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AN EXPLORATORY QUANTITATIVE AND QUALITATIVE ANALYSIS OF
STUDENT PERFORMANCE IN SINGLE-GENDER CLASSROOMS IN ONE
FLORIDA ELEMENTARY ASCHOOL: 2006-2009

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the School of Teaching, Learning, and Leadership
in the College of Education
at the University of Central Florida
Orlando, Florida

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ABSTRACT

The purpose of this study was to determine the relationship of participation in single-gender classrooms on student performance on the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students on the Florida Comprehensive Assessment Test (FCAT). The FCAT is a standardized test that is administered to all grade 3 through grade 10 public school students in the state of Florida and has been used to assess students' achievement in reading and mathematics. Students in grades 4, 8, and 10 have also been assessed in science and writing. This study was concerned only with FCAT reading and mathematics scores.

The elementary school whose standardized test scores were utilized in this study was comprised of working class families. The standardized test scores were generated by third, fourth, and fifth grade students who were enrolled in (a) single-gender all boys' classes, (b) single-gender all girls' classes, and (c) mixed-gender or traditional classes that contained both boys and girls.

The analysis of data presented in this study was inconclusive with respect to the advantage of the single-gender educational setting over the mixed-gender educational setting. The analysis of the data produced the following results. During the school years 2005-2006, 2006-2007, 2007-2008, and 2008-2009, there were 80 opportunities for a given class type to achieve the highest reading DSS mean, reading DSS median, mathematics DSS mean, or mathematics DSS median. The single-gender boys' class achieved the highest DSS 44 times (55%), the mixed-gender classes achieved the highest

DSS 29 times (36%), and the single-gender girls' class achieved the highest DSS 7 times (9%).

To my mother, Ms. Mable L. Sharpe,
my “school mother” Dr. Jerrie L. C. Scott,
and to the memory of my grandmother Ms. Louse G. Haynes
and my great-grand aunt, Ms. Florine B. Francis.

The love, devotion, and encouragement of these ladies made this educational
achievement possible.

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CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

This chapter has been organized to present the problem of the study, the purpose, and an introduction to the conceptual framework. Also included are definitions of terminology, the research questions which were used to guide the study, and a description of the background of the study. Concluding the chapter are the significance of the study, limitations, and a chapter summary.

Problem of the Study

The effort to improve public education has been continuous. Public education has been impacted primarily by legislative mandates and reports such as A Nation at Risk (1983), The Individuals with Disabilities Education Act (2004), and the No Child Left Behind Act (2002). Also influencing the direction of public education has been research showing the impact of socio-economic status on learning, the importance of teachers' attitudes on student learning, and the impact of self-esteem on student learning (Rosenthal & Jacobson, 1968.) Recommendations of researchers have been implemented cautiously, because district staff and school-based administrators have been reluctant to implement programs and practices that are not evidenced-based (U. S. Department of Education, 2005).

Proponents and critics of public education have continued to search for ways to increase student achievement. Curricula has been repeatedly revised, assessment tools

have increased in frequency and level of difficulty, and matriculation requirements have become more stringent (American Competitiveness Initiative, 2006). Student achievement along with teacher accountability has been evaluated more stringently than ever before (No Child Left Behind, 2002). As educational institutions, schools have been expected to academically prepare children for participation in the world of work. As social institutions, the expectation has been to socially prepare children to establish and maintain relationships and bonds that are conducive to learning. Sax (2005a) wrote:

The great mission of education is to enable every child to fulfill their potential, to discover that corner of the field of knowledge that they can call their own. . . Our educational system isn't doing very well in this regard. Girls and boys are being pushed into pink and blue cubbyholes regardless of their individual aptitude. And this pink and blue stereotype is worse now that it was twenty years ago. Twenty years of gender-blind education has not ameliorated gender differences in important educational outcomes; in some cases it has exacerbated them. (p. 114)

Since 2001, there has been rising interest in single gender classrooms and schools. Single-gender education has been defined as the practice of educating boys and girls in separate classrooms or schools (National Association for Single Sex Education, 2007). Within single-gender schools and classrooms, teachers have utilized a variety of gender-specific instructional techniques, methodologies, and activities prescribed as effective for that particular gender (Gurian, 2003). The increased interest has been spurred primarily by two concerns. First, school districts have been interested in developing unique programs for specific populations addressing specific concerns in an effort to increase student achievement (National Association for Single Sex Public Education, 2007). Second, in November of 2006, new regulations in The No Child Left Behind Act (2002) eliminated the restrictions in Title IX that prohibited schools that received federal tax

dollars, from establishing schools and classrooms based on gender. In 2006, there were 242 schools in the United States that offered single-gender classes. In 2007, the number had increased to 345. The number of single-gender schools increased from 52 in 2006 to 84 in 2007 as reported by the National Association for Single Sex Public Education in 2007. As the numbers of single-gender schools and classrooms have increased, single-gender education has found support in a growing body of research. The rationale has rested on the theory of hard-wired gender differences in how boys and girls learn, not that separation of the sexes will minimize distractions or reduce discipline issues. It has been determined that the rate at which the area of the brain responsible for geometry and spatial relations develops faster in boys than in girls and the area of the brain responsible for language and fine motor skills develops faster in girls than in boys (Sax, 2005b). According to Sax (2005b), these gender differences are critical and become very important in the learning environment.

In 1972, Title IX legislation made it illegal for public school districts to separate children in classes or schools based on gender. Some single-sex education continued, however, in private schools which had the autonomy of self-governance. In 2004, under the No Child Left Behind Act (2002), regulations around Title IX changed, and states and school districts were offered some flexibility in providing for single-gender schools and classrooms (Salomone, 2006). The regulations required that as states and districts sought to implement single-gender schools and classrooms that they use scientifically based research to guide their actions. As states and districts considered implementing single-gender schools and classrooms, they were required to do so with clear and concise

rationale(s). Educators had to first consider the legality of their rationale(s), remaining mindful of the fact that Title IX was enacted to provide male and female students with equal access to educational opportunities. Educators also had to consider the known specifics as they related to gender and child development. Teacher training and re-training was essential. Finally, and most importantly, each implementation of a single-gender school or classroom was viewed as an opportunity to conduct and collect valid research that could provide useful information to assist other educators as they struggle to provide the best possible learning environment for their students.

Only a limited amount of research has been conducted to investigate single-gender schools. In the 2005 American Institute for Research for Education's evaluation of 2,221 studies involving single-gender schools, only 40 were identified as meeting its methodological criteria. Much of the research up to the time of the present study has been generated from single-gender schools and classrooms outside of the United States.

Bracey (2007) cited the need for more valid research in the area of single-gender education. He noted that although, the number of single-gender classrooms have increased, there has not been enough useful data to support sweeping change.

The legality of single-gender education has been challenged by women's groups such as the American Association of University Women (AAUW), the National Women's Organization (NOW), and feminist groups who have argued that single-gender education promotes gender stereotypes and plays into cultural myths. In the 1976 case of *Vorchheimer vs. School District (Philadelphia)*, the court upheld single gender restrictions regarding a public high school that denied Vorchheimer admission to an all

male high school with a specialized curriculum. A university's right to single-gender restrictions was not upheld, however, in the 1982 case of *Mississippi University for Women vs. Hogan* in which Hogan had been denied admission to an all female nursing program (Inner City School, 1992).

As school officials have continued their search for programs to increase student academic achievement, single-gender education has come to the forefront of the discussion (National Association for Single Sex Public Education, 2007). The present study and others like it are needed to measure the impact of single-gender education on student academic achievement. This study was conducted to review some of the factors that surround single-gender education, its impact, and ultimately the potential applicability of the program.

Purpose of the Study

The purpose of this study was to determine the relationship of classroom environment on student performance on the reading and mathematics developmental scale scores (DSS) on the Florida Comprehensive Assessment Test (FCAT) for 2006-2009 of third, fourth, and fifth grade students enrolled in (a) single-gender classes and (b) traditional mixed-gender classes.

Research Questions

Three research questions were used to guide the study. They are as follows:

1. What difference, if any, exists in the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students in single-gender and mixed-gender classrooms for Florida Comprehensive Assessment Test (FCAT) administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School?
2. What unique preparation and training have teachers who teach single-gender classes at Woodward Avenue Elementary School received that other teachers in Woodward Avenue Elementary School have not received?
3. To what do the teachers of single-gender or traditional mixed-gender classes at Woodward Avenue Elementary School attribute the gain on Florida Comprehensive Assessment Test (FCAT) reading and mathematics administrations in 2006-2009?

Definition of Terms

Florida Comprehensive Assessment Test (FCAT)--“The Florida Comprehensive Assessment Test (FCAT) is part of Florida’s overall plan to increase student achievement by implementing higher standards. The FCAT, administered to students in Grades 3-11, consists of criterion-referenced tests (CRT) in mathematics, reading, science, and writing, which measure student progress toward meeting the Sunshine State Standards (SSS) benchmarks” (Florida Department of Education, 2009).

Learning Gains--The growth achieved by a student over the period of 1 year. (Florida Department of Education, 2009)

Developmental Scale Score (DSS)--A score achieved by a student that represents a point within a level. (Florida Department of Education, 2009)

Mixed-gender classes--Classes that have both genders represented. (National Association of Single Sex Public Education, 2007)

Mobility rate--The rate at which students enter and exit the school during the year. (Florida Department of Education, 2009)

Single-gender-classes--Classes that have only one gender represented. (National Association for Single Sex Public Education, 2007)

Background of the Study

The school whose standardized test data were analyzed in this study was Woodward Avenue Elementary School (WAES), a neighborhood school located in DeLand, Florida. The school opened its doors in 1966. In 2005, the school had a student population of 730 students in grades Pre-K-5. Demographic data available for the 2005-2006 school year indicated a student population of 48% Caucasian, 35% African-American, 15% Hispanic, and 2% other minority groups. The mobility rate was 25.8%, and the free and reduced lunch rate was 60%. The district mobility rate was 41.4% and the district free and reduced lunch rate was 41.29%.

WAES is a school that has had a very impressive record of academic performance. In the state's A+ Program, which assigns a letter grade based on the school's performance on the Florida Comprehensive Assessment Test (FCAT), WAES earned an "A" in the 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009 school years.

The FCAT is the state of Florida's standardized test assessing students' achievement in reading, mathematics, science and writing that has been administered to students in Grades 3 through 11.

In school year 2005-2006, WAES offered its initial set of single-gender classes. However, the preparation for offering single-gender classes began much earlier. This initiative was the result of one fifth grade teacher who was searching for additional strategies to increase student achievement. As the teacher continued to gather research on her own, she began an active dialogue with the principal concerning the potential benefits of single-gender classrooms. The principal and the teacher collaborated on the research and implementation strategies, enlisting the support and advice of the Teacher Education Department at Stetson University.

Stetson University is a small liberal arts institution located in DeLand, FL. Because of its participation in Stetson's Professional Development School (PDS) Network, WAES had an established relationship with the University. In the PDS Network, the school and the university work cooperatively on a number of education related issues. Primarily, these issues concern reading, mathematics, and science achievement or the academic achievement of an identified student group. The PDS Network also gives school-based and university-based faculty and staff access to each other through a blending of theory and practice, one intended to inform the other. Members of Stetson's Teacher Education Department participated in the discussions surrounding the feasibility of single-gender classes.

As the discussions grew in intensity and ideas crystallized, a timeline was developed. There would be a year (2004-2005) of planning, training, and research followed by a year of limited implementation. It was also decided to approach the initiative as a team. Both the school-based and university-based personnel would attend and participate in the trainings. Training would be open to all WAES teachers.

During the planning year, the teachers for the single-gender classes were selected. Selection was based on three characteristics: (a) willingness to participate in the necessary training, (b) level of experience and number of years at the projected grade level, and (c) personal disposition. Some of the team members attended the Michael Gurian Institute on single-gender education, and the team read *The Boys and Girls Learn Differently* (Gurian, 2003). The training at the Gurian Institute was particularly useful in that it provided information that was helpful to teachers regardless of the gender of the students in the classroom. Upon their return to the school, institute participants were very eager to share what they had learned with the rest of the single-gender education team.

There were several issues that were of concern to the school's administration and faculty:

1. At the time there were no other public schools in the state that were offering single-gender classes, so there was no geographical applicable/relevant data. The schools that were offering single-gender classes were predominately private institutions with history and autonomy. With no comparable precedents, the principal knew that it would be difficult to gain support for the new program at the district level.

2. The research findings that were available revealed mixed results. The majority of the research that was gathered was from schools and systems in other countries. Though the data were applicable as related to increased academic achievement, the nature of the educational and social systems (attitudes, community support) were very different.
3. There was a concern as to how best to promote and convince stakeholders (parents, district personnel, and community members) that the idea was truly viable. Stetson University was able to assist greatly with this. The university was able to provide both qualitative and quantitative research-based evidence supportive of the implementation of single-gender classrooms. However, it was the principal who had to convince parents and district personnel of the worth of the program.

There were some concerns from those Stetson University faculty members who planned to be involved in the project: (a) supporting an unproven method of classroom instruction in the public school system, and (b) relying on personnel to implement instructional methodologies in classrooms over which they had no direct control. Faculty members were somewhat uncertain about being involved in a project where they could only indirectly exercise influence by providing support and making suggestions for a particular course of action.

