

THE IMPACT OF THE VIRGINIA K-3 PRIMARY CLASS SIZE REDUCTION  
PROGRAM ON STUDENT ACHIEVEMENT IN READING

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Dissertation submitted to the Faculty of the  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy  
in  
Educational Leadership and Policy Studies

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April 18, 2007  
Virginia Beach, Virginia

Keywords: Class Size, Student Achievement, Reading Instruction

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Yvonne A. Holloman

## ABSTRACT

This study investigated the impact of Virginia's K-3 Primary Class Size Reduction Program on student achievement in reading. The theoretical framework hypothesized that a reduction in class size and sustained professional development would impact instructional strategies implemented by teachers which would result in increased reading achievement by students. Information regarding the history of class size research was presented to provide readers with a chronological overview of the topic. In addition, statewide class size reduction initiatives from Indiana, Tennessee, Wisconsin, and California were reviewed. Data were collected using administrator and teacher surveys as well as an analysis of the Virginia Standards of Learning Assessments for Grade 3 English and the Phonological Awareness Literacy Screening (PALS) results for schools participating in the research study. The findings revealed that the Virginia K-3 Primary Class Size Reduction Program benefited grade 3 students according to gender, ethnicity, and socioeconomic status.

## ACKNOWLEDGEMENTS

I wish to express my sincere gratitude and appreciation to the members of my dissertation committee, Dr. Jimmie Fortune, Dr. J. Larry Hoover, Dr. Rose Martin, and Dr. Patricia Johnson for their support during the past year. A special thank you to Dr. Travis Twiford, my committee chairperson, who always reminded me that “feedback is your friend.”

I would also like to acknowledge the support of the school division superintendents, principals, and teachers who participated in the research study by providing pertinent information. Their insight will certainly benefit everyone who reviews the findings of the research study.

Finally, I would like to thank the two special “guys” in my life who were the “footprints in the sand” for me. First, I would like to recognize my wonderful and supportive husband, Ronald, for all of his encouragement during the past year especially when I felt like giving up. Words cannot express my gratitude for his understanding when I needed to spend countless hours every Saturday and Sunday conducting research and writing my dissertation. God certainly “broke the mold” when he was born. Second, my beautiful “boy” Satchel deserves credit also for spending every weekend nestled under my feet and desk as I wrote my masterpiece.

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## CHAPTER I: INTRODUCTION

### Statement of the Problem

The pursuit to attain characteristics of an effective school has served as the motivation for school improvement throughout the United States. Factors indicative of an effective school include a clear school mission, high expectations, and monitoring student progress (Johnson, Livingston, Schwartz, & Slate, 2000). With an increased emphasis on student achievement and collaborative decision making, teachers and administrators have striven to provide students with a quality educational experience. Although divergent opinions exist regarding the method for achieving this goal, students remain the focus. Thus, creating optimal conditions within the classroom, has become paramount.

In the capacity of an elementary school principal, I have observed the positive impact of the effective school components. However, increasingly larger class sizes posed a significant threat to school effectiveness. During the past three years, the average class size at my school increased from 17 students to 24 students. As a result, resources were strained and teacher morale plummeted. This concern was noted by researchers such as Glass and Smith (1980) who found a correlation between small class size and teacher morale.

The initial years of my tenure were marked by the addition of classes at kindergarten, first, second, and third grade following the first month of school. The annual “ten day count” ritual sparked delight as well as dread among teachers, students, and parents because children were uprooted from their original classes to form a new

class due to large enrollment. Each fifth grade class at my school peaked at 27 students during the past school year. Concurrently, discipline referrals increased tremendously. The crowded conditions also affected teachers because their ability to execute engaging lessons was diminished. Teachers often perceived that smaller class sizes would provide them with more opportunities to present creative lessons (Shapson, Wright, Eason, & Fitzgerald, 1980).

Observations of fifth grade classes revealed fewer cooperative group activities and projects. Unfortunately, while creating class rosters for the present academic year, I learned that each fifth grade class would have in excess of 30 students. These experiences stimulated my interest in the impact of class size on student achievement. I pondered whether the number of students assigned to a teacher changed instructional practices implemented in the classroom.

Divergent opinions exist regarding what constitutes a large or small class and the effects of class size reduction on student achievement. The controversy has been compared to the “search for the Holy Grail in both duration and lack of results” (Slavin, 1989, p. 99).

The purpose of this research study is to investigate the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. This program provides funds from the Commonwealth of Virginia to local school divisions to reduce class sizes in grades kindergarten through third in schools serving large percentages of economically disadvantaged students (Virginia Department of Education, 2006).

### Background of the Problem

For several decades, officials at the federal and state level have been actively involved in improving student achievement by instituting various programs. In 1965, President Lyndon Johnson sought to address academic concerns regarding students from disadvantaged backgrounds by signing the Elementary and Secondary Education Act of 1965 into law (Guskey, 2005). This act led to the creation of compensatory programs such as Chapter I that provided additional funding for disadvantaged students to receive remediation in reading and math. Although millions of dollars have been allocated for a variety of programs, an achievement gap continues to exist between low socioeconomic status (SES) students and their more advantaged counterparts. For example, the results of the 1998 National Assessment of Educational Progress (NAEP) assessment in reading for fourth grade students revealed an average scale score of 227.0 for students not eligible for free/reduced lunch compared to an average scale score of 195.6 for eligible students (National Center for Education Statistics, 2007).

In 1983, former U.S. Secretary of Education, William Bennett published the *A Nation at Risk Report* criticizing the educational institutions in America for having “lost sight of the basic purposes of schooling, and of the high expectations and disciplined effort needed to attain them” (Bennett, 1983, p. 1). Although the government continued to fund compensatory programs, student achievement continued to wane. This resulted in an accountability movement in U.S. schools to address the issue of declining student performance.

The Commonwealth of Virginia became one of the first states to embark upon an accountability system, known as the Virginia Standards of Learning (SOL), for all

schools of grades kindergarten through twelve (Division of Legislative Services, 1997). The SOL's represent the minimum grade-level or content area objectives that students are expected to master in all Virginia public schools.

The Virginia Board of Education revised the SOL's in 1995 to include an assessment component for measuring student mastery of grade-level objectives (Commission on Educational Accountability, 1999). Beginning in the spring of 1998, students were administered SOL tests in grades three, five, eight, and high school at the end of core courses (Commission on Educational Accountability, 1999). The results of the statewide assessments were used to assign accreditation ratings to schools in Virginia. Consequently, there was resurgence in the concern for the performance of economically disadvantaged students who failed to score at the proficient level during the initial years of SOL testing.

The Virginia General Assembly recognized the need for improving the achievement of economically disadvantaged students and appropriated funds for a statewide initiative, the K-3 Primary Class Size Reduction Program, as a component of the 1994-1996 biennium budget (Virginia Department of Education, 2006). Initially, the program was designed to provide an incentive to school divisions throughout Virginia to reduce class sizes in the primary grades of kindergarten through third grade below the required ratios of 25 to 1 included in the Standards of Quality (Virginia Department of Education, 2006). In fiscal year 1995, the General Assembly appropriated the initial funds of \$38.7 million for disbursement to school divisions across the commonwealth (Virginia Department of Education, 2006). However, significant revisions were made to the program during the 1998 General Assembly:



First, the program was expanded to make it available to all schools with grades kindergarten through three.

Second, the range of student-to-teacher ratios was expanded from three levels to eight levels to soften the transition from one tier to the next and to include a tier for all schools regardless of the free lunch rate.

Third, program expansion also further reduced the student-to-teacher ratios and maximum class size caps that were available to schools. (Virginia Department of Education, 2006, p. 5)

Moreover, changes were made to the Standards of Quality (SOQ) requirement of student to teacher ratios to not exceed 24 to 1 in grades kindergarten through third and changes to the eligibility requirements of the K-3 Primary Class Size Reduction Program to disqualify schools that have free lunch eligibility rates below 16 percent (Virginia Department of Education, 2006). Approximately \$67.2 million has been allocated for the program annually to fund the state's share of the cost to reduce class sizes below what is required by the SOQ (Virginia Department of Education). Localities were required to provide a match in funding based on their local composite index.

Student to teacher ratios and maximum class size requirements are based on the free lunch eligibility rate for each school provided that the rate is not below 16 percent (Virginia Department of Education, 2006). State legislators wanted to insure that the most economically disadvantaged students benefited from the program. Table 1 depicts the K-3 student to teacher ratios used to determine participation in the K-3 Primary Class Size Reduction Program in fiscal year 2006.

Table 1

*K-3 Student-to-Teacher Ratio for Fiscal Year 2006*

Percentage of Students Eligible for Free Lunch	Grades K-3 School Ratio	Maximum Individual Class Size
16% but less than 30%	20 to 1	25
30% but less than 45%	19 to 1	24
45% but less than 55%	18 to 1	23
55% but less than 65%	17 to 1	22
65% but less than 70%	16 to 1	21
70% but less than 75%	15 to 1	20
75% or more	14 to 1	19

Note: Adapted from “Status of the K-3 Primary Class Size Reduction Program,” Virginia Department of Education, 2006, Appendix A.

Congress joined the effort to reduce class sizes by initiating the Class Size Reduction Program authorized in PL 105-277 in 1998 (Cohen, Miller, Stonehill, & Geddes, 2000). They instituted a seven-year program with an initial appropriation of \$1.2 billion for school districts across the nation to hire additional teachers to reduce class sizes. The intent was to improve student achievement, especially in reading, by reducing pupil to teacher ratios in the primary grades to 18 to 1. The program was a result of former President Clinton’s request for the federal government to become involved in the debate surrounding improving student achievement by reducing class

sizes. He believed “reducing class size is one of the most important investments we can make in our children’s future” (Cohen et al., p. 1).

The Department of Education Appropriations Act of 1999 appropriated \$1.2 billion to states for the purpose of reducing class sizes in grades one through three (Millsap et al., 2004). Officials at the state-level were expected to distribute funds to school divisions based on a formula using SES and enrollment data (2004). Latitude was provided to school district officials regarding use of the funds; however, the funds were intended to be used for teacher salaries, professional development, or recruitment (2004). Kindergarten class size reduction was added to the appropriation in fiscal year 2000 (2004).

The efforts of federal, state, and local officials to reduce class sizes were relatively unnoticed by the public until the reauthorization of the 2001 Elementary and Secondary Education Act of 1965 (ESEA) entitled the No Child Left Behind Act of 2001 (U.S. Department of Education, 2002). The federal legislation required educators to ensure academic achievement of all students especially minority, special education, economically disadvantaged, and limited English proficient. It functioned as companion legislation to the Department of Education Appropriations Act of 1999 because both documents intended to improve the educational opportunities for low income students. As a result, the Class Size Reduction Program was consolidated under Title II, Part A of the No Child Left Behind Act of 2001 (Millsap et al., 2004).

### Rationale for the Study

The rationale for researching the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading is two-fold. First, it is important to determine whether the allocation of additional funds to school divisions in Virginia for class size reduction in the primary grades has yielded improved student achievement in reading. As stewards of public funds, it is important for legislators to ensure that programs are cost effective. The appropriation for the class size reduction program has increased from \$38.7 million in fiscal year 1995 to \$67.2 million in fiscal year 2006 (Virginia Department of Education, 2006). However, there is currently no evaluation of the program's impact on student achievement in reading.

Second, researching the program would help to determine if reducing class sizes has impacted the instructional strategies implemented by teachers during reading lessons. It is important to note that reduction in class size should be complemented with professional development for teachers regarding research-based instructional strategies. To address concerns about reading achievement, the National Reading Panel published a report of their findings after reviewing over 100,000 research studies about reading instruction published since 1966 (Center for the Improvement of Early Reading Achievement, 2003; National Reading Panel, 2000). The Panel identified five components of an effective reading program including phonics, phonemic awareness, fluency, comprehension, and vocabulary development. In addition, the Panel made recommendations regarding professional development. This research study will determine whether instructional strategies implemented in the schools participating in the

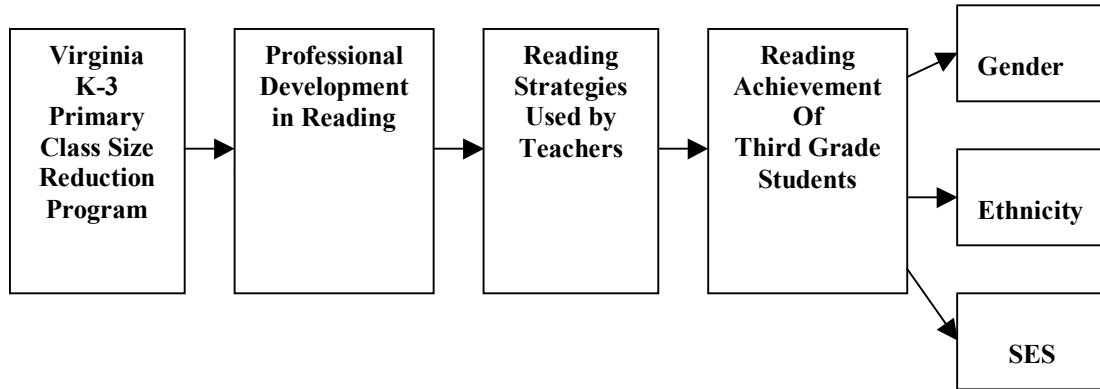
Virginia K-3 Primary Class Size Reduction Program are consistent with the panel's recommendations.

### Research Questions

This research study answers the following questions: (1) Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade? (2) Have the reduced class sizes impacted the reading instructional strategies used by teachers? (3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading? (4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

### Theoretical Framework

The theoretical framework for this study was developed from a review of the literature about class size reduction and its effect on student achievement in reading, professional development in reading, and reading instructional strategies used by teachers. Based on information gleaned from the literature review, the researcher hypothesizes that a reduction in class size and sustained professional development in reading will impact the instructional strategies implemented by teachers which will result in increased reading achievement for students. A diagram of the theoretical framework is in Figure 1.



*Figure 1.* The impact of class size reduction on student achievement in reading.

### Significance of the Study

This study contributes to scholarly literature about the impact of class size reduction programs by investigating the relationship to student achievement in reading, professional development for teachers, and instructional strategies implemented during reading lessons. The Commonwealth of Virginia, coupled with additional funds from the federal government, has invested large sums of funds to reduce class sizes in the primary grades; therefore, a study assessing its impact has significance. The study will provide administrators, teachers, and policymakers with information regarding the impact of class size reduction on students and teachers.

### Limitations

This research study is limited to teachers and principals in several elementary schools from several school districts in Virginia who responded to a survey. The participants were selected based on their participation in the Virginia K-3 Primary Class Size Reduction Program. Moreover, the absence of a control group of students will limit the researcher's ability to generalize the findings of this study because the Virginia K-3 Primary Class Size Reduction Program provides additional funding to school divisions to

reduce class sizes in schools with a large percentage of low SES students. All schools participating in the program are high poverty schools; therefore, comparing their performance with non-participating schools would skew the outcome. The results of the research study will report the perceptions of participating teachers and principals and the related Virginia Standards of Learning assessment data since there is no control group. In addition, the PALS data was self-reported by principals due to the researcher's inability to obtain the information from the PALS office or the individual school divisions. Finally, the low return rate for the administrator and teacher surveys limited the researcher's ability to generalize the findings of the research study.

### Definitions

The following definitions were utilized in this study:

*Class size* is defined as the “actual number of pupils taught by a teacher at a particular time” (Ehrenberg, Brewer, Gamoran, & Willms, 2001, p. 2).

*Fluency* is defined as the “ability to read text accurately and quickly” (National Reading Panel, 2000, p. 22).

*High poverty schools* are defined as schools with 16% or more students eligible for free lunch (Virginia Department of Education, 2006).

*Phonics* is defined as the “relationship between the letters (graphemes) of written language, and the individual sounds (phonemes) of spoken language” (National Reading Panel, 2000, p. 12).

*Phonemic awareness* is defined as the “ability to notice, think about, and work with the individual sounds in spoken words” (National Reading Panel, 2000, p. 2).

*Professional Development is defined as* activities that are “high quality, sustained, intensive and classroom-focused in order to have a positive and lasting impact on classroom instruction and the teacher’s performance in the classroom; are not 1 day or short term workshops or conferences” (U.S. Department of Education, 2002, Title IX Part A).

*Reading comprehension* is defined as “purposeful and active reading for a purpose” (National Reading Panel, 2000, p. 57).

*Teacher/pupil ratio* is defined as “a global measure of the human resources brought to bear, directly or indirectly, on children’s learning” (Ehrenberg et al., 2001, p. 2).

*Vocabulary development* is defined as “the words we must know to communicate effectively” (National Reading Panel, 2000, p. 34).

#### Organization of Paper

This study is organized into five chapters. Chapter 1 provides a context for the inquiry, background of the problem, purpose of the study, significance of the study, limitations, and definitions. A review of the literature relating to class size and reading achievement is presented in Chapter 2. Chapter 3 provides an explanation of the research methodology including context of the case study, participants, research questions to be investigated, data collection procedures, and data analysis procedures. The findings of the study will be presented in Chapter 4. A summary, conclusions, implications, and recommendations for further research will be presented in Chapter 5.



## CHAPTER 2: REVIEW OF THE LITERATURE

Examining the impact of class size on student achievement in reading necessitates a review of scholarly literature about class size and statewide class size reduction programs. This literature review will include information about the history of class size research as well as research about statewide class size reduction programs conducted in Indiana, Tennessee, Wisconsin, and California public schools. The impact of reduced class size on student achievement in reading, professional development for teachers, and instructional strategies implemented by teachers will also be explored.

A variety of search term combinations were used when conducting research such as reading achievement and elementary school students; class size, reading achievement, and elementary school students; class size, reading achievement, findings, and elementary school students; class size reading achievement, instructional strategies, findings, and elementary school students . Selected research studies were limited to those including elementary school students and teachers participating in class size reduction programs focusing on improved reading achievement.

### Historical Perspective of Class Size Research

During the past century, a plethora of school reform initiatives have been implemented in schools across the country with varying levels of success. As early as the 1900s, class size reduction emerged as a method for increasing student achievement (Burr, 2001; Phi Delta Kappa, 2002). In 1893, J.M. Rice examined the correlation between math scores and class sizes at the elementary level (Burr; PDK; Robinson & Wittebols, 1986). Her results revealed no differences in achievement that could be attributed to exceedingly large class sizes (Burr; PDK; Robinson & Wittebols, 1986).

Further analysis of the impact of class size on student achievement was conducted by Glass and Smith (1979). They introduced the statistical procedure of meta-analysis which involved measuring the magnitude of the impact of one variable on another variable to produce an effect size (Robinson & Wittebols, 1986). In their meta-analysis of 77 studies, they sought to remedy the problems inherent in previous research including poor research methodology and confounding findings. Using research data from over a dozen countries, they were able to extract 725 comparisons of smaller and larger classes based on almost 900,000 students (Glass & Smith, 1979). Glass and Smith (1979) noted the meta-analysis required more efficient inquiry of data than had been utilized in previous studies. They sought to correct inadequacies in previous studies by conducting a search of previously published literature.

Dissertation literature was traced back as far as 1900. Although they located a large assortment of dissertations, only 12 were used. Glass and Smith also found that of approximately 300 documents referenced, only 80 were relevant because they addressed class size and achievement specifically. Another problem encountered by Glass and Smith was the use of ambiguous titles and incorrect key words by authors of class size research. This made it difficult for them to access all literature about the topic.

Class size research was organized into 4 stages: the pre-experimental era (1895-1920); the primitive experimental era (1920-1940); the large-group technology era (1950-1970); and the individualization era (1970 –present) (Glass & Smith, 1979, p.3). At each stage, the researchers noted an advanced degree of “sophistication” in the research methodology employed and the motives and interpretations of the data changed even when data remained stagnant (Glass & Smith, 1979, p. 3).

Following the 1920s, the research methodology improved through the use of control and experimental groups (Glass & Smith, 1979). During the 1940s, very little educational research regarding class size was published because of World War II. However, a desire to increase the size of college classes led to renewed interest and research in the topic during the 1950s and 1960s.

In the 1970s, the researchers found that the research focused on proving the advantages of individualizing instruction for students by reducing class sizes to numbers as small as two to three pupils per teacher or tutor (Glass & Smith, 1979).

As an integral component of the meta-analysis, Glass and Smith (1979) coded each study based on its characteristics by noting variables influencing the relationship between class size and achievement such as year and source of data, instruction, classroom demographics, study conditions, and outcome variables (Glass & Smith, 1979, p. 6).

Regression analysis was used to consolidate the characteristics to illustrate the relationship between class size and achievement (Glass & Smith, 1979, p. 16). Findings indicated a “clear and strong relationship between class size and achievement” (Glass & Smith, 1979, p. 15). For example, the achievement of students assigned to small class treatment conditions as small as one student demonstrated a difference of more than one-half standard deviation when compared to students assigned to a class size of 40. Therefore, they asserted that an increase in class size would result in a decrease in student achievement on standardized achievement tests (Glass & Smith).

Although the secondary grades demonstrated a more pronounced relationship when compared to elementary grades, there was no statistically significant difference

across content areas, intelligence indicators, or demographic features (Glass & Smith). Studies implementing an experimental research design randomly assigning students to treatment conditions resulted in significant differences in the relationships between class size and student achievement.

Glass and Smith (1980) published a second meta-analysis focusing attention on class size and its relationship to attitudes and instruction. The researchers reviewed 59 studies yielding 371 comparisons. Research studies were coded in the same manner used in the first study. However, additional categories were included in this study to determine certain “Domain of Effects” such as student attitudes, individualization, student participation in learning, enrichment, and classroom behavior. The researchers sought to answer the question, “Are small classes better learning environments than large classes?” (Glass & Smith, 1980, p. 423).

Results of the second meta-analysis revealed that comparisons of small and large class sizes resulting in differences of approximately one-half standard deviation units regardless of class type when measuring the domain of effects identified by the researchers (Glass & Smith, 1980). In addition, researchers found that the affective effects for both students and teachers were positive as a result of the small class size treatment condition.

The findings of Glass and Smith reignited the class size debate among a variety of researchers. In 1980, The Educational Research Service published a critique of the two meta-analyses criticizing the methodology, findings, and conclusions. Five concerns regarding the Glass and Smith research were noted. First, the integration of a large number of variables or effects from previous research studies made it difficult to extract

clear and concise meaning from the data (ERS). Second, the findings of the first meta-analysis conducted by Glass and Smith was based on only 14 “well-controlled” studies containing elementary, high school, and college students (ERS, 1980, p. 21). As a result, educators would experience difficulty generalizing the results. Third, the Educational Research Service noted a plethora of inconsistencies in the reporting of the findings by the researchers. For example, in the first meta-analysis, it was noted that minimal differences in student achievement were achieved as a result of reducing or increasing class size. However, subsequent articles published by the project directors indicated that significant reductions in class size would be necessary to impact achievement. The confusing results and absence of justifiable data to assist educators were noted as the fourth issue of concern. Finally, the Educational Research Service concluded that the researchers prematurely considered the class size debate resolved by suggesting that no additional research was necessary.

In an attempt to respond to criticism regarding the meta-analyses conducted by Glass and Smith, Hedges and Stock (1983) published an analysis of the statistical methods. They cited errors in the models used to determine effect sizes. Many of the studies used by Glass and Smith contained insufficient sample sizes to conduct a meta-analysis; therefore, resulting in bias. However, they noted that the “tests of significance” confirmed the theory that class size impacted student achievement although not to the extent as noted by Glass and Smith.

The debate regarding class size research continued throughout the 1980s. Using 100 studies, Robinson and Wittebols (1986) conducted a “Related Cluster Analysis” to provide specific information about how class size impacted students at specific grade-

levels, in various content areas, pupil demographics, instructional practices, and cost implications for school officials. The studies were divided into 18 clusters or groups according to predetermined categories such as class size and instructional methods. Findings of the analysis indicated that there was no optimal class size which in isolation of other variables improved student achievement. However, small classes in the early primary grades were shown to increase student achievement in reading and math (Robinson & Wittebols, 1986). Moreover, the cluster analysis indicated that minority and economically disadvantaged students benefited from small class sizes. The research also stated students would receive minimal benefits from smaller class sizes if teachers' instructional practices were not adapted (Robinson & Wittebols, 1986).

