, attending to important information from authority figures, and identifying resources in the school environment. These traits may enhance skill acquisition. Therefore, it may be fair to say that, for these children, the cushion of public assistance may provide the foundational and basic need supports that allow children opportunities to flourish academically. Programs and schools that focus on constructive relationships between students and teachers, may see the effects well beyond the early years, as positive connections and interactions promote self-regulation and increase resiliency skills.

Research Implications

In order to gain understanding on why there were no other statistically significant findings between student achievement and process quality in the study site, reflection must occur on what tenets and structures truly define high quality environments, from structures, procedures, scheduling, and also, the human element. In this regard, my findings agree with literature in the field that asserts using achievement outcomes as indicators of quality may lead to a misinterpretation of what individual facets of the program have contributed to the overall quality (Lee & Walsh, 2004). Such results should lead educators to create a systematic identification and classification of what quality is, how it is implemented, cost, training, etc... There is much that early childhood experts agree upon; continued research defining the elements of quality in a variety of informational platforms would serve to uphold the positive impact of intentional, active, and

engaging instruction for young children. Other studies on quality included those in which classrooms offered materials and activities that kept students engaged, therefore, resulting in better behaved students and higher levels of productivity (Hamre & Pianta, 2007). These results correlated with findings in the study site could assist in identifying specific characteristics of quality that could be easily replicated across early childhood environments.

Classrooms high in instructional support promote children's higher-order thinking skills by encouraging independent thinking and development of language. In the study site, the overall instructional support score was in the middle range. Concept development, quality of feedback and language modeling scores were all in the middle range. Evidence from a previous study indicated students in low instructional quality classrooms functioned lower than their peers in high instructional quality classrooms (Hamre & Pianta, 2007). Overall, the study site program had a sum quality indicator score in the high range. This finding was contradictory to research that indicates children living in poverty are much less likely to attend high-quality preschool programs (Bainbridge et al., 2003).

In an effort to identify quality present in preschool sites, Lee & Walsh (2004) found the implications of utilizing program outcomes as indicators of quality were not effective. The researchers asserted that outcomes as indicators of quality may lead to a misinterpretation of what individual facets of the program have contributed to the overall quality (Lee & Walsh, 2004). The study findings further supported assessing process dimensions as in this research project to ensure evaluation results were meaningful for preschool programs. [CS1]SLF(2) This assertion was further supported by the current study. While student achievement in the study site was high overall, it was unclear what aspects of the program could have attributed to the high

levels of student achievement without further investigating the level of process indicators present.

While process quality has been identified in several studies as an indicator of improved child outcomes in prekindergarten environments, the findings for this project indicated no significant relationship between process quality and student achievement. Additional studies state that participation in preschool programs do have a marked impact on children's social emotional development as well as reading and mathematics achievement (Clifford, et al., 2005) and does enhance academic outcomes at school entry (Magnuson et al., 2007). Such contrasting results point to a genuine need for additional research projects that are laser focused on identifying specific process quality elements. Results from a variety of these future studies would identify patterns and trends that might assist educational evaluators in coming to a consensus of what in fact, does define process quality in prekindergarten programs.

Historically, the majority of early childhood evaluations have focused on how to measure program outcomes and their effect on children. These studies focused on program outcomes as an indicator of success. However, research does not identify outcomes as a quality indicator for early childhood programs (Lee & Walsh, 2004). These implications provide support for the research project as it focused on process domains as indicators of quality. The findings also indicated that strong relationships between student achievement and process quality were not present.

While many of the research studies investigated assessed the long term effects of prekindergarten on student progress, this project focused on student achievement during the prekindergarten participation year. For example, The Perry Preschool Project noted significantly

higher achievement scores at the participant's ages of 14 and 19 (Schweinhart (1993). It is possible that there were other variables contributing to their achievement. This study focused solely on students' academic success during the prekindergarten year.

The Perry Preschool Project focused entirely on student success during the preschool year, and followed children through the ages of 14 and 19, noting significantly higher achievement scores, as compared to peers who did not participate (Schweinhart, 1993). These findings dismiss that there are many other possible contributing factors related to high achievement and that simply attending prekindergarten is the primary reason for high achievement during the teen years. I assert that one must sift through both obvious and subtle facets of preschool programs, across geographic, economic, familial, cultural, and technological boundaries, in order to delineate commonalities that lead to school and life success for children. Synthesizing such findings with developmentally appropriate practices in prekindergarten environments could lead to the discovery of practical formulas that early childhood programs could embrace and implement.