With any academic program, the implementation of the program is critical for success. The administration at WAES faced the task of recruiting teachers from current staff to teach in the single-gender classrooms. The principal began by informally

surveying the teachers to determine interest in teaching a single-gender class. The principal also discussed the single-gender program at several faculty meetings, answered questions, provided literature and research articles, and invited Stetson faculty members to attend and participate in meetings. School administrators were seeking to recruit teachers who (a) loved teaching; (b) wanted to do what is “right” for children; (c) would embrace the idea of single-gender classrooms; and (d) would participate in book studies and summer workshops, attend/present at conferences, and dialogue with university faculty.

After determining the initial cadre of teachers, the single-gender program at WAES began its first set of classes in school year 2005-2006. During the 2005-2006 school year, WAES began offering single-gender classes at the kindergarten, first-, second-, and fifth-grade levels. The public’s response was very positive. Parents wanted their children to be in the single-gender program; and as the demand for single-gender grew, so did the class offerings. In the 2006-2007, 2007-2008, and 2008-2009 school years, WAES offered single-gender classes at all grade levels (K-5) and additional teachers began to participate in the single-gender program.

Significance of the Study

This study was conducted to provide information through research on the impact of single-gender education. District and school-based administrators and community stakeholders may find this study useful as they seek to provide the most appropriate

educational settings for their students. Researchers will find the study useful as another point of reference on which to build in future research initiatives.

Limitations of the Study

The following limitations of the study were considered:

1. This study was limited by the accuracy of the FCAT standardized test score responses generated by students enrolled in Woodward Avenue Elementary school during the 2005-2006, 2006-2007, 2007-2008 and 2008-2009 school years by students in the third, fourth, and fifth grades in both the single-gender and mixed-gender classes.
2. The study was limited by the willingness of the teachers to provide accurate responses to the teacher questionnaire.
3. These limitations may impact the ability to generalize the findings beyond the target group and school.

Delimitations of the Study

The following delimitations of the study were imposed on the study by the researcher:

1. This study was delimited to the FCAT standardized test scores generated by students enrolled in Woodward Avenue Elementary school during the 2005-2006, 2006-2007, 2007-2008 and 2008-2009 school years by students in the

third, fourth, and fifth grades in both the single-gender and mixed-gender classes.

2. The data analyzed were delimited to the official standardized test scores contained in and retrieved from the Volusia County School District's data warehouse.
3. The study was delimited to include only the test scores of students who had not been retained.
4. This study did not consider the reasons parents or guardians may or may not have selected a particular classroom make-up for their students.
5. This study did not differentiate between students' FCAT scores by race or ethnicity.
6. This study was delimited to data obtained for teachers of the third, fourth, and fifth grade single-gender and mixed-gender classes during the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years and to that obtained from administrators who served during the 2004-2005, 2005-2006, and 2006-2007 school years.

Summary

This study was conducted to explore the differences in reading and mathematics developmental scale scores (DSS) on the Florida Comprehensive Assessment Test (FCAT) for 2006-2009 of third, fourth, and fifth grade students enrolled in (a) single-gender classes and (b) traditional mixed-gender classes. In this chapter, the problem and

purpose of the study were presented. The background of the study, the potential significance as well as the limitations, have been explained. Chapter 2 contains a review of the literature and related research. The methodology used to conduct the study is detailed in Chapter 3. Chapter 4 presents the analysis of the data. Chapter 5 provides a summary and discussion of the findings, implications, and recommendations for future research.

CHAPTER 2 REVIEW OF THE LITERATURE AND RELATED RESEARCH

Introduction

This chapter provides a review of literature related to the present study. In the first section, relevant literature on brain research which provides a rationale for single-gender education is reviewed. The second section addresses single-gender initiatives in schools. Alternative perspectives on single-gender classes and schools are presented in the third section. The final section is focused on research studies concerned with academic achievement and single-gender education.

The literature review was conducted using the University of Central Florida Library research databases. These databases were utilized to search the Educational Resources Information Center (ERIC) for key terms and known authors. This search supported information presented in the first and second sections of the review related to single-gender education and single-gender initiatives in schools. Finally, through the use of the research databases, primarily EBSCO Host and the federal government database, information was retrieved on the single-gender research studies that are presented in the final section.

In this review, the researcher found limited literature and studies focused on single-gender education in the United States. One example of the limited amount of material available was evident in the evaluation of single gender-programs conducted by the U. S. Department of Education (2005). Of 88 programs available for review, only 40

were determined to have met the single-gender criteria that made them eligible for the Department's review.

Brain Research: The Rationale for Single-Gender Education

Gurian (2003) and Sax (2005b) argued that it makes sense to educate boys and girls separately--it is biological. They contended that male and female brains develop and function differently. The female brain develops sooner and has stronger connecting fibers between the left and right hemispheres than the male brain (Gurian, 2003). The hormones that are required to produce and develop female and male fetuses are very different. Slocumb (2004) wrote that until about the sixth week of pregnancy, the brain is genderless. It is not until messages are sent and received calling for hormones that the sex of the brain and ultimately the sex of the fetus is determined.

Kimura (2004) also noted that early exposure to sex hormones such as androgen, estrogen, testosterone among others was the proximate mechanism for the appearance of cognitive differences between the sexes. These hormones continue to influence behavior throughout the life of the individual. Testosterone for example, is present in both males and females; however, the levels found, show very little overlap between the two. Higher spatial ability is consistent with low to normal levels of testosterone in males. Females with "high" levels of testosterone, levels that approach the male low to normal levels in males, perform better on visio-spatial tasks than do females with "low" levels of testosterone. The hormones androgen and estrogen, present in males and females, impact sexually dimorphic behaviors and problem-solving behaviors. The cognitive differences

are the result of the varying levels of hormones present in different areas of the brain and the function or task associated with that particular area (Kimura, 2004).

Baron-Cohen (2005) also supported the hormonal theory of brain development.

His argument is as follows:

Today, the pendulum has settled sensibly in the middle of the nature-nurture debate, and scientists who care deeply about ending inequality and oppression can at the same time also talk freely about biological differences between the male and female brain and mind. . . A relatively new theory, known as Empathizing-Systemizing (E-S) theory. (p. 23)

E-S theory has been used to suggest that there are three common types of human brains: (a) the empathizing brain; (b) the systemizing brain; and (c) the balanced brain. The theory has postulated that the female brain is predominately hard-wired for empathy with empathy being defined as the inclination or tendency to identify or respond to another person's thoughts or emotions. The brain, inclined toward empathizing, can figure out how people are feeling and know how to treat them. In contrast, the male brain is predominately hard-wired for systemizing or the inclination to understand and build systems--to understand how things work, function, and interrelate. The brain, inclined toward systemizing, figures out the underlying rules and why things work. The balanced brain has the capacity to both empathize and systemize and develops in both males and females with equal frequency. Baron-Cohen (2005) contended that brain type is evidenced in play and aggression. Females, at play, will choose to play with dolls, creating social and emotional themes (empathy). In aggression, females will use covert methods such as exclusion, gossip, and snide remarks to inflict pain. Males, at play, will

build, destroy, or compete (systems). In aggression, males will use overt behaviors such as pushing, hitting, and punching.

Halpern (2004) discussed the very real differences in the cognitive abilities of males and females, but he also warned that there is no evidence that one sex is more intelligent than the other. Females typically excel on long-term memory tests, and males perform better on visio-spatial tasks. Halpern (2004) attributed these differences to the influence of prenatal hormones in which the early menarche cycle of estrogen helps to develop the female body and brain, and testosterone helps to develop the male body and brain. Halpern's (2004) cognitive-process approach asserted that, as the brain develops, the ways in which male and female brains acquire, store, select, retrieve and use information begin to differ. These differences have been caused by hormones and have become apparent in cognitive ability tests. According to Halpern (2004),

Women have more rapid access to phonological, semantic, and episodic information in long-term memory. And obtain higher scores on tests of verbal learning and the productions and comprehension of complex prose. . . while males have large advantages on tasks that require transformations in visio-spatial working memory. . . and tasks that require velocity judgments about moving objects, tracking movement through three-dimensional space, and aiming at a moving or stationary target. (p. 136)

In addition to the course of brain development, the size and compartmentalization of male and female brains are different (Sax, 2005b). The male brain is 10%-15% larger than the female brain but contains a smaller corpus callosum. The corpus callosum is the bundle of nerves that connects the left and right hemispheres of the brain (Gurian, 1997). Slocum (2004) likened male and female brains to houses with multiple rooms. In the

male brain (house) one can only access one room at a time. In the female brain (house), one can access all of the rooms at one time or move from room to room.

Sax (2005b), in his discussion of differences of male and female brain development, extended his argument to include the eyes and their function. The eyes are made up of three layers including the photoreceptors, the rods, and the cones. Photoreceptors receive light, rods are sensitive to black and white, and cones are sensitive to color. Rods and cones send their messages to ganglion cells called M cells while small ganglion cells are called P cells. Males tend to have more M cells and females tend to have more P cells (Sax, 2005). M cells are best suited to interpret location, direction, and speed. These cells help to answer the questions: Where is it now? Where is it going? and How fast is it going? P cells are best suited to interpret color and texture. These cells help answer the questions: What is it? and What is it like?

Gurian and Stevens (2004) discussed significant differences in the way that female and male brains learn information. Through Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) (Gurian and Stevens, 2004), researchers have been able to determine which area of the brain is used during the learning of a subject or the completion of a task. Some of the female-male brain differences cited by Gurian and Stevens (2004) were: (a) female brains tended to have a larger (up to 25%) corpus callosum; (b) female brains tended to have stronger neural connectors in their temporal lobes; (c) the female brain's hippocampus (memory storage area) was larger; (d) females tended to use the cortical area of the brain for verbal and emotive functioning, while males used the cortical area for spatial and mechanical functioning; (e) male brains

tended to lateralize activity and operate on less blood flow; and (f) the male brain needed to reorient itself by entering a state of rest, but the female brain continued to function normally without entering a state of rest.

In a brain research study that measured brain developmental trajectories, Lenroot et al. (2007) used magnetic resonance imaging (MRI) to measure the brain development of 387 subjects (209 males, 178 females) aged 3 to 27 years. Using the 829 MRI scans recorded, the researchers were able to plot age-appropriate trajectories of brain development for males and females for: “(a) total brain volume, (b) grey matter volume, (c) white matter volume, (d) lateral ventricle volume, (e) midsagittal area of the corpus, and (f) caudate volume” (Lenroot et al., 2007, p. 1068).

They noted the following: “(a) total cerebral volume was approximately 10% higher in males than in females; (b) total grey matter peaked at 10.5 years in females and 14.5 years in males, (c) total white matter volume increased with age, but the male brain showed a greater increase in white matter volume during adolescence, (d) the lateral ventricle volume was larger in males than in females, but the shape of the trajectories was not significantly different; (e) the development trajectories for the midsagittal corpus callosum showed no difference in shape or height between males and females” (Lenroot et al., 2007, p. 1068). This study produced evidence of the differences in size and rates of development between male and female brains. There was no evidence of functional advantage or disadvantage relative to trajectory shape or height; however, the varying rates of development could impact a student’s readiness to learn certain subjects and affect predisposition to learning style.

Single-Gender Educational Initiatives in Schools

Supported by the No Child Left Behind Act (2002), the National Association for Single Sex Public Education (2007) has been encouraged in its advocacy for the specific benefits of single-gender education. In a number of large metropolitan areas, where inner-city schools have had large numbers of economically disadvantaged youth, males, especially black males, have been recognized as grossly underachieving (Inner City School, 1992). This underachievement, however, has been reflective of male underachievement nationally. School districts across the country have been searching for programs and reform efforts to address the problem of male underachievement. Single-gender education is one reform effort that has been suggested as positively impacting the academic achievement of males. Jordan and Cooper (2003) suggested that male underachievement was, in addition to being a gender issue, an economic issue. They have viewed the underachievement of males as one result of a failing school system that has allowed low standards, a flawed system of resource allocation, and distribution, and under-prepared instructional and administrative staffs.

Sax (2005a) expressed his belief that single-gender education offers a viable alternative for educators in failing schools or educators who want to increase student achievement. However, the results of single-gender initiatives have been mixed. There have been several stories of improved test scores, e.g., Thurgood Marshall Elementary in Seattle Washington, Odyssey Middle school in Boynton Beach, Florida, and the Afrocentric School in Columbus, Ohio. In contrast, there have been examples of schools that have showed no significant improvement in test scores, e.g., Newport Middle School

in Newport, Kentucky and Eagle Rock Junior High in Idaho Falls, Idaho. Sax attributed the differences in test results, in part, to teacher preparation in his statement that “Putting a teacher in a single-gender classroom for which she is not suited by temperament or training maybe a recipe for failure” (Sax, 2005a, p. 34).

King and Gurian (2006) have cited instances in which schools’ state standardized test scores increased after the school moved to a single-gender classroom setting or used the current research on brain differences and developed specific instructional strategies for teaching males and females that take advantage of the natural tendencies that boys and girls bring with them. According to King and Gurian (2006), boys world-wide have fallen further and further behind their female counterparts in academic achievement. They clarified this position in their statement that “Most classrooms have been structured to accommodate the verbal-emotive, sit still, take notes, listen carefully, multi-tasking girl, not the impulsive, single-task focusing, spatial-kinesthetic learning, physically aggressive boy” (King & Gurian, 2006, p. 57).