Educators in other countries around the world also grappled with the issue of class size. In Melbourne, Australia, researchers investigated the relationship between small class size, teaching practices, and student achievement (Bourke, 1986). Using a sample of 63 math teachers in 33 metropolitan schools, information was gathered regarding teachers' instructional strategies, student achievement data, and interactions between students and teachers over a 12-week period. Researchers used observations and questionnaires as data collection tools. Class size was calculated by dividing the number of students in a classroom by the number of teachers in the room during observations which were conducted in 5 minute intervals. A mean of 25.2 students per teacher was calculated with classes ranging from 12 to 33 students.

Researchers controlled for extraneous variables such as family background, academic ability, level of expected education, and students' attitudes towards mathematics. In addition, teacher variables such as experience, age, and beliefs about

pedagogy were controlled. The results indicated that a positive, but not significant ( $r=0.18$ ) relationship between class size and class mean achievement. A multiple regression was conducted to predict the relationship between student, school, and teacher variables and class size on student achievement. Researchers found a strong relationship between student ability and achievement when controlling for class size. Higher student ability and smaller classes independently resulted in higher achievement (Bourke).

A variety of teaching practices found to be related to student achievement were used to create a composite variable. These practices were correlated with class size and achievement levels. Results revealed that none of the identified variables were significantly correlated with student achievement - correlations of 0.20 were considered significant (Bourke, 1986). They also found that teachers of small classes used whole group instruction more frequently than teachers of large classes. However, there were fewer interactions between teachers and students in smaller classes. Teachers of small classes probed students more frequently and waited longer for responses. Students in small classes were assigned more homework and had higher achievement.

Another international class size study was conducted by the Board of Education in Toronto, Canada at the request of the Toronto Teachers' Federation (Shapson, Wright, Eason, & Fitzgerald, 1980). The purpose of the study was to investigate the impact of class size on teachers' perceptions regarding the efficacy of class size, attitudes and opinions of participants, student achievement, and a variety of classroom process variables (Shapson, et. al, 1980). The two-year experimental study included 62 classes of fourth and fifth grade students attending 11 schools in Metropolitan Toronto. The

sample included students representing all socioeconomic levels; however, 52% percent of participants were of low socioeconomic status.

During the first year of the study, researchers randomly assigned teachers and students to fourth grade classes according to one of four treatment conditions: 16, 23, 30, or 37 students per class (Shapson, et. al, 1980). This procedure was repeated during the second year of the study for the original participants in grade 5; however, there were two caveats – students were not permitted to be assigned to either the largest or smallest classes for both years of the study and teachers who were assigned the two largest class sizes during the initial year of the study were assigned the two smallest class sizes during the second year of the study (Shapson, et. al, 1980).

Dependent variables for the research study included student outcome measures such as The Canadian Test of Basic Skills achievement test scores, the New York Self-Concept Inventory, and an art and composition measure (Shapson, Wright, Eason, & Fitzgerald, 1980). In addition, participating classrooms received eight half-day observations by trained observers who looked for examples of classroom process variables. The Toronto Classroom Observation Schedule (TCOS) was utilized by observers to record information about the following variables: teacher-pupil interaction, pupil participation, pupil satisfaction, method of instruction, subject emphasis, physical conditions, use of educational aids, and classroom atmosphere. In addition, both students and teachers were administered questionnaires to assess their attitudes about instruction, school, and expectations regarding class size.

A one way ANOVA was used to analyze differences among the class size treatment condition of 16, 23, 30, and 37 students. Researchers compared participating



teachers' expectations about the impact of class size before the study began to their perceptions at the conclusion of the study. They found that teachers' expectations were congruent with their experiences. For example, 81% of teachers who initially stated that small class sizes would result in increased individualized instruction reported that this occurred. However, their opinions were inconsistent with the results of the observations. The amount of time teachers dedicated to discussing classroom activities with students was not affected by changes in class size. Researchers found that the greatest impact of the class size manipulation was on teachers' attitudes and opinions.

The results of standardized test scores revealed minimal impact of class size on content area achievement with the exception of mathematics-concepts (Shapson et al., 1980). For example, mean reading scores for class sizes of 16 students were 44.08 as compared to 44.28 for class sizes of 37 students. Moreover, researchers noted students' attitudes toward school and their self-concept was not affected by class size.

The researchers concluded that a reduction in class size did very little to alter teachers' instructional methods or students' perceptions about school. Instead the reduction increased teacher morale about their working conditions (Shapson et al., 1980).

#### Statewide Class Size Research Studies

Using information gleaned from previous research studies and federal initiatives, several states instituted class size reduction programs to address concerns about student achievement in the early primary grades. Four of the most cited initiatives have been included in this literature review to coincide with the proposed research topic of class size reduction in Virginia and its impact on student achievement.

*Indiana's Prime Time Study*

One of the first large-scale class size reduction programs initiated by a state legislature occurred in Indiana (Lapsley et. al, 2002). In an effort to improve student performance in reading, writing, and mathematics, Governor Robert D. Orr requested the Indiana General Assembly to appropriate funds for a pilot class size reduction project for nine schools. Pupil-teacher ratios ranged from 15:1 to 18:1 based on the “corporation’s at-risk index” (Lapsley et. al, 2002, p.20). Following a 2-year pilot study involving students in grades K-2, the Indiana General Assembly expanded the project by appropriating additional funds to hire additional teachers or instructional assistants to reduce pupil/teacher ratio in all K-3 classrooms.

Participants of Prime Time included 10, 927 students in grades K-3 from 61 schools or “corporations” across the state of Indiana (Lapsley et. al, 2002). Females comprised 49.6% of the sample and the ethnic composition of participants was consistent with demographics for the state “85% Caucasian 9.2% African-American, 3.2% Hispanic” (Lapsley et. al, 2002, p. 6). The experimental group of classes with Prime Time aides included 4,016 students and the control group included 6,765 students.

The state-mandated achievement test, the Indiana Statewide Testing for Educational Progress – Plus (ISTEP+) was used to measure student outcomes in reading, language arts, and math (Lapsley,et. al, 2002). During the analysis, researchers recorded class enrollment numbers, ethnicity, and the presence of Prime Time aides. Students were not randomly assigned to classes with Prime Time aides or to small classes. The authors noted that this was a weakness in the methodology.

Researchers used descriptive statistics to analyze the achievement scores for students assigned to Prime Time assisted classrooms in comparison to classrooms without Prime Time assistants (Lapsley et. al, 2002). The results were not controlled for covariates. Classes with Prime Time assistants were shown to have a greater impact on student achievement especially in reading. The results were consistent across all geographic regions. The findings revealed that student achievement was influenced by socioeconomic status and race. For example, high SES White students in larger classes achieved at higher levels than their low SES minority counterparts who were assigned to smaller classes.

Critics cited several concerns regarding the Indiana Prime Time study. First, the quasi-experimental design of the program made it difficult to evaluate (Lapsley et al., 2002; McGiverin et al., 1989). The program was initially a demonstration project which evolved into a study. There was also a concern regarding control of variables between the large and small classes such as actual class sizes. Evaluating the effectiveness of the study was difficult because no standard achievement test was used by the various sites. Finally, implementation of supplemental programs was not controlled by the researchers to determine the impact of Prime Time.

#### *Tennessee's Project STAR*

One of the most cited studies regarding class size is the Tennessee program entitled Project STAR (Student/Teacher Achievement Ratio), a large-scale longitudinal study conducted in public schools across the state (Word et al., 1994). In 1985, the Tennessee State Legislature passed legislation authorizing and funding a four year policy study about the impact of class size on students in grades kindergarten through third.

Under the guidance of the Tennessee State Department of Education, Elizabeth Word, the project director, collaborated with personnel from four Tennessee universities, representatives from the State Board of Education and the Tennessee Association of School Superintendents (TASS) to design and implement the study. In an effort to determine the external validity of the findings, two renowned experts on class size research, Dr. Doris Ryan and Dr. Roy Forbes, were invited to serve on the “external review and advisory committee” (p. 2).

Participants in the study included students from inner-city, suburban, urban, and rural schools across the state of Tennessee (Word et al., 1994). Schools were given these designations based on the following definitions:

Inner-city and suburban schools were all located in metropolitan areas. Schools that had more than half of their students on free or reduced cost lunch (indicative of a low-income family background) were tentatively defined as inner city. Schools in the outlying areas of metropolitan cities were classified as suburban. In non-metropolitan areas, schools were classified as urban or rural depending on the location of the school. If located in a town of over 2,500 and serving primarily an urban population (the census definition of urban), the school was classified as urban. All other schools were classified as rural (Word et al., 1994, p. 2).

During the first year of the study, 79 schools (17 inner city, 16 suburban, 38 rural, and 8 urban) representing 42 school divisions participated in Project STAR although all Tennessee school systems were invited to join the study. A total of 6,500 students from 330 classrooms representing grades kindergarten through third participated in the study. Prior to acceptance, schools were required to commit to participate all 4 years and have a minimum of 57 students at each grade-level. In addition, researchers identified 22 comparison schools for the purpose of determining whether the Project STAR schools

were influenced by the Hawthorne Effect. Students attending comparison schools were administered the same tests as those attending the Project STAR schools.

There were two components of the study design. First, a within-school design was implemented to control for variables such as types of students, curriculum, daily schedules, funding, etc. (Word et al., 1994). The second component was random assignment of teachers and students to one of three class types: small (13-17 students), regular (22-25), or regular with a full-time aide. In an effort to ascertain the cumulative effect of a specific class type, kindergarten students assigned to the small class type continued with this assignment for first through third grade. “The control-group design was Campbell and Stanley (1963) Design Number 6, a randomized experiment employing post-test analysis only.”(p. 5).

During each year of the study, researchers analyzed data in subsets using the following outcome measures that were administered to students: the Stanford Achievement Test (SAT) achievement scales, the Tennessee Basic Skills First (BSF) criterion-referenced tests (grades 1-3), and the SCAMIN self-concept and motivation scales (Word et al., 1994). A cross-sectional analysis of data for students who participated in the project in grades 1-3 was performed by the researchers. They also conducted longitudinal analyses for students who were assigned to a specific class type for the duration of the study. Analysis of variance (ANOVA) was used to examine the cognitive outcomes using interactions among class type, school type, schools, classes, and students.

Achievement test results revealed the positive impact of small class sizes on kindergarten students; however, the benefits of a teacher’s aide in this grade-level were

not confirmed (Word et al., 1994). First grade students assigned to small classes also earned higher achievement scores as compared with their regular class size counterparts. For example, “small-class students scored at the 64<sup>th</sup> percentile in reading and the 59<sup>th</sup> percentile in math at the end of first grade, while students in regular classes scored at the 53<sup>rd</sup> percentile (11 points lower) in reading and the 47<sup>th</sup> percentile (12 points lower) in math”( p. 9). Moreover, researchers found evidence to substantiate the efficacy of teacher’s aides in regular size classes at grade one. Low socioeconomic status students benefited from the small class condition especially in reading.

The pattern of increased achievement for small class sizes continued in grades two and three. However, researchers noted that the effect sizes for the small class condition began to wane following first grade. Overall, the students assigned to small classes achieved at higher levels than students who were assigned to the other treatment conditions in other settings and at all grade-levels.

Because Project STAR was the first longitudinal study to determine the impact of class size on a cohort of students, it garnered the attention of many researchers. During a review of the literature, a number of analyses of the STAR results were found. Finn and Achilles (1990) analyzed results for grade one students from the second year of the study which began in the fall of 1985.

Researchers employed the research technique of post hoc theorizing to analyze data from the experimental design of Project STAR. Students were randomly assigned to first grade classes, including those who did not participate in the study during the first year (Finn & Achilles, 1990). In response to concerns from parents, half of the students assigned to regular classes in kindergarten were reassigned to regular classes with

teacher's aides in first grade. However, students who were originally assigned the small class sizes remained with that treatment condition for the second year of the study.

Teachers were randomly assigned to a new group of first grade students.

To gauge the impact of class size on achievement, first grade participants were administered the Stanford Achievement Tests (SAT) in reading and math (Finn & Achilles, 1990). The Tennessee Basic Skills First (BSF) tests, based on specific objectives in reading and math, were also administered to students. Project STAR researchers sought to determine the academic self-concept and motivation of participating students using the Self-Concept and Motivation Inventory (SCAMIN) at the conclusion of the school year.

Finn and Achilles (1990) calculated the means for each treatment condition followed by calculations for White and minority students. Afterwards, they performed two analyses of the data. First, a cross-sectional analysis was conducted using the first grade sample. The focus was on the two cognitive measures of the SAT and BSF in both reading and math. In addition, motivation and self-concept measures were included in the analysis using two subscales of the SCAMIN. The second analysis involved a longitudinal analysis of the outcome measures for students who participated in the study for two years. Researchers used the means from the reading, word study skills, and total mathematics subtests of the SAT for minority and White students for grades kindergarten and first.

An analysis of variance for the SAT and BSF measures revealed several findings (Finn & Achilles, 1990). First, a significant relationship existed between the location of the schools participating in Project STAR (rural, urban, suburban, and inner-city), race,

and scores on the cognitive measures. Minority students yielded significantly lower scores than White students on all tests. These differences were attributed to the locations of the schools. For example, researchers noted a 20 point difference in the passing rates of rural White students and minority students on the BSF reading test. In the inner city schools, differences in pass rates were also noted – 46.9% for White students and 52.1% for minority students.

First grade students assigned to the small class condition yielded mean scores of 521.8 and 68.0 respectively on the SAT reading and BSF reading measures. This was significantly higher than students assigned to the regular class condition who earned mean scores of 505.1 and 55.9 respectively on the SAT reading and BSF reading tests. However, students assigned to the regular class with an aide achieved higher scores than the regular class students, but lower than the small class students. Researchers also found that minority students reaped greater benefits from the small class condition than White students. For example, minority students demonstrated a mean difference of 16.7 points on the SAT reading scale as opposed to an 8.6 point mean difference for White students. Longitudinal analysis showed that after one year, gains in reading and math were significantly greater in small classes.

A multitude of researchers have questioned the veracity of the Project STAR results and whether participation would net enduring academic effects on students (Nye, Hedges, & Konstantopoulos, 2001; Finn, Gerber, Achilles, & Boyd-Zacharias, 2001). A six-year follow-up of the students who participated in Project STAR was conducted by researchers (Nye et al., 2001). They examined the effects of being assigned small classes for all four (K-3) years of the experiment on 9<sup>th</sup> grade math achievement.



Researchers analyzed the achievement test scores of 757 ninth grade students who participated in the original Project STAR experiment (Nye, Hedges, & Konstantopoulos, 2001). This represented 39% of the students who participated in the original study in third grade. The genders of the participants were 379 males and 383 females. Minority students represented 342 participants while White students represented 419 participants.

Post hoc theorizing was used by researchers. They based their analysis on the experimental design data gleaned from Project STAR. The treatment group consisted of students who participated in one or more years of the experiment and were assigned to the small class condition as third graders (Nye et al., 2001). The control group consisted of students who participated in one or more years of the experiment and were assigned to the regular-size class condition as third graders. Researchers analyzed the Stanford Achievement Test (SAT) scores in reading and mathematics of ninth grade students who were original Project STAR participants. Scores for ninth grade students were categorized according to availability of test scores. This resulted in two designations - “stayers” and “leavers” (p. 3).

Researchers found that the effect of the small class condition was “statistically significant” as evidenced by an effect size of .146 standard deviation units (Nye et al., 2001, p. 3). Minority students demonstrated a larger effect of .186 standard deviation units from the small class condition as opposed to White students who yielded only .002 standard deviation units. Girls benefited from the small-class condition more than boys as evidenced by their mathematics achievement in ninth grade. For example, girls who participated in small-classes in grade 3 yielded a mean score of 66.76 while boys who experienced the same treatment condition yielded a mean score of 63.12.

The results of the ANOVA showed a treatment effect for the small-class condition of .340 standard deviation units (Nye et al., 2001). In addition, low SES students did not benefit significantly from the small-class size treatment condition as compared with other students.

Researchers found similar achievement effects at ninth grade for students who participated in all four years of Project STAR as they found for the same students at third grade (Nye et al., 2001). This finding verified their hypothesis that the small-class condition had an enduring effect on students through high school.

Researchers re-examined data from the original STAR sample to determine the enduring impact of class size reduction on student achievement in comparison to their peers (Finn et al., 2001; Nye, 1994)). Analysis of the achievement scores for both the Stanford 9 Achievement Test and the Tennessee Basic Skills First Test revealed an overall small class advantage of 0.2 standard deviations in kindergarten and 0.3 standard deviations in first grade (Finn et al., 2001). However, the achievement levels declined slightly in grades 2 and 3. Low socioeconomic status (SES) and minority students did not outperform their counterparts. This finding was consistent with the results of another analysis of the STAR results focusing on the benefits of small class sizes to disadvantaged students (Nye, Hedges, & Konstantopoulos, 2000). Students attending inner-city schools benefited more from small-class sizes than any other group. The long-term effects of reduced class sizes in the primary grades were not significant unless students participated in this treatment condition for at least 2 years (Finn et al., 2001).

The Lasting Benefits Study (LBS) was conducted as a follow-up process for STAR students when they enrolled in fourth and fifth grade classes (Nye, 1994). Over

4,230 fourth grade and 4,649 fifth grade students participated in the study. Achievement scores on the Tennessee Comprehensive Assessment Program (TCAP) and teachers' ratings of students on a Pupil Participation Questionnaire were analyzed. The results revealed that students who were assigned to small classes in the primary grades in all locations had a statistically significant advantage ( $p \leq .01$ ) over their peers assigned to regular classes and regular classes with aides (Nye, 1994). Fourth grade students attending inner city and suburban classes demonstrated the greatest achievement advantage. This was significant because students were no longer in small classes in the fourth and fifth grade; therefore, the small class size condition had an enduring effect.

*Wisconsin's SAGE Program*

A five-year pilot study entitled the Wisconsin Student Achievement Guarantee in Education (SAGE) was instituted during the 1996-1997 school year (Molnar et al., 1999). The purpose of the project was to provide kindergarten through third grade students, in participating high-poverty schools, with four interventions:

- a) reduce the pupil-teacher ratio within a classroom to 15 students per teacher beginning with kindergarten and first grade in the 1996-97 school year (second grade was added in 1997-98 and third grade in 1998-99), (b) establish 'lighted schoolhouses' open from early in the morning until late in the evening, (c) develop 'rigorous' curricula, and (d) create a system of staff development and professional accountability (Molnar et al., 1999, p.165).

Program evaluators compared the performance of students in SAGE schools to that of pre-selected students in comparison schools (Molnar et al., 1999).

School districts in Wisconsin having at least one school with 50% or more children living below the poverty level were invited to participate in the pilot study (Molnar et al., 1999). During the first year of SAGE, 30 schools representing 21 school

districts in Wisconsin with 30% or more students living below the poverty-level participated in the study. SAGE participants represented a wide array of ethnic groups including African American (24.8%), Asian (5.7%), Hispanic (6.6%), Native American (11.7%), White (48.8%), and Other (1.6%). Free lunch eligibility of SAGE students was 57.7% while 10.9% of SAGE students qualified for reduced lunch. A total of 3,217 kindergarten and first grade students participated in the study compared to 1,821 kindergarten and first grade students in the comparison schools.

SAGE classrooms had pupil-teacher ratios which averaged between 12:1 and 15:1. The comparison classrooms had pupil-teacher ratios between 21:1 and 25:1 (Molnar et al., 1999). A quasi-experimental, comparative change design was implemented by researchers. The SAGE classrooms were compared with comparison schools that had regular class sizes and were similar to the SAGE schools with respect to socioeconomic status, reading achievement, racial composition, and enrollment in grades kindergarten through third.

There were four main types of classroom organization in the SAGE program: a classroom with one teacher was designated as a regular classroom; a classroom containing a temporary wall that creates two teaching spaces, each with one teacher and approximately 15 students was designated as a shared space classroom; a classroom with two teachers who shared the teaching duties was designated as a two-teacher team classroom; a classroom with one teacher and approximately 30 students for all subjects except for reading, language arts, and mathematics when another teacher provides instruction with the first teacher was designated as a floating teacher classroom.

Researchers compared the achievement of first grade students in the 30 SAGE schools that began the program in 1996 with a group of 14-17 comparison schools with similar student and school characteristics (Molnar et al., 1999). The Comprehensive Test of Basic Skills (CTBS) complete battery was used as the outcome measure instrument. SAGE students and students from the comparison schools were administered the CTBS in October 1996 and May 1997 to provide baseline and outcome data. In addition, student and classroom organization profiles were compiled by school officials. In May, teachers completed questionnaires and participated in interviews regarding their experience in SAGE classrooms.

Descriptive statistics were used to analyze the CTBS pretest and posttest results for the first two years of the program. The pretest results of both groups were comparable; however, the posttest scores revealed significant differences in all areas. For example, in the spring 1997, SAGE students earned a mean score of 582.22 in reading as compared with 578.66 for students in comparison schools.

In an effort to determine the effect of the SAGE program on achievement while controlling for other factors, researchers used regression analysis for subtest and total scale scores. They also used hierarchical linear modeling (HLM) to determine whether the data yielded different results for individual students and classrooms.

SAGE students achieved at higher statistically significant levels as compared to cohorts attending comparison schools (Molnar et al., 1999). They demonstrated gains of 0.2 standard deviations. The Spring 1997 CTBS results revealed a total mean score of 569.90 for SAGE students while comparison students earned a total mean score of 564.50. Moreover, African American students experienced higher achievement levels as

evidenced by CTBS posttest total scale scores. For example, during the 1996-1997 school year, African American students had a pretest total scale score of 498.32; however, this score increased to 552.11 during the posttest. Although their scores were lower than White students, they succeeded in closing the achievement gap.

The analysis of teacher interviews and surveys revealed that the SAGE program had a positive impact on the classroom environment and instructional program. Teachers reported that participation in the SAGE program enabled them to enhance their relationships with students, reduce the amount of time devoted to classroom management, and increase the occurrence of individualized instruction for certain students.

Critics of the SAGE program challenge its results due to several concerns. First, the Hawthorne effect and selection bias were identified as possible threats to external validity (Hruz, 2000). People often behave differently when they are aware of their participation in a program. For example, teachers of the SAGE classrooms may have worked harder while the teachers in the comparison schools may have been reticent to teach as they did normally (Grissmer, 1999; Hruz, 2000). As a result, the outcome of the study may have been compromised. In addition, critics claimed that the participating schools were not randomly selected and many of the comparison schools discontinued their participation in the study (Grissmer; Hruz).

#### *California's CSR Initiative*

In 1996, California lawmakers enacted legislation, providing nearly \$1 billion in education funding to school districts that reduced their class sizes from an average of 30 students per class to 20 or fewer in grades kindergarten through third grade (Stecher,

McCaffrey, & Bugliari, 2003). The Class Size Reduction (CSR) Initiative was implemented in public schools across the state of California. Researchers focused on three cohorts of students who entered kindergarten in 1995-96, 1996-97, and 1997-98 to examine the relationship between student achievement and duration of exposure to CSR in grades K-3.

The final sample included 1,225 schools included in the California Standardized Testing and Reporting (STAR) data files (Stecher et al., 2003). Researchers divided the schools in two groups: Group A schools and Group B schools. Group A schools had the following characteristics: 66.84% minority, 33.23% English Language Learners, 20.40% AFDC recipients, and 13.30 average years of experience for teachers. In Group A schools (877 schools), students had reduced-size classes in grades 1, 2, and 3, but not kindergarten. Group B schools had the following characteristics: 69.23% minority, 32.06% English Language Learners, 21.09% AFDC recipients, and 13.25 average years of experience for teachers. In Group B schools (348 schools), students entering kindergarten in 1995-96 had two years of exposure to CSR in second and third grade.

A quasi-experimental design was implemented as there was no random assignment of students to treatment conditions. In selecting schools to participate in the study, researchers searched for schools resembling schools across the state according to several variables such as free or reduced lunch eligibility, ethnicity, and “language status” (Stecher et al., 2003, p. 5). Moreover, they focused on three cohorts of students who began kindergarten in 1995-96, 1996-97, and 1997-98.