In a multi-state study conducted by The National Center for Early Development & Learning (NCEDL), scores on the CLASS were lower than previously found in other large-scale studies. According to Clifford, et al., (2005) these low scores in the area of instructional climate indicated that teachers did not consistently engage in instruction or encourage higher level thinking amongst their students. The research further suggested that these programs needed increased attention to process quality in order to increase the school readiness skills of at-risk students (Clifford, et al, 2005). Conversely, the quality dimension scores in the study site indicate a high level of process quality^[CS3]^[SLF(4)]. The medium to high quality scores across dimensions and domains and high sum scores make it difficult to discern differences in

engagement and higher level thinking amongst students. This complexity might be attributed to the lack of variance between the quality scores by school and classroom.

To gain a clear understanding of the implications of the study site scores and how they compared nationally to similar populations, study site scores were compared to the CLASS domain mean scores from the 2015 Head Start Review grantee scores. The comparison showed study site mean scores were higher in every domain than the Head Start grantee mean scores. Because the population of the two groups were so similar, it was prudent to question why the study site scores were higher. One identifiable difference between the two groups was teacher credentialing and instructional assistant qualifications. In the study site all teachers were licensed professionals and instructional assistants were highly qualified, while the majority of Head Start teachers were not credentialed and the majority of instructional assistants were not highly qualified. This assertion is supported by the NCEDL study which indicated that credentialed teachers provided more robust environments that encouraged positive interactions and were more responsive to children's needs than those who were not credentialed (Pianta et al., 2015).

Policy Recommendations

Educational researchers must develop and agree upon a comprehensive criterion of elements that indicate quality in early childhood programs (LoCasale-Crouch et al.; 2007). Such research should target both structural and process quality. In order for prekindergarten programs to provide effective experiences and outcomes for children, the constructs of quality must be clearly defined. This will enable organizations to best utilize resources of time, effort, and funding when evaluating programs in an effort to gain useful information.

A challenge in evaluating early childhood programs in a way that provides meaningful information requires that educators agree upon the specific tenets that are indicative of quality. Meaningful measures would lead to better early childhood education policy decisions, promoting the global purpose of eliminating the cycle of poverty. According to Pianta (2005), additional indicators of process quality should be investigated in order to learn about the impact of school readiness programs.

While the study site found one positive relationship between process quality and student achievement, additional research might find more significant relationships than were indicated in the study site. Information that points to the specifics regarding what makes for a high quality prekindergarten program is needed in order to ensure programs can work in a targeted manner toward effective interventions for young children.

Standardizing certain elements of structural quality may lead to less misinterpretation about effects of prekindergarten on overall child achievement. Structures and guidelines that are implemented for all prekindergarten programs would lessen many of the variables that are in question regarding quality, such as hours of attendance and staff certifications and ongoing training opportunities (USDHHS, 2003).

It is recommended that policy makers take an in-depth look at risk factors and environments that prevent students from having access to high quality environments. As an example, mothers who did not complete high school may earn below average wages; therefore, policy makers need to develop practices and funding to assist this group in attaining quality early childhood experiences for their children.

Researchers argue that a major pitfall in replicating studies such as Perry Preschool Project and the Abecedarian Project in today's society is the transient nature of the families

served in early childhood programs (Bainbridge et al., 2003). Families may move due to loss of housing, loss of job, or death of a family member, thus making it arduous to provide long term study effects of the children that were served in early childhood programs. In order to maintain consistency for these families and students it is suggested that a universal tracking system be implemented that follows the health and educational services that at risk children and families receive. This would provide a universal tracking system that would allow for consistency of services as well as provide valuable long term data to assess the impact of the early childhood experiences.

Implications for further study

For further study, it is also recommended that additional studies might utilize a control group with similar characteristics of the program participants. If possible, the control groups should not have any preschool experience as oppose to students participating in a high quality program. This would allow researchers to observe the true effects that the prekindergarten experience has on the participants.