Gurian (2006), in reviewing research on the topic reported support for the need to teach boys and girls differently. Specifically, differences in brain function, chemistry and the differences in the visual system were noted. Differences in male and female brains were identified in the levels of hormones (estrogen, testosterone, and androgen) and the level of blood flowing to the brain and connective tissue. The visual system for males and females have been determined to differ in the number of P and M cells. Females tended to have more P cells (color variation, placement of objects in a series), and males tended to have more M cells (spatial activity, graphic clues). Gurian (2006) believed that

this research should be considered by schools when providing educational opportunities. He has expressed the belief that schools considering this research-based information in their planning efforts could (a) increase standardized test scores, (b) improve in-class academic performance, and (c) reduce discipline referrals.

Gurian and Stevens (2004) also cited the significance of male and female brain differences and suggested that schools must take the differences into account when teaching. The female brain for example, has a larger corpus callosum (connective tissue between right/left hemisphere), stronger neural connectors in the temporal lobes, larger hippocampus (memory storage area), and a more active prefrontal cortex. In contrast, “the male brain has more serotonin and oxytocin which controls impulsivity and aggression, more of the cortical area which is dedicated to spatial-mechanical functioning, more compartmentalized learning, less blood flow, and enters a rest state periodically” (Gurian & Stevens, 2004, p. 27). Acknowledging these differences, Gurian and Stevens (2007) have supported the nature-based approach to learning: “The nature-based approach was a term coined to call attention to the importance of basing human attachment and education on strategies on research-driven biological understanding of human learning” (p. 24). This approach has focused on the significance of differences in the way that male and female brains learn and process information and the importance of teacher training to accommodate these differences.

Alternative Perspectives on Single-Gender Classes and Schools

Bracey (2007) identified four distinct groups and perspectives in regard to the single-gender education issue.

First, there are those who have held the belief that coeducation is best, as evidenced in the majority of American public schools. A second group has believed that coeducation is best but that sometimes the ideals of coeducation cannot be realized and single-gender classes and schools are viable alternatives. This has been evidenced in cases of failing schools and some urban areas. The third group has been selective, holding the belief that separate schools are best for some groups, e.g., at-risk and traditionally underachieving student groups. The fourth group consists of those who have been convinced that boys and girls learn so differently that single-gender schools can maximize learning. (p. 23-24)

The perspective of this group has been based on research that asserts that boys and girls learn differently in addition to developing physiologically at different rates.

Parents and guardians have played a vital role in their child's education. Gurian (2007) stressed the importance of parents "knowing" their child and cited informed parental input as critical for student achievement. He discussed the importance of parents understanding a child's core nature: "The core nature consists of personality type, temperament, emotional/relational style, learning style, gender differences, talent set and proclivities, inherent strengths and weaknesses, and resilience to trauma" (p. 54). Knowing a child's core nature can assist parents greatly in supporting children in activities and involvement in school.

Salomone (2006) predicted that because of the changes in The No Child Behind Act, in which Congress gave states the authority to use federal funds to establish and maintain educational programs that separated and educated students on the basis of sex, the number of single-gender schools and classrooms would greatly increase. Prior to

these changes instituted by Congress, this would have not been allowed under The No Child Left Behind Act. Data available at the time of the present study indicated that the number of single-gender schools had increased. “In 2006, there were 242 schools in the United States that offered single-gender classes. By 2007, that number had increased to 345, and the number of single-gender schools increased from 52 in 2006 to 84 in 2007.” (National Association for Single Sex Public Education, 2007). As the numbers of single-gender schools and classrooms have increased, single-gender education has found support in a growing body of research.

Research on Academic Achievement and Single-Gender Education

As the number of single gender schools and classrooms increase, the body of research surrounding these educational programs is also increasing. Researchers are tracking student performance using both academic and social data. In a re-analysis of data, Daly and Defty (2004) reviewed the data on 42,000 students in 294 schools of single- and mixed-gender classes in the United Kingdom. Although the data were obtained from the Curriculum Evaluation and Management (CEM) Centre and did not represent a true random sample, the re-analysis of the data was interesting in that the researchers attempted to identify a correlation between mathematics achievement and attitude.

Methodologically, a multilevel design of regression analysis was used to control for social factors such as father’s job (manual/non-manual). However, no controls were set for the possibility of the school being a grammar or faith-based school and the

likelihood of students having an accompanying required entrance score. The researchers found that the 29% variation of achievement in mathematics was attributed at the school level and 71% at the student level. Variations at the school level included (a) location, (b) change in setting, (c) new teacher, and (d) different teaching methods. Variations at the student level included (a) perceptions of the benefits, (b) safer environment, or (c) attitude. Aside from the variation of cause of achievement, the actual achievement of boys over girls was 1.5% of a standard deviation. It was concluded that there was no causal relationship between achievement and attitude toward mathematics.

In an Australian study conducted by Mulholland, Hansen and Kaminski (2004), a group of Year Nine students at a single gender school were evaluated. Unlike the data used by Daly and Defty (2004), these data were more random in that students were allowed to choose single or mixed-gender classrooms. In the study, 67 students selected the single gender English class (35 males and 32 females), and 29 females selected the single gender mathematics class. No males selected the single gender mathematics class. Students were administered the Progressive Achievement Test in Reading Comprehension (Form 4) produced by the Australian Council for Educational Research at the beginning and six months later at the end of the study. The results indicated gender and class selection type were not significant contributors to achievement in post-test vs. pre-test scores. While not deemed significant by the researchers, it should be noted that the single gender groups had small mean increases of .3% for girls and 1.2% for boys.

In a broader study by Parker, Riordan and Schaub (1995), the role and effects of single gender education was studied on an international scale. Belgium, New Zealand,

Thailand and Japan were selected to be a part of the study. The research focused on the success of single-gender education's dependence on its perceived uniqueness when national context was considered.

Countries that produce small niches of specialized schools are more prone to between-sector differences across major inputs to the production of achievement. When a unique type of school organization, such as single-gender, is part of a small sector of school, it may be associated with a distinct learning environment and attract different students than the main body of mixed-sex schools. (Parker et al., 1995, p. 469)

Nationally, Belgium had a single-gender enrollment of 68%, New Zealand 48%, Thailand 19%, and Japan 14%. The study used data from the 12th grade of each country. Samples were drawn and from those samples intact mathematics classes were randomly selected. The evaluation and analyses of the data were guided by the International Educational Assessment (IEA) Center and the International Educational Assessment Mathematics Committee to ensure comparability. A standard multiple-choice achievement test of 17 items, with five choices for each item, was administered to each student. There were eight forms of the test and each student was administered the test twice. Controls were set for guessing and social parameters such as father's occupation, educational level of mother, degree to which the home language matched the school language, and the student's personal educational expectations. Additional controls were also put in place for school-related factors such as teacher, mixed- or single-gender classes, teacher training, teacher age, and teacher gender. The results indicated that in an environment where single-gender education was more common (Belgium and New Zealand), the increase in mean difference was near zero. Even when the data were

controlled for effect size, the change was not statistically significant. However, in an environment where single-gender education was not common (Thailand and Japan), the increase in mean difference was significant and became more pronounced when controlled for effect size. These data supported the researchers' initial hypothesis concerning the uniqueness of school organization type.

In a study designed to determine the effects of school size on single-gender education, Spielhofer, Benton, and Schagen (2004), reported that school size did have a relationship to student performance. In evaluating the effect of school size, they discovered some impacting factors: (a) the number of students receiving free lunch, (b) the variation of course offerings, (c) faith-based (entrance requirements), and (d) proximity to metropolitan areas. The data used in the analysis was obtained from the National Value-Added Datasets (NVADs) and contained records of over 369,000 students. The students were all in Year 11 in six different school types: mixed gender, boy's single gender and girl's single gender comprehensive schools; and mixed gender, boy's single gender and girl's single gender elementary schools. After designing a multilevel model to control for these factors, it was determined that there was no causal relationship between student achievement and school size. Once the factors were controlled for and the data charted, the majority of the schools were observed to perform as expected. Medium-sized schools performed better than either small or large schools (Spielhofer et al., 2004).

Jackson (2002) reported on a study conducted in the United Kingdom that focused on the attitudes and perceptions of students participating in single-gender classrooms.

The research was conducted at a school of approximately 550 students in Years 7-11 in a middle class community and was conducted using only mathematics classes. One focus of the study was to see if the single-gender classes enhanced the learning experience of the students. A total of 125 students (62 males and 63 females) participated in the study. The researcher administered questionnaires to the students. Of those distributed, 79 questionnaires were returned (39 from males and 40 from females). The questionnaire consisted of nine questions covering the students' perceptions of the differences between single-gender and mixed-gender classes, positive / negative features of the single-gender classes, the student's relative academic achievement, and enjoyment and confidence level. A total of 11 students also participated in semi-structured interviews. In the interviews, students were asked their opinions of the single-gender classes in regard to the reasons (a) they believed the school put forth the effort to form single-gender classes, and (b) the reasons the school stated for forming single-gender classes.

Jackson's (2002) data generated the following results: After participating in the single-gender classes, 80% of the girls claimed an increase in confidence; 65% claimed that their progress in mathematics was enhanced; 55% claimed to have enjoyed mathematics more as compared to 15% who claimed to have enjoyed the mixed gender classes more; and 80% of the girls expressed interest in continuing in single-gender classes. Of the boys, 59% felt that their progress was neither helped nor hindered; 33% claimed to feel less confident; 64% did not want to continue in the single-gender classes; and 72% claimed to enjoy the mixed gender class more.

Gray and Wilson (2006) conducted a qualitative study in Northern Ireland in which they measured teachers' experiences in a high school with a population of 600-700 students from a predominately working-class community. They developed a survey that contained 22 questions arranged on a nominal scale ranging from 1 to 5 with an open-ended section at the end for comments. Of the 51 surveys distributed, 31 were returned completed. The survey addressed five critical areas concerning the single-gender program at the school: (a) the implementation process; (b) training and support; (c) stress; (d) impact on behavior, performance and interactions; and (e) sustainability. The data generated suggested that teachers believed that they were not consulted in developing the implementation plan, that single-gender classrooms did not improve classroom behaviors or academic achievement, and that more and continued training was needed to successfully implement the program.

In a two-year study involving in a large, urban high school, Hoffman, Badgett, and Parker (2008) measured the impact of single-gender instruction and mixed-gender instruction on learning, differences in instructional practice, teacher self-efficacy, and perceptions of both students and teachers. The researchers developed a five-item instrument. The instrument addressed the following questions:

- (a) Are achievement scores of students participating in SSI (single-sex instruction) greater for those than participants in traditional CE (co-educational) classroom instruction?
- (b) What was the influence of different teachers on the achievement of students grouped in SSI and CE classrooms?
- (c) What is the impact of SSI on teacher efficacy and satisfaction?
- (d) What are the opinions of teachers and students participating in SSI?
- and (e) Are engagement levels higher in SSI classrooms than in mixed-sex classes? (Hoffman et al., 2008, p. 17)

They compared grades and standardized test scores of 10th-grade students in single-gender classes with those in mixed-gender classes during the 2003-2004 and 2004-2005 school years. Additional qualitative data were collected through interviews, focus groups and classroom observations. A total of 86 teacher and student surveys were administered and 12 interview and focus groups were conducted. Hofman et al. (2008) found that the coeducational instructional classes outperformed single gender instruction classes with the exception of Year 1 Algebra, in which superior performance was reported for single-gender instruction classes. Regarding student perception of single-gender classes, students felt that single-gender classes were not supportive of each student's maximized learning. Most did not prefer single-gender instruction over co-educational instruction. This response, according to the researchers, was consistent with adolescent behavior. Teachers' responses to the survey were more positive but not wholly supportive. The researchers suggested that teacher support may have been diminished by the lack of involvement in the development of the initiative and lack of teacher training provided.

Jackson and Bisset (2005) identified and explored the influences of parental selection of single-gender or co-educational schools. They identified three junior and senior high schools comparable in size. The schools served the same parent population.

To gather information on factors influencing school choice, parents were surveyed, and some participated in semi-structured interviews. A questionnaire was administered in March 1999, and interviews were conducted from August through

November 1999. A total of 339 parents received the surveys. The questionnaire was designed to elicit information as to

(a) demographic information, i.e., age of the child, previous school that the child attended, other children in the family, the ethnic background of the parents and whether or not they were educated at single-gender schools; (b) other schools considered when present school was chosen; (c) reasons for choice of the school; (d) advantages and characteristics of single-gender or co-educational schools; and (e) willingness of parents to be interviewed. (p. 199)

Of the 225 parents who responded to the questionnaire, 136 (60%) agreed to participate in an interview. The purpose of the interview was to speak with a small group of parents (15) and gain in-depth knowledge about the process that they had used in choosing a school. The parents who were sampled were those whose children had entered the school that year. This population was chosen because of (a) their recent experience in choosing the school and their ability to accurately recall the process and (b) their classification as “new” parents who, because of their limited experience with the school, were likely to provide unbiased responses. The results from the study indicated that the four primary factors were, “the school’s reputation, exam results, good staff, and small class size.” (Jackson & Bisset, 2005, pg. 203) The data suggested that, though there were a variety of factors that influenced parental choice, neither single-gender nor co-education classes, were major factors. Instead, parents were reported to have made choices based on characteristics that they believed would most benefit their child.