Researchers used the California Standardized Testing and Reporting (STAR) data files to access the Stanford Achievement Test (SAT-9) scale scores of participating

students from the 1997-98 school year through 2000-01 (Stecher et al., 2003). The distribution of third grade SAT-9 scores in reading, language arts, and math for successive cohorts of students with constant CSR exposure (Group A schools) was compared with the scores of students with increasing CSR exposure (Group B Schools). Box and whisker plots were used by researchers to demonstrate the distribution of scores.

Researchers found identical trends in the SAT-9 scale scores for the Group A and Group B schools. The three cohorts of Group A schools had an additional year of CSR exposure; however, their math SAT-9 scores were similar to those of the Group B schools. For example, the math scores for the 1997-98 cohort of the Group A schools earned scale scores ranging from 570 to 660 while the 1997-98 cohort of the Group B schools earned scaled scores ranging from 550-670. Similar patterns existed for the reading and language arts scale scores across the cohorts. Based on the results, the effect of an additional year of CSR exposure was minimal.

The research design of CSR was widely criticized because there was no control group or random assignment to treatment condition (Ehrenberg et al., 2001). Moreover, there were no assessment instruments to evaluate the effectiveness of the program during its initial year of implementation (Ehrenberg et al., 2001; Korostoff, 1999). Finding qualified teachers and facilities for the additional classes were also noted as weaknesses (Ehrenberg et al.; Wexler et al., 1998)

#### *Synthesis of Statewide Class Size Reduction Research*

The studies included in this literature review of statewide class size reduction initiatives noted a variety of benefits. Although White students achieved higher scores, the small class treatment condition reduced the achievement gap especially in reading for



minority students (Finn et al., 2001; Nye et al., 2000; & Nye et al., 2001; Word et al., 1994). Researchers also noted the advantages of small class size on students from economically disadvantaged backgrounds. Low socioeconomic status (SES) students did not demonstrate achievement scores at comparable levels as high socioeconomic status; however, there was a positive impact (Finn et al., 2001; Nye et al., 2000; & Nye et al., 2001). Results from the SAGE study indicated reduced class sizes posed a significant impact on high SES minority students (Molnar et al., 1999). Differences in the impact of class size on achievement levels according to gender were noted in reading and verbal measures (Finn et al., 2001 & Nye et al., 2000).

The enduring effects of participation in small class size initiatives were analyzed by several researchers (Finn et al., 2001; Lapsley et al., 2002; McGiverin et al., 1989; Mitchell & Mitchell, 2001; Nye, 1994; Nye et al., 2001; & Stecher et al., 2003). Early exposure to small class size settings provided the most benefit to students. Results of studies suggested first grade as the best level for initial exposure since kindergarten is not mandatory in several states (Hruz, 2000; Lapsley et al.; Mitchell & Mitchell; Molnar et al., 1999; Word et al., 1994). However, the duration of exposure to small class sizes netted better results when it occurred for more than two years; one year in a small class did not impact achievement significantly (Finn et al.; Nye; Nye et al.; & Mitchell & Mitchell).

Researchers noted a variety of class size limits to achieve benefits ranging from 15 to 20 students with varying levels of success as documented by standardized and criterion-referenced assessments (Lapsley et al., 2002; Molnar et al., 1999; Stecher et al., 2003; Word et al., 1994). For instance, the small class sizes for Project STAR included

classes of 15-17 students while the SAGE program reduced class sizes to 15 students per teacher. Project Prime Time reduced class sizes each year from 20 students in 1985 to 17 students in 1986. The California Class Size Reduction program reduced class sizes to 19 to 20 students per teacher.

### Changes in Teaching Practices

One of the purposes of the Virginia K-3 Primary Class Size Reduction Program is to improve student performance in reading. It is often assumed that smaller class sizes will increase a teacher's instructional effectiveness by altering what is done in the classroom. In response to concerns about the reading abilities of upper elementary students, Torgesen suggested, "If any elementary school is producing high numbers of children in fourth and fifth grade who cannot read well enough to do grade-level work, the first place to suggest change is in the regular classroom reading curriculum in kindergarten through Grade 3" (Torgesen, 2002, p. 13)

Reviews of the literature regarding reading instructional practices and class size reduction programs revealed a variety of suggestions. The National Reading Panel conducted a meta-analysis of over 100,000 research studies regarding reading instruction which resulted in several recommendations including the need for explicit instruction for primary students in the areas of phonics, phonemic awareness, fluency, reading comprehension, and vocabulary (National Reading Panel, 2000). Implementing intensive and explicit instruction in reading for at-risk students was noted as a variable in increasing student achievement (Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Torgesen, 2002). Students experiencing difficulty mastering basic reading skills require scaffolding, extensive teacher modeling of strategies, and repetition (Reutzel &

Smith, 2004; Taylor, Pearson, Peterson, & Rodriguez, 2003; Torgesen). Providing reading instruction to students in small groups was also noted as a strategy for improving achievement (Cantrell, 1999; Taylor, Pearson, Clark, & Walpole, 2000; Torgesen, 2002)

Researchers noted inconsistencies regarding the impact of reduced class sizes on teachers' instructional practices. Several researchers found no variance in the teaching practices for small and regular class sizes. For instance, when classes in Virginia and California were observed, investigators found that teachers' instructional approaches were the same before and after class size reduction (Cahen et al., 1983). Similar results were found in studies conducted in Australia and Canada. Although the class sizes were reduced, both teachers and observers reported the occurrence of more whole class lessons as opposed to more individualized instruction (Bourke, 1986; Shapson, Wright, Eason, & Fitzgerald, 1980). Observations of randomly selected Project STAR second and third grade classes revealed no substantial changes in instructional delivery as a result of smaller class sizes (Everston & Randolph, 1989). The state-mandated curriculum impacted teaching practices more than the reduced class sizes (Everston & Randolph, 1989).

Alternate views of class size on teachers' instructional practices existed in a number of studies. Hargreaves, Galton, and Pell (1998) noted increased sustained interactions occurred between students and teachers when class sizes were reduced (Hargreaves, Galton, & Pell, 1998). In addition, they found more individualized instruction and inquiry-based lessons in smaller classes. This finding was consistent with the results reported by researchers who conducted a longitudinal study of students in small classes in the United Kingdom. They noted more individualized instruction, more

time spent teaching, and more support provided to students (Blatchford, Bassett, Goldstein, & Martin, 2003).

Robinson and Wittebols (1986) surmised the relationship between reduced class size and teachers' instructional practices by stating, "research indicates that few if any pupil benefits can be expected from reducing class size if teachers continue to use the same instructional methods and procedures in the smaller classes that they used in the larger classes" (p.204).

#### Professional Development for Teachers

The ambiguity regarding the impact of small class sizes on changes in teachers' instructional practices have highlighted a need for professional development. A gap in the literature was found in this area due to the limited discussion of professional development as a companion piece to reducing class sizes in the primary grades. Several researchers suggested that teacher training to adapt practices to smaller class sizes is needed (Blatchford et al., 2003; Everston & Randolph, 1989; Hargreaves et al., 1998; Robinson & Wittebols, 1986; Torgesen, 2002). Teachers require support with not only specific instructional strategies, but also with the nuances of smaller classes (Blatchford; Hargreaves). Of the four most cited statewide class size reduction programs, the Student Achievement Guarantee in Education (SAGE) Program was the lone initiative including staff development as an integral component from the program's inception (Molnar et al., 1999). However, the California Class Size Reduction (CSR) Program added teacher training after several years of implementation (Stecher et al., 2003). Providing a sustained professional development program to address instructional strategies for optimizing the benefits of reduced class sizes is needed (Blatchford; Everston & Randolph; Torgesen).

### Summary of Literature Review

The research studies included in this chapter demonstrate the need for additional research regarding the impact of reduced class size on student achievement, instructional strategies, and professional development for teachers. Although several states have implemented class size reduction initiatives, student achievement outcomes were inconsistent. In addition, teachers' instructional methods underwent minimal changes as class sizes decreased. The absence of professional development designed specifically to address strategies for teaching smaller classes was also noted in the literature review.

The researcher will address the gap in the literature regarding professional development opportunities by exploring the types of training provided to teachers. There will be a focus on professional development to address reading strategies for teaching reduced class sizes. Moreover, the impact of the training on teachers' instructional practices will also be examined by the researcher.

## CHAPTER 3: RESEARCH METHODOLOGY

### Statement of the Problem

This study investigated the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. The following research questions were investigated: (1) Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade? (2) Have the reduced class sizes impacted the reading instructional strategies used by teachers? (3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading? (4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading? This chapter addresses the setting for the study, a description of the population, the instrumentation, the procedures for data collection, and the statistical method.

### Setting

The setting for this study was public schools within the Commonwealth of Virginia participating in the Virginia K-3 Primary Class Size Reduction Program. During fiscal year 2006, a total of 127 of the 132 school divisions in Virginia received payments for participation in the program (Virginia Department of Education, 2006). The number of schools from each district participating in the program ranged from 1 to 46 depending on whether the eligibility requirements were met. A total of 805 schools were eligible for the program with 804 schools meeting the requirements for state funding based on the lowest student-to-teacher ratio for which they qualified. However,

one school did not meet the lowest eligible student-to-teacher ratio requirement, but accepted reduced funding at a higher student-to-teacher ratio (Virginia Department of Education, 2006). Table 2 depicts the number of schools participating in the program for fiscal year 2006 and the class size utilized in each school. Funding for reduced class size is provided on a sliding scale based on the Local Education Agency's (LEA) wealth.

### Population

The population selected for this study included 803 of the 804 elementary schools that participated in the Virginia K-3 Primary Class Size Reduction Program during fiscal year 2006. One participating school was not included in the study because the researcher serves as the school's principal. A total of 803 elementary school principals and one primary grade teacher from each school were asked to participate in this study. The rationale for selecting these participants was twofold. First, the focus of the class size reduction program is in the primary grades of kindergarten through third grade. Second, the elementary principal serves as the instructional leader of the school and would have knowledge of the program's impact on student achievement and instructional practices.

The participating schools have a free-lunch eligibility of 16% or more. Since the entire population of eligible schools participated in this study, the population represented urban, suburban, and rural school districts from across the Commonwealth of Virginia.

Table 2

*K-3 Student-to-Teacher Ratio of Participating Schools*

Student to Teacher Ratio	Number of Schools
14 to 1 Ratio	34
15 to 1 Ratio	12
16 to 1 Ratio	25
17 to 1 Ratio	89
18 to 1 Ratio	111
19 to 1 Ratio	254
20 to 1 Ratio	280
Total	805

Note: Adapted from, "Status of the K-3 Primary Class Size Reduction Program," Virginia Department of Education, 2006, p. 7.

## Instrumentation

The two survey instruments used in this study were both developed by the researcher and were available via the Internet. The researcher posted surveys using the website SurveyMonkey.com. Surveys enabled the researcher to gather information from individuals who represented the population of elementary school principals and teachers participating in the Virginia K-3 Primary Class Size Reduction Program. A survey design provided a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2003, p. 153). This approach was selected for several reasons including minimal costs, ease of



communication with the sample population, timing, and ease of implementation (Bourque & Fielder, 2003; Creswell).

There were several disadvantages associated with utilizing a survey design methodology. First, potential participants may choose not to complete and return the survey resulting in a low response rate. Bourque and Fielder (2003) researched the problem of declining response rates for online surveys and found a common return rate from 10% to 20%. Another disadvantage to using an online survey was participants' access to technology needed to complete the instrument.

#### *Administrator Survey*

The administrator survey consisted of 17 close-ended questions and seven questions about administrator demographics. Participants were asked to reflect upon the 2005-2006 school year as they responded to the survey. Of the 17 questions, seven questions consisted of information about reading instructional practices observed by the principal in primary classrooms. Questions were designed based on the recommendations from the National Reading Panel regarding the five components of reading instruction including phonics, phonemic awareness, fluency, reading comprehension, and vocabulary development (National Reading Panel, 2000). Responses were designed to answer the research question, "Has the reduced class sizes impacted reading instructional strategies used by teachers? "

Five questions consisted of information about professional development opportunities provided for teachers in reading. Questions were designed based on the recommendations from the National Reading Panel (2000) and the No Child Left Behind Act of 2001 regarding sustained professional development for teachers (U.S. Department

of Education, 2002). Responses were designed to answer the research question, “Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?”

Five questions consisted of information about principals’ perceptions of the class size reduction program’s impact on student achievement. Responses were designed to answer the research question, “Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading?”

Demographic information related to administrators’ education level, school population, years as a principal, and gender were also included at the end of the instrument. The complete administrator survey and accompanying letter are included in Appendix A.

The instrument was validated for clarity, content, and correlation with the research questions by members of the dissertation committee and members of the 2003 Virginia Polytechnic Institute and State University Tidewater Doctoral Cohort. Modifications to the survey instrument were made based on the responses noted on the survey validation table. A survey validation table is included in Appendix B.

#### *Teacher Survey*

The teacher survey consisted of 15 close-ended questions and eight questions about teacher demographics. Of the 15 questions, eight consisted of information about reading instructional practices implemented by teachers in primary classrooms. Questions were designed based on the recommendations from the National Reading Panel regarding the five components of reading instruction including phonics, phonemic awareness, fluency, reading comprehension, and vocabulary development (National

Reading Panel, 2000). Responses were designed to answer the research question, “Has the reduced class sizes impacted the reading instructional strategies used by teachers?”

Four questions consisted of information about professional development opportunities provided for teachers in reading. Questions were designed based on the recommendations from the National Reading Panel (2000) and the No Child Left Behind Act of 2001 regarding sustained professional development for teachers (U.S. Department of Education, 2002). Responses were designed to answer the research question, “Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?”

Four questions consisted of information about teachers’ perceptions of the class size reduction program’s impact on student achievement. Responses were designed to answer the research question, “Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading?”

Demographic information related to teachers’ education level, school population, years as a teacher, and gender were also included at the end of the instrument. The complete teacher survey and accompanying letter are included in Appendix C.

The instrument was validated for clarity, content, and correlation with the research questions by a purposeful sample of 15 teachers who work in elementary schools, but are not part of the sample used in the research study. Modifications to the survey instrument were made based on the responses noted on the survey validation table. A survey validation table is included in Appendix D.

### Data Collection Procedures

Prior to contacting any potential research subjects, the researcher obtained written permission from the following: (1) the Virginia Polytechnic Institute and State University Institutional Review Board, (2) Superintendents of the participating school divisions to administer surveys to administrators and teachers, and (3) Administrators of each participating elementary school. A letter to the superintendents requesting permission to administer surveys to principals and teachers is included in Appendix E. The Virginia Polytechnic Institute and State University's Institutional Review Board Initial Review Application and Request for Exempt Review are included in Appendices F and G.

### *Survey Procedures*

After receiving permission to conduct the study, the researcher contacted the Assistant Superintendent of Finance at Virginia Department of Education to request the names of elementary school principals and primary teachers from the participating schools. The researcher contacted the principals via electronic mail (email) to inform them about the upcoming survey. The email message contained information about survey procedures, confidentiality of survey responses, and a request for the school principal to provide the email addresses of the identified teachers who are currently participating in the Virginia K-3 Primary Class Size Reduction Program.

Approximately one week after the initial contact, the researcher electronically distributed the survey and cover letter to the selected school administrators and teachers including a hyperlink to the Web-based survey. One week later, a reminder email was sent to participants who had not responded to the online survey. After another week elapsed, a second email reminder was sent to non-respondents. The researcher sent a

third email reminder to non-respondents. Finally, a fourth email reminder was sent to non-respondents. The researcher concluded the survey administration period five weeks after its inception.

#### *Procedures for Collecting Assessment Data*

The Virginia Standards of Learning (SOL) Assessments for Grade 3 English and the Phonological Awareness Literacy Screening (PALS) results for kindergarten through second grade were the dependent variables for the research study. Student SOL performance results for the participating schools were available in the public domain via the Virginia Department of Education's website at <http://www.pen.k12.va.us/>. Information regarding student performance on the PALS assessment was available from the PALS website at <http://www.pals.virginia.edu/>.

#### Data Analysis Procedures

The data from the administrator and teacher surveys was exported from SurveyMonkey.com to the Statistical Program for the Social Sciences (SPSS). Descriptive statistics were used to report data according to gender, location of school (urban, suburban, and rural), percent of students eligible for free lunch, and position within the school (teacher and administrator) by determining mean, median, standard deviation, and variance. In addition, the survey data was compared based on the responses from teachers and administrators regarding the frequency and type of professional development provided in reading, changes in teachers' instructional practices, and their perceptions regarding the impact of the Virginia K-3 Primary Class Size Reduction Program.

The proficiency rates from the 2006 Virginia Standards of Learning (SOL) Assessment in English for Grade 3 were analyzed using regression analysis to predict the impact of small class size on student achievement in reading. Results were also compared according to free lunch eligibility rate of the participating schools. The researcher used regression analysis because it used an independent variable to predict the variability of a criterion variable.

A Paired Samples T-Test was used to test the research hypothesis “Kindergarten through second grade students who have participated in the Virginia K-3 Class Size Reduction Program will have higher achievement in reading as measured by Fall 2005 and Spring 2006 PALS scores”. The researcher decided to use this method of assessment because it allowed her to compare students’ performance at the beginning and end of the school year after they have been exposed to the reduced class size treatment condition. Presentation of the data included correlations between the Fall 2005 and Spring 2006 PALS pass rates for kindergarten through second grade students.

The purpose of this research study was to investigate the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. The findings could serve as a valuable planning tool for state and school officials as they ponder whether to continue funding the class size reduction initiative.

## CHAPTER 4: REPORT OF FINDINGS

The purpose of this study was to investigate the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. The following research questions guided this study:

1. Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?
2. Have the reduced class sizes impacted the reading instructional strategies used by teachers?
3. Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?
4. Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

## Survey Administration Procedures

*Permission to Survey*

On November 9, 2006, the researcher mailed letters to the superintendents of the 121 school divisions that participated in the Virginia K-3 Primary Class Size Reduction Program during the 2005/2006 academic year. As a result of the initial mailing, permission to survey principals and teachers was granted from 44 (36%) schools divisions. Superintendents from six (4%) school divisions refused to grant permission to the researcher. A total of 71 (58%) superintendents did not respond to the initial letter.

A second attempt to garner permission from superintendents was conducted on December 2, 2006. The researcher mailed a second letter to the superintendents of school divisions that did not respond to the first letter. This mailing resulted in 15 additional superintendents granting permission for the researcher to survey their employees. However, four additional superintendents or their designees denied the researcher permission to conduct research within their respective school divisions.

Eight school divisions required the researcher to complete a research application prior to granting or denying permission for her to survey their employees. A total of 12 school superintendents or their designees requested copies of the administrator and teacher surveys prior to rendering a decision.

During the weeks of January 2-22, 2007, the researcher contacted all non-responding school superintendents via telephone to make a verbal request to survey principals and teachers. This resulted in 18 additional school divisions granting permission to conduct the research study.

The final survey participants included 181 principals and 125 teachers who represented 81 school divisions from across the Commonwealth of Virginia.

#### *Validation of the Administrator Survey*

On November 9, 2006, the researcher validated the administrator's survey with members of the 2003 Virginia Polytechnic Institute and State University Tidewater Doctoral Cohort. Participants validated the instrument for clarity, association, and correlation with the research questions. A score of 80% in the aforementioned areas indicated that individual survey questions were appropriate. Consequently, five research questions were eliminated. In addition, the participants noted an overabundance of



questions related to the second research question as compared to the first research question. As a result, the researcher revised the survey to include more questions related to the first research question. The findings of the first survey validation are included in Appendix H.

On November 30, 2006, the researcher conducted a second survey validation with the same group of participants. Five questions were validated for clarity, association, and correlation with research questions. The second survey validation instrument is included in Appendix I. All survey questions received a score of 80% in all areas; therefore, they were valid questions to include in the final administrator survey. The findings of the second survey validation are included in Appendix J. Using information gleaned from the first and second survey validation activities, the researcher revised the administrator survey to include all valid questions. A copy of the final administrator survey is included in Appendix K.

#### *Validation of the Teacher Survey*

On November 27, 2006, the researcher validated the teacher survey with a group of elementary school teachers representing grades kindergarten through third grade. Participants validated the survey questions for clarity, association, and correlation with the research questions. A score of 80% in the aforementioned areas indicated that individual survey questions were appropriate. Consequently, two questions were eliminated. Since there were sufficient numbers of survey questions related to each research question, the researcher did not include additional questions. The findings of the survey validation are included in Appendix L. A copy of the final teacher survey is included in Appendix M.

*Survey Administration*

The survey administration period began on January 6, 2007. Participating principals were sent an email containing a letter, a link to the principal survey, and a link to the teacher survey to be forwarded to one teacher representing kindergarten, first, second, or third grade. The initial response rate was 8.1% (29) for teachers and 13.1% (47) for principals. An email reminder was sent to all non-respondents on January 13, 2007 which resulted in a response rate of 14.1% (52) for teachers and 19% (70) for principals. The researcher sent a second email reminder to all non-respondents on January 20, 2007 which resulted in a response rate of 16.8% (62) for teachers and 25.8% (95) for principals. A third email reminder was sent to non-respondents on January 27, 2007 which resulted in a response rate of 20.6% (76) for teachers and 29.6 (109) for principals.

On February 3, 2007, a fourth email reminder was sent to non-respondents. The researcher also mailed copies of the survey on the same date. This resulted in a response rate of 22.2% (82) for teachers and 41.0% (151) for principals. On February 12, 2007, the researcher sent a fifth email reminder and a second mailed survey to all non-respondents. This resulted in a response rate of 27.7% (102) for teachers and 44.5% (164) for principals. On February 17, 2007, a sixth email reminder was sent to non-respondents. This resulted in a response rate of 31.2% (122) for teachers and 43.9% (172) for principals

On February 22, 2007, an additional school division granted the researcher permission to survey administrators and teachers. As a result, the total number of possible participants increased from 368 to 391. The researcher forwarded a seventh

email reminder and a third mailed survey to all non-respondents. This resulted in a response rate of 31.9% (125) for teachers and 46.2% (181) for principals.

In an attempt to garner additional survey responses, the researcher conducted a non-respondent telephone study. Using a list of principals who had not responded to the survey, the researcher selected a random number between 1 and 20. Next, the researcher selected every sixth name on the non-respondents' list. A total of 24 principals were selected to participate from the list of 188 non-respondents.

The participants were contacted by telephone and asked to respond to the following primary questions about the research study: 1) Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade? 2) Have the reduced class sizes impacted the reading instructional strategies used by teachers? 3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading? 4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

The researcher received responses from 18 of the 24 principals who were selected to participate in the non-respondent telephone survey. A copy of the protocol for the non-respondent telephone survey is included in Appendix N.

### Presentation of the Data

A survey of principals and teachers was used to determine the impact of the class size reduction program on the reading instructional strategies and the types of related staff development opportunities provided for teachers.

#### *Administrator Survey Results*

Survey question 1: Indicate the highest degree you have obtained.

Of the 181 principals who responded to the survey, the vast majority (89) earned a Master's Degree. The distribution is illustrated in Table 3.

Survey question 2: Which of the following best describe the community that your school serves?

Of the 181 principals who responded to the survey, the vast majority (101) indicated that their schools were located in rural communities. The distribution is illustrated in Table 4.

Survey question 3: Which of the following best describe the size of your district?

Of the 181 principals who responded to the survey, the majority (56) indicated that their school districts served less than 5,000 students. The distribution is illustrated in Table 5.

Survey question 4: How many years have you served as a principal?

Of the 181 principals who responded to the survey, the greatest number (83) had 1-5 years of experience as a principal. The distribution is illustrated in Table 6.