Researchers might also consider using a growth model for future research focusing prekindergarten quality and student achievement. By collecting student achievement data at the beginning of program participation, and then again at the end of program participation, analysis can identify the amount of growth students make over the year. It is hoped this would provide a more in depth picture of the relationship between program quality and student achievement.

It is vitally important to develop prekindergarten programs that can be easily replicated. Replicating successful programs would save time, money, and effort. Practitioners can increase and standardize structural quality factors such as length of day, credentialing requirements of staff, and the maintenance of an organized system of in-service training and

systematic curriculum oversight, while ensuring the presence of process quality, This focus will create prekindergarten programs that offer the most at risk students the highest quality possible.

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Appendices

Appendix A

Summary of ANOVA for Emotional Support by Classroom

Source	Sum of Squares	df	Mean Square	F	η^2
Factor	320.080	78	4.104	138.309*	.940
Within Groups (Error)	1059549.22	1499	706.84		
Total	1066475.07	1500			

* $p < .05$; $p = .000$

Appendix B

Emotional Support by School

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1																		X					X	X	X		X
2																							X				
3									X											X			X	X	X		X
4															X			X			X			X	X		X
5									X														X				
6																		X					X	X	X		X
7									X											X			X		X		X
8																											
9			X		X		X			X	X	X	X	X	X	X		X			X	X		X	X	X	X
10									X												X			X			
11									X												X			X			
12									X												X			X	X	X	X
13									X												X			X	X	X	X
14									X										X					X	X	X	X
15				X					X											X	X			X			
16									X															X	X	X	X
17																								X	X	X	X
18				X		X			X					X						X	X			X			
19															X				X			X			X	X	X
20			X				X			X	X	X	X		X				X			X	X		X	X	X
21									X											X	X			X		X	
22									X												X			X			
23	X	X	X		X	X	X			X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X
24	X	X		X		X			X			X	X	X		X	X			X	X			X			
25	X		X	X		X	X		X			X	X	X		X	X			X	X	X		X			
26									X												X			X			X
27	X		X	X		X	X		X			X	X	X		X	X			X	X		X				

Appendix C

Means and Standard Deviations of Emotional Support for Schools (n=27)

Site Code	<i>N</i>	<i>M</i>	<i>SD</i>
1	49	5.99	.421
2	17	6.19	.000
3	71	6.19	.569
4	34	5.83	.187
5	27	6.18	.193
6	33	5.99	.254
7	88	6.24	.347
9	36	5.50	.254
10	48	6.32	.137
11	18	6.50	.000
12	70	6.10	.534
13	87	6.20	.233
14	71	6.06	.371
15	67	6.42	.331
16	50	6.09	.154
17	35	6.02	.634

Site Code	<i>N</i>	<i>M</i>	SD
18	29	6.62	.127
19	60	5.90	.922
20	48	5.64	.424
21	171	6.29	.338
22	35	6.18	.314
23	64	5.48	.321
24	88	6.59	.273
25	68	6.65	.297
26	68	6.28	.472
27	69	6.62	.280

Appendix D

Means and Standard Deviations of Classroom Organization for Classrooms (n=78)

Site Code	<i>N</i>	<i>M</i>	<i>SD</i>
1	17	6.33	.000
2	15	4.83	.000
3	17	6.00	.000
4	17	6.08	.000
5	36	5.84	1.18
6	17	5.00	.000
7	18	6.17	.000
8	18	5.83	.000
9	16	5.17	.000
10	13	6.50	.000
11	14	6.17	.000
12	17	5.00	.000
13	16	6.00	.000
14	16	4.50	.000
15	18	6.50	.000
16	18	5.00	.000
17	18	6.67	.000

Site Code	<i>N</i>	<i>M</i>	<i>SD</i>
18	18	6.67	.000
19	36	5.17	.340
20	16	4.33	.000
21	32	6.40	.254
22	18	6.50	.000
23	17	5.33	.000
24	18	7.00	.000
25	18	4.33	.000
26	17	3.00	.000
27	17	6.67	.000
28	18	6.17	.000
29	35	5.53	.294
30	17	6.00	.000
31	18	5.00	.000
32	36	6.42	.593
33	17	6.50	.000
34	33	6.30	.294
35	17	4.67	.000
36	17	6.33	.000