In a study designed to measure teachers’ experiences, Gray and Wilson (2006) conducted a study in Northern Ireland in the English County of Yorkshire. They chose a secondary school of approximately 600-700 students, located in a working class

community. The study had two parts. “The initial part was a questionnaire designed to elicit teachers’ perceptions of the process, the training available to teachers in single-gender classes, and the impact of the single-gender class approach on pupil performance and behavior” (Gray & Wilson, 2006, p. 288). The second part of the study was qualitative and was conducted using one-on-one and small group interviews. The questionnaire contained 22 questions on a nominally scaled response scale, (strongly agree, agree, disagree, strongly disagree, and don’t know) and included an open-ended comment section. A total of 51 questionnaires were distributed and 31 teachers responded for a response rate of 61%. Of the 31 teachers who responded, 15 agreed to participate in interviews. The results were categorized as follows:

(a) teachers’ attitudes to the implementation of single-gender classes, (b) teachers’ training and support, (c) the impact the approach had on teachers’ enjoyment of teaching, (d) teachers’ perceptions of the impact of this approach on classroom behavior and academic performance, and (e) the sustainability of the approach. (Gray & Wilson, 2006, p. 289)

The results showed a need for a consultation phase, preliminary and continued in-service, and training. (Gray & Wilson, 2006). Of those surveyed, 71% reported that not enough training was provided, and 65% indicated that not enough ongoing in-service was provided to support the teachers in the single-gender classrooms. Regarding teachers’ enjoyment of teaching single-gender or co-educational classes, 71% preferred to teach co-educational classes. Regarding the sustainability and benefits of single-gender classes, teachers did not support the continuance of the program because it had not increased positive behaviors or raised academic standards.

The U.S. Department of Education, Office of Planning, Evaluation and Policy Development (2005) conducted a systematic review of single-gender and co-educational settings. The purpose of the review was to identify quantitative research studies involving single-gender classrooms/schools and document the outcomes relative to the efficacy of the single-gender program. The following research questions were addressed.

1. Are single-gender schools more or less effective than coeducational schools in terms of concurrent, quantifiable academic accomplishments?
2. Are single-gender schools more or less effective than coeducational schools in terms of long-term, quantifiable academic accomplishment?
3. Are single-gender schools more or less effective than coeducational schools in terms of concurrent, quantifiable indicators of individual student adaptation and socioemotional development?
4. Are single-gender schools more or less effective than coeducational schools in terms of long-term, quantifiable indicators of individual student adaptation and socioemotional development?
5. Are single-gender schools more or less effective than coeducational schools in terms of addressing issues of procedural (e.g., classroom treatment) and outcome measures of gender inequity?
6. Are single-gender schools more or less effective than coeducational schools in terms of perceptual measures of the school climate or culture that may have an impact on performance? (p. ix)

Of the 88 studies submitted, only 40 were reviewed. As each study was reviewed, it was coded in one of four categories: (a) Pro-SS if the study's findings supported single-gender schooling, (b) Pro-CE, if the study's findings supported co-educational schooling, (c) Null if the study's findings showed no difference in single-gender and co-educational schooling, and (d) Mixed, if the study's findings showed significant findings in opposite directions for different subgroups. (p. xii)

The first question in the U. S. Department of Education (2005) study was most closely aligned with issues of concern in the present study. That question called for a

comparison of the effectiveness of single-gender schools compared to that of coeducational schools. Of the 112 findings, 33 addressed issues raised in question 1. Each of the identified 33 findings that were examined fell into one of the four established categories. The data presented in Table 1 were retrieved from the summary of findings of the study. Displayed are the number of findings related to the effectiveness of single-gender schools as compared to mixed gender schools in terms of concurrent, quantifiable academic accomplishment for all subjects (n = 9), mathematics (n = 14), and verbal/English (n = 10). As shown in Table 1, 12 of the findings indicated effectiveness of single-gender schools in contrast to only one mixed gender school which showed effectiveness. A total of 17 of the findings revealed no effect and three presented mixed results.

Table 1

Effectiveness Comparison of Single-Sex (SS) and Coeducational (CE) Schools

Achievement Test Scores (n)	Pro-SS	Pro-CE	Null	Mixed
All subjects (9)	6	1	2	0
Mathematics (14)	3	0	8	3
Verbal/English (10)	3	0	7	0

Source: Adapted from U. S. Department of Education (2005, p. xiii).

Note. (n) = the number of findings related to the effectiveness of single-gender schools as compared to coeducational schools in terms of concurrent, quantifiable academic accomplishment (U. S. Department of Education, 2005)

Summary

This chapter has provided a review of literature in four sections: (a) relevant literature on brain research providing a rationale for single-gender education, (b) single-gender initiatives in schools, (c) alternative perspectives on single-gender classes and schools, and (d) research studies concerned with academic achievement and single-gender education. The four sections represent biological, institutional, and research-based support for single-gender education. The researcher found limited literature and studies focused on single-gender education in the United States. A majority of single gender studies have taken place outside of the United States where single-gender education has been more common.

CHAPTER 3 METHODOLOGY

Introduction

The methods and procedures that were used to conduct the study are detailed in this chapter. The purpose of the study was reviewed and the setting was described. The chapter contains information related to the sources of data, instrumentation, and the procedures used in the collection and analysis of data. This study was initiated only after having received the approval of the school district, the school that was the target of the study (Appendix A) and the Institutional Review Board of the University of Central Florida (Appendix B).

Purpose of the Study

The purpose of this study was to determine the relationship of participation in single gender classrooms on student performance on the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students on the Florida Comprehensive Assessment Test (FCAT). The FCAT is a standardized test that is administered to all grades 3 through grade 11 public school students in the state of Florida and has been used to assess students' achievement in reading and mathematics. Students in grades 4, 8, 10, and 11 have also been assessed in science and writing. This study was concerned only with FCAT reading and mathematics scores.

Research Questions

Three research questions were used to guide the study. They are as follows:

1. What difference, if any, exists in the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students in single-gender and mixed-gender classrooms for Florida Comprehensive Assessment Test (FCAT) administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School?
2. What unique preparation and training have teachers who teach single-gender classes at Woodward Avenue Elementary School received that other teachers in Woodward Avenue Elementary School have not received?
3. To what do the teachers of single-gender or traditional mixed-gender classes at Woodward Avenue Elementary School attribute the gain on Florida Comprehensive Assessment Test (FCAT) reading and mathematics administrations in 2006-2009?

Setting

Woodward Avenue Elementary School (WAES), an elementary school whose population at the time of the study was approximately 840 students enrolled in grades Pre-K through 5, was located in Deland, Florida 40 miles northeast of Orlando, Florida. The students attending WAES were primarily from low to median-income families. The student population was comprised of Caucasian (50%), African-American (37%), Hispanic (11%) and Other (2%). The free and reduced lunch percentage and the mobility

rates ranged between 59% and 64% and 42% and 43% respectively for the years 2006-2009.

Population

Woodward Avenue Elementary School (WAES) has partnered with Stetson University in the establishment of a professional development school since 2003. The partnership has been part of a collaborative arm of the Education Department within Stetson's College of Arts and Science. Through the PDS, Stetson University collaborates and works with local elementary and middle schools on issues, concerns, and initiatives specific to that school. Stetson University assisted WAES in accessing research and providing financial support for conferences and materials for book studies and meetings.

The major initiative supported by the PDS at Woodward Avenue Elementary School (WAES) was the implementation of the single-gender program. In the single-gender program, WAES offered parents the option of enrolling their sons and daughters in an all boys' or all girls' class. Initially, single-gender classes were offered for kindergarten, second-, and fifth-grade students.

Sources of Data

The sources of data identified for this research study were test scores for third, fourth, and fifth grade students at Woodward Avenue Elementary School in both the single-gender and mixed-gender classes during the 2005-2006, 2006-2007, 2007-2008 and 2008-2009 school years. The number of test scores identified in the analysis for each

school year represented the test scores of eligible students at that particular grade level. All boys', girls' and mixed classes were comprised of approximately 20 students. The total number of test scores identified in the analysis for the four years reflected the number of students in the identified grades.

The school principal and school records documenting professional development served as sources of data about the activities, methodologies, preparation, and strategies that were used the teachers believed made their students successful. Teachers responded to a researcher-developed questionnaire (Appendix C) to gather additional information about teacher involvement and perceptions regarding the single-gender program.

Instrumentation

The standardized testing instrument used for the basis of comparison in these analyses was the Florida Comprehensive Assessment Test (FCAT). The FCAT is a state mandated test that has been a part of the Florida A+ School Program. FCAT results have been used to assign letter grades ranging from A to F to elementary, middle and high schools. The grade that each school earns has also been used to determine how much of the A+ monies are awarded to each individual school. The purpose of the FCAT has been to:

Assess student achievement of the Sunshine State Standards (SSS) benchmarks in reading, mathematics, science, and writing. The FCAT also includes norm-referenced tests (NRT) in reading comprehension and mathematics problem solving, which allow for comparing the performance of Florida students with students across the nation. (Florida Department of Education, 2008, p. xx)

The FCAT has been administered annually to all public school general education and exceptional education students in grades three through 11 in the state of Florida. Though all students take the FCAT, only (a) test scores generated by students who are present at the same school during both the October and February full-time-equivalent (FTE) count and (b) test scores generated from the Sunshine State Standards (SSS) section of the test are used in the calculation to determine the school's grade. The SSS is Florida's curriculum framework, providing guidelines for the educational curriculum in Florida which include curriculum content areas, strands, standards, and benchmarks (Florida Department of Education, 2008).

The FCAT is divided into two parts: the Sunshine State Standards (SSS) section and the Norm-Referenced Test (NRT) section. The SSS is designed to measure a student's ability to answer questions designed for his/her grade level from content material in the state's curriculum. The NRT is designed to measure a student's performance on content material as it relates to other students' performance on content material in other areas of the nation.

The FCAT contains questions in mathematics, reading, science, and writing. Under the current elementary FCAT administration format, third grade students are tested in mathematics and reading; fourth grade students are tested in mathematics, reading, and writing; fifth grade students are tested in mathematics, reading, and science. In Grades 3-5, the content areas covered in the reading portion of the SSS are: Words and Phrases in Context, Main Idea, Plot, and Purpose, Comparisons and Cause/Effect; and Reference and Research. Content areas covered in the mathematics portion of the SSS for third,

fourth and fifth grade students are: Number Sense, Concepts and Operations, Measurement, Geometry and Spatial Sense, Algebraic Thinking, and Data Analysis and Probability (Florida Department of Education, 2008). In the fourth grade, students respond to a writing prompt.

For the purpose of this study only the student test scores generated from the SSS were used for comparison. A student's performance is measured on the SSS by a variety of indicators. The initial indicator is reported in levels supported by a numbering system that extends from Level 1 to Level 5, and a student's score can be on any of the five levels. Within each level there is a set of numbers that provides a more accurate description of each student's performance. The number within the levels represents a student's individual developmental scale score (DSS).

Using reading as an example, the five levels of the reading developmental scale scores are sequentially divided across the grade level. In the third grade, developmental scale scores (DSS) range from a minimum Level 1 DSS of 86 to a maximum Level 5 DSS of 2514.0. For example, two third grade students could both be described as exhibiting Level 3 performance on the reading section of the SSS part of the FCAT, but their DSS scores could be 1,250 and 1,450 respectively. The levels and developmental scale score ranges for FCAT reading and mathematics are displayed by grade level in Table 2.

Table 2

Florida Comprehensive Assessment Test (FCAT) Reading and Developmental Scale Scores (DSS) by Grade Level

Grade	Level 1	Level 2	Level 3	Level 4	Level 5
Reading					
3	86-1045	1046-1197	1198-1488	1489-1865	1866-2514
4	295-1314	1315-1455	1456-1689	1690-1964	1965-2638
5	474-1341	1342-1509	1510-1761	1762-2058	2059-2713
Mathematics					
3	375-1078	1079-1268	1269-1508	1509-1749	1750-2225
4	581-1276	1277-1443	1444-1657	1658-1862	1863-2330
5	569-1451	1452-1631	1632-1768	1769-1956	1957-2456

Note. Adapted from Florida Department of Education, Understanding FCAT Reports (2009, p. 6)

A researcher-designed questionnaire was used to gather additional information from teachers willing to share their experience with the program. All teachers who taught students in the single-gender classes during the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years were given the opportunity to respond to a set of questions designed to elicit background information regarding their specific involvement with the single-gender program, the preparation they had received, and their experiences with the program. They were queried as to how their performance in teaching single-gender classes differed from teaching mixed groups and what they had learned about teaching in general and themselves as a result of their experience. They were also afforded the opportunity to share any additional insights, motivating factors, unique experiences that they believed impacted them or their students.

There were two teacher participants in the 2005-2006 year and six teacher participants in each of the subsequent three years, 2006-2007, 2007-2008 and 2008-2009. A total of 10 teachers participated in the program over the four-year period, seven of whom responded to the questionnaire to gather additional information about teacher involvement and perceptions regarding the single-gender program. The Teacher Questionnaire is presented in Appendix C.