Table 3

*Highest Degree Earned by Principals*

Degree	N	Percent
Master's Degree	89	49.2
Master's Degree plus 30 hours	33	18.2
Educational Specialists/CAGS	34	18.8
Doctorate	25	13.8
Total	181	100

Table 4

*Communities Served by Schools*

Community	N	Percent
Urban	41	22.7
Suburban	39	21.5
Rural	101	55.8
Total	181	100.0

Table 5

*Size of School Districts*

Community	N	Percent
Less than 5,000 students	56	30.9
5,000 – 10,999 students	46	25.4
11,000 – 20,999 students	28	15.5
21,000 – 30,999 students	22	12.2
More than 30,999 students	26	14.4
No response	3	1.7
Total	181	100.0

Table 6

*Experience of Principals*

Number of Years	N	Percent
1-5	83	45.9
6-10	57	31.5
11-15	19	10.5
More than 15 years	22	12.2
Total	181	100.0

Survey question 5: What is your gender?

Of the 181 principals who responded to the survey, the vast majority (120) were female. A total of 61 respondents were male. The distribution is illustrated in Table 7.

Table 7

*Gender of Principals*

Gender	N	Percent
Male	61	33.7
Female	120	66.3
Total	181	100.0

Survey question 6: Which of the following best describe the free lunch eligibility rate for your school?

Of the 181 principals who responded to the survey, the majority (48) indicated that their school's free lunch eligibility rate was between 30%-44%. The distribution is illustrated in Table 8.

Survey question 7: During the 2005-2006 school year, did your school employ teachers whose salaries were funded using federal dollars from Title II, Part A?

Of the 181 principals who responded to the survey, the majority (99) indicated that they employed teachers whose salaries were funded using federal dollars from Title II, Part A. The distribution is illustrated in Table 9.

Survey question 8: Have your PALS (Phonological Awareness Literacy Screening) scores improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?

Of the 181 principals who responded to the survey, the vast majority (160) reported that the PALS scores improved since their school began participating in the class size reduction program. The distribution is illustrated in Table 10.

Table 8

*Free Lunch Eligibility Rates*

Rate	N	Percent
16%-29%	28	15.5
30%-44%	48	26.5
45%-54%	37	20.4
55%-64%	25	13.8
65%-69%	16	8.8
70%-74%	7	3.9
75% or more	20	11.0
Total	181	100.0

Table 9

*Use of Title II, Part A Funded Teachers*

	N	Percent
Yes	99	54.7
No	82	45.3



Table 10

*Improved PALS Scores*

	N	Percent
Yes	160	88.4
No	21	11.6
Total	181	100.0

Survey question 9: How often do you observe reading lessons in primary classrooms?

Of the 181 principals who responded to the survey, the majority (87) indicated that they observed reading lessons in primary classrooms 0-3 times per week. The distribution is illustrated in Table 11.

Survey question 10: Which of the following activities have you observed during your visits to primary classrooms in your school? (Check all that apply)

The 181 principals who responded to the survey reported observations of the following activities during their visits to primary classrooms: phonics instruction, phonemic awareness instruction, fluency/oral reading activities, vocabulary lessons, and reading comprehension lessons. They were asked to indicate all strategies observed during visits to primary classrooms. As a result, the vast majority reported observing all five activities. The distribution is illustrated in Table 12.

Table 11

*Observations of Reading Lessons*

Times per week	N	Percent
0-3	87	48.1
4-6	81	44.8
7-10	8	4.4
More than 10	5	2.8
Total	181	100.0

Table 12

*Activities Observed During Visits*

Activity	N	Percent
Phonics instruction	165	91.2
Phonemic awareness	170	93.9
Fluency/oral reading	172	95.0
Vocabulary lessons	172	95.0
Reading comprehension lessons	174	96.1

Survey question 11: What type of training, related to reading instructional strategies for use with small class sizes, have your primary teachers received? (Check all that apply)

The 181 principals who responded to the survey reported that their teachers received the following types of training related to reading instructional strategies for use with small class sizes: reading comprehension, individualized reading instruction, guided

reading instruction, recording and analyzing running records, and phonics and phonemic awareness instruction. They were asked to indicate all types of training provided to teachers. As a result, a vast difference was noted in the percent of respondents who provided training related to individualized reading and running records. The distribution is illustrated in Table 13.

Survey question 12: What percentage of kindergarten students at your school met the PALS benchmark in Fall 2005?

Of the 181 principals who responded to the survey, the majority (73) indicated that between 61%-80% of their kindergarten students met the PALS benchmark in Fall 2005. The distribution is illustrated in Table 14.

Survey question 13: What percentage of kindergarten students at your school met the PALS benchmark in Spring 2006?

Of the 181 principals who responded to the survey, the vast majority (118) indicated that 81% or more of their kindergarten students met the PALS benchmark in Spring 2006. The distribution is illustrated in Table 15.

Table 13

*Training Related to Reading Instructional Strategies*

Training	N	Percent
Reading comprehension	168	92.8
Individualized reading	110	60.8
Guided reading	170	93.9
Recording and analyzing running records	118	65.2
Phonics and phonemic awareness	151	83.4

Table 14

*Fall 2005 Kindergarten PALS Pass Rates*

Percent passing	N	Percent
0-20%	3	1.7
21%-40%	11	6.1
41%-60%	33	18.2
61%-80%	73	40.3
81% or above	61	33.7
Total	181	100.0

Table 15

*Spring 2006 Kindergarten PALS Pass Rates*

Percent passing	N	Percent
0-20%	5	2.8
21%-40%	1	.6
41%-60%	6	3.3
61%-80%	51	28.2
81% or above	118	65.2
Total	181	100.0

Survey question 14: What percentage of first grade students at your school met the PALS benchmark in Fall 2005?

Of the 181 principals who responded to the survey, the majority (81) indicated that between 61%-80% of their first grade students met the PALS benchmark in Fall 2005. The distribution is illustrated in Table 16.

Survey question 15: What percentage of first grade students at your school met the PALS benchmark in Spring 2006?

Of the 181 principals who responded to the survey, the vast majority (124) indicated that 81% or more of their first grade students met the PALS benchmark in Spring 2006. The distribution is illustrated in Table 17.

Table 16

*Fall 2005 First Grade PALS Pass Rates*

Percent Passing	N	Percent
0-20%	2	1.1
21%-40%	6	3.3
41%-60%	29	16.0
61%-80%	81	44.8
81% or above	63	34.8
Total	181	100.0

Table 17

*Spring 2006 First Grade PALS Pass Rates*

Percent passing	N	Percent
0-20%	4	2.2
21%-40%	2	1.1
41%-60%	7	3.9
61%-80%	44	24.3
81% or above	124	68.5
Total	181	100.0

Survey question 16: How often have you observed phonics lessons in your primary classrooms during a school year?

Of the 181 principals who responded to the survey, the majority (59) reported that they observed phonics lessons in primary classrooms on more than 30 occasions. The distribution is illustrated in Table 18.

Survey question 17: Has the performance of minority students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?

Of the 181 principals who responded to the survey, the vast majority (143) reported that the performance of minority students on the English SOL Assessments improved since their school began participating in the Virginia K-3 Primary Class Size Reduction Program. The distribution is illustrated in Table 19.

Survey question 18: How often have you observed phonemic awareness lessons in your primary classrooms during a school year?

Of the 181 principals who responded to the survey, the majority (63) reported that they observed phonemic awareness lessons in primary classrooms on 10-20 occasions. . The distribution is illustrated in Table 20.

Table 18

*Observations of Phonics Lessons*

Number of occasions	N	Percent
0-9	36	19.9
10-20	56	30.9
21-30	30	16.6
More than 30	59	32.6
Total	181	100.0

Table 19

*Improved English SOL Assessment Scores for Minorities*

	N	Percent
Yes	143	79.0
No	35	19.3
No response	3	1.7
Total	181	100.0



Table 20

*Observations of Phonemic Awareness Lessons*

Number of occasions	N	Percent
0-9	32	17.7
10-20	63	34.8
21-30	27	14.9
More than 30	57	31.5
No response	2	1.1
Total	181	100.0

Survey question 19: Has the performance of economically disadvantaged students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?

Of the 181 principals who responded to the survey, the vast majority (151) reported that the performance of economically disadvantaged students on the English SOL Assessments improved since their schools began participating in the Virginia K-3 Primary Class Size Reduction Program. The distribution is illustrated in Table 21.

Table 21

*Improved English SOL Assessment Scores for Economically Disadvantaged Students*

	N	Percent
Yes	151	83.4
No	26	14.4
No response	4	2.2
Total	181	100.0

Survey question 20: How often have you observed vocabulary development lessons in your primary classrooms during a school year?

Of the 181 principals who responded to the survey, the majority (64) reported that they observed vocabulary development lessons in primary classrooms on 10-20 occasions. The distribution is illustrated in Table 22.

Survey question 21: How often have you observed reading comprehension lessons in your primary classrooms during a school year?

Of the 181 principals who responded to the survey, the majority (72) reported observing reading comprehension lessons in primary classrooms on more than 30 occasions. The distribution is illustrated in Table 23.

Table 22

*Observations of Vocabulary Development Lessons*

Number of occasions	N	Percent
0-9	30	16.6
10-20	64	35.4
21-30	39	21.5
More than 30	48	26.5
Total	181	100.0

Table 23

*Observations of Reading Comprehension Lessons*

Number of occasions	N	Percent
0-9	17	9.4
10-20	58	32.0
21-30	34	18.8
More than 30	72	39.8
Total	181	100.0

Survey question 22: Has the number of students retained in grades K-3 decreased since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?

Of the 181 principals who responded to the survey, the vast majority (132) reported a decrease in the number of students retained in grades kindergarten through

third since their schools began participating in the Virginia K-3 Primary Class Size Reduction Program. The distribution is illustrated in Table 24.

Survey question 23: How often have you observed fluency development lessons in your primary classrooms during a school year?

Of the 181 principals who responded to the survey, the majority (66) reported observations of fluency development lessons in primary classrooms on 10-20 occasions. The distribution is illustrated in Table 25.

Survey question 24: How many hours of training in reading instructional strategies are provided to your primary teachers during a school year?

Of the 181 principals who responded to the survey, the majority (63) reported that they provided 0-5 hours of training in reading instructional strategies to their primary teachers during a school year. The distribution is illustrated in Table 26.

Survey question 25: What percentage of second grade students at your school met the PALS benchmark in Fall 2005?

Of the 181 principals who responded to the survey, the majority (82) reported that 61%-80% of their second grade students met the PALS benchmark in Fall 2005. The distribution is illustrated in Table 27.

Table 24

*Decrease in K-3 Retentions*

	N	Percent
Yes	132	72.9
No	48	26.5
No response	1	.6
Total	181	100.0

Table 25

*Observations of Fluency Development Lessons*

Number of occasions	N	Percent
0-9	46	25.4
10-20	66	36.5
21-30	31	17.1
More than 30	38	21.0
Total	181	100.0

Table 26

*Hours of Training in Reading Instructional Strategies*

Number of hours	N	Percent
0-5	63	34.8
6-10	61	33.7
11-15	31	17.1
16 or more	26	14.4
Total	181	100.0

Table 27

*Fall 2005 Second Grade PALS Pass Rates*

Percent passing	N	Percent
0-20%	3	1.7
21%-40%	3	1.7
41%-60%	18	9.9
61%-80%	82	45.3
81% or above	75	41.4
Total	181	100.0

Survey question 26: What percentage of second grade students at your school met the PALS benchmark in Spring 2006?

Of the 181 principals who responded to the survey, the vast majority (123) reported that 81% or more of their second grade students met the PALS benchmark in Spring 2006. The distribution is illustrated in Table 28.

Survey question 27: Which of the following influences how training in the implementation of reading instructional strategies is designed for your primary teachers? (Check all that apply)

The 181 principals who responded to the survey reported the following influenced how training in the implementation of reading instructional strategies is designed for their primary teachers: needs assessments, feedback from observations, assessment results, and mandates from the central office. They were asked to identify all influences on how training is designed. As a result, the fewest respondents identified feedback from observations and mandates from the central office as major influences. The distribution is illustrated in Table 29.

Table 28

*Spring 2006 Second Grade PALS Pass Rates*

Percent passing	N	Percent
0-20%	4	2.2
21%-40%	0	0
41%-60%	3	1.7
61%-80%	51	28.2
81% or above	123	68.0
Total	181	100.0

Table 29

*Influences on How Training is Designed*

	N	Percent
Needs assessments	136	75.1
Feedback from observations	124	68.5
Assessment results	159	87.8
Mandates from the central office	122	67.4

Survey question 28: Which of the following best describe how you sustain professional development for your teachers? (Check all that apply)

The 181 principals who responded to the survey reported that professional development for their teachers was sustained using the following methods: peer coaching, classroom observations, lesson plan reviews, and grade-level meetings. They were asked



to identify all methods included in the responses. As a result, the fewest number of respondents identified peer coaching and lesson plan reviews as methods. The distribution is illustrated in Table 30.

Survey question 29: During the past year, how many professional development activities, regarding instructional strategies designed specifically for small class instruction, have been provided for primary teachers?

Of the 181 principals who responded to the survey, the vast majority (132) reported that they provided 0-3 professional development activities for teachers regarding instructional strategies designed specifically for small class instruction. The distribution is illustrated in Table 31.

Survey question 30: To what extent do you feel implementation of the Virginia K-3 Primary Class Size Reduction Program has improved student achievement in reading?

Of the 181 principals who responded to the survey, the majority (87) reported that the Virginia K-3 Primary Class Size Reduction Program had a moderate impact on student achievement in reading. The distribution is illustrated in Table 32.

Table 30

*Methods of Sustaining Professional Development*

Method	N	Percent
Peer coaching	93	51.6
Classroom observations	152	84.4
Lesson plan reviews	102	56.6
Grade-level meetings	158	87.7
No response	1	.6

Table 31

*Professional Development Activities for Small Class Instruction*

Number of activities	N	Percent
0-3	132	72.9
4-6	34	18.8
7-9	6	3.3
10 or more	9	5.0
Total	181	100.0

Table 32

*Impact of the Virginia K-3 Primary Class Size Reduction Program*

Impact	N	Percent
Not at all	1	.6
Rarely	11	6.1
Moderately	87	48.1
Significantly	81	44.8
No response	1	.6
Total	181	100.0

*Teacher Survey Results*

Survey question 1: How much total time do you spend providing reading instruction daily?

Of the 125 teachers who responded to the survey, the vast majority (84) reported that they spent more than 90 minutes providing reading instruction daily. The distribution is illustrated in Table 33.

Survey question 2: To what extent do you feel small class size impacts student performance on the PALS (Phonological Awareness Literacy Screening)?

Of the 125 teachers who responded to the survey, the vast majority (109) reported that small class sizes significantly impacted student performance on the PALS (Phonological Awareness Literacy Screening). The distribution is illustrated in Table 34.

Table 33

*Total Time Spent Providing Reading Instruction Daily*

Number of minutes	N	Percent
0-30	0	0.0
31-60	5	4.0
61-90	36	28.8
More than 90	84	67.2
Total	125	100.0

Table 34

*Impact of Small Class Size on PALS Performance*

Impact	N	Percent
Not at all	4	3.2
Rarely	3	2.4
Moderately	9	7.2
Significantly	109	87.2
Total	125	100.0

Survey question 3: Which of the following reading strategies do you implement daily?

(Check all that apply)

The 125 teachers who responded to the survey reported that they implemented the following reading strategies daily: phonics instruction, phonemic awareness instruction, fluency/oral reading activities, vocabulary lessons, and reading comprehension lessons.

They were asked to identify all strategies implemented from a list of responses. As a result, there was an equal distribution of responses with the exception of reading comprehension. The distribution is illustrated in Table 35.

Survey question 4: How much time do you spend teaching guided reading group lessons daily?

Of the 125 teachers who responded to the survey, the majority (37) reported that they spent 41-60 minutes teaching guided reading lessons daily. The distribution is illustrated in Table 36.

Survey question 5: How often do you teach phonics and phonemic awareness lessons during a school year?

Of the 125 teachers who responded to the survey, the vast majority (110) reported that they taught phonics and phonemic awareness lessons on more than 30 occasions during a school year. The distribution is illustrated in Table 37.

Table 35

*Reading Strategies Implemented by Teachers Daily*

Strategy	N	Percent
Phonics instruction	108	86.4
Phonemic awareness	102	81.6
Fluency/oral reading activities	112	89.6
Vocabulary lessons	108	86.4
Reading comprehension lessons	119	95.2

Table 36

*Total Time Spent Teaching Guided Reading Lessons Daily*

Number of minutes	N	Percent
0-20	21	16.8
21-40	36	28.8
41-60	37	29.6
More than 60 minutes	31	24.8
Total	125	100.0

Table 37

*Frequency of Phonics and Phonemic Awareness Lessons*

Number of occasions	N	Percent
0-9	2	1.6
10-20	2	1.6
21-30	9	7.2
More than 30	110	88.0
No response	2	1.6
Total	125	100.0

Survey question 6: How many hours of professional development in reading are provided to you during a school year?

Of the 125 teachers who responded to the survey, the majority (38) reported that they are provided 0-5 hours of professional development in reading during a school year. The distribution is illustrated in Table 38.

Survey question 7: To what extent do you feel having a small class size has improved student achievement in reading?

Of the 125 teachers who responded to the survey, the vast majority (112) reported that small class sizes significantly improved student achievement in reading. The distribution is illustrated in Table 39.

Table 38

*Hours of Professional Development in Reading*

Number of hours	N	Percent
0-5	38	30.4
6-10	36	28.8
11-15	21	16.8
16 or more	30	24.0
Total	125	100.0

Table 39

*Impact of Small Class Size on Student Achievement in Reading*

Impact	N	Percent
Not at all	1	.8
Rarely	0	0.0
Moderately	12	9.6
Significantly	112	89.6
Total	125	100.0

Survey question 8: How often do you teach reading comprehension lessons during a school year?

Of the 125 teachers who responded to the survey, the vast majority (118) reported that they taught reading comprehension lessons on more than 30 occasions during a school year. The distribution is illustrated in Table 40.



Table 40

*Frequency of Reading Comprehension Lessons*

Number of occasions	N	Percent
0-9	2	1.6
10-20	1	.8
21-30	4	3.2
More than 30	118	94.4
Total	125	100.0

Survey question 9: Which of the following best describe how you implement new reading strategies learned during professional development? (Check all that apply)

The 125 teachers who responded to the survey reported that they used the following methods to implement new reading strategies learning during professional development: peer coaching, observations of other teachers, lesson planning with other teachers, and team teaching. They were asked to identify all methods used to sustain professional development. As a result, the vast majority (80.8%) identified lesson planning with other teachers as the most dominant method. The distribution is illustrated in Table 41.

Table 41

*Methods Used to Implement New Reading Strategies*

Method	N	Percent
Peer coaching	37	29.6
Observations of other teachers	48	38.4
Lesson planning with other teachers	101	80.8
Team teaching	34	27.2

Survey question 10: Which of the following best describe how professional development in reading is designed for you? (Check all that apply)

The 125 teachers who responded to the survey reported that the following methods are used to design professional development in reading for them: needs assessment results, feedback from observations, assessment results, and mandates from the central office. They were asked to identify all methods used to design professional development from a list of responses. As a result, the vast majority (80.8%) identified assessment results as the dominant method. The distribution is illustrated in Table 42.

Survey question 11: To what extent do you feel small class size impacts the performance of minority students on the English SOL Assessments?

Of the 125 teachers who responded to the survey, the vast majority (102) reported that small class sizes significantly impacted the performance of minority students on the English SOL Assessments. The distribution is illustrated in Table 43.

Table 42

*Methods for Designing Professional Development in Reading*

Method	N	Percent
Needs assessment results	35	28.0
Feedback from observations	42	33.6
Assessment results	101	80.8
Mandates from the central office	74	59.2
No response	1	.8

Table 43

*Impact of Small Class Size on the Performance of Minority Students*

Impact	N	Percent
Not at all	0	0.0
Rarely	3	2.4
Moderately	20	16.0
Significantly	102	81.6
Total	125	100.0

Survey question 12: During the past year, how many professional development activities regarding instructional strategies designed specifically for small class instruction have been provided for you?

Of the 125 teachers who responded to the survey, the majority (48) reported that no professional development activities regarding instructional strategies designed

specifically for small class instruction were provided for them. The distribution is illustrated in Table 44.

Survey question 13: How often do you teach vocabulary development lessons during a school year?

Of the 125 teachers who responded to the survey, the vast majority (96) reported that they taught vocabulary development lessons on more than 30 occasions during a school year. The distribution is illustrated in Table 45.

Survey question 14: How have you changed your reading instruction as a result of having a reduced class size? (Check all that apply)

The 125 teachers who responded to the survey reported that the following changes in their reading instruction as a result of having a reduced class size: increased student-teacher interactions, increased guided reading groups, increased modeling of instructional strategies, increased explicit phonics instruction, increased phonemic awareness instruction, increased fluency/oral reading activities, and increased reading comprehension activities. They were asked to identify all changes to their reading instruction from a list of responses. As a result, the vast majority (84.0%) identified increased student-teacher interactions as the dominant change to instruction. Fourteen respondents reported no changes were made to their instructional practices. The distribution is illustrated in Table 46.

Table 44

*Professional Development Activities for Small Class Instruction*

Number of activities	N	Percent
None	48	38.4
1-3	40	32.0
4-6	25	20.0
7 or more	12	9.6
Total	125	100.0

Table 45

*Frequency of Vocabulary Development Lessons*

Number of occasions	N	Percent
0-9	5	4.0
10-20	6	4.8
21-30	18	14.4
More than 30	96	76.8
Total	125	100.0

Table 46

*Changes to Reading Instruction*

	N	Percent
Student-teacher interactions	105	84.0
Guided reading groups	91	72.8
Modeling of instructional strategies	87	69.6
Explicit phonics instruction	80	64.0
Phonemic awareness	76	60.8
Fluency/oral reading activities	86	68.8
Reading comprehension activities	87	69.6
No changes	14	11.2
No response	1	.8

Survey question 15: What difference have you noticed in student learning behaviors as a result of having a reduced class size? (Check all that apply)

The 125 teachers who responded to the survey reported that the following differences in student learning behaviors as a result of having reduced class sizes: more time on task, more student participation during lessons, positive climate, increased homework completion, and increased class work completion. They were asked to identify differences in student learning behaviors from a list of responses. As a result, the vast majority identified more student time on task and more student participation as the dominant differences. Twelve respondents reported that they observed no differences in student learning behaviors. The distribution is illustrated in Table 47.

Table 47

*Differences in Student Learning Behaviors*

Difference	N	Percent
More student time on task	100	80.0
More student participation	104	83.2
Positive climate	81	64.8
Increased homework completion	29	23.2
Increased class work completion	68	54.4
No differences	12	9.6
No response	1	.8

Survey question 16: Indicate the highest degree you have obtained.

Of the 125 teachers who responded to the survey, the vast majority (83) reported that the highest degree they had obtained was a Bachelor's Degree. The distribution is illustrated in Table 48.

Survey question 17: Which of the following best describe the community that your school serves?

Of the 125 teachers who responded to the survey, the vast majority (43) indicated that their schools were located in rural communities. The distribution is illustrated in Table 49.

Table 48

*Highest Degree Obtained by Teachers*

Degree	N	Percent
Bachelor's	83	66.4
Master's	33	26.4
Master's plus 30 hours	5	4.0
Educational Specialist's/CAG	3	2.4
Doctorate	0	0.0
No response	1	.8
Total	125	100.0

Table 49

*Communities Served by Schools - Teachers*

Community	N	Percent
Urban	40	32.0
Suburban	40	32.0
Rural	43	34.4
No response	2	1.6
Total	125	100.0



Survey question 18: Which of the following best describe the size of your school district?

Of the 125 teachers who responded to the survey, the majority (38) indicated that their school districts served 21,000 – 30,999 students. The distribution is illustrated in Table 50.

Survey question 19: What grade-level do you currently teach?

Of the 125 teachers who responded to the survey, the majority (37) identified themselves as kindergarten teachers. The distribution is illustrated in Table 51.

Survey question 20: What is the total number of years that you have taught in elementary school?

Of the 125 teachers who responded to the survey, the majority (48) reported 1-5 years of elementary teaching experience. The distribution is illustrated in Table 52.

Survey question 21: How many students are currently enrolled in your class?

Of the 125 teachers who responded to the survey, the majority (46) reported having a class size of 18-20 students. The distribution is illustrated in Table 53.

Survey question 22: Do you have a teacher's assistant working with you?