Site Code	<i>N</i>	<i>M</i>	SD
37	16	5.83	.000
38	17	6.67	.000
39	17	6.17	.000
40	18	6.83	.000
41	17	5.17	.000
42	14	6.83	.000
43	15	6.67	.000
44	17	4.67	.000
45	14	6.00	.000
46	14	6.67	.000
47	15	5.50	.000
48	15	5.00	.000
49	18	3.33	.000
50	15	5.17	.000
51	16	4.50	.000
52	29	6.09	.086
53	16	6.33	.000
54	15	6.67	.000
55	14	5.67	.000

Site Code	<i>N</i>	<i>M</i>	SD
56	16	6.50	.000
57	15	5.50	.000
58	15	6.50	.000
59	4	6.33	.000
60	17	5.00	.000
61	18	5.83	.000
62	16	5.17	.000
63	15	4.83	.000
64	16	6.50	.000
65	17	4.50	.000
66	30	6.46	.186
67	16	5.17	.000
68	13	6.50	.000
69	15	6.33	.000
70	14	6.67	.000
71	33	6.91	.086
72	35	6.10	.421
73	35	5.35	.674
74	16	6.00	.000

Site Code	<i>N</i>	<i>M</i>	SD
75	17	5.83	.000
76	35	6.09	.086
77	34	6.34	.340
78	15	5.50	.000
79	16	6.67	.000

Appendix E

Classroom Organization Domain by School

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1												X								X							
2																					X						
3												X						X		X					X		
4																		X		X					X		
5									X			X								X			X				
6																		X		X					X		
7												X								X							
8																											
9					X						X			X		X		X			X			X	X		X
10																		X		X							
11									X			X								X			X				
12	X		X		X		X				X	X	X	X	X	X	X	X	X		X			X	X		X
13												X									X			X			
14									X			X									X			X			
15												X									X						
16									X			X									X			X			
17												X									X						
18			X	X		X			X	X		X							X	X		X	X			X	
19																			X		X					X	
20		X	X	X	X	X	X			XX		X	X	X	X	X	X	X	X	X		X	X		X	X	X
21									X			X									X			X			
22																			X		X					X	
23					X						X		X	X		X					X			X	X		X
24									X			X									X			X			
25			X	X		X			X			X							X	X		X	X			X	
26																			X		X					X	
27									X			X									X			X			

Appendix F

Means and Standard Deviations of Classroom Organization for Schools (n=27)

Site Code	<i>N</i>	<i>M</i>	<i>SD</i>
1	49	5.76	.637
2	17	6.08	.000
3	71	5.72	.940
4	34	5.52	.334
5	27	6.33	.168
6	33	5.48	.508
7	88	5.90	.921
9	36	5.17	.340
10	48	5.71	1.01
11	18	6.50	.000
12	70	4.94	1.47
13	87	6.00	.467
14	71	6.08	.760
15	67	5.89	.748
16	50	6.23	.347
17	35	6.02	.842

Site Code	<i>N</i>	<i>M</i>	SD
18	29	6.75	.081
19	60	5.65	.747
20	48	4.43	.861
21	171	6.01	.639
22	35	5.43	.421
23	64	5.24	.770
24	88	6.24	.529
25	68	6.49	.510
26	68	5.63	.560
27	69	6.21	.275

Appendix G

Means and Standard Deviations of Instructional Support for Classrooms (n=78)

Site Code	<i>N</i>	<i>M</i>	SD
1	17	3.67	.000
2	15	2.33	.000
3	17	5.33	.000
4	17	4.42	.000
5	36	4.25	1.60
6	17	2.83	.000
7	18	3.17	.000
8	18	2.83	.000
9	16	2.50	.000
10	13	4.00	.000
11	14	4.33	.000
12	17	3.33	.000
13	16	2.83	.000

Site Code	<i>N</i>	<i>M</i>	SD
14	16	3.67	.000
15	18	5.33	.000
16	18	3.33	.000
17	18	5.33	.000
18	18	4.00	.000
19	36	4.00	.507
20	16	3.00	.000
21	32	2.62	.674
22	18	5.50	.000
23	17	2.67	.000
24	18	4.17	.000
25	18	3.00	.000
26	17	2.00	.000
27	17	4.67	.000
28	18	4.00	.000
29	35	3.67	.000