Data Analysis

The test scores of all eligible third, fourth, and fifth grade students were used in the analysis. Using the Statistical Program for the Social Sciences (SPSS), all of the eligible test scores of eligible students were analyzed to produce a mean, median, skew, and standard deviation for each single-gender and mixed-gender class. The data were then re-analyzed after the outliers were removed. The purpose of the re-analysis was to provide a 'cleaner' representation of the classes' performance as a unit. The presence of outliers (scores more than two standard deviations from the mean) would have positively or negatively affected the slope of the distribution. The analysis and re-analysis were used to produce a set of scores (mean, median, skew, and standard deviation) that permitted the comparative measurement of performance among the classes.

The existing school classroom structure provided a natural statistical nested design to maintain intact groups. The design of the study enabled the formation of three groups: (a) all boys' classes, (b) all girls' classes, and (c) mixed-gender classes. This design permitted the tracking of the groups so that comparisons could be made across and

between grade levels. The design also allowed for the identification and isolation of variables that may have contributed to standardized test score results.

Research Question 1 explored the difference, if any, in the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students in single-gender and mixed-gender classrooms for Florida Comprehensive Assessment Test (FCAT) administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School. The reading and mathematics scores of boys enrolled in single-gender classes were compared to the reading and mathematics scores of students enrolled in mixed-gender classes. Likewise, the reading and mathematics scores of girls enrolled in single-gender classes were compared to the reading and mathematics scores of students enrolled in mixed-gender classes.

Research Question 2, addressed the unique preparation and training that teachers who taught single-gender classes at Woodward Avenue Elementary School received that was not received by other teachers in the school. The researcher, who was WAES's assistant principal, at the time of the research served as a major source of data in responding to this question. School and district records were also accessed to document any professional development provided specifically for teachers of single-gender classes.

Research Question 3 sought to elicit the perceptions of teachers of single-gender classes at Woodward Avenue Elementary School regarding gains that had been made on the Florida Comprehensive Assessment Test (FCAT) Reading and Mathematics administrations in 2006-2009. Of the 10 teachers who had participated in the program over the four-year period, seven responded to the survey. The researcher summarized

and categorized the data for each of the responding teachers. The data were further reviewed to determine any commonalities in the factors that were identified by each teacher to explain school developmental scale scores on the Florida Comprehensive Assessment Test (FCAT) Reading and Mathematics administrations in 2006-2009.

Table 3

Research Questions, Sources of Data and Analyses

Research Question	Data Sources	Analysis
1. What difference, if any, exists in the reading and mathematics developmental scale scores (DSS) of third, fourth, and fifth grade students in single-gender and mixed-gender classrooms for Florida Comprehensive Assessment Test (FCAT) administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School?	Florida Comprehensive Assessment Test reading and mathematics developmental scale scores (FCAT)	Comparative Measurement of Performance among classes (mean, median, skew, and standard deviation)
2. What unique preparation and training have teachers who teach single-gender classes at Woodward Avenue Elementary School received that other teachers in Woodward Avenue Elementary School have not received?	Review of school documentation of professional development by principal Teacher Questionnaire	Descriptive statistics
3. To what do the teachers of single-gender or traditional mixed-gender classes at Woodward Avenue Elementary School attribute the gain on Florida Comprehensive Assessment Test (FCAT) reading and mathematics administrations in 2006-2009?	Teacher Questionnaire	Descriptive statistics

Confidentiality

To ensure confidentiality, the collection of data was conducted by the researcher as follows: Class rosters were used to identify which students were in a given class during a particular year. Students' test scores were recorded and numbered as they appeared on the class roster (1-20). Each class was assigned an alpha numeric ID that contained three digits and a letter identifying the class by year, grade level, and gender make-up. For example, a class labeled 653M would be a fifth grade mixed-gender class that took the FCAT during the 2005-2006 school year. Students' test scores were entered into the SPSS database under their class alpha numeric ID. In the analysis, the generated mean, median, skew, and standard deviation were identified using only the alpha numeric ID. Additionally, the responses of each teacher were coded with an alpha numeric ID to ensure anonymity.

Summary

The methods and procedures used to conduct the study have been outlined in this chapter. The three research questions that guided the study and the data sources used to respond to each of the research questions have been presented. The setting of the study, the instruments used for measurement and evaluation, and the data analysis instrument used have been described.

CHAPTER 4 ANALYSIS OF THE DATA

Introduction

The student test scores used in the analyses were the scores of students enrolled in the single-gender or mixed-gender classes at Woodward Avenue Elementary School (WAES) during the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Only the FCAT developmental scale scores (DSS) that were generated from the Sunshine State Standards section of the Florida Comprehensive Assessment Test (FCAT) from the third, fourth, and fifth grades that had both single-gender and mixed-gender classes were used in the analyses.

The purpose of the analysis was to determine the mean, median, standard deviation, and skew for each set of data. The mean, median, and skew are descriptive statistics. “Descriptive statistics refers to a set of concepts and methods used in organizing, summarizing, tabulating, depicting, and describing collections of data.” Shavelson (1996, p. 8). The mean and median are statistical measures of central tendency. Shavelson (1996) also stated that the “central tendency of a distribution describes the location of the center of the distribution by indicating one score value that represents the “average” score” (p. 81). He defined the mean as “the sum of the scores divided by the number of scores that entered that sum” (p. 92); the median as “the point or score value below which 50 percent of the scores fall” (p. 89). The standard deviation, according to Shavelson (1996) was defined as “An average variability of scores in the distribution measured in units of the original score” (p. 82), and skew referred to the

symmetry of a distribution. A skewed distribution is “a distribution in which one tail is longer than the other tail relative to its central portion” (Shavelson, 1996, p. 60).

After an initial analysis of the data and close examination of the compiled developmental scale scores (DSS), it was found that some of the data sets contained very high and/or very low DSS. These very high or very low data points, statistically referred to as “outliers,” can change the relationship between variables in small sample sizes (Shavelson, 1996). For the purpose of this study, therefore, all of the DSS that were more than two standard deviations away from the mean were removed from the data set, and a second analysis (re-analysis) was performed.

Removing the outliers may have caused the following changes to occur in a given data set: an increase or decrease in the reading mean DSS, reading median DSS, mathematics Mean DSS, or mathematics Median DSS. Also, the number of useable Reading and/or Math DSS may decrease for an identified data set. The following information represents the re-analysis of the original data after the removal of the outliers. The results of the original analysis of the data are contained in Appendix D.

Research Question 1

What difference, if any, exists in the reading and mathematics developmental scale scores of third-, fourth-, and fifth-grade students in single-gender and mixed-gender classrooms for FCAT administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School?

Reading and Mathematics Analysis: 2005-2006

In 2005-2006, there were no single-gender classes at the third and fourth grade levels. In the fifth grade, there were two mixed-gender classes, one all boys' class, and one all girls' class. The number of students who generated useable FCAT developmental scale scores (DSS) was 87 for both reading and mathematics. The analysis of developmental scale scores for fifth-grade reading and mathematics for 2005-2006 is presented in Table 4.

Table 4

Fifth Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis: 2005-2006

Class	N	Mean	SD	Median	Skew
Reading					
650 Mixed	23	1658.2	218.0	1677.0	-.214
651 Mixed	19	1676.8	142.9	1711.0	.175
652 Boys	24	1625.5	179.0	1615.0	.173
653 Girls	21	1617.4	201.8	1666.0	-.106
Total	87				
Mathematics					
650 Mixed	24	1688.7	179.9	1628.5	.541
651 Mixed	20	1683.1	203.8	1680.5	-.497
652 Boys	23	1703.7	131.8	1678.0	-.101
653 Girls	20	1628.0	118.2	1666.0	-.108
Total	87				

Fifth Grade Reading: 2005-2006

In 2005-2006, the reading DSS class means of the four fifth-grade classes ranged from 1617.4 to 1676.8. This range of scores fell into the Level 3 category which was in the average range. Of the four, Class 651, a mixed-gender class, had the highest reading DSS mean (1676.8). The reading DSS medians of the four 5th grade classes ranged from 1615.0 to 1711.0. Class 651 also had the highest reading DSS median (1711.0).

Fifth Grade Mathematics: 2005-2006

In 2005-2006, the mathematics DSS class means of the four fifth-grade classes ranged from 1628.0 to 1703.7. All of these scores fell into the Level 3 category which was in the average range. Of the four classes, Class 652, a single-gender boys' class, had the highest mathematics DSS mean (1703.7). The mathematics DSS class medians of the four 5th grade classes ranged from 1628.5 to 1680.5. Of the four classes, Class 651, a mixed-gender class, had the highest mathematics DSS median (1680.5).

Summary of Fifth Grade Analysis: 2005-2006

In summary, for 2005-2006, with respect to the fifth-grade classes, Class 651, a mixed-gender class, had the highest reading DSS mean, reading median, and mathematics median. Class 652, a single-gender boys' class, had the highest mathematics DSS mean.

Reading and Mathematics Analysis: 2006-2007

In 2006-2007, students in the third, fourth, and fifth grades took the FCAT, and there were mixed-gender and single-gender classes at all of the grade levels. In the third grade, there were five mixed-gender classes, one all girls' class and one all boys' class. the number of student-generated useable reading developmental scale scores (DSS) in third grade was 126, and the number of student-generated useable mathematics DSS in third grade was 111. In the fourth grade, there were three mixed-gender classes, one all girls' class and one all boys' class. The number of fourth-grade student-generated useable reading developmental scale scores (DSS) was 95, and the number of fourth grade student-generated useable mathematics DSS was 92. In the fifth grade there were three mixed gender classes, one all girls' class, and one all boys' class. The number of student-generated useable reading developmental scale scores (DSS) was 103, and the number of student-generated useable mathematics DSS was 105. The results of the analyses for grades three, four, and five are displayed in Tables 5, 6 and 7, respectively.

Third Grade Reading: 2006-2007

In 2006-2007, the reading DSS mean scores of the seven 3rd grade classes ranged from 1249.5 to 1442.7 (See Table 5). These scores fell into the Level 3 category which was in the average range. Of the seven classes, Class 730, a mixed-gender class, had the highest reading DSS mean (1442.7). The DSS reading medians of the seven 3rd grade classes ranged from 1282.0 to 1446.0. Class 733, a single-gender boys' class, had the highest reading DSS median (1446.0).

Third Grade Mathematics: 2006-2007

In 2006-2007, The mathematics DSS class means of the seven 3rd grade classes ranged from 1182.9 to 1591.5 (See Table 5). These scores were categorized as average and ranged from a high Level 2 to a low Level 4. Of the seven classes, Class 733, a single-gender boys' class, had the highest mathematics DSS mean of 1591.5. The reading DSS class medians of the seven 3rd grade classes ranged from 1224.0 to 1603.0. Of the seven classes, Class 733 also had the highest mathematics median DSS (1603.0).

Table 5

Third Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis: 2006-2007

Class	N	Mean	SD	Median	Skew
Reading					
730 Mixed	18	1442.7	195	1430.5	.136
731 Mixed	19	1334.4	223.5	1355.0	.077
732 Mixed	19	1249.5	297.9	1282.0	-.080
733 Boys	19	1414.4	270.8	1446.0	.130
734 Girls	16	1293.5	215.2	1309.0	-.005
735 Mixed	16	1302.7	306.6	1343.0	-.519
736 Mixed	19	1378.9	232.3	1361.0	.375
Total	126				
Mathematics					
730 Mixed	18	1423.4	215.3	1448.8	-.248
731 Mixed	19	1489.2	167.1	1480.0	.215
732 Mixed	18	1316.4	218.7	1330.0	-.550
733 Boys	19	1591.5	188.7	1603.0	.033
734 Girls	15	1454.3	114.8	1471.0	-.617
735 Mixed	16	1182.9	393.3	1224.0	-.909
736 Mixed	21	1459.0	198.4	1453.0	.200
Total	111				

Summary of Third Grade Analysis 2006-2007

In summary, for 2006-2007, with respect to third-grade classes, Class 730, a mixed-gender class, had the highest reading DSS mean. Class 733, a single-gender all boys' class, had the highest reading DSS median, mathematics DSS mean, and mathematics DSS median.

Fourth Grade Reading: 2006-2007

In 2006-2007, the reading DSS class means of the five fourth-grade classes ranged from 1435.8 to 1617.7 (See Table 6). These scores fell into the upper Level 2 to Level 3 category which was in the average range. Of the five classes, Class 743, a single-gender boys' class, had the highest reading DSS mean (1617.7). The reading DSS class medians of the five 4th grade classes ranged from 1408.0 to 1607.0. Of the five classes, Class 743 also had the highest reading DSS median score (1607.0).

Table 6

*Fourth Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2006-2007*

Class	N	Mean	SD	Median	Skew
Reading					
740 Mixed	18	1522.9	218.4	1466.5	.442
741 Girls	21	1549.8	299.2	1601.0	-.515
742 Mixed	18	1455.1	220.3	1455.0	-.090
743 Boys	19	1617.7	178.0	1607.0	-.617
744 Mixed	19	1435.8	200.7	1408.0	.123
Total	95				
Mathematics					
740 Mixed	17	1459.8	122.0	1482.0	-.370
741 Girls	20	1579.9	208.3	1608.5	-.741
742 Mixed	18	1429.4	157.5	1440.5	.107
743 Boys	19	1611.9	149.9	1596.0	-.192
744 Mixed	18	1396.3	208.7	1438.5	-.406
Total	92				

Fourth Grade Mathematics: 2006-2007

In 2006-2007, the mathematics DSS class means of the five fourth grade classes ranged from 1396.3 to 1611.9 (See Table 6). These scores fell into the mid-Level 2 to upper Level 3 categories and spanned the low average to upper average ranges. Of the five classes, Class 743, a single-gender boys' class, had the highest mathematics DSS mean (1611.9). The mathematics DSS class medians ranged from 1438.5 to 1608.5. Of the five classes, Class 741, a single-gender girls' class, had the highest mathematics DSS median (1608.5).