Of the 125 teachers who responded to the survey, the majority (69) reported working with a teacher's assistant. The distribution is illustrated in Table 54.

Survey question 23: What is your gender?

Of the 125 teachers who responded to the survey, the vast majority (123) were female. One respondent was male. The distribution is illustrated in Table 55.

Table 50

*Size of School Districts - Teachers*

Community	N	Percent
Less than 5,000 students	29	23.2
5,000 – 10,999 students	20	16.0
11,000 – 20,999 students	19	15.2
21,000 – 30,999 students	38	30.4
More than 30,999 students	12	9.6
No response	7	5.6
Total	125	100.0

Table 51

*Grade-levels Taught by Participants*

Grade-level	N	Percent
Kindergarten	37	29.6
First	34	27.2
Second	28	22.4
Third	25	20.0
No response	1	.8
Total	125	100.0

Table 52

*Years of Elementary Teaching Experience*

Number of Years	N	Percent
1-5	48	38.4
6-10	18	14.4
11-15	17	13.6
More than 15	41	32.8
No response	1	.8
Total	125	100.0

Table 53

*Class Enrollment of Survey Participants*

Number of students	N	Percent
Less than 15	22	17.6
15-17	32	25.6
18-20	46	36.8
21-24	24	19.2
No response	1	.8
Total	125	100.0

Table 54

*Survey Participants Working with a Teacher's Assistant*

	N	Percent
Yes	69	55.2
No	54	43.2
No response	2	1.6
Total	125	100.0

Table 55

*Gender of Teacher Survey Participants*

Gender	N	Percent
Male	1	.8
Female	123	98.4
No response	1	.8
Total	125	100.0

## Non-Respondent Telephone Survey Results

The researcher conducted a non-respondent telephone survey to garner responses from principals who did not respond to the electronic or mail surveys. Of the 24 telephone calls made to the non-respondents, the researcher was able to survey 18 principals. A total of six non-respondents did not return the researcher's telephone calls.

The researcher posed six questions to the principals who agreed to participate in the non-respondent telephone survey: (1) Has the Virginia K-3 Primary Class Size

Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade? (2) Have the reduced class sizes impacted the reading instructional strategies used by teachers? (3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading? (4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading? (5) Is there a reason that you decided not to participate in the survey that was sent to you via email and U.S. mail? (6) Would you be willing to allow one teacher representing grades kindergarten through third to complete a survey about class size reduction? Individual responses are included in Appendix O.

Sixty-one percent of respondents reported that the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading. According to 50% of respondents, reduced class sizes impacted the types of instructional strategies used by teachers. Staff development in reading was provided for teachers in 94% of respondents' schools. Eighty-three percent of respondents indicated that the class size reduction program benefited students according to gender, socioeconomic status, and ethnicity.

Respondents to the telephone survey reported a multitude of reasons for their non-response to the email and mailed surveys including not having the time to complete the survey, misplacing the survey, and no recall of receiving the survey.

### Synthesis of Survey Results

*Research Question 1:* Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through third grade?

The following administrator survey questions were related to this research question: 8, 12, 13, 14, 15, 25, 26, and 30. Based on the survey responses, 160 (88.4%) administrators participating in the Virginia K-3 Primary Class Size Reduction Program reported increases in PALS scores, 143 (79%) administrators reported increases in English SOL scores for minority students, and 151 (83%) administrators reported increases in English SOL scores for economically disadvantaged students. Moreover, 132 (72.9%) administrators reported a decrease in the number of retentions in the primary grades since their schools began participating in the program. Implementation of the Virginia K-3 Primary Class Size Reduction Program was cited as a significant influence on student achievement in reading by 81 (44.7%) administrators. The program was cited as a moderate influence by 87 (48%) administrators.

For further analysis, the researcher conducted an ANOVA to compare the means of principals regarding the impact of class size on student achievement in reading according to free-lunch eligibility rate which used to determine class size in the Virginia K-3 Primary Class Size Reduction Program. There was no significant difference in responses according to free-lunch eligibility rates ( $F(6,173) = 1.379; p = .226$ ). Table 56 depicts the ANOVA.

Table 56

*ANOVA for Free-Lunch Eligibility Rate and Achievement in Reading*

	SS	df	MS	F	Sig.
Between Groups	3.208	6	.535	1.379	.226
Within Groups	67.103	173	.388		

The following teacher survey questions were related to this research question: 2, 7, and 15. Based on the survey responses, 112 (89.6%) teachers reported that small class sizes significantly impacted student achievement in reading. According to 109 (87.2%) respondents, PALS scores were significantly impacted by small class sizes. In addition, teachers noted changes in students' learning behaviors as a result of small class sizes. More student time on task during reading lessons was cited as a benefit by 100 (80%) of teachers who responded to the survey.

For further analysis, the researcher conducted an ANOVA to compare the means of teachers regarding the impact of class size on student achievement in reading according to current class enrollment. There was no significant difference in responses according to current class enrollment ( $F(3,120) = 1.019; p = .387$ ). Table 57 depicts the ANOVA.

The responses of administrators and teachers were congruent regarding their perceptions of impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. Both groups of respondents considered the program beneficial to improving student achievement in reading.

Table 57

*ANOVA for Class Enrollment and Achievement in Reading*

	SS	df	MS	F	Sig.
Between Groups	.477	3	.159	1.019	.387
Within Groups	18.709	120	.156		

*Research Question 2:* Have the reduced class sizes impacted the reading instructional strategies used by teachers?

The following administrator survey questions were related to this research question: 9, 10, 16, 18, 20, 21, and 23. Based on the survey responses, administrators reported observing the five reading instructional strategies recommended by the National Reading Panel. Phonics instruction was observed by 165 (91.2%) administrators. Phonemic awareness instruction was observed by 170 (93.9%) administrators. Fluency/oral reading activities were observed by 172 (95%) administrators. Vocabulary lessons were observed by 172 (95%) administrators. Reading comprehension lessons were observed 174 (96%) administrators.

For further analysis, the researcher conducted an ANOVA to compare the means of principals regarding the reading instructional strategies observed according to the free-lunch eligibility rate for their schools. There was no significant difference in observations of phonics instruction according to free-lunch eligibility rate. Tables 58, 59, 60, 61, and 62 depict the ANOVA for each reading instructional strategy.



Table 58

*ANOVA for Free-Lunch Eligibility Rate and Phonics Instruction*

	SS	df	MS	F	Sig.
Between Groups	.435	6	.073	.892	.502
Within Groups	14.150	174	.081		

Table 59

*ANOVA for Free-Lunch Eligibility Rate and Phonemic Awareness*

	SS	df	MS	F	Sig.
Between Groups	.606	6	.101	1.989	.070
Within Groups	8.841	174	.051		

Table 60

*ANOVA for Free-Lunch Eligibility Rate and Fluency/Oral Reading*

	SS	df	MS	F	Sig.
Between Groups	.398	6	.066	1.414	.212
Within Groups	8.155	174	.047		

Table 61

*ANOVA for Free-Lunch Eligibility Rate and Vocabulary Lessons*

	SS	df	MS	F	Sig.
Between Groups	.492	6	.082	1.768	.108
Within Groups	8.061	174	.046		

Table 62

*ANOVA for Free-Lunch Eligibility Rate and Reading Comprehension*

	SS	df	MS	F	Sig.
Between Groups	.188	6	.031	.833	.546
Within Groups	6.541	174	.038		

The following teacher survey questions were related to this research question: 1, 3, 4, 5, 8, 13, and 14. Based on the survey responses, teachers reported that they implemented the five reading instructional strategies recommended by the National Reading Panel on a daily basis. Phonics instruction was implemented daily by 108 (86.4%) respondents. Phonemic awareness lessons were implemented daily by 102 (81.6%) respondents. Fluency/oral reading activities were implemented daily by 112 (89.6%) respondents. Vocabulary lessons were implemented daily by 108 (86.4%) respondents. Reading comprehension lessons were implemented daily by 119 (95.2%) respondents. Moreover, 84 (67.2%) teachers reported spending more than 90 minutes daily providing reading instruction to their students.

Based on the survey responses, 91 (72.8%) teachers increased the frequency of guided reading group lessons as a result of having reduced class sizes. Increased modeling of instructional strategies was noted by 87 (69.6%) teachers. Explicit phonics instruction was increased by 80 (64%) teachers. Increased phonemic awareness instruction was noted by 76 (60.8%) teachers. Fluency/oral reading activities were increased by 86 (68.8%) teachers. According to 87 (69.6%) teachers, reading comprehension activities were increased as a result of having reduced class sizes.

Reading instructional strategies were not affected as a result of reduced class sizes according to 14 (11.2%) teachers.

For further analysis, the researcher conducted an ANOVA to compare the means of teachers regarding the reading instructional strategies implemented according to the current enrollment in their classrooms. There was no significant difference in implementation of reading instructional strategies according to current enrollment in their classrooms with the exception of modeling of instructional strategies. Significant differences were noted in the increased modeling of instructional strategies ( $F(3,119) = 3.684; p < .05$ ). Table 63 depicts the ANOVA for increased modeling of instructional strategies. Tables 64, 65, 66, 67, and 68 depict the ANOVA for teacher implementation of each reading instructional strategy.

The responses of administrators and teachers were congruent regarding the impact of reduced class sizes on the reading instructional strategies used by teachers. Both groups of respondents reported that the reading instructional strategies recommended by the National Reading Panel were implemented in primary classrooms.

Table 63

*ANOVA for Enrollment and Increased Modeling of Instructional Strategies*

	SS	df	MS	F	Sig.
Between Groups	2.198	3	.733	3.684	.014
Within Groups	23.671	119	.199		

Table 64

*ANOVA for Enrollment and Increased Guided Reading*

	SS	df	MS	F	Sig.
Between Groups	.166	3	.055	.274	.844
Within Groups	23.980	119	.202		

Table 65

*ANOVA for Enrollment and Increased Explicit Phonics Instruction*

	SS	df	MS	F	Sig.
Between Groups	.524	3	.175	.749	.525
Within Groups	27.736	119	.233		

Table 66

*ANOVA for Enrollment and Increased Phonemic Awareness Instruction*

	SS	df	MS	F	Sig.
Between Groups	.977	3	.326	1.381	.252
Within Groups	28.064	119	.236		

Table 67

*ANOVA for Enrollment and Increased Fluency/Oral Reading Activities*

	SS	df	MS	F	Sig.
Between Groups	.426	3	.142	.655	.581
Within Groups	25.834	119	.217		

Table 68

*ANOVA for Enrollment and Increased Comprehension Instruction*

	SS	df	MS	F	Sig.
Between Groups	1.327	3	.442	2.145	.098
Within Groups	24.543	119	.206		

*Research Question 3:* Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?

The following administrator survey questions were related to this research question: 11, 24, 27, 28, and 29. Based on the survey responses, 168 (92.8%) administrators reported that they provided training in reading comprehension for teachers. Individualized reading instruction training was provided for teachers by 110 (60.8%) administrators. Guided reading instruction training was provided for teachers by 170 (93.9%) administrators. Training in recording and analyzing running records was provided for teachers by 118 (65.2%) administrators. Phonics and phonemic awareness instruction training was provided for teachers by 151 (83.4%) administrators.

The frequency of training in reading instructional strategies for primary teachers during a school year varied as reported by the administrators. Sixty-three (34.8%) administrators provided 0-5 hours of training. Sixty-one (33.7%) administrators provided 6-10 hours of training. Thirty-one (17.1%) administrators provided 11-15 hours of training. Twenty-six (14.4%) administrators provided 16 or more hours of training.

Professional development activities regarding instructional strategies designed specifically for small class instruction were provided by administrators in varying frequencies. One to three activities were provided by 132 (72.9%) administrators. Four to six activities were provided by 34 (18.7%) administrators. Seven to nine activities were provided by 6 (3.3%) administrators. Ten or more activities were provided by nine (4.9%) administrators.

Administrators employed a variety of methods to design reading professional development for their teachers. Needs assessment results were cited as a method by 136 (75%) administrators. Feedback from observations was used to design professional development for teachers by 124 (68.5%) administrators. Assessments results were used by 159 (87.8%) administrators. Mandates from the central office were used to design professional development for teachers by 122 (67.4%) administrators.

Sustaining professional development in reading for teachers was achieved in a variety of ways. Ninety-three (51.3%) administrators cited peer coaching as a means of sustaining professional development. Classroom observations were cited by 152 (83.9%) administrators. Reviews of teachers' lesson plans were cited by 102 (56.3%). Discussion of strategies during grade-level meetings was cited by 158 (87.2%) administrators.

For further analysis, the researcher conducted an ANOVA to compare the means of principals regarding the impact of class size on the frequency of staff development provided for teachers according to free-lunch eligibility rate which is used to determine class size in the Virginia K-3 Primary Class Size Reduction Program. There was no significant difference in responses according to free-lunch eligibility rates ( $F(6,174) = .142; p = .990$ ). Table 69 depicts the ANOVA.

The researcher also conducted an ANOVA to compare the means of principals regarding the impact of class size on the frequency of staff development designed specifically for addressing small class instruction in reading according to free-lunch eligibility rate which is used to determine class size in the Virginia K-3 Primary Class Size Reduction Program. There was no significant difference in responses according to free-lunch eligibility rates ( $F(6, 174) = .295; p = .938$ ). Table 70 depicts the ANOVA.

Table 69

*ANOVA for Free-Lunch Rate and Staff Development in Reading*

	SS	df	MS	F	Sig.
Between Groups	.952	6	.159	.142	.990
Within Groups	194.838	174	1.120		

Table 70

*ANOVA for Free-Lunch Rate and Staff Development for Small Class Size*

	SS	df	MS	F	Sig.
Between Groups	1.105	6	.184	.295	.938
Within Groups	108.453	174	.623		

The following teacher survey questions were related to this research question: 6, 9, 10, and 12. Based on the survey responses, the frequency of training in reading instructional strategies provided for teachers during a school year varied. Thirty-eight (30.4%) respondents received 0-5 hours of training. Thirty-six (28.8%) respondents received 6-10 hours of training. Twenty-one (16.8%) respondents received 11-15 hours of training. Thirty (24%) respondents received 16 or more hours of training.

Teachers identified several methods that were used to design professional development in reading for them. Needs assessment results were identified as a method by 35 (28%) teachers. Feedback from observations was identified as a method by 42 (33.6%) teachers. Assessment results were identified as a method by 101 (80.8%) teachers. Mandates from the central office were identified as a method by 74 (59.2%).



Professional development activities regarding instructional strategies designed specifically for small class instruction were provided for teachers in varying frequencies. Teachers reporting that no activities specifically designed for small group instruction were provided for them comprised 48 (38.4%) of responses. One to three activities were cited by 40 (32%) teachers. Four to six activities were cited by 25 (20%) teachers. Seven or more activities were cited by 12 (9.6%) teachers.

Teachers used a plethora of methods to implement reading strategies gleaned from professional development activities. Peer coaching was used by 37 (29.6%) teachers to implement new strategies. Observations of other teachers were used by 48 (38.4%) teachers to implement new strategies. Lesson planning with other teachers was used by 101 (80.8%) teachers to implement new strategies. Team teaching was used by 34 (27.2%) teachers to implement new strategies.

For further analysis, the researcher conducted an ANOVA to compare the means of teachers regarding the impact of class size on the frequency of staff development provided for teachers according to their current class enrollment. There was no significant difference in responses according to free-lunch eligibility rates ( $F(3,120) = .1354$ ;  $p = .260$ ). Table 71 depicts the ANOVA.

The researcher also conducted an ANOVA to compare the means of teachers regarding the impact of class size on the frequency of staff development designed specifically for addressing small class instruction in reading according to current class enrollment. There was a significant difference in responses according to current class enrollment ( $F(3, 120) = 2.723$ ;  $p = .047$ ). Table 72 depicts the ANOVA.

Table 71

*ANOVA for Class Enrollment and Staff Development in Reading*

	SS	df	MS	F	Sig.
Between Groups	.952	6	.159	.142	.990
Within Groups	194.838	174	1.120		

Table 72

*ANOVA for Class Enrollment and Staff Development for Small Class Size*

	SS	df	MS	F	Sig.
Between Groups	7.646	3	2.549	2.723	.047
Within Groups	112.321	120	.936		

Teachers with 18-20 students enrolled in their classrooms had a mean of 1.782 as compared with the means of teachers with 15-17 students (2.0938) and teachers with 21-24 students (2.458). Table 73 illustrates the descriptive statistics for this model.

The responses of administrators and teachers were congruent regarding the types of professional development provided for teachers regarding reading instructional strategies. However, there were differences noted regarding the frequency of professional development designed specifically for small class size instruction.

Table 73

*Descriptive Statistics for Class Enrollment and Staff Development*

	N	Mean	Std. Deviation	Std. Error
< 15 students	22	1.9091	.86790	.18504
15-17 students	32	2.0938	1.05828	.18708
18-20 students	46	1.7826	.89226	.13156
21-24 students	24	2.4583	1.06237	.21685
No response	1			
Total	125	2.0161	.98760	.08869

*Research Question 4:* Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

The following administrator survey questions were related to this research question: 17 and 19. Based on the survey responses, 143 (79%) administrators reported that small class sizes improved the performance of minority students on the English SOL Assessments. According to 151 (83.4%) respondents, the performance of economically disadvantaged students also improved as a result of small class sizes.

Teacher survey question number 11 was related to this research question. Based on the survey responses, 102 (81.6%) teachers reported that small class sizes had a significant impact on the performance of minority students.

Both groups of respondents reported that the performance of minority students was significantly impacted by small class sizes. Further analysis was not conducted

because the researcher was unable to acquire survey data about student performance according to gender.

### Virginia Standards of Learning (SOL) Results

The Virginia Standards of Learning (SOL) assessment in English for grade 3 students was used as a measure to determine the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. This assessment was used because it evaluated student mastery of three of the five reading strategies recommended by the National Reading Panel (2000): phonics, vocabulary development, and reading comprehension. The SOL assessment in English is administered to students in the spring of each school year. Scores range from 0 to 600. A score of 400 and above is considered proficient while a score of 500 and above is considered advanced. The required pass rate for each participating school is 75%.

### *SOL Results of Participating Schools*

The researcher conducted a regression analysis of the SOL English pass rate of third grade students attending the participating schools and the free lunch rate for these schools which is used to determine the maximum class size.

During a review of the Spring 2006 Grade 3 English SOL scores and written responses from superintendents, the researcher noted that several schools did not have SOL scores for a variety of reasons including: 32 (.03%) of the schools served pre-kindergarten through second grade students; two schools (.002%) served either grades 2-5 or pre-kindergarten through first; one (.001%) school served grades 4-6, six (.007%) schools were closed; two schools (.002%) were new schools with no available SOL scores; two schools (.002%) did not have any scores posted on the Virginia Department

of Education's website; one (.001%) opted out of the class size reduction program and one (.001%) school did not receive funding for the program.

A total of 726 schools had Grade 3 English SOL scores available on the Virginia Department of Education's website in aggregate and disaggregate form. The mean percent of students scoring at the proficient level on the Spring 2006 Grade 3 English SOL Assessment was 81.6% with a standard deviation of 9.86928. The mean percent of students eligible for free lunch in the 726 schools was 39.1 with a standard deviation of 16.66372. Based on the Virginia K-3 Primary Class Size Reduction Program, schools with 30% - 44% free lunch eligibility rates would have a student/teacher ratio of 19 to 1 with a maximum class size of 24 students. Table 74 depicts the descriptive statistics for the SOL pass rate and free lunch rate of the participating schools.

In an effort to ascertain the variance in grade 3 SOL English pass rates attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .097 indicating that 9.7% of variance in grade 3 SOL English pass rates could be predicted by the combination of free lunch eligibility rate and class size. Table 75 depicts the model summary.

The ANOVA table indicated a significance level of .000 for the regression; therefore, the null hypothesis was rejected because the model was significant. Table 76 depicts the results of the ANOVA table.

Table 74

*Descriptive Statistics for SOL Pass Rate and Free Lunch Rate*

	Mean	Std. Deviation	N
Grade 3 SOL	81.6915	9.86928	726
English Pass Rate			
Free Lunch Rate	39.1548	16.66372	726

Table 75

*Model Summary for Regression of SOL Pass Rate, Free Lunch Rate, and Class Size*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.311 <sup>a</sup>	.097	.095	9.39129

Table 76

*ANOVA Table of SOL Pass Rate, Free Lunch Rate, and Class Size*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6851.009	2	3425.504	38.840	.000
Residual	63765.878	723	88.196		
Total	70616.887	725			

The coefficient's model (individual T-tests) indicated a significance level of .069 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for student/teacher ratio, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates. Finally, student/teacher ratio had a significance level of .531; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, student/teacher ratio was not a good predictor of grade 3 English SOL pass rates. Table 77 depicts coefficients model (individual T-tests).

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates and free lunch eligibility rate was negative and showed a significant relationship,  $r = -.311$ ,  $p = .000$ . A negative correlation and significant relationship also existed between third grade English SOL pass rates and class size,  $r = -.305$ ,  $p = .000$ . Table 78 depicts the correlation of variables.

Table 77

*Coefficients Model of SOL Pass Rate, Free Lunch Rate, and Class Size*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	88.338	1.259		70.160	.000
Free Lunch Rate	-.138	.076	-.233	-1.821	.069
Class Size	-.531	.847	-.080	-.627	.531

Table 78

*Correlation of SOL Pass Rate, Free Lunch Eligibility Rate, and Class Size*

	English Pass Rate	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.311	-.305
Sig. (1-tailed)		.000	.000
Free Lunch Rate	-.311	1.000	.961
Sig. (1-tailed)	.000		.000
Class Size	-.305	.961	1.000
Sig. (1-tailed)	.000	.000	

p<.05



*SOL Results for Sub-groups*

The fourth research question focused on the impact of the Virginia K-3 Primary Class Size Reduction Program and student achievement according to the sub-groups of gender, socioeconomic status, and ethnicity. Table 79 depicts the descriptive statistics for each sub-group.

*Results for Male Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for male students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .079 indicating that 7.9% of variance in grade 3 SOL English pass rates for male students could be predicted by the combination of free lunch eligibility rate and class size. Table 80 depicts the model summary.

The ANOVA table indicated a significance level of .000 for the regression; therefore, the null hypothesis was rejected because the model was significant. Table 81 depicts the results of the ANOVA table.

Table 79

*Descriptive Statistics for Sub-groups*

	N	Minimum	Maximum	Mean	Std. Deviation
Percent of female 3rd grade students passing English SOL	704	47.00	100.00	83.5099	10.18463
Percent of male 3rd grade students passing English SOL	716	33.00	100.00	79.9679	12.02342
Percent of Black 3rd grade students passing English SOL	459	29.00	100.00	73.6514	13.48558
Percent of White 3rd grade students passing English SOL	614	39.00	100.00	86.5798	9.31430
Percent of Hispanic 3rd grade students passing English SOL	118	50.00	100.00	78.4746	12.23328
Percent of Asian 3rd grade students passing English SOL	32	64.00	100.00	89.4062	9.13645
Percent of economically disadvantaged students passing English SOL	651	31.00	100.00	75.4224	13.01176
Valid N (listwise)	9				

Table 80

*Model Summary for Regression- Male Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.281 <sup>a</sup>	.079	.076	11.55634

Table 81

*ANOVA Table for Male Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
					.000
Regression	8141.836	2	4070.918	30.483	
Residual	95220.425	713	133.549		
Total	103362.26	715			

The coefficient's model (individual T-tests) indicated a significance level of .244 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for male students. Finally, class size had a significance level of .313; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for male students. Table 82 depicts coefficients model (individual T-tests).

Table 82

*Coefficients Model for Male Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	86.709	1.560		55.589	.000
Free Lunch Rate	-.110	.094	-.152	-1.166	.244
Class Size	-1.058	1.049	-.131	-1.009	.313

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for male students and free lunch eligibility rate was negative and showed a significant relationship,  $r = -.278$ ,  $p = .000$ . A negative correlation and significant relationship also existed between third grade English SOL pass rates for male students and class size,  $r = -.278$ ,  $p = .000$ . Table 83 depicts the correlations.