Site Code	<i>N</i>	<i>M</i>	SD
30	17	4.00	.000
31	18	2.67	.000
32	36	3.92	.928
33	17	4.83	.000
34	33	4.17	.167
35	17	3.67	.000
36	17	5.17	.000
37	16	2.67	.000
38	17	3.83	.000
39	17	4.17	.000
40	18	3.83	.000
41	17	3.00	.000
42	14	5.17	.000
43	15	3.00	.000
44	17	2.17	.000
45	14	3.33	.000

Site Code	<i>N</i>	<i>M</i>	SD
46	14	5.50	.000
47	15	4.00	.000
48	15	3.50	.000
49	18	1.67	.000
50	15	2.67	.000
51	16	4.17	.000
52	29	3.71	.040
53	16	4.50	.000
54	15	4.33	.000
55	14	4.33	.000
56	16	4.17	.000
57	15	3.17	.000
58	15	5.17	.000
59	4	5.00	.000
60	17	5.00	.000
61	18	2.50	.000

Site Code	<i>N</i>	<i>M</i>	SD
62	16	4.00	.000
63	15	2.17	.000
64	16	3.37	.000
65	17	2.67	.000
66	30	5.34	.151
67	16	2.67	.000
68	13	5.00	.000
69	15	4.00	.000
70	14	5.08	.000
71	33	6.12	.420
72	35	4.64	1.01
73	35	2.77	.761
74	16	3.17	.000
75	17	4.50	.000
76	35	3.51	.507
77	34	5.17	.167

Site Code	<i>N</i>	<i>M</i>	SD
78	15	3.50	.000
79	16	4.00	.000

Appendix H

Means and Standard Deviations of Classroom Organization for School (n=27)

Site Code	<i>N</i>	<i>M</i>	<i>SD</i>
1	49	3.84	1.23
2	17	4.42	.000
3	71	3.64	1.30
4	34	2.67	.167
5	27	4.17	.168
6	33	3.09	.254
7	88	4.35	.850
9	36	4.00	.507
10	48	2.75	.576
11	18	5.50	.000
12	70	2.98	.794
13	87	4.00	.365
14	71	3.82	1.01
15	67	4.30	.565
16	50	3.57	.643
17	35	3.43	.421

Site Code	<i>N</i>	<i>M</i>	SD
18	29	4.05	1.10
19	60	3.68	1.22
20	48	2.55	.768
21	171	4.09	.530
22	35	3.71	1.27
23	64	3.06	.692
24	88	4.53	1.00
25	68	5.36	1.08
26	68	3.30	.900
27	69	4.33	.913

Appendix I

Instructional Support by School

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
1				X						X	X									X					X			
2				X						X		X								X								
3											X									X				X	X			
4	X	X			X		X		X		X	X	X	X	X			X		X				X	X		X	
5				X						X		X								X						X		
6							X				X				X					X				X	X		X	
7				X		X				X		X								X			X		X	X		
8																												
9				X						X	X									X						X		
10	X	X			X		X		X		X		X	X	X	X		X		X				X	X		X	
11	X		X	X		X			X	X		X	X	X		X	X		X	X	X	X	X				X	
12		X			X		X				X		X		X					X			X		X	X		X
13				X						X	X	X								X				X		X		
14				X						X	X									X						X		
15				X		X				X		X								X			X		X	X		
16											X														X	X		
17											X														X	X		
18				X																X					X			
19											X									X				X	X			
20	X	X	X		X		X		X		X		X	X	X			X	X		X	X		X	X		X	
21				X		X				X	X	X								X			X	X	X		X	
22											X									X						X		
23							X				X		X		X					X				X	X		X	
24			X	X		X				X		X				X	X		X	X			X		X	X		
25	X		X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
26							X				X				X						X				X	X		X
27				X		X				X		X									X		X		X	X		

Vita

Susan Lynette Flemmons was born November 15, 1963 in Suffolk, Virginia. She received her Associate of Arts degree from Ferrum College, Ferrum, Virginia in 1984. She also received a Bachelor of Science degree from James Madison University, Harrisonburg, Virginia in 1986. In addition, she received her Master of Science degree in Public School Administration from Old Dominion University, Norfolk, Virginia in 1995. Mrs. Flemmons taught elementary school for Norfolk Public Schools, Norfolk, Virginia for 16 years. She is currently the Preschool Specialist for Henrico County Public Schools in Henrico Virginia.