Summary of Fourth Grade Analysis: 2006-2007

In summary, for 2006-2007, with respect to fourth grade classes, Class 743, a single-gender boys' class, had the highest reading DSS mean, reading median, and mathematics mean. Class 741, a single-gender girls' class, had the highest mathematics DSS median.

Fifth Grade Reading: 2006-2007

In 2006-2007, the reading DSS class means of the five fifth-grade classes ranged from 1586.7 to 1720.7 (See Table 7). These scores fell into the mid Level 2 to upper Level 3 categories, which was in the average range. Of the five classes, Class 752, a single-gender girls' class, had the highest reading DSS mean (1720.7). The reading DSS class medians ranged from 1604.5 to 1722.0. Of the five classes, Class 753, a single-gender boys' class, had the highest reading median score of 1722.0.

Fifth Grade Mathematics: 2006-2007

In 2006-2007, the mathematics DSS class means of the five fifth-grade classes ranged from 1595.4 to 1727.0 (See Table 7). These scores fell into the mid Level 2 to mid Level 3 category, which was in the average range. Of the five classes, Class 753, a single-gender boys' class, had the highest mathematics DSS mean of 1727.0. The mathematics DSS class medians ranged from 1579.0 to 1706.0. Of the five classes, Class 753 also had the highest mathematics DSS median (1706.0).

Table 7

*Fifth-Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2006-2007*

Class	N	Mean	SD	Median	Skew
Reading					
750 Mixed	22	1609.0	212.8	1621.0	-.419
751 Mixed	20	1650.4	175.6	1652.5	-.218
752 Girls	20	1720.7	140.5	1700.0	-.325
753 Boys	19	1714.4	99.8	1722.0	.325
754 Mixed	22	1586.7	240.3	1604.5	.045
Total	103				
Mathematics					
750 Mixed	21	1595.4	151.2	1579.0	.176
751 Mixed	20	1669.4	172.8	1671.0	.068
752 Girls	21	1674.9	111.5	1640.0	.348
753 Boys	21	1727.0	108.4	1706.0	.482
754 Mixed	22	1639.8	173.1	1598.0	.512
Total	105				

Summary of Fifth Grade Analysis: 2006-2007

In summary, for 2006-2007, with respect to fifth grade classes, Class 752, a single-gender girls' class, had the highest reading DSS mean. Class 753, a single-gender boys' class had the highest reading DSS median, mathematics mean, and mathematics median.

Reading and Mathematics Analysis for 2007-2008

In 2007-2008, the students in the third, fourth, and fifth grades took the FCAT, and had both mixed-gender and single-gender classes at each of the grade levels. In the third grade, there were five mixed-gender classes, one all girls' class and one all boys'

class. The number of student-generated useable reading developmental scale scores (DSS) was 104, and the number of student generated mathematics DSS was 107. In the fourth grade, there were four mixed-gender classes, one all girls' class, and one all boys' class. The number of student-generated useable reading DSS scores was 102, and the number of student-generated mathematics DSS was 98. In the fifth grade there were two mixed gender classes, one all girls' class, and one all boys' class. The number of student-generated useable reading DSS was 87 and the number of student-generated mathematics FCAT DSS was 88. The data for the 2007-2008 analyses for grades three, four, and five are presented in Tables 8, 9, and 10, respectively.

Third Grade Reading: 2007-2008

In 2007-2008, the reading DSS class means of the seven 3rd grade classes ranged from 1213.8 to 1483.0 (See Table 8). These scores fell into the Level 3 category, which is in the average range. Of the seven classes, Class 834, a mixed gender class, had the highest reading DSS mean (1483.0). The reading DSS class medians ranged from 1181.5 to 1458.0. Of the seven classes, Class 834 also had the highest reading DSS median (1458.0).

Table 8

*Third Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2007-2008*

Class	N	Mean	SD	Median	Skew
Reading					
830 Boys	13	1406.0	194.8	1421.0	-.037
831 Mixed	17	1381.5	282.7	1392.0	-.102
832 Mixed	15	1288.2	177.9	1379.0	-1.150
833 Mixed	16	1213.8	213.4	1181.5	.093
834 Mixed	14	1483.0	185.5	1458.0	.746
835 Girls	14	1392.9	267.3	1446.0	-.704
836 Mixed	15	1355.4	199.2	1288.0	.827
Total	104				
Mathematics					
830 Boys	14	1530.5	174.7	1536.0	.085
831 Mixed	16	1495.8	169.5	1495.8	-.212
832 Mixed	16	1474.0	232.7	1473.5	.260
833 Mixed	16	1381.3	295.3	1395.0	-.398
834 Mixed	15	1585.5	106.3	1587.0	.024
835 Girls	15	1485.4	197.4	1457.0	.375
836 Mixed	15	1544.5	229.8	1536.0	.383
Total	107				

Third-Grade Mathematics: 2007-2008

In 2007-2008, the mathematics DSS class means of the seven 3rd grade classes ranged from 1381.3 to 1585.5 (See Table 8). These scores fell into the mid-Level 3 to lower Level 4 category, which was in the average range. Of the seven classes, Class 834, a mixed-gender class, had the highest mathematics DSS mean of 1585.5. The mathematics DSS class medians ranged from 1395.0 to 1587.0. Of the seven classes, Class 834 also had the highest mathematics median DSS of 1587.0.

Summary of Third Grade Analysis: 2007-2008

In summary, for 2006-2007, with respect to third grade classes, Class 834, a mixed-gender class, had the highest reading DSS mean, reading DSS median, mathematics DSS mean, and mathematics DSS median.

Fourth Grade Reading: 2007-2008

In 2007-2008, the Reading DSS class means of the six fourth grade classes ranged from 1525.0 to 1663.6 (See Table 9). These scores fell into the Level 3 category, which was in the average range. Of the six classes, Class 843, a single-gender boys' class, had the highest reading DSS mean (1663.6). The reading DSS class medians ranged from 1478.0 to 1720.5. Of the seven classes, Class 843 also had the highest reading DSS median (1720.5).

Table 9

*Fourth-Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2007-2008*

Class	N	Mean	SD	Median	Skew
Reading					
840 Mixed	17	1536.1	263.3	1490.0	-.348
841 Mixed	18	1598.0	270.1	1651.0	-.279
842 Girls	18	1605.0	129.3	1642.0	-.306
843 Boys	15	1663.6	200.7	1672.0	.135
844 Mixed	16	1525.0	232.3	1548.5	-.507
845 Mixed	18	1591.3	252.9	1612.5	-.188
Total	102				
Mathematics					
840 Mixed	17	1649.1	182.4	1679.0	.133
841 Mixed	17	1669.7	135.3	1661.0	.052
842 Girls	17	1495.5	98.8	1478.0	.132
843 Boys	14	1728.0	114.6	1720.5	.282
844 Mixed	16	1583.1	148.1	1545.5	.227
845 Mixed	17	1550.1	193.5	1534.0	.804
Total	98				

Fourth Grade Mathematics: 2007-2008

In 2007-2008, the mathematics DSS class means of the six 4th grade classes ranged from 1495.5 to 1728.0 (See Table 9). These scores fell into the Level 3 to mid Level 4 categories, which was in the average range. Of the six classes, Class 843, a single-gender boys' class, had the highest mathematics DSS mean (1728.0). The mathematics DSS class medians ranged from 1478.0 to 1720.5. Of the six classes, Class 843 also had the highest mathematics DSS median (1720.5).

Summary of Fourth Grade Analysis: 2007-2008

In summary, for 2007-2008, with respect to fourth grade classes, Class 843, a single-gender boys' class, had the highest reading DSS mean, reading DSS median, mathematics DSS mean, and mathematics DSS median.

Fifth Grade Reading: 2007-2008

In 2007-2008, the reading DSS class means of the four 5th grade classes ranged from 1531.8 to 1643.2 (See Table 10). These scores fell into the Level 3 category, which was in the average range. Of the four classes, Class 852, a mixed-gender class, had the highest reading DSS mean (1643.2). The reading DSS class medians ranged from 1532.0 to 1677.0. Of the four classes, Class 852 also had the highest reading DSS median (1677.0).

Fifth Grade Mathematics: 2007-2008

In 2007-2008, the mathematics DSS class means of the four 5th grade classes ranged from 1611.6 to 1681.3 (See Table 10). These scores fell into the high Level 2 to mid-Level 3 categories which was in the average range. Of the four classes, Class 850, a single-gender boys' class, had the highest mathematics DSS mean (1681.3). The mathematics DSS class medians ranged from 1626.0 to 1720.5. Of the four classes, Class 853, a single-gender girl's class, had the highest mathematics DSS median (1720.5).

Table 10

*Fifth-Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2007-2008*

Class	N	Mean	SD	Median	Skew
Reading					
850 Boys	21	1531.5	220.8	1532.0	-.218
851 Mixed	21	1551.4	148.3	1537.0	-.107
852 Mixed	20	1643.2	181.9	1677.0	-.407
853 Girls	25	1560.9	235.6	1577.0	-.020
Total	87				
Mathematics					
850 Boys	22	1681.3	136.8	1661.5	.102
851 Mixed	22	1611.6	163.5	1626.0	.015
852 Mixed	20	1672.7	124.0	1673.0	-.024
853 Girls	24	1669.1	183.5	1720.5	-.605
Total	88				

Summary of Fifth Grade Analysis: 2007-2008

In summary, for 2007-2008, with respect to fifth grade classes, Class 852, a mixed-gender class, had the highest reading DSS mean and reading DSS median. Class 850, a single-gender boys' class, had the highest mathematics DSS mean and Class 853, a single-gender girls' class, had the highest mathematics DSS median.

Reading and Mathematics Analysis for 2008-2009

In 2008-2009 the students in the third, fourth and fifth grades took the FCAT, and had both mixed-gender and single-gender classes at each of the grade levels. In the third grade there were three mixed gender classes, one all girls' class and one all boys' class. The number of student-generated useable reading developmental scale scores (DSS) scores was 75, and the number of student-generated useable mathematics DSS was 72. In

the fourth grade there were three mixed gender classes, one all girls' class and one all boys' class. The number of student-generated useable reading DSS was 93, and the number of student-generated useable mathematics DSS was 94. In the fifth grade, there were three mixed gender classes, one all girls' class and one all boys' class. The number of student-generated usable reading and mathematics DSS was 102. These data for grades three, four, and five for 2008-2009 are displayed in Tables 11, 12, and 13, respectively.

Third Grade Reading Analysis: 2008-2009

For 2008-2009, the reading DSS class means of the five 3rd grade classes ranged from 1387.8 to 1488.3 (See Table 11). These scores fell into the Level 3 category, which was in the average range. Of the five classes, Class 930, a single-gender boys' class, had the highest reading DSS mean (1488.3). The reading DSS class medians ranged from 1391.0 to 1509.5. Of the five classes, Class 930, also had the highest reading DSS median (1509.5).

Third Grade Mathematics Analysis: 2008-2009

For 2008-2009, the mathematics DSS class means of the five 3rd grade classes ranged from 1527.0 to 1678.1 (See Table 11). These scores fell into the Level 4 category, which was in the above average range. Of the five classes, Class 932, a mixed gender class, had the highest mathematics DSS mean (1678.1). The mathematics DSS

class medians ranged from 1471.0 to 1686.5. Of the five classes, Class 932 also had the highest mathematics DSS median (1686.5).

Table 11

Third Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis: 2008-2009

Class	N	Mean	SD	Median	Skew
Reading					
930 Boys	14	1488.3	261.3	1509.5	.016
931 Mixed	16	1457.0	230.4	1485.0	-.316
932 Mixed	14	1459.1	218.5	1424.5	.770
933 Mixed	14	1406.2	272.2	1415.5	.251
934 Girls	17	1387.8	185.0	1391.0	.193
Total	75				
Mathematics					
930 Boys	14	1587.7	237.9	1566.0	.188
931 Mixed	15	1481.0	178.2	1471.0	-.325
932 Mixed	14	1678.1	310.0	1686.5	.328
933 Mixed	14	1580.2	222.9	1573.0	-.010
934 Girls	15	1527.0	177.9	1471.0	1.741
Total	72				

Summary of Third Grade Analysis: 2008-2009

In summary, for 2008-2009 with respect to third grade classes, Class 930, a single-gender all boys' class, had the highest reading DSS mean and DSS reading median. Class 932, a mixed-gender class, had the highest mathematics DSS mean, and mathematics DSS median.

Fourth Grade Reading: 2008-2009

In 2008-2009, the reading DSS means of the five 4th grade classes ranged from 1606.5 to 1659.0 (See Table 12). These scores fell into the Level 3 category, which was in the average range. Of the five classes, Class 942, a single-gender boys' class, had the highest reading DSS mean (1659.0). The reading DSS class medians ranged from 1584.0 to 1724.0. Of the five classes, Class 941, a single-gender girls' class, had the highest reading DSS median (1724.0).