Table 83

*Correlations for Male Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.278	-.278
Sig. (1-tailed)		.000	.000
Free Lunch Rate	-.278	1.000	.961
Sig. (1-tailed)	.000		.000
Class Size	-.278	.961	1.000
Sig. (1-tailed)	.000	.000	

p&lt;.05

*Results for Female Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for female students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .065 indicating that 6.5% of variance in grade 3 SOL English pass rates for female students could be predicted by the combination of free lunch eligibility rate and class size. Table 84 depicts the model summary.

The ANOVA table indicated a significance level of .000 for the regression; therefore, the null hypothesis was rejected because the model was significant. Table 85 depicts the results of the ANOVA table.

Table 84

*Model Summary for Regression – Female Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.255 <sup>a</sup>	.065	.062	9.86304

Table 85

*ANOVA Table for Female Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4727.018	2	2363.509	24.296	.000
Residual	68192.913	701	97.279		
Total	72919.930	703			

The coefficient's model (individual T-tests) indicated a significance level of .061 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for female students. Finally, class size had a significance level of .955; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for female students. Table 86 depicts the coefficients model (individual T-tests).

Table 86

*Coefficients Model for Female Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	89.517	1.333		67.130	.000
Free Lunch Rate	-.151	.081	-.247	-1.874	.061
Class Size	-.051	.901	-.007	-.057	.955

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for female students and free lunch eligibility rate was negative and showed a significant relationship,  $r = -.255$ ,  $p = .000$ . A negative correlation and significant relationship also existed between third grade English SOL pass rates for female students and class size,  $r = -.245$ ,  $p = .000$ . Table 87 depicts the correlations.

Table 87

*Correlations for Female Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.255	-.245
Sig. (1-tailed)		.000	.000
Free Lunch Rate	-.255	1.000	.961
Sig. (1-tailed)	.000		.000
Class Size	-.245	.961	1.000
Sig. (1-tailed)	.000	.000	

p<.05

*Results for Black Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for Black students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .009 indicating that 0.9% of variance in grade 3 SOL English pass rates for black students could be predicted by the combination of free lunch eligibility rate and class size. Table 88 depicts the model summary.

The ANOVA table indicated a significance level of .140 for the regression; therefore, the null hypothesis was not rejected. Class size and free lunch rates are not significant predictors of grade 3 SOL English pass rates for Black students. Table 89 depicts the results of the ANOVA table.



Table 88

*Model Summary for Regression- Black Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093 <sup>a</sup>	.009	.004	13.45699

Table 89

*ANOVA Table for Black Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	714.882	2	357.441	1.974	.140
Residual	82577.344	456	181.091		
Total	83292.227	458			

The coefficient's model (individual T-tests) indicated a significance level of .076 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for Black students. Finally, class size had a significance level of .141; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for Black students. Table 90 depicts the coefficients model (individual T-tests).

Table 90

*Coefficients Model for Black Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	69.320	2.269		30.550	.000
Free Lunch Rate	.232	.130	.310	1.778	.076
Class Size	-2.101	1.424	-.257	-1.476	.141

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for Black students and free lunch eligibility rate was low and showed a non-significant relationship,  $r = .062$ ,  $p = .092$ . A low correlation and non-significant relationship also existed between third grade English SOL pass rates for Black students and class size,  $r = .041$ ,  $p = .188$ . Table 91 depicts the correlations.

Table 91

*Correlations for Black Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	.062	.041
Sig. (1-tailed)		.092	.188
Free Lunch Rate	.062	1.000	.964
Sig. (1-tailed)	.092		.000
Class Size	.041	.964	1.000
Sig. (1-tailed)	.188	.000	

p<.05

*Results for Hispanic Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for Hispanic students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .011 indicating that 1.1% of variance in grade 3 SOL English pass rates for Hispanic students could be predicted by the combination of free lunch eligibility rate and class size. Table 92 depicts the model summary.

The ANOVA table indicated a significance level of .525 for the regression; therefore, the null hypothesis was not rejected. Class size and free lunch rates are not significant predictors of grade 3 SOL English pass rates for Hispanic students. Table 93 depicts the results of the ANOVA table.

Table 92

*Model Summary for Regression- Hispanic Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.106 <sup>a</sup>	.011	-.006	12.27030

Table 93

*ANOVA Table for Hispanic Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
					.525
Regression	194.991	2	97.495	.648	
Residual	17314.433	115	150.560		
Total	17509.424	117			

The coefficient's model (individual T-tests) indicated a significance level of .887 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for Hispanic students. Finally, class size had a significance level of .814; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for Hispanic students. Table 94 depicts the coefficients model (individual T-tests).

Table 94

*Coefficients Model for Hispanic Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	81.128	3.887		20.871	.000
Free Lunch Rate	-.037	.257	-.040	-.143	.887
Class Size	-.741	3.137	-.067	-.236	.814

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for Hispanic students and free lunch eligibility rate was negative and showed a non-significant relationship,  $r = -.103$ ,  $p = .133$ . A negative correlation and non-significant relationship also existed between third grade English SOL pass rates for Hispanic students and class size,  $r = -.105$ ,  $p = .130$ . Table 95 depicts the correlations.

Table 95

*Correlations for Hispanic Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.103	-.105
Sig. (1-tailed)		.133	.130
Free Lunch Rate	-.103	1.000	.944
Sig. (1-tailed)	.133		.000
Class Size	-.105	.944	1.000
Sig. (1-tailed)	.130	.000	

p<.05

*Results for Asian Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for Asian students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .031 indicating that 3.1% of variance in grade 3 SOL English pass rates for Asian students could be predicted by the combination of free lunch eligibility rate and class size. Table 96 depicts the model summary.

The ANOVA table indicated a significance level of .629 for the regression; therefore, the null hypothesis was not rejected. Class size and free lunch rates are not significant predictors of grade 3 SOL English pass rates for Asian students. Table 97 depicts the results of the ANOVA table.

Table 96

*Model Summary for Regression - Asian Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.177	.031	-.035	9.29646

Table 97

*ANOVA Table for Asian Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
					.629
Regression	81.417	2	40.709	.471	
Residual	2506.302	29	86.424		
Total	2587.719	31			

The coefficient's model (individual T-tests) indicated a significance level of .381 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for Asian students. Finally, class size had a significance level of .495; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for Asian students. Table 98 depicts the coefficients model (individual T-tests).

Table 98

*Coefficients Model for Asian Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	94.522	5.676		16.654	.000
Free Lunch Rate	-.356	.400	-.454	-.889	.381
Class Size	3.661	5.302	.353	.691	.495

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for Asian students and free lunch eligibility rate was negative and showed a non-significant relationship,  $r = -.125$ ,  $p = .248$ . A negative correlation and non-significant relationship also existed between third grade English SOL pass rates for Asian students and class size,  $r = -.071$ ,  $p = .349$ . Table 99 depicts the correlations.



Table 99

*Correlations for Asian Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.125	-.071
Sig. (1-tailed)		.248	.349
Free Lunch Rate	-.125	1.000	.934
Sig. (1-tailed)	.248		.000
Class Size	-.071	.934	1.000
Sig. (1-tailed)	.349	.000	

p&lt;.05

*Results for White Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for White students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .025 indicating that 2.5% of variance in grade 3 SOL English pass rates for White students could be predicted by the combination of free lunch eligibility rate and class size. Table 100 depicts the model summary.

The ANOVA table indicated a significance level of .000 for the regression; therefore, the null hypothesis was rejected. Class size and free lunch rates are significant predictors of grade 3 SOL English pass rates for White students. Table 101 depicts the results of the ANOVA table.

Table 100

*Model Summary for Regression- White Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.159	.025	.022	9.21014

Table 101

*ANOVA Table for White Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1352.520	2	676.260	7.972	.000
Residual	51829.069	611	84.827		
Total	53181.590	613			

The coefficient's model (individual T-tests) indicated a significance level of .508 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for White students. Finally, class size had a significance level of .528; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for White students. Table 102 depicts the coefficients model (individual T-tests).

Table 102

*Coefficients Model for White Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	89.929	1.312		68.521	.000
Free Lunch Rate	-.057	.087	-.083	-.662	.508
Class Size	-.677	1.073	-.079	-.631	.528

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for White students and free lunch eligibility rate was negative and showed a significant relationship,  $r = -.157$ ,  $p = .000$ . A negative correlation and significant relationship also existed between third grade English SOL pass rates for White students and class size,  $r = -.157$ ,  $p = .000$ . Table 103 depicts the correlations.

Table 103

*Correlations for White Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.157	-.157
Sig. (1-tailed)		.000	.000
Free Lunch Rate	-.157	1.000	.948
Sig. (1-tailed)	.000		.000
Class Size	-.157	.948	1.000
Sig. (1-tailed)	.000	.000	

p<.05

*Results for Economically Disadvantaged Sub-group*

In an effort to ascertain the variance in grade 3 SOL English pass rates for economically disadvantaged students attributed to a school's free lunch eligibility rate and class size, a multiple regression was performed. The significance level of .05 was used in each statistical test. The null hypothesis for the model was  $\beta_1 = \beta_2 = 0$ . The model summary included an R square of .005 indicating that 0.5% of variance in grade 3 SOL English pass rates for economically disadvantaged students could be predicted by the combination of free lunch eligibility rate and class size. Table 104 depicts the model summary.

The ANOVA table indicated a significance level of .179 for the regression; therefore, the null hypothesis was not rejected. Class size and free lunch rates are not significant predictors of grade 3 SOL English pass rates for economically disadvantaged students. Table 105 depicts the results of the ANOVA table.

Table 104

*Model Summary for Regression - Economically Disadvantaged Students*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.073	.005	.002	12.99731

Table 105

*ANOVA Table for Economically Disadvantaged Students*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	582.165	2	291.082	1.723	.179
Residual	109466.67	648	168.930		
Total	110048.83	650			

The coefficient's model (individual T-tests) indicated a significance level of .178 for free lunch eligibility rate; thus, the researcher failed to reject the null hypothesis because this was not significant. When controlling for class size, free lunch eligibility rate was not a good predictor of grade 3 English SOL pass rates for economically disadvantaged students. Finally, class size had a significance level of .099; thus, the researcher failed to reject the null hypothesis. When controlling for free lunch eligibility rate, class size was not a good predictor of grade 3 English SOL pass rates for

economically disadvantaged students. Table 106 depicts the coefficients model (individual T-tests).

For further analysis, the researcher conducted a Pearson Correlation to ascertain the relationship between the independent and dependent variables. The correlation between third grade English SOL pass rates for economically disadvantaged students and free lunch eligibility rate was negative and showed a non-significant relationship,  $r = -.033$ ,  $p = .200$ . A negative correlation and non-significant relationship also existed between third grade English SOL pass rates for economically disadvantaged students and class size,  $r = -.050$ ,  $p = .101$ . Table 107 depicts the correlations.

Table 106

*Coefficients Model for Economically Disadvantaged Students*

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	74.337	1.836		40.499	.000
Free Lunch Rate	.149	.110	.187	1.349	.178
Class Size	-2.049	1.239	-.230	-1.654	.099

Table 107

*Correlations for Economically Disadvantaged Students*

	English Pass Rates	Free Lunch Rate	Class Size
English Pass Rates	1.000	-.033	-.050
Sig. (1-tailed)		.200	.101
Free Lunch Rate	-.033	1.000	.959
Sig. (1-tailed)	.200		.000
Class Size	-.050	.959	1.000
Sig. (1-tailed)	.101	.000	

p<.05

### Phonological Awareness Literacy Screening (PALS) Results

The Phonological Awareness Literacy Screening (PALS) was used as a measure to determine the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. This assessment was used because it evaluated student mastery of all five reading strategies recommended by the National Reading Panel (2000). The PALS assessment is administered to kindergarten through second grade students in the fall and the spring of each school year. However, third grade students are administered the assessment in the fall and are only required to participate in the spring administration if they failed the initial screening. For this reason, the researcher did not use the PALS assessment for third grade students who participated in the Virginia K-3 Primary Class Size Reduction Program.

The researcher used survey results from 181 principals who responded to questions regarding the percentage of kindergarten, first, and second grade students meeting the PALS (Phonological Awareness Literacy Screening) Fall 2005 and Spring 2006 Benchmarks. A Paired Samples T-Test was conducted to compare the percentage of students meeting the Spring 2006 PALS Benchmark to the results of Fall 2005 PALS Benchmark after receiving reading instruction from their teachers. The significance level of .05 was used in each statistical test.

The research hypothesis tested was that kindergarten students whose schools participated in the Virginia K-3 Primary Class Size Reduction Program were more likely to meet the Spring 2006 PALS benchmark. The results of the Paired Samples T-Test for kindergarten students revealed a positive and significant correlation between the pass



rates in Fall 2005 and Spring 2006,  $r = .607$ ,  $p = .000$ . Table 108 depicts the Paired Samples Correlations.

The probability value (significance level) was .000 indicating a significant increase in the percent of kindergarten students meeting the PALS benchmark in Spring 2006 after being exposed to the small class size treatment condition. The Paired Samples Test is included in Appendix P.

The researcher conducted a Paired Samples T-Test of the first grade Fall 2005 and Spring 2006 PALS pass rates to test the research hypothesis that first grade students whose schools participated in the Virginia K-3 Primary Class Size Reduction Program were more likely to meet the Spring 2006 PALS benchmark. The results of the Paired Samples T-Test for first grade students revealed a positive and significant correlation between the pass rates in Fall 2005 and Spring 2006,  $r = .543$ ,  $p = .000$ . Table 109 depicts the Paired Samples Correlations.

The probability value (significance level) was .000 indicating a significant increase in the percent of first grade students meeting the PALS benchmark in Spring 2006 after being exposed to the small class size treatment condition. The Paired Samples Test is included in Appendix Q.

A Paired Samples T-Test of the second grade Fall 2005 and Spring 2006 PALS pass rates was conducted to test the research hypothesis that second grade students whose schools participated in the Virginia K-3 Primary Class Size Reduction Program were more likely to meet the Spring 2006 PALS benchmark. The results of the Paired Samples T-Test for second grade students revealed a positive and significant correlation between

the pass rates in Fall 2005 and Spring 2006,  $r = .650$ ,  $p = .000$ . Table 110 depicts the Paired Samples Correlations.

The probability value (significance level) was .000 indicating a significant increase in the percent of second grade students meeting the PALS benchmark in Spring 2006 after being exposed to the small class size treatment condition. The Paired Samples Test is included in Appendix R.

Table 108

*Correlations for Kindergarten Fall 2005 and Spring 2006 PALS Pass Rates*

	N	Correlation	Sig.
PALS Fall 2005 & Spring 2006	181	.607	.000

Table 109

*Correlations for First Grade Fall 2005 and Spring 2006 PALS Scores*

	N	Correlation	Sig.
PALS Fall 2005 & Spring 2006	181	.543	.000

Table 110

*Correlations for Second Grade Fall 2005 and Spring 2006 PALS Scores*

	N	Correlation	Sig.
PALS Fall 2005 & Spring 2006	181	.650	.000

### Emergent Themes

The researcher identified several emergent themes as a result of reviewing data from administrator and teacher surveys, Spring 2006 Grade 3 SOL English scores, and Fall 2005 and Spring 2006 PALS pass rates.

*Research Question 1:* Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?

Administrator and teacher survey results indicated that third grade students demonstrated progress on SOL and PALS assessments. The Paired Samples T-Test of Fall 2005 and Spring 2006 PALS pass rates indicated increases after students were exposed to small class sizes. However, the regression analysis of SOL scores revealed that class size was not a good predictor of SOL pass rates because students performed well regardless of their class size as established by Virginia K-3 Primary Class Size Reduction Program. Thus, this was identified as an emerging theme.

*Research Question 2:* Have the reduced class sizes impacted the reading instructional strategies used by teachers?

Based on administrator and teacher survey results, primary teachers employed at schools participating in the Virginia K-3 Primary Class Size Reduction Program implemented the five instructional strategies recommended by the National Reading Panel (2000). Teachers reported that their instructional practices changed as a result of having reduced class sizes through increased student-teacher interactions, increased guided reading instruction, increased modeling of instructional strategies, increased explicit phonics instruction, increased phonemic awareness instruction, increased

fluency/oral reading activities, and increased reading comprehension activities.

Administrators reported observing these activities during their visits to primary classrooms. Thus, this was identified as an emerging theme.

*Research Question 3:* Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?

Based on administrator and teacher survey results, primary teachers employed at schools participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading. Administrators reported that teachers received training related to reading comprehension, individualized reading instruction, guided reading instruction, recording and analyzing running records, and phonics and phonemic awareness instruction. The majority of administrators and teachers reported between 0-5 hours of staff development were provided to teachers during a school year. However, when asked about the frequency of staff development activities designed specifically for small class instruction, 70% of teachers and 72.9% of administrators reported that 0-3 activities were provided during a school year. Thus, this was identified as an emerging theme.

*Research Question 4:* Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

Based on administrator and teacher survey results, the Virginia K-3 Primary Class Size Reduction Program benefited minority and low SES students. Moreover, each subgroup, with the exception of Black students, met or exceeded the minimum pass for the Spring 2006 SOL English Assessment for third grade students. However, the

regression analysis of the Spring 2006 Grade 3 English SOL pass rates indicated that class size was not a good predictor of sub-group performance because students performed well regardless of the class size established by the program. Thus, this was identified as an emerging theme.

#### Summary

Based on the emerging themes, chapter 5 will be developed to address the impact of class size on English SOL pass rates, PALS pass rates, instructional strategies implemented by teachers, and the types and frequency of staff development in reading.

## Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

### Purpose of the Study

The purpose of this research study was to determine the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading. The following research questions were investigated: (1) Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade? (2) Have the reduced class sizes impacted the reading instructional strategies used by teachers? (3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading? (4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

The researcher received permission from 81 (65.8%) school superintendents or their designees to survey principals and teachers. The survey administration period began on January 6, 2007 and ended on February 26, 2007. A total of 125 (31.9%) teachers and 181 (46.2%) principals responded to their respective surveys. After 12 attempts were made to secure survey responses, the researcher conducted a non-respondent telephone survey with 18 of the 24 selected principals.

### Summary of Findings

Based on the data, the researcher developed the following findings for the research study:

*Finding 1:* The Virginia K-3 Primary Class Size Reduction Program had a positive impact on the performance of third grade students on the Spring 2006 English SOL Assessment.

*Finding 2:* The Virginia K-3 Primary Class Size Reduction Program had a positive impact on the performance of kindergarten through second grade students as measured by the Fall 2005 and Spring 2006 PALS Assessments.

*Finding 3:* Primary teachers and principals who participated in the research study perceived that class size positively impacted student achievement in reading.

*Finding 4:* The Virginia K-3 Primary Class Size Reduction Program impacted the instructional strategies implemented by primary teachers.

*Finding 5:* Teachers who participated in the research study did not receive sustained staff development regarding reading instructional practices.

*Finding 6:* Principals who participated in the research study did not provide adequate staff development, designed specifically for small class instruction, to primary teachers.

*Finding 7:* Based on the Spring 2006 SOL English Assessment results, the Virginia K-3 Primary Class Size Reduction Program benefited third grade students according to gender, socioeconomic status, and ethnicity.



### Discussion of Findings

*Finding 1:* The Virginia K-3 Primary Class Size Reduction Program had a positive impact the performance of third grade students on the Spring 2006 English SOL Assessment.

The researcher found that the Virginia K-3 Primary Class Size Reduction Program significantly impacted the performance of third grade students on the Spring 2006 English SOL Assessment. First, descriptive statistics of the Spring 2006 English SOL pass rates for third grade students of the participating schools revealed a mean of 81.6%. This pass rate exceeded the required 75% for all third grade students in Virginia. Moreover, the pass rate for all third grade students in the Commonwealth of Virginia was 84%. Students attending schools that participated in the program performed as well as their counterparts whose schools did not qualify for the program.

Second, the mean free-lunch eligibility rate for participating schools was 39.1548 requiring class sizes between 19 and 24 students. Only 34 of the 804 schools included in the Virginia K-3 Class Size Reduction Program had free-lunch eligibility rates of 75% or higher. The majority of schools (80%) had free-lunch eligibility rates between 16% and 54%. Based on the data, the class size requirement for schools participating in the program did not differ significantly from the Standards of Quality (SOQ) mandates.

The regression analysis revealed that free-lunch eligibility rate/class size were not significant predictors of English SOL pass rates for third grade students. Only 9.7% of variance in pass rates could be predicted by free-lunch eligibility rate/class size. The researcher expected that class size requirements dictated by the program would be significant predictors of student performance on the English SOL Assessment.

*Finding 2:* The Virginia K-3 Primary Class Size Reduction Program had a positive impact on the performance of kindergarten through second grade students as measured by the Fall 2005 and Spring 2006 PALS Assessments.

Results of the Paired Samples T-Test revealed a positive and significant relationship between participation in the Virginia K-3 Primary Class Size Reduction Program and the increase in the percent of kindergarten through second grade students meeting the PALS benchmark. This finding was consistent with the researcher's hypothesis that students would benefit from exposure to small class sizes in the primary grades. Survey results indicated consistent implementation of the five reading instructional strategies recommended by the National Reading Panel (2000) in classrooms. These five areas are assessed using the PALS at the beginning and end of the school year. The data revealed a positive and significant correlation between pass rates at the beginning and the end of the 2005/2006 academic year.

*Finding 3:* Primary teachers and principals who participated in the research study perceived that class size positively impacted student achievement in reading.

The results of the administrator's survey revealed 44.7% of respondents identified small class size as a significant influence on student achievement. However, 48% of respondents considered small class size as a moderate influence. Several participants in the non-respondent telephone survey attributed student success to the Reading First Program. The researcher expected a larger percent of survey respondents to report that class size significantly impacted student achievement in reading.

Results of the ANOVA indicated no differences in mean responses according to the free-lunch eligibility rate of survey respondents' schools. The free-lunch eligibility

rate is used by the Virginia Department of Education to determine the range of class sizes for schools participating in the Virginia K-3 Primary Class Size Reduction Program.

The results of the teacher's survey revealed 89.6% of respondents identified small class size as a significant influence on student achievement. Moreover, 80% of respondents reported student time-on-task increased as a result of small class size.

Results of the ANOVA indicated no differences in mean responses according to the current enrollment of survey respondents' classes. This finding was consistent with the researcher's hypothesis.

*Finding 4:* The Virginia K-3 Primary Class Size Reduction Program impacted the instructional strategies implemented by primary teachers.

Administrator survey results revealed that principals observed the five reading instructional strategies recommended by the National Reading Panel (2000).

Furthermore, they noted a high frequency of the strategies being implemented consistently by teachers. The ANOVA results indicated no significant differences in mean responses according to free-lunch eligibility rate.

Teacher survey results revealed that teachers implemented the five reading instructional strategies recommended by the National Reading Panel. Moreover, the ANOVA results indicated no significant differences in mean responses according to current enrollment of survey respondents' classes. This finding surprised the researcher because she predicted that differences would exist in responses based on a teacher's class enrollment.

*Finding 5:* Teachers who participated in the research study did not receive sustained staff development regarding reading instructional practices.

Administrator survey results revealed differences in the frequency of staff development in reading provided to teachers. The largest percent of respondents (34.8%) provided 0-5 hours of staff development in reading during a school year. The smallest percent of respondents (14.3%) provided 16 or more hours of staff development in reading during a school year. Results of the ANOVA indicated no significant differences in mean responses according to free-lunch eligibility rate. The researcher did not anticipate the minimal hours of staff development in reading as reported by the survey respondents since reading is emphasized in the primary grades. Moreover, the No Child Left Behind Act of 2001 requires sustained professional development in research-based instructional strategies.

Teacher survey results revealed differences in the frequency of staff development opportunities provided for them during a school year. The largest percent of respondents (30.4%) reported receiving between 0-5 hours of staff development in reading during a school year. The smallest percent of respondents (16.8%) reported receiving between 11-15 hours of staff development in reading during a school year. Results of the ANOVA revealed no significance differences in mean responses according to current class enrollment.

The researcher found the expected consistency between the teacher and administrator survey results. Both groups indicated a need for additional staff development in reading.

*Finding 6:* Principals who participated in the Virginia K-3 Primary Class Size Reduction Program did not provide adequate staff development, designed specifically for small class instruction, to primary teachers.

Administrators who participated in the survey reported varying numbers of staff development opportunities designed specifically for small class instruction. The largest percent of respondents (72.9%) reported providing 1-3 staff development opportunities. The smallest percent of respondents (4.9%) reported providing 10 or more staff development opportunities. Results of the ANOVA indicated no significant differences in mean responses according to free-lunch eligibility rate.

Teachers participating in the survey reported varying numbers of staff development opportunities designed specifically for small class instruction. The largest percent of respondents (38.4%) reported no staff development opportunities designed for small class instruction was provided for them. The smallest percent of respondents (9.6%) reported 7 or more staff development opportunities. Results of the ANOVA revealed significant differences in mean responses according to current class enrollment. The mean of teachers with 18-20 students enrolled in their classes was 1.7826 indicating no staff development in this area. While teachers with 21-24 students enrolled in their classes had a mean of 2.4583 indicating 1-3 staff development activities related small class instruction.

This finding was surprising for the researcher because she expected the results to indicate increased staff development emphasizing strategies to address small class sizes. *Finding 7:* Based on the Spring 2006 SOL English Assessment results, the Virginia K-3 Primary Class Size Reduction Program benefited third grade students according to gender, socioeconomic status, and ethnicity.

The results of the administrator survey revealed that 79% of respondents reported small class size benefited minority students. In addition, 83.4% of respondents reported

small class size benefited economically disadvantaged students. These results were consistent with the teacher survey results which revealed 81.6% of respondents reported small class size benefited minority students.

Regression analysis results revealed that the range of class sizes was not a significant predictor of third grade English SOL pass rates for males or females participating in the class size reduction program. In addition, Pearson Correlation results indicated a negative relationship for both groups.

Economically disadvantaged students' performance on the third grade English SOL assessments could not be predicted using the range of class sizes as a variable according to the regression analysis. There also existed a negative correlation. Finally, the range of class sizes was not a significant predictor of performance of Black, Hispanic, or Asian students. There was a low correlation between the range of class sizes and student performance on the third grade Spring 2006 English SOL Assessment. A negative correlation existed for both Hispanic and Asian students.

The results were consistent with the researcher's hypothesis. She expected that each subgroup of students to receive a benefit from participation in the class size reduction program. Students representing each subgroup, with the exception of Black students, satisfied the minimum pass rate required on the third grade Spring 2006 English SOL Assessment regardless of the range of class sizes established by the program.

### Conclusions

Several themes emerged from the analysis of survey data, regression analysis, and paired samples T-test. First, small class size had a positive impact on the performance of third grade students on the criterion-referenced test, the Virginia Standards of Learning

(SOL) English Assessment. Students participating in the program performed as well as their counterparts whose schools did not qualify for the program. The mean pass rate on the Spring 2006 third grade English SOL Assessment was 81.6% for schools participating in the Virginia K-3 Primary Class Size Reduction Program compared with a mean pass rate of 84% for all schools. This finding was consistent with the results of Project STAR (Word et al., 1994) which noted increased achievement of students in grade three who were exposed to the small class treatment condition.

The second theme identified by the researcher was the implementation of research-based reading instructional strategies recommended by the National Reading Panel (2000). Over 90% of administrators responding to the survey reported observing phonics instruction, phonemic awareness instruction, fluency/oral reading activities, vocabulary lessons, and reading comprehension lessons. In addition, teachers reported implementing these strategies on a daily basis. This finding was inconsistent with the research conducted by Cahen et al. (1983) and Everston and Randolph (1989) who reported minimal differences in the instructional strategies implemented by teachers with small class sizes.

Another instructional benefit noted by teachers was increased interactions with students. Of the teacher survey respondents, 84% reported that the frequency of their interactions with students increased as a result of having fewer students. This finding was consistent with the research of Hargreaves, Galton, and Pell (1998).

The frequency of staff development in reading designed specifically for small class instruction emerged as a third theme. Of the teacher survey respondents, 70% reported receiving 0-3 staff development activities designed to assist them with

instructing smaller classes of students. The principals' responses were congruent as evidenced by 72.9% of them reporting that they provided 0-3 activities in this area for teachers during a school year. Researchers including Blatchford et al. (2003), Robinson and Wittebols (1986), and Torgesen (2002) identified appropriate staff development for meeting the needs of smaller classes of students as an area of concern. Thus, the experiences of teachers and principals participating in the Virginia K-3 Primary Class Size Reduction Program were similar to those observed by the aforementioned researchers.

The final theme identified by the researcher was third grade students benefited from participation in the program according gender, socioeconomic status, and ethnicity. Regression analysis results revealed that 7.9% of variance in grade 3 SOL English pass rates for male students and 6.5% of variance in grade 3 SOL English pass rates for female students could be predicted by class size. However, the pass rates for both groups exceeded the minimum of 75% required by the Virginia Department of Education with 79% of males and 83% of females passing the assessment. This finding was consistent with the research of Finn et al. (2001) and Nye et al. (2000) who found that small class sizes impacted achievement in reading especially for female students.

Although regression analysis results revealed that 0.5% of variance in grade 3 SOL English pass rates could be predicted by class size for economically disadvantaged students participating in the class size reduction program, they achieved a 75% pass rate on the assessment. Thus, they met the minimum requirement as established by the Virginia Department of Education. This finding was consistent with the research of Finn



et al. (2001), Nye et al. (2000), and Nye et al. (2001) who found a positive impact of small class sizes on the achievement of low socioeconomic status students.

Finally, the researcher found that class size was not a significant predictor of Spring 2006 SOL English pass rates for third grade minority students participating in the class size reduction program. The results of the regression analysis revealed that 0.9% of variance in pass rates for Black students, 1.1% of variance in pass rates for Hispanic students, and 3.1% of variance in pass rates for Asian students could be predicted by class size. Both Asian and Hispanic third grade students exceeded the minimum pass rate of 75%. However, Black students achieved a mean pass rate of 73%. Researchers including Finn et al. (2001), Nye et al. (2000), and Word et al. (1994) noted that although White students achieved higher scores than minority students when exposed to the small class treatment condition, the achievement gap was reduced. The researcher found that third grade minority students whose schools participated in the Virginia K-3 Primary Class Size Reduction Program scored significantly lower than White students on the Spring 2006 SOL English Assessment with the exception of Asian students.

#### Recommendations for Practice

Using information gleaned from the literature review and the results of this study, the researcher developed the following recommendations:

1. The Virginia K-3 Primary Class Size Reduction Program should be expanded to include grades four and five. As noted in the results of this research study, students derived a benefit from participation in the program in grades kindergarten through third grade.
2. The Virginia Department of Education should suggest professional development

requirements for school divisions participating in the Virginia K-3 Primary Class Size Reduction Program and provide adequate funding for implementation. This would ensure that class size reduction is coupled with sustained professional development.

3. Principals should conduct a needs assessment to determine the adequacy of the current professional development activities in reading provided to teachers employed in schools participating in the Virginia K-3 Primary Class Size Reduction Program.
4. The Virginia Department of Education should develop an evaluation instrument to assess the effectiveness of the Virginia K-3 Primary Class Size Reduction Program as there is currently no means to evaluate the initiative. The evaluation instrument should include assessment data such as SOL scores and PALS scores in addition to principal and teacher survey questions. This would assist the Virginia Department of Education with ensuring the continuous improvement of the program.

#### Suggestions for Future Studies

As a result of this study, the researcher developed several recommendations for future research:

1. A longitudinal study should be conducted to determine whether there are enduring effects of participating in the Virginia K-3 Primary Class Size Reduction Program. The performance of students who participated in the program for four years could be tracked using Virginia Standards of Learning Assessments in Reading for fifth, sixth, and eighth grades.

2. A qualitative study should be conducted involving focus groups of teachers and principals from across the Commonwealth of Virginia to determine their perceptions of how the Virginia K-3 Primary Class Size Reduction Program impacts the instructional strategies implemented in primary classrooms. The focus group discussions should be coupled with observations of reading lessons to compare responses with observed behaviors.
3. A qualitative study should be conducted involving focus groups of principals and teachers to explore the processes used to plan, execute, and sustain professional development in reading for schools participating in the Virginia K-3 Primary Class Size Reduction Program. The focus group discussions should be coupled with observations of professional development planning sessions and activities.
4. The present study should be replicated to explore the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in mathematics. This would enable the researcher to determine whether the program exerts a similar impact on student achievement in math as compared with reading.
5. A longitudinal study should be conducted to explore the Virginia K-3 Primary Class Size Reduction Program as a growth model by determining its annual impact on student achievement in reading and math at the conclusion of kindergarten, first grade, second grade, and third grade.
6. The present study should be replicated to explore the differences in administrator and teacher survey responses based on demographic information such as years of experience, location of school, and gender.

7. The present study should be replicated using a smaller, controlled sample of schools.

### Reflections

Participating in this research study was an enlightening experience for several reasons. First, I learned about the history of the Virginia K-3 Primary Class Size Reduction Program. As an elementary school principal whose school participated in the program, I had minimal knowledge about its inception. The literature review provided essential information regarding the link between legislation in Virginia and the goals of the class size reduction program.

Second, the research study enabled me to analyze student achievement data from schools across the Commonwealth of Virginia in an effort to determine whether students reaped the benefits of smaller class sizes. Conversations with teachers and administrators piqued my interest in the topic several years ago because of the prevailing belief that smaller class sizes would improve student achievement. The findings of this research study were consistent with the opinions shared by many educators.

And thirdly, my research study did not provide a viable solution for the dilemma regarding the absence of adequate professional development to address instructional strategies designed specifically for small class sizes. Teachers and principals who participated in the research study were consistent in their need for more support in this area. As a result, professional development continues to be a topic requiring additional research in the future.

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Appendix A

Administrator Letter and Survey

Dear Administrator:

I am gathering data for my dissertation in Educational Leadership and Policy Studies at Virginia Polytechnic Institute and State University, and want to invite you to participate in a survey about the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading.

This is a statewide study that includes principals and selected teachers from all schools participating in the program. Your participation is voluntary. You have valuable information to share about the impact of the program on your primary grade students that would be of great value to my study. Your responses will be strictly confidential; all replies are anonymous, and no individual or school will be named in any report of this research. All data will be reported in a summative manner.

I hope you will take the time needed to thoughtfully complete this survey which reflects an important concern for most educators. The link below will connect you to the survey. The survey will take approximately 15 minutes to complete. After completing the survey, click on the 'Submit' button. There is also a link to a teacher survey. Please have one teacher from your school who teaches kindergarten, first, second, or third grade complete the survey.

Should you have any questions or concerns, please feel welcome to contact me at yah905@msn.com or (757) 825-4638.

Knowing how busy you are throughout the school year, please know in advance how appreciative I am of your time and effort to share your professional insights.

Sincerely,

Yvonne A. Holloman

Doctoral Candidate

**Administrator Perceptions of the Impact of the  
Virginia K-3 Primary Class Size Reduction Program**

Please answer the following questions based on your experiences during the 2005-2006 school year. For the following questions, please choose one response, unless otherwise noted.

- 1) How much time do primary teachers at your school spend providing reading instruction daily?
  - 0 - 30 minutes
  - 31- 60 minutes
  - 61- 90 minutes
  - More than 90 minutes
  
- 2) How often do you observe reading lessons in primary classrooms?
  - 0 - 3 times per week
  - 4 - 6 times per week
  - 7- 10 times per week
  - More than 10 times per week
  
- 3) Which of the following activities have you observed during your visits to primary classrooms in your school? (Check all that apply)
  - Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons
  
- 4) Which of the following best describe the components included in your primary teachers' reading lesson plans? (Check all that apply)
  - Guided reading lessons
  - Vocabulary development lessons
  - Oral reading/fluency activities
  - Reading comprehension activities
  - Phonics activities
  - Phonemic awareness activities
  
- 5) Have you compared the quality of primary teachers' reading lesson plans before and after the implementation of the class size reduction program?
  - Yes
  - No
  
- 6) What strategies of primary teachers' reading lesson plans changed as a result of implementing the class size reduction program?
  - More individualized lessons
  - More small group lessons
  - More phonemic awareness lessons
  - More phonics lessons
  - More fluency lessons
  - More reading comprehension lessons

- More vocabulary lessons
  - No changes were observed
- 7) How often have you observed phonics lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 8) How often have you observed phonemic awareness lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 9) How often have you observed vocabulary development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 10) How often have you observed reading comprehension lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 11) How often have you observed fluency development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 12) How many hours of professional development in reading are provided to your primary teachers during a school year?
- 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours
- 13) Which of the following influences how professional development in reading is designed for your primary teachers?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office

- 14) Which of the following best describe how you sustain professional development for your teachers? (Check all that apply)
- Peer coaching
  - Classroom observations
  - Lesson plan reviews
  - Grade-level meetings
- 15) During the past year, how many professional development activities, regarding instructional strategies designed specifically for small class instruction, have been provided for primary teachers?
- 0-3
  - 4-6
  - 7-9
  - 10 or more
- 16) How do your primary classrooms differ from classrooms that don't have reduced class sizes? (Check all that apply)
- More individualized instruction
  - More small group activities
  - More higher-level questioning strategies
  - More cooperative groups
  - No differences have been observed
- 17) How has instruction changed in your primary classes as a result of the Virginia K-3 Primary Class Size Reduction Program? (Check all that apply)
- Increased student-teacher interactions
  - Increased guided reading groups
  - Increased modeling of instructional strategies by teachers
  - Increased explicit phonics instruction
  - Increased phonemic awareness instruction
  - Increased fluency/oral reading activities
  - Increased reading comprehension activities
  - No changes have been observed
- 18) To what extent do you feel implementation of the Virginia K-3 Primary Class Size Reduction Program has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all

**ADMINISTRATOR DEMOGRAPHICS:** Please answer the following questions about your school and yourself.



- 1) Indicate the highest degree you have obtained.
  - Master's Degree
  - Master's Degree plus 30 hours
  - Educational Specialists/Certificate of Advanced Graduate Studies
  - Doctorate
  
- 2) Which of the following best describes the community that your school serves?
  - Urban
  - Suburban
  - Rural
  
- 3) Which of the following best describes the size of your school district?
  - Less than 5,000 students
  - 5,000 – 10,999 students
  - 11,000 – 20,999 students
  - 21,000 – 30,999 students
  - More than 30,999 students
  
- 4) How many years have you served as a principal?
  - 1-5
  - 6-10
  - 11-15
  - More than 15 years
  
- 5) What is your gender?
  - Male
  - Female
  
- 6) Which of the following best describes the free lunch eligibility rate for your school?
  - 16% - 29%
  - 30% - 44%
  - 45% - 54%
  - 55% - 64%
  - 65% - 69%
  - 70% - 74%
  - 75% or above
  
- 7) During the 2005-2006 school year, did your school employ teachers whose salaries were funded using federal dollars from Title II, Part A?
  - Yes
  - No

Appendix B

Survey Validation Instrument – Administrator Survey

**Survey Pilot Test**

**Purpose:** To determine the reliability and validity of the survey by reviewing questions for content (does the survey measure what it is expected to measure?) and clarity (is the survey easy for respondents to understand?)

**Procedures:**

- 1) Read each survey question below.
- 2) Circle the number corresponding with the appropriate research question listed in the key. Which research question do you think the survey question is related to?
- 3) Circle the number corresponding with the clarity rating listed in the key.
- 4) Circle the number corresponding with the association rating listed in the key.

**Key**

**Research Questions:**

- 1 = Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?
- 2 = Has the reduced class sizes impacted the reading instructional strategies used by teachers?
- 3 = Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?

**Clarity:**

- 1 = Very difficult to understand
- 2 = Difficult to understand
- 3 = Somewhat easy to understand
- 4 = Easy to understand
- 5 = Very easy to understand

**Association:**

- 1 = Very weakly associated with research question
- 2 = Weakly associated with research question
- 3 = Associated with research question
- 4 = Strongly associated with research question
- 5 = Very strongly associated with research question

Please answer the following questions based on your experiences during the 2005-2006 school year. For the following questions, please choose one response, unless otherwise noted.

- 1) How much time do primary teachers at your school spend providing reading instruction daily?
- 0 - 30 minutes
  - 31- 60 minutes
  - 61- 90 minutes
  - More than 90 minutes

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 2) How often do you observe reading lessons in primary classrooms?
- 0 - 3 times per week
  - 4 - 6 times per week
  - 7- 10 times per week
  - More than 10 times per week

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 3) Which of the following activities have you observed during your visits to primary classrooms in your school? (Check all that apply)
- Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 4) Which of the following best describe the components included in your primary teachers' reading lesson plans? (Check all that apply)
- Guided reading lessons
  - Vocabulary development lessons
  - Oral reading/fluency activities
  - Reading comprehension activities
  - Phonics activities
  - Phonemic awareness activities

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 5) Have you compared the quality of primary teachers' reading lesson plans before and after the implementation of the class size reduction program?
- Yes
  - No

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 6) What components of primary teachers' reading lesson plans changed as a result of implementing the class size reduction program? (Check all that apply)
- More individualized lessons
  - More small group lessons
  - More phonemic awareness lessons
  - More phonics lessons
  - More fluency lessons
  - More reading comprehension lessons
  - More vocabulary lessons
  - No changes were observed

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 7) How often have you observed phonics lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 8) How often have you observed phonemic awareness lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 9) How often have you observed vocabulary development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 10) How often have you observed reading comprehension lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 11) How often have you observed fluency development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 12) How many hours of professional development in reading are provided to your primary teachers during a school year?
- 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 13) Which of the following influences how professional development in reading is designed for your primary teachers?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

14) Which of the following best describe how you sustain professional development for your teachers? (Check all that apply)

- Peer coaching
- Classroom observations
- Lesson plan reviews
- Grade-level meetings

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

15) During the past year, how many professional development activities, regarding instructional strategies designed specifically for small class instruction, have been provided for primary teachers?

- 0-3
- 4-6
- 7-9
- 10 or more

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

16) How do your primary classrooms differ from classrooms that don't have reduced class sizes? (Check all that apply)

- More individualized instruction
- More small group activities
- More higher-level questioning strategies
- More cooperative groups
- No differences have been observed

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

17) How has instruction changed in your primary classes as a result of the Virginia K-3 Primary Class Size Reduction Program? (Check all that apply)

- Increased student-teacher interactions
- Increased guided reading groups
- Increased modeling of instructional strategies by teachers
- Increased explicit phonics instruction
- Increased phonemic awareness instruction
- Increased fluency/oral reading activities
- Increased reading comprehension activities
- No changes have been observed

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 18) To what extent do you feel implementation of the Virginia K-3 Primary Class Size Reduction Program has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all

Research Question			Clarity					Association				
1	2	3	1	2	3	4	5	1	2	3	4	5

Adapted from “Teacher Beliefs About the Outcomes of High-Stakes Testing and Measurement-Driven Instruction in Virginia’s Public Schools,” Dale E. Margheim, 2001.

Appendix C

Teacher Letter and Survey

Dear Primary Teacher:

I am gathering data for my dissertation in Educational Leadership and Policy Studies at Virginia Polytechnic Institute and State University, and want to invite you to participate in a survey about teachers' perceptions of the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading.

This is a statewide study that includes principals and teachers from schools participating in the program. Your participation is voluntary. You have valuable information to share about the program's impact on student achievement that would be of great value to my study. Your responses will be strictly confidential; all replies are anonymous, and no individual or school will be named in any report of this research. All data will be reported in a summative manner.

I hope you will take the time needed to thoughtfully complete this survey which reflects an important concern for most educators. The link below will connect you to the survey. The survey will take approximately 15 minutes to complete. After completing the survey, click on the 'Submit' button.

Should you have any questions or concerns, please feel welcome to contact me at yah905@msn.com or (757) 825-4638.

Knowing how busy you are throughout the school year, please know in advance how appreciative I am of your time and effort to share your professional insights.

Sincerely,

Yvonne A. Holloman  
Doctoral Candidate



**Teacher Perceptions of the Impact of the  
Virginia K-3 Primary Class Size Reduction Program**

For the following questions, please choose one response, unless otherwise noted.

- 1) How much total time do you spend providing reading instruction daily?
  - 0 - 30 minutes
  - 31- 60 minutes
  - 61- 90 minutes
  - More than 90 minutes
  
- 2) To what extent do you feel small class size impacts student performance on the PALS (Phonological Awareness Literacy Screening)?
  - Significantly
  - Moderately
  - Rarely
  - Not at all
  
- 3) Which of the following reading strategies do you implement daily?  
(Check all that apply)
  - Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons
  
- 4) How much time do you spend teaching guided reading group lessons daily?
  - 0 - 20 minutes
  - 21-40 minutes
  - 41- 60 minutes
  - More than 60 minutes
  
- 5) How often do you teach phonics and phonemic awareness lessons during a school year?
  - 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
  
- 6) How many hours of professional development in reading are provided to you during a school year?
  - 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours

- 7) To what extent do you feel implementation small class size has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all
- 8) How often do you teach reading comprehension lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 9) Which of the following best describe how you implement new reading strategies learned during professional development?
- Peer coaching
  - Observations of other teachers
  - Lesson planning with other teachers
  - Team teaching
- 10) Which of the following best describe how professional development in reading is designed for you?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office
- 11) To what extent do you feel small class size impacts the performance of minority students on the English SOL Assessments?
- Significantly
  - Moderately
  - Rarely
  - Not at all
- 12) During the past year, how many professional development activities regarding instructional strategies designed specifically for small class instruction have been provided for you?
- None
  - 1-3
  - 4-6
  - 7 or more
- 13) How often do you teach vocabulary development lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

14) How have you changed your reading instruction as a result of having a reduced class size?

(Check all that apply)

- Increased student-teacher interactions
- Increased guided reading groups
- Increased modeling of instructional strategies
- Increased explicit phonics instruction
- Increased phonemic awareness instruction
- Increased fluency/oral reading activities
- Increased reading comprehension activities
- No changes have been made

15) What differences have you noticed in student learning behaviors as a result of having a reduced class size? (Check all that apply)

- More time on task
- More student participation during lessons
- Positive climate
- Increased homework completion
- Increased class work completion
- No differences have been observed

**TEACHER DEMOGRAPHICS:** Please answer the following questions about your school and yourself.

1) Indicate the highest degree you have obtained.

- Bachelor's Degree
- Master's Degree
- Master's Degree plus 30 hours
- Educational Specialists/Certificate of Advanced Graduate Studies
- Doctorate

2) Which of the following best describe the community that your school serves?

- Urban
- Suburban
- Rural

3) Which of the following best describe the size of your school district?

- Less than 5,000 students
- 5,000 – 10,999 students
- 11,000 – 20,999 students
- 21,000 – 30,999 students
- More than 30,999 students

4) What grade-level do you currently teach?

- Kindergarten
- First
- Second
- Third

- 5) What is the total number of years that you have taught in elementary school?
- 1-5
  - 6-10
  - 11-15
  - More than 15 years
- 6) How many students are currently enrolled in your class?
- 15 - 17
  - 18 - 20
  - 21 - 24
- 7) Do you have a teacher's assistant working with you?
- Yes
  - No
- 8) What is your gender?
- Male
  - Female

Appendix D

Survey Validation Instrument – Teacher Survey

**Survey Pilot Test**

**Purpose:** To determine the reliability and validity of the survey by reviewing questions for content (does the survey measure what it is expected to measure?) and clarity (is the survey easy for respondents to understand?)

**Procedures:**

- 1) Read each survey question below.
- 2) Circle the number corresponding with the appropriate research question listed in the key. Which research question do you think the survey question is related to?
- 3) Circle the number corresponding with the clarity rating listed in the key.
- 4) Circle the number corresponding with the association rating listed in the key.

**Key**

**Research Questions:**

- 1 = How has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?
- 2 = What has been the impact of reduced class sizes on the reading instructional strategies used by teachers?
- 3 = How has the Virginia K-3 Primary Class Size Reduction Program influenced the professional development in reading provided to teachers?