Table 12

*Fourth-Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis:
2008-2009*

Class	N	Mean	SD	Median	Skew
Reading					
940 Mixed	19	1630.4	229.3	1607.0	.341
941 Girls	19	1658.6	153.8	1724.0	-.616
942 Boys	21	1659.0	237.0	1654.0	-.058
943 Mixed	17	1625.5	147.9	1630.0	.211
944 Mixed	17	1606.5	129.3	1584.0	.364
Total	93				
Mathematics					
940 Mixed	20	1630.9	209.7	1630.5	-.262
941 Girls	21	1613.7	146.2	1631.0	-.119
942 Boys	19	1742.1	171.0	1748.0	-.537
943 Mixed	17	1612.2	132.7	1613.0	-.165
944 Mixed	17	1633.5	146.0	1631.0	.504
Total	94				

Fourth Grade Mathematics: 2008-2009

In 2008-2009, the mathematics DSS class means of the five 4th grade classes ranged from 1612.2 to 1742.1 (See Table 12). These scores fell into the upper Level 3 to mid-Level 4 categories, which was in the average to above average range. Of the five classes, Class 942, a single-gender boys' class, had the highest mathematics DSS mean (1742.1). The mathematics DSS median class scores ranged from 1613.0 to 1748.0. Of the five classes, Class 942 also had the highest mathematics DSS median (1748.0)

Summary of Fourth Grade Analysis: 2008-2009

In summary, for 2008-2009, with respect to fourth grade classes, Class 942, a single-gender boys' class, had the highest reading DSS mean, mathematics DSS mean, and mathematics DSS median. Class 941, a single-gender girls' class had the highest reading DSS median.

Fifth Grade Reading Analysis: 2008-2009

For 2008-2009, the reading DSS class means of the five 5th grade classes ranged from 1491.5 to 1666.4 (See Table 13). These scores fell into the mid-Level 2 to mid-Level 3 categories, which was in the average range. Of the five classes, Class 952, a mixed-gender class, had the highest reading DSS mean of 1666.4. The reading DSS class medians ranged from 1532.0 to 1669.0. Of the five classes, Class 952 also had the highest reading DSS median (1669.0).

Fifth Grade Mathematics Analysis: 2008-2009

In 2008-2009, the mathematics DSS class means of the five 5th grade classes ranged from 1616.2 to 1749.4 (See Table 13). These scores fell into the high Level 2 to Mid-Level 3 categories, which was in the average range. Of the five classes, Class 952, a mixed-gender class, had the highest mathematics DSS mean of 1749.4. The mathematics DSS class medians ranged from 1626.0 to 1749.0. Of the five classes, Class 952 also had the highest mathematics DSS median (1749.0).

Table 13

Fifth-Grade Reading and Mathematics Developmental Scale Score (DSS) Analysis: 2008-2009

Class	N	Mean	SD	Median	Skew
Reading					
950 Boys	19	1491.5	236.3	1453.0	.295
951 Mixed	22	1619.5	277.9	1615.5	-.232
952 Mixed	20	1666.4	130.7	1669.0	-.835
953 Mixed	21	1593.1	214.6	1532.0	.883
954 Girls	20	1573.5	168.8	1590.5	-.033
Total	102				
Mathematics					
950 Boys	19	1707.4	129.0	1692.0	.314
951 Mixed	21	1687.0	153.6	1722.0	-.431
952 Mixed	21	1749.4	137.1	1749.0	-.415
953 Mixed	21	1616.2	205.9	1626.0	-.297
954 Girls	20	1692.8	106.6	1685.0	.302
Total	102				

Summary of Fifth-Grade Analysis: 2008-2009

In summary, for 2008-2009, with respect to fifth-grade classes, Class 952, a mixed-gender class, had the highest reading DSS mean, reading DSS median, mathematics DSS mean and mathematics DSS median.

Comparison of Initial Analysis and Re-analysis

The information that follows presents a summary comparison of the results of the re-analysis presented in this chapter and the initial analysis of the data which is included in Appendix D. Tabular displays and accompanying narratives have been used to summarize the highest developmental scale score (DSS) means identified in both analyses. The major distinction between the re-analysis and the initial analysis was that data used in the initial analysis (Appendix D) contained all of the useable developmental scale scores generated by all of the students at the identified grade who were enrolled in a general education class at the specified grade level. The data in the re-analysis represented the useable developmental scale scores generated by the students who were within two standard deviations of the mean for that data set. Any data point (developmental scale scores) that was more than two standard deviations away from the mean (outlier) was removed from the dataset. It is noted that in small sample sizes outliers may change the relationship between variables. (Shavelson, 1996).

Comparison of Initial Analysis and Re-analysis for Fifth Grade (2005-2006)

For the 2005-2006 school year, as shown in Table 14, a comparison between the re-analysis and the initial analysis (Appendix D) of fifth grade developmental scale scores revealed little difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2005-2006, a mixed-gender class out-performed all of the other fifth grade classes on three of four measures in the re-analysis. In the initial analysis, a mixed-gender class had the highest reading mean and median of all of the fifth grade classes and the single-gender boys' class had the highest mathematics mean and mathematics median. At the fifth grade level in 2005-2006 there were four 5th grade classes: two mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Table 14

Re-analysis and Initial Analysis: Comparison of Highest Reading and Mathematics Scores: 2005-2006

Class by Grade Level (#)	Highest Reading Score		Highest Mathematics Score	
	Mean	Median	Mean	Median
Re-analysis - Grade 5				
Mixed gender (2)	X	X		X
Boys			X	
Girls				
Initial analysis - Grade 5				
Mixed gender (2)	X	X		
Boys			X	X
Girls				

Comparison of Initial Analysis and Re-analysis for Third Grade (2006-2007)

For the 2006-2007 school year, as shown in Table 15, a comparison between the re-analysis and the initial analysis (Appendix D) of third grade developmental scale scores revealed little difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2006-2007, the single-gender boys' class consistently out-performed all of the other third grade classes. The single-gender boys' class out-performed all of the other third grade classes in three of the four measures in the re-analysis and out-performed all of the other third grade classes on four of four measures in the initial analysis. At the third grade level in 2006-2007 there were seven 3rd grade classes: five mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Comparison of Initial Analysis and Re-analysis for Fourth Grade (2006-2007)

For the 2006-2007 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fourth grade developmental scale scores revealed little difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2006-2007, the single-gender boys' class consistently out-performed all of the other fourth grade classes. The single-gender boys' class out-performed all of the other fourth grade classes on three of four measures in the re-analysis and out-performed all of the other fourth grade classes on four of four

measures in the initial analysis. At the fourth grade level in 2006-2007 there were five 4th grade classes: three mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Comparison of Initial Analysis and Re-analysis for Fifth Grade (2006-2007)

For the 2006-2007 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fifth grade developmental scale scores revealed no difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2006-2007, the single-gender boys' class consistently out-performed all of the other fifth grade class. The single-gender boys' class out-performed all of the other fifth grade classes on three of four measures in the re-analysis and out-performed all of the other fifth grade classes on three of four measures in the initial analysis. At the fifth grade level in 2006-2007 there were five fifth grade classes: three mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Table 15

Re-analysis and Initial Analysis: Comparison of Highest Reading and Mathematics Scores: 2006-2007

Classes by Grade Level (#)	Highest Reading Score		Highest Mathematics Score	
	Mean	Median	Mean	Median
Grade 3 Re-analysis				
Mixed Gender (5)	X			
Boys		X	X	X
Girls				
Grade 3 Initial Analysis				
Mixed Gender (5)				
Boys	X	X	X	X
Girls				
Grade 4 Re-analysis				
Mixed Gender (3)				
Boys	X	X	X	
Girls				X
Grade 4 Initial Analysis				
Mixed Gender (3)				
Boys	X	X	X	X
Girls				
Grade 5 Re-analysis				
Mixed Gender (3)				
Boys		X	X	X
Girls	X			
Grade 5 Initial Analysis				
Mixed Gender (3)				
Boys		X	X	X
Girls	X			

Comparison of Initial Analysis and Re-analysis for Third Grade (2007-2008)

For the 2007-2008 school year, as shown in Table 16, a comparison between the re-analysis and the initial analysis (Appendix D) of third grade developmental scale scores revealed some differences in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading

median, mathematics mean, and mathematics median. In 2007-2008, in the re-analysis, a mixed-gender class out-performed all of the other third grade classes on four of the four measures. In the initial analysis, a single-gender boys' class out-performed all of the other third grade classes on two of four measures, highest reading mean and highest reading median. In the initial analysis, a mixed-gender class out-performed all of the other third grade classes on two of the four measures, highest mathematics mean and highest mathematics median. At the third grade level in 2007-2008 there were seven 3rd grade classes: five mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Comparison of Initial Analysis and Re-analysis for Fourth Grade (2007-2008)

For the 2007-2008 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fourth grade developmental scale scores revealed no difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2007-2008, in the re-analysis and the initial analysis, the single-gender boys' class consistently out-performed all of the other fourth grade classes on four of four measures. At the fourth grade level in 2007-2008 there were six 4th grade classes: four mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Comparison of Initial Analysis and Re-analysis for Fifth Grade (2007-2008)

For the 2007-2008 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fifth grade developmental scale scores revealed no difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2007-2008, in the re-analysis and the initial analysis, a mixed-gender class out-performed all of the other fifth grade classes on two of four measures, highest reading mean, and reading median. However, in both the re-analysis and the initial analysis, the single-gender boys' class, had the highest mathematics mean, and the single-gender girls', class had the highest mathematics median. Please note that at the fifth grade level in 2007-2008 there were six 5th grade classes: four mixed-gender classes, one single-gender boys' class, and one single-gender girls' class.

Table 16

Re-analysis and Initial Analysis: Comparison of Highest Reading and Mathematics Scores: 2007-2008

Class by Grade Level (#)	Highest Reading Score		Highest Mathematics Score	
	Mean	Median	Mean	Median
Grade 3 Re-analysis				
Mixed Gender (5)	X	X	X	X
Boys				
Girls				
Grade 3 Initial Analysis				
Mixed Gender (5)			X	X
Boys	X	X		
Girls				
Grade 4 Re-analysis				
Mixed Gender (4)				
Boys	X	X	X	X
Girls				
Grade 4 Initial Analysis				
Mixed Gender (4)				
Boys	X	X	X	X
Girls				
Grade 5 Re-analysis				
Mixed Gender (4)	X	X		
Boys			X	
Girls				X
Grade 5 Initial Analysis				
Mixed Gender (4)	X	X		
Boys			X	
Girls				X

Comparison of Initial Analysis and Re-analysis for Third Grade (2008-2009)

For the 2008-2009 school year, as shown in Table 17, a comparison between the re-analysis and the initial analysis (Appendix D) of third grade developmental scale scores revealed no difference in the level of performance between the single-gender and

mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. For 2007-2008, in the re-analysis and the initial analysis, the single-gender boys' class out-performed all of the other third grade classes on two of four measures, highest reading mean and reading median. In both re-analysis and initial analysis, a mixed-gender class out-performed all of the other third grade classes on two of the four measures, highest mathematics mean and mathematics median. At the third grade level in 2008-2009 there were five 3rd grade classes: three mixed-gender classes, one single-gender boys' and one single-gender girls' class.

Comparison of Initial Analysis and Re-analysis for Fourth Grade (2008-2009)

During the 2008-2009 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fourth grade developmental scale scores revealed little difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median, mathematics mean, and mathematics median. In 2008-2009, in the re-analysis, the single-gender boys' class out-performed all of the other fourth grade classes on three of the four measures, highest reading mean, mathematics mean, and mathematics median. In the initial analysis, a mixed-gender class had the highest reading mean while the single-gender boys' class had the highest mathematics mean and mathematics median. At the fourth grade level in 2008-2009 there were five 4th grade classes: three mixed-gender classes, one single-gender boys' and one single-gender girls' class.

Table 17

Re-analysis and Initial Analysis: Comparison of Highest Reading and Mathematics Scores: 2008-2009

Class by Grade Level (#)	Highest Reading Score		Highest Mathematics Score	
	Mean	Median	Mean	Median
Grade 3 Re-analysis				
Mixed Gender (3)			X	X
Boys	X	X		
Girls				
Grade 3 Initial Analysis				
Mixed Gender (3)			X	X
Boys	X	X		
Girls				
Grade 4 Re-analysis				
Mixed Gender (3)				
Boys	X		X	X
Girls		X		
Grade 4 Initial Analysis				
Mixed Gender (3)	X			
Boys			X	X
Girls		X		
Grade 5 Re-analysis				
Mixed Gender (3)	X	X	X	X
Boys				
Girls				
Grade 5 Initial Analysis				
Mixed Gender (3)	X	X	X	X
Boys				
Girls				

Comparison of Initial Analysis and Re-analysis for Fifth Grade (2008-2009)

For the 2008-2009 school year, a comparison between the re-analysis and the initial analysis (Appendix D) of fifth grade developmental scale scores revealed no difference in the level of performance between the single-gender and mixed-gender classes relative to which class had the highest reading mean, reading median,

mathematics mean, and mathematics median. In 2008-2009, in both the re-analysis and the initial analysis, a mixed-gender class out-performed all of the other fifth grade classes on four of four measures, highest reading mean, reading median, mathematics mean and mathematics median. At the fifth grade level in 2008-2009 there were five 5th grade classes: three mixed-gender classes, one single-gender boys' and one single-gender girls' class.