**Clarity:**

- 1 = Very difficult to understand
- 2 = Difficult to understand
- 3 = Somewhat easy to understand
- 4 = Easy to understand
- 5 = Very easy to understand

**Association:**

- 1 = Very weakly associated with research question
- 2 = Weakly associated with research question
- 3 = Associated with research question
- 4 = Strongly associated with research
- 5 = Very strongly associated with research question

- 1) How much total time do you spend providing reading instruction daily?
- 0 - 30 minutes
  - 31- 60 minutes
  - 61- 90 minutes
  - More than 90 minutes

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 2) To what extent do you feel small class size impacts student performance on the PALS (Phonological Awareness Literacy Screening)?
- Significantly
  - Moderately
  - Rarely
  - Not at all

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 3) Which of the following reading strategies do you implement daily?  
(Check all that apply)
- Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 4) How much time do you spend teaching guided reading group lessons daily?
- 0 - 20 minutes
  - 21-40 minutes
  - 41- 60 minutes
  - More than 60 minutes

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 5) How often do you teach phonics and phonemic awareness lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 6) How many hours of professional development in reading are provided to you during a school year?
- 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 7) To what extent do you feel having a small class size has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 8) How often do you teach reading comprehension lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 9) Which of the following best describe how you implement new reading strategies learned during professional development?
- Peer coaching
  - Observations of other teachers
  - Lesson planning with other teachers
  - Team teaching

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 10) Which of the following best describe how professional development in reading is designed for you?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 11) To what extent do you feel small class size impacts the performance of minority students on the English SOL Assessments?
- Significantly
  - Moderately
  - Rarely
  - Not at all

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 12) During the past year, how many professional development activities regarding instructional strategies designed specifically for small class instruction have been provided for you?
- None
  - 1-3
  - 4-6
  - 7 or more

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 13) How often do you teach vocabulary development lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5



14) How have you changed your reading instruction as a result of having a reduced class size?

(Check all that apply)

- Increased student-teacher interactions
- Increased guided reading groups
- Increased modeling of instructional strategies
- Increased explicit phonics instruction
- Increased phonemic awareness instruction
- Increased fluency/oral reading activities
- Increased reading comprehension activities
- No changes have been made

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

15) What differences have you noticed in student learning behaviors as a result of having a reduced class size? (Check all that apply)

- More time on task
- More student participation during lessons
- Positive climate
- Increased homework completion
- Increased class work completion
- No differences have been observed

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

Adapted from “Teacher Beliefs About the Outcomes of High-Stakes Testing and Measurement-Driven Instruction in Virginia’s Public Schools,” Dale E. Margheim, 2001.

Appendix E

Letter to Division Superintendents

Dear Superintendent:

I am gathering data for my dissertation in Educational Leadership and Policy Studies at Virginia Polytechnic Institute and State University, and want to invite your principals and teachers to participate in a survey about the impact of the Virginia K-3 Primary Class Size Reduction Program on student achievement in reading.

This is a statewide study that includes principals and teachers from schools participating in the program. Your principals and teachers have valuable information to share about the program's impact on student achievement. Their responses will be strictly confidential; all replies are anonymous, and no individual or school will be named in any report of this research. All data will be reported in a summative manner.

The following schools from your school district have been selected for participation in the study:

Please indicate below whether permission will be granted for your principals and teachers to participate in the survey by completing and returning the bottom portion of this letter in the envelope provided.

Should you have any questions or concerns, please feel welcome to contact me at yah905@msn.com or (757) 825-4638.

Thank you for your assistance with this endeavor.

Sincerely,

Yvonne A. Holloman  
Doctoral Candidate

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**Permission to Participate**

Permission to participate in the research study *The Impact of the Virginia K-3 Class Size Reduction Program on Student Achievement in Reading*:

(please check  the appropriate response)

has been granted

has not been granted

to schools from the \_\_\_\_\_ School District.

Superintendent's Signature \_\_\_\_\_

Date \_\_\_\_\_

Appendix F

Institution Review Board Initial Review Application

Appendix G

Institutional Review Board Request for Exempt Review

Appendix H

Administrator Survey Validation Table

The Impact of

	Research Question			Clarity					Association				
	1	2	3	1	2	3	4	5	1	2	3	4	5
1	25%	75%				37.5%	25%	50%	25%	25%	50%	12.5%	12.5%
2	14.2%	85%		12.5%		37.5%	12.5%	37.5%	25%	37.5%	25%	12.5%	12.5%
3	14.2%	85%			25%		12.5%	62.5%	12.5%	12.5%	37.5%	25%	12.5%
4	12.5%	75%	12.5%		14.2%	14.2%		71%	42.8%	42.8%	14.2%	14.2%	28.5%
5	37.5%	62.5%				37.5%	25%	25%	14.2%	14.2%	42.8%	25%	14.2%
6	12.5%	62.5%	25%			12.5%	37.5%	50%	12.5%	12.5%	25%	62.5%	
7		100%				12.5%	50%	37.5%	12.5%	12.5%	37.5%	12.5%	37.5%
8	12.5%	87.5%				12.5%	25%	62.5%	12.5%	12.5%	37.5%	12.5%	37.5%
9		100%				28.5%	14.2%	57.1%		12.5%	50%		37.5%
10		100%				25%	25%	50%		12.5%	50%		37.5%
11		100%				25%	25%	50%		12.5%	37.5%	12.5%	37.5%
12		100%				12.5%	25%	50%			37.5%		62.5%
13		14.2%				25%	12.5%	50%		12.5%	25%	25%	37.5%
14		100%			12.5%		37.5%	50%		12.5%	25%	25%	37.5%
15		100%				12.5%	25%	50%			37.5%		62.5%
16	57%	42.8%				12.5%	25%	50%			12.5%	12.5%	50%
17	25%	75%				25%	25%	50%		12.5%	25%	37.5%	25%
18	100%					12.5%	25%	62.5%		12.5%	28.5%	12.5%	50%

Appendix I

Second Survey Validation Instrument – Administrator Survey

**Survey Pilot Test**

**Purpose:** To determine the reliability and validity of the survey by reviewing questions for content (does the survey measure what it is expected to measure?) and clarity (is the survey easy for respondents to understand?)

- Procedures:**
- 5) Read each survey question below.
  - 6) Circle the number corresponding with the appropriate research question listed in the key. Which research question do you think the survey question is related to?
  - 7) Circle the number corresponding with the clarity rating listed in the key.
  - 8) Circle the number corresponding with the association rating listed in the key.

**Key**

<p><b><u>Research Questions:</u></b></p> <p>1 = Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?</p> <p>2 = Have the reduced class sizes impacted the reading instructional strategies used by teachers?</p> <p>3 = Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?</p> <p><b><u>Association:</u></b></p> <p>1 = Very weakly associated with research question</p> <p>2 = Weakly associated with research question</p> <p>3 = Associated with research question</p> <p>4 = Strongly associated with research question</p> <p>5 = Very strongly associated with research question</p> <p><b><u>Clarity:</u></b></p> <p>1 = Very difficult to understand</p> <p>2 = Difficult to understand</p> <p>3 = Somewhat easy to understand</p> <p>4 = Easy to understand</p> <p>5 = Very easy to understand</p>
--

Please answer the following questions based on your experiences during the 2005-2006 school year. For the following questions, please choose one response, unless otherwise noted.

- 1) Have your PALS (Phonological Awareness Literacy Screening) scores improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 2) What types of training, related to reading instructional strategies for use with small class sizes, have your primary teachers received? (Check all that apply)
- Reading comprehension instruction
  - Individualized reading instruction
  - Guided reading instruction
  - Recording and analyzing running records
  - Phonics and phonemic awareness instruction
  - Recording and analyzing running records

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 3) Has the performance of minority students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 4) Have the number of students retained in grades K-3 decreased since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5

- 5) Has the performance of economically disadvantaged students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No

Research Question			Association					Clarity				
1	2	3	1	2	3	4	5	1	2	3	4	5



Appendix J

Second Administrator Survey Validation Table

The Impact of

	Research Question			Clarity					Association				
	1	2	3	1	2	3	4	5	1	2	3	4	5
1	100%							100%					
2			100%				30%	70%				18%	63%
3	90%	10%						100%			20%	20%	60%
4	80%	20%					30%	70%		10%	10%	30%	60%
5	100%						30%	70%		10%	30%	30%	30%
											20%	30%	50%

Appendix K

Final Administrator Survey

**Administrator Perceptions of the Impact of the  
Virginia K-3 Primary Class Size Reduction Program**

Please answer the following questions based on your experiences during the 2005-2006 school year. For the following questions, please choose one response, unless otherwise noted.

- 1) Have your PALS (Phonological Awareness Literacy Screening) scores improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
  - Yes
  - No
  
- 2) How often do you observe reading lessons in primary classrooms?
  - 0 - 3 times per week
  - 4 - 6 times per week
  - 7- 10 times per week
  - More than 10 times per week
  
- 3) Which of the following activities have you observed during your visits to primary classrooms in your school? (Check all that apply)
  - Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons
  
- 4) What type of training, related to reading instructional strategies for use with small class sizes, have your primary teachers received? (Check all that apply)
  - Reading comprehension instruction
  - Individualized reading instruction
  - Guided reading instruction
  - Recording and analyzing running records
  - Phonics and phonemic awareness instruction
  
- 5) How often have you observed phonics lessons in your primary classrooms during a school year?
  - 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

- 6) Has the performance of minority students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No
- 7) How often have you observed phonemic awareness lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 8) Has the performance of economically disadvantaged students on the English SOL Assessments improved since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No
- 9) How often have you observed vocabulary development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 10) How often have you observed reading comprehension lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 11) Has the number of students retained in grades K-3 decreased since your school began participating in the Virginia K-3 Primary Class Size Reduction Program?
- Yes
  - No
- 12) How often have you observed fluency development lessons in your primary classrooms during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

- 13) How many hours of training in reading instructional strategies are provided to your primary teachers during a school year?
- 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours
- 14) Which of the following influences how training in the implementation of reading instructional strategies is designed for your primary teachers?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office
- 15) Which of the following best describe how you sustain professional development for your teachers? (Check all that apply)
- Peer coaching
  - Classroom observations
  - Lesson plan reviews
  - Grade-level meetings
- 16) During the past year, how many professional development activities, regarding instructional strategies designed specifically for small class instruction, have been provided for primary teachers?
- 0-3
  - 4-6
  - 7-9
  - 10 or more
- 17) To what extent do you feel implementation of the Virginia K-3 Primary Class Size Reduction Program has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all
- 18) What percentage of **kindergarten** students at your school met the PALS benchmark in Fall 2005?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above
- 19) What percentage of **kindergarten** students at your school met the PALS benchmark in Spring 2006?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above

- 20) What percentage of **first grade** students at your school met the PALS benchmark in Fall 2005?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above
- 21) What percentage of **first grade** students at your school met the PALS benchmark in Spring 2006?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above
- 22) What percentage of **second grade** students at your school met the PALS benchmark in Fall 2005?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above
- 23) What percentage of **second grade** students at your school met the PALS benchmark in Spring 2006?
- 0-20%
  - 21% - 40%
  - 41% - 60%
  - 61% - 80%
  - 81% or above

**ADMINISTRATOR DEMOGRAPHICS:** Please answer the following questions about your school and yourself.

- 1) Indicate the highest degree you have obtained.
  - Master's Degree
  - Master's Degree plus 30 hours
  - Educational Specialists/Certificate of Advanced Graduate Studies
  - Doctorate
  
- 2) Which of the following best describe the community that your school serves?
  - Urban
  - Suburban
  - Rural
  
- 3) Which of the following best describe the size of your school district?
  - Less than 5,000 students
  - 5,000 – 10,999 students
  - 11,000 – 20,999 students
  - 21,000 – 30,999 students
  - More than 30,999 students

- 4) How many years have you served as a principal?
  - 1-5
  - 6-10
  - 11-15
  - More than 15 years
  
- 5) What is your gender?
  - Male
  - Female
  
- 6) Which of the following best describe the free lunch eligibility rate for your school?
  - 16% - 29%
  - 30% - 44%
  - 45% - 54%
  - 55% - 64%
  - 65% - 69%
  - 70% - 74%
  - 75% or above
  
- 7) During the 2005-2006 school year, did your school employ teachers whose salaries were funded using federal dollars from Title II, Part A?
  - Yes
  - No

Appendix L

Teacher Survey Validation Table



The Impact of

	Research Question			Clarity					Association				
	1	2	3	1	2	3	4	5	1	2	3	4	5
1	20%	60%	20%								40%	40%	20%
2	100%						40%	60%				60%	40%
3		80%	20%				40%	60%				20%	80%
4		80%	20%				40%	60%			20%	40%	40%
5		100%					80%	20%			40%	40%	20%
6		20%	80%				20%	80%				40%	60%
7	100%						20%	80%				20%	80%
8		100%					80%	20%				80%	20%
9			100%				40%	60%				20%	80%
10			100%		20%		40%	20%			40%	20%	40%
11	80%	20%			40%		20%	40%			20%	40%	40%
12		20%	80%				20%	60%				40%	60%
13		100%					60%	20%			20%	40%	40%
14	100%						40%	60%				40%	100%
15	60%	40%				20%	20%	60%		40%	20%	20%	20%

Appendix M

Final Teacher Survey

**Teacher Perceptions of the Impact of the  
Virginia K-3 Primary Class Size Reduction Program**

For the following questions, please choose one response, unless otherwise noted.

- 1) To what extent do you feel small class size impacts student performance on the PALS (Phonological Awareness Literacy Screening)?
  - Significantly
  - Moderately
  - Rarely
  - Not at all
  
- 2) Which of the following reading strategies do you implement daily?  
(Check all that apply)
  - Phonics instruction
  - Phonemic awareness instruction
  - Fluency/oral reading activities
  - Vocabulary lessons
  - Reading comprehension lessons
  
- 3) How much time do you spend teaching guided reading group lessons daily?
  - 0 - 20 minutes
  - 21-40 minutes
  - 41- 60 minutes
  - More than 60 minutes
  
- 4) How often do you teach phonics and phonemic awareness lessons during a school year?
  - 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
  
- 5) How many hours of professional development in reading are provided to you during a school year?
  - 0-5 hours
  - 6-10 hours
  - 11-15 hours
  - 16 or more hours

- 6) To what extent do you feel having a small class size has improved student achievement in reading?
- Significantly
  - Moderately
  - Rarely
  - Not at all
- 7) How often do you teach reading comprehension lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions
- 8) Which of the following best describe how you implement new reading strategies learned during professional development?
- Peer coaching
  - Observations of other teachers
  - Lesson planning with other teachers
  - Team teaching
- 9) Which of the following best describe how professional development in reading is designed for you?
- Needs assessment results
  - Feedback from observations
  - Assessment results (i.e. Benchmark data, PALS data, etc.)
  - Mandates from the central office
- 10) To what extent do you feel small class size impacts the performance of minority students on the English SOL Assessments?
- Significantly
  - Moderately
  - Rarely
  - Not at all
- 11) During the past year, how many professional development activities regarding instructional strategies designed specifically for small class instruction have been provided for you?
- None
  - 1-3
  - 4-6
  - 7 or more
- 12) How often do you teach vocabulary development lessons during a school year?
- 0-9 occasions
  - 10-20 occasions
  - 21-30 occasions
  - More than 30 occasions

13) How have you changed your reading instruction as a result of having a reduced class size?

(Check all that apply)

- Increased student-teacher interactions
- Increased guided reading groups
- Increased modeling of instructional strategies
- Increased explicit phonics instruction
- Increased phonemic awareness instruction
- Increased fluency/oral reading activities
- Increased reading comprehension activities
- No changes have been made

**TEACHER DEMOGRAPHICS:** Please answer the following questions about your school and yourself.

9) Indicate the highest degree you have obtained.

- Bachelor's Degree
- Master's Degree
- Master's Degree plus 30 hours
- Educational Specialists/Certificate of Advanced Graduate Studies
- Doctorate

10) Which of the following best describe the community that your school serves?

- Urban
- Suburban
- Rural

11) Which of the following best describe the size of your school district?

- Less than 5,000 students
- 5,000 – 10,999 students
- 11,000 – 20,999 students
- 21,000 – 30,999 students
- More than 30,999 students

12) What grade-level do you currently teach?

- Kindergarten
- First
- Second
- Third

13) What is the total number of years that you have taught in elementary school?

- 1-5
- 6-10
- 11-15
- More than 15 years

14) How many students are currently enrolled in your class?

- 15 - 17
- 18 - 20
- 21 - 24

15) Do you have a teacher's assistant working with you?

- Yes
- No

16) What is your gender?

- Male
- Female

## Appendix N

**Protocol for Non-Respondents' Telephone Survey**

Directions: Contact randomly selected non-respondents by telephone and ask them each question listed below.

**Non-respondent's Name** \_\_\_\_\_

**School Division** \_\_\_\_\_ **School** \_\_\_\_\_

**Date** \_\_\_\_\_ **Time** \_\_\_\_\_

**Telephone Number** \_\_\_\_\_

**Telephone Survey Questions:**

- 1) Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?
- 2) Have the reduced class sizes impacted the reading instructional strategies used by teachers?
- 3) Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?
- 4) Did the Virginia K-3 Primary Class Size Reduction Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?
- 5) Is there a reason that you decided not to participate in the survey that was sent to you via email and U.S. mail?
- 6) Would you be willing to allow one teacher representing grades kindergarten through third to complete a survey about class size reduction?

Appendix O

**Responses to the Non-Respondents' Telephone Survey**

Telephone survey question 1: Has the Virginia K-3 Primary Class Size Reduction Program impacted student achievement in reading as measured by third grade SOL scores in reading and PALS scores for kindergarten through second grade?

Respondent #1 – “It does impact it, but our county has had small class sizes.”

Respondent #2 – “Yes.”

Respondent #3 – “Yes.”

Respondent #4 – “Yes.”

Respondent #5 – “Yes.”

Respondent #6 – “No.”

Respondent #7 – “No.”

Respondent #8 – “Significantly. We have shown gains.”

Respondent #9 – “Yes.”

Respondent #10 – “We are a very small school with a Reading First grant. Can't say whether one thing has an impact.”

Respondent #11 – “Yes, it made a major impact for every child.”

Respondent #12 – “In general, I think it has.”

Respondent #13 – “It has not been helpful. I have 25 students in each class. I have good test results because of good teachers.”

Respondent #14 – “Yes, in PALS.”

Respondent #15 – “No, I haven't seen changes.”

Respondent #16 – “Yes, we are a very large school. I have seen no major change in class size.”

Respondent #17 – “All scores are very good. Class sizes are good, but I don’t think it has an impact.”

Respondent #18 – “No.”

Telephone survey question 2: Have the reduced class sizes impacted the reading instructional strategies used by teachers?

Respondent #1 – “Not sure that has had an impact. The county has provided lots of resources like Reading Recovery and reading specialists.”

Respondent #2 – “Yes.”

Respondent #3 – “Yes.”

Respondent #4 – “I don’t know if it has impacted because we have been doing it for so long.”

Respondent #5 – “No. We have been doing more strategies all the time. I can’t say that small classes helped.”

Respondent #6 – “No.”

Respondent #7 – “Yes.”

Respondent #8 – “We are using the Reading First grant so that gives us more opportunities for training.”

Respondent #9 – “Yes.”

Respondent #10 – “We are a Reading First school. We use a variety of strategies like small groups.”

Respondent #11 – “Yes.”



Respondent #12 – “Yes.”

Respondent #13 – “Yes.”

Respondent #14 – “Yes.”

Respondent #15 – “Yes, but it’s a slow, small change.”

Respondent #16 – “The school has between 20-22 students.”

Respondent #17 – “I don’t think so.”

Respondent #18 – “No.”

Telephone survey question 3: Have teachers participating in the Virginia K-3 Primary Class Size Reduction Program received related staff development in reading?

Respondent #1 – “Yes.”

Respondent #2 – “Yes.”

Respondent #3 – “Yes.”

Respondent #4 – “Yes.”

Respondent #5 – “Yes.”

Respondent #6 – “I don’t think we participated in the program.”

Respondent #7 – “Yes.”

Respondent #8 – “Yes.”

Respondent #9 – “Yes.”

Respondent #10 – “Yes.”

Respondent #11 – “Yes.”

Respondent #12 – “Yes.”

Respondent #13 – “Yes.”

Respondent #14 – “Yes.”

Respondent #15 – “Yes.”

Respondent #16 – “Yes through Reading First. We have had 20 hours of training.”

Respondent #17 – “Yes.”

Respondent #18 – “Yes.”

Telephone survey question 4: Did the Virginia K-3 Primary Class Size Reduction

Program show greater benefit to students according to gender, socioeconomic status, or ethnicity as measured by third grade SOL scores in reading?

Respondent #1 – “No for gender. We don’t have enough diversity. It helps struggling students and decreased retentions.”

Respondent #2 – “No.”

Respondent #3 – “Yes.”

Respondent #4 – “Yes, all of our groups did well.”

Respondent #5 – “Yes.”

Respondent #6 – “Yes.”

Respondent #7 – “Yes.”

Respondent #8 – “Yes, significantly.”

Respondent #9 – “Yes, it works for all students in all categories.”

Respondent #10 – “Yes for all of them.”

Respondent #11 – “It’s a plus for every child.”

Respondent #12 – “Yes.”

Respondent #13 – “Absolutely.”

Respondent #14 – “Probably not for gender and SES. We don’t have a diverse population. We are 97% White.”

Respondent #15 – “Absolutely.”

Respondent #16 – “Yes.”

Respondent #17 – “Yes.”

Respondent #18 – “I don’t feel we have small sizes, but yes it works.”

Telephone survey question 5: Is there a reason that you decided not to participate in the survey that was sent to you via email and U.S. mail?

Respondent #1 – “Too many questions.”

Respondent #2 – Didn’t recall receiving the survey.

Respondent #3 – Didn’t have time to complete the survey.

Respondent #4 – Didn’t recall receiving the survey.

Respondent #5 – Didn’t recall receiving the survey.

Respondent #6 – Didn’t recall receiving the survey.

Respondent #7 – Didn’t have time to complete the survey.

Respondent #8 – Survey got “stuck in a stack of papers” on her desk.

Respondent #9 – Didn’t have time to complete the survey.

Respondent #10 – Didn’t have time to complete the survey.

Respondent #11 – New principal to the school and didn’t have time to complete the survey.

Respondent #12 – No reason was given for non-participation.

Respondent #13 – Forgot to complete the survey.

Respondent #14 – “It’s probably on my desk somewhere.”

Respondent #15 – “I get so many surveys.”

Respondent #16 – No reason was given for non-participation.

Respondent #17 – Didn't recall receiving the survey.

Respondent #18 – “I get too many surveys to complete.”

Telephone survey question 6: Would you be willing to allow one teacher representing grades kindergarten through third to complete a survey about class size reduction?

Respondent #1 – “Yes.”

Respondent #2 - “Yes.”

Respondent #3 - “Yes.”

Respondent #4 - “Yes, but it must be voluntary.”

Respondent #5 – “I will ask a teacher, but I can't guarantee it. It's voluntary.”

Respondent #6 - “Yes.”

Respondent #7 - “Yes.”

Respondent #8 - “Yes.”

Respondent #9 - “Yes.”

Respondent #10 - “Yes.”

Respondent #11 - “Yes.”

Respondent #12 - “Yes.”

Respondent #13 - “Yes.”

Respondent #14 - “Yes.”

Respondent #15 - “Yes.”

Respondent #16 - “Yes.”

Respondent #17 - “Yes.”

Respondent #18 - “Yes.”

Appendix P

Kindergarten Paired Samples Test

The Impact of

Pair 1	Paired Differences		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error	Mean			
What percentage of kindergarten students met the PALS benchmark in Fall 2005 - What percentage of kindergarten students met the PALS benchmark in Spring 2006	-.54144	.79909	.05940	-.42423	-9.116	180	.000

Appendix Q

First Grade Paired Samples Test

The Impact of

	Paired Differences				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Pair 1					
What percentage of first grade students met the PALS benchmark in Fall 2005 - What percentage of first grade students met the PALS benchmark in Spring 2006	-.46961	.79959	.05943	-.58689	-.35234
			t	df	Sig. (2-tailed)
			-7.902	180	.000



Appendix R  
Second Grade Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	What percentage of second grade students met the PALS benchmark in Fall 2005 - What percentage of second grade students met the PALS benchmark in Spring 2006	-.36464	.65800	.04891	-.46115	-.26813	-7.456	180	.000