Research Question 2

What unique preparation and training; have teachers who teach single-gender classes at Woodward Avenue Elementary School received that other teachers in Woodward Avenue Elementary School have not received?

Woodward Avenue Elementary School (WAES) has partnered with Stetson University in the establishment of The Professional Development School (PDS) Network since 1994 (Stetson University, 2010). The following description is cited on the webpage which describes Stetson's Nina B. Hollis Institute for Educational Reform

Professional Development Schools (PDS) are schools that have joined with universities to accomplish common educational goals that include developing exemplary practice to maximize student outcomes, providing optimum sites for teacher candidate preparation, offering in-service teacher professional development, and implementing reflective inquiry to enhance teacher and student learning. (Stetson University, 2010)

The PDS partnership between Woodward Avenue Elementary School (WAES) and Stetson University has had five areas of focus: (a) utilize data driven decision making to improve the academic performance of all students, (b) enrich instruction with hands-on activities and technology, (c) provide professional development activities for teachers, (d)

draw on community resources to support students and families, and (e) continue to provide families with a single gender program option. This study focused on the single-gender program option. Through the PDS, Stetson University has collaborated and worked with local elementary schools on issues, concerns, and initiatives specific to that school. At the time of the research, there were three PDS elementary schools and four affiliate schools that were involved in collaborative efforts with Stetson University. Stetson University assisted WAES in accessing research and providing financial support for conferences and materials for book studies and meetings.

The major initiative supported by the PDS at Woodward Avenue Elementary (WAES) was the implementation of the single-gender program. In the single-gender program, WAES offered parents the option of enrolling their sons and daughters in an all boys' or all girls' class. Initially, single-gender classes were offered for kindergarten, second, and fifth grade students..

As the program structure solidified, a plan for continual professional development was developed. The school's approach to professional development was two-fold: the offering of professional development that was open to all of the faculty members regardless of the make-up of their classes and specific professional development funded by Stetson University that was targeted to teachers of single-gender classes.

During the development year (2003-2004) the school identified six teachers to participate in the program. There were two kindergarten, two second grade, and two fifth grade teachers identified to participate in the program. The teachers read articles and research on single-gender program implementation and effectiveness. Teachers and

university researchers met monthly to discuss topics such as curriculum, student participation, professional development, measures of success, stakeholder input, marketing of the program, district issues and concerns, protecting the program's integrity, and self perpetuation.

In 2004-2005, the six teachers that were selected participated in a book study of Gurian's *The Boys and Girls Learn Differently*. The fifth-grade teacher who was the initial driving force behind the program and one university researcher attended the Michael Gurian Institute to gather additional information about single-gender classes. After returning, the conference attendees presented information to and shared their observations with the rest of the staff.

In 2005-2006; teachers also participated in a book study. The chosen book was Sax's *Why Gender Matters* (2005b). Book studies were designed and paced in such a way that teachers read a few chapters, made notes or comments and then met monthly to discuss the topics and any related single-gender information. All of the book studies were open to the entire elementary faculty, but single-gender teachers were required to participate. Single-gender issues were also discussed monthly at the PDS meetings. In 2006-2007, three teachers and three Stetson University researchers participated in the K-12 Innovation Conference in Orlando, FL. to gather information on single-gender practices and current research.

In 2007-2008; Stetson University hosted Sax for a single-gender summer workshop. The workshop focused on gender stereotypes and how those stereotypes enter into and impact teacher instruction. The workshop presented methods for teachers to use

to minimize the inherent gender biases in education. Four WAES teachers, two WAES administrators and all of the Stetson researchers attended the workshop. Also, four teachers and four Stetson University researchers attended the National Association of Single Sex Public Education Conference in Detroit, Michigan.

In 2008-2009; six teachers and four Stetson University researchers attended a single-gender conference in Celebration, Florida featuring Sax. For a second year, four WAES teachers and three university researchers also attended the National Association of Single Sex Public Education Conference in Memphis, TN. WAES also hosted a team of teachers from an elementary school in Oklahoma visited to observe the single-gender classrooms.

In 2009-2010; four teachers, two WAES administrators, and four Stetson University researchers attended the National Association of Single Sex Public Education Conference in Atlanta, Georgia for the third year. During this year, several groups of school representatives visited the school to learn more about the program. A team of six teachers and an administrator from a south Florida school visited to observe the single-gender program, meet with the teachers, and speak with the administrative staff. Also, a team of teachers from a private catholic school in St. Louis, Missouri, that had already implemented single-gender, visited to observe classes and speak with teachers. A visitor from Saudi Arabia visited classrooms and spoke with teachers regarding the single-gender classrooms. A local middle school sent a team of sixth-grade science teachers and an administrator to observe students in single-gender classrooms and speak with teachers concerning the program.

In summary, professional development was encouraged for all instructional staff. However, the teachers who were actively participating in the single-gender program were required to participate in book studies and were offered the opportunity to attend conferences on single gender. This professional development was supported by Stetson University, and WAES teachers had formal and informal access to higher education colleagues. Additionally, the teachers who were participating in the single-gender program were encouraged to seek opportunities to advance their knowledge through additional reading, interaction with visitors to the school, and sharing their experiences with their WAES colleagues teaching in regular classrooms.

Research Question 3

To what do the teachers at Woodward Avenue Elementary School attribute the gain on FCAT reading and mathematics administrations in 2006-2009 of single-gender or traditional mixed-gender classes?

Teacher Insights

A researcher-designed questionnaire (Appendix A) was used to gather additional written information from teachers willing to share their experience with the program. All teachers who taught students in the single-gender classes during the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years were given the opportunity to respond to a set of questions designed to elicit background information regarding their specific involvement with the single-gender program, the preparation they had received, and their experiences with the program. They were queried as to how their performance in

teaching single-gender classes differed from teaching mixed groups and what they had learned about teaching in general and themselves as a result of their experience. They were also afforded the opportunity to share any additional insights, motivating factors, unique experiences that they believed impacted them or their students.

There were two teacher participants in the 2005-2006 school year and six teacher participants in each of the subsequent three school years, 2006-2007, 2007-2008 and 2008-2009. A total of 10 teachers participated in the program over the four-year period, seven of whom responded to the questionnaire. Following are responses provided by teachers who, were either currently teaching in the single-gender program or who taught in the single program during the years for which DSS test data were generated. All teachers were asked to respond to the following prompts:

1. How did you become involved in the single-gender program?
2. What grade did you (do you) teach?
3. Which gender do you teach?
4. How long did you teach (have you taught) in the single gender program?
5. What trainings have you participated in that either prepared or informed you about the single gender program?
6. Tell me about your experiences in the single-gender program.
7. What have you learned about teaching in general and yourself as a result of these experiences?
8. What did (do) you do differently in single-gender classes, than when you taught in a traditional classroom?

9. Please feel free to share any additional insights, motivating factors, unique experiences, etc. . . that impacted you or your students.

The following response reports have been structured to provide additional information gleaned regarding teachers' involvement in and perceptions of the single-gender program. Not all of the teachers responded to every question. The researcher, therefore, has restated only the questions to which individual teachers responded. Questions which were not answered were excluded from the summaries. The responses presented are cited directly from the responses to the questionnaire. The researcher has added [dates/sites] when they were perceived to be helpful in clarifying the time frame of events.

Teacher 1 (Female)

How long did you teach in the single-gender program?

I currently teach the third grade all boys' class. I have taught this grade and gender for two years. Let me tell you a little about my spectrum of teaching. Prior to my teaching in the single-gender program, I have taught in ESE, both the Self-Contained Mild Varying Exceptionalities and the Self-Contained/ Emotional Behaviorally Disabled classrooms at both the high school and elementary levels and I taught fourth grade at a private institution.

What trainings have you participated in?

I participated in the "Why Gender Matters" book study (2007) in addition to reading other books and articles by Leonard Sax and Michael Gurian. I attended the Brain-based Learning Conference [2007/New Orleans] and the NASSPE Conference [2007/IL]. I attended and presented at the NASSPE Conference [2008/Orlando].

What did you do differently than when you taught in a traditional classroom?

When I taught in a co-ed class, I believe that I was able to be more unstructured and allow for deviations from the lecture. I had to allow for a certain amount of discourse due to venting and the socialization needs of the co-ed group, I also found myself having to be more of a “mother” to the children rather than a facilitator of information.

What have you learned about teaching and yourself?

I believe that single-gender works. I do not think that it is a fit for every child, but the data shows that it can work if support and diligence are given to the program. I am thankful for the support from Stetson and our school administration. It is nice to have a sounding board when situations arise.

I have learned many things about myself from working with the boys. I have found that I do best with order and structure. Procedures and expectations are a must. I have also learned that children may come to you biologically intact, often there are other factors which lead to a disconnect within the learning environment. I have learned to use music and movement as teaching tools and not just down time. I have learned that I am the Alpha Male; no matter what classroom situation arises (this can be both positive and negative).

Teacher 2 (Male)

How long did you teach in the single-gender program?

I was hired by the principal in the 2006-2007 school year to teach a traditional fifth grade class. This happened to be the second year of the single gender program at Woodward. Near the end of the school year I was asked if I would be interested in taking over the fifth grade all boys’ class, as the current teacher was retiring. I was very excited about this opportunity as I had heard some really positive things concerning the program, so I agreed. I taught fifth grade boys’ for two years [2007-2008 and 2008-2009].

What trainings have you participated in?

I participated in the “Why Gender Matters” book study [2007]. I attended the Introduction to Single Gender Conference with Dr. Leonard Sax [2007/Stetson University]. I attended the Brain-based Learning Conference [2007/New Orleans], I attended and presented at the NASSPE Conference [2008/Orlando] on the topics of Boys Reading and Writing, Boys Mathematics, Boys and Girls Science and Boys and Girls Social Studies.

What have you learned about teaching and yourself?

In looking back at my various experiences over the past 10 years that I have taught, I found that I used many of those good practices with my students. I also found some occasions where I wish that I had had the information that I have now. I think that it would have me make better decisions at the time.

I give boys the ability to move, much more so that when I taught in a traditional classroom setting. Too much movement in a traditional classroom would distract the girls. I now create assignments that focus on the boys' strengths and likes.

I have also found that I am a Boys' teacher at heart. It is hard for me to sit still for any length of time and research says that boys need someone (the teacher) to move to keep them focused. I literally struggle to sit still. My leg is bouncing or I am tapping my foot. Research also shows that boys struggle to sit still and need the ability to move. I can give that in class, because I need it also. Boys also tend to struggle with Reading. They would rather be doing something else. I was that same way and I still am sometimes. With this being the case, it helps me to create a classroom where they (boys) can find a place and read. It also helps me to motivate them because I am one of them.

Additional insights...

I love to teach the all boys class because it is a challenge. While there is preliminary information out there, in some ways we are testing that information and adapting it. We are on the cutting edge of helping students succeed and what could be better than that?

Teacher 3 (Female)

What grade did you teach?

I was hired by the principal to teach the fifth grade all girls' class during the 2005-2006 school year. At the time I thought that it would be an exciting opportunity. I was always a good and outgoing student in school. In high school and college I was an athlete as well. I am very competitive and am not your typical girly-girl. I wanted the opportunity to show those young girls much they can accomplish. I wanted them to get excited about school, as well as teach them self-respect.

What trainings have you participated in...?

I participated in the “Why Gender Matters” book study [2006]. Also, I read “Girl Wars” to help me understand how and why adolescent girls treat each other the way that they do.

What did you do differently than when you were in a traditional classroom...?

My seating chart allowed for a lot more group discussion. I was able to give the girls several instructions from a list format and they responded well. I was able to have a lot more helper jobs (girls love to help). I did a lot more sharing about myself and allowing them to share as well.

What have you learned about teaching and yourself...?

I learned to have patience, and I learned that each student (especially females) have individual personalities and individual emotions that accompany those personalities. I also learned how much girls at that age worry about boys instead of school, friends, etc...

Additional insights...

I was a first year teacher at the time, so teaching all girls definitely had a huge impact on me. I learned a lot about myself and I learned a lot about teaching. I felt that I did well in many aspects. One area I had struggles with was the “girl wars” that went on in the classroom. Girls can be very mean to each other. I had a great administration and great co-workers who were able to give me tips and assistance. Overall, the experience was very beneficial. After teaching three years since then, I have learned a great deal. Sometimes I miss teaching single-gender because there was less variation in teaching strategies. Girls seem to enjoy quiet work time more, while boys want more active learning (in general). But I do enjoy the mixed gender teaching more. There are many benefits to both, and I am grateful for the experience.

Teacher 4 (Female)

How did you become involved in the single-gender program?

It was my idea to start the single-gender classes. I felt that school was not boy friendly so I approached the principal with the idea and we worked to develop a proposal to present to the school board. I also approached Stetson University about their support of the idea.

What gender do you teach?

I co-taught a full-inclusion class of thirty-five fourth grade boys.

How long did you teach (have you taught) in the single gender program?

3 Years [2004-2005, 2005-2006, 2006-2007]

What trainings have you participated in that either prepared or informed you about the single gender program?

I read Michael Gurian's book, and attended a week-long training on single-gender education at the Gurian Institute in Colorado Springs with a university representative. I have read numerous books on males and females by both Michael Gurian and Leonard Sax. I also led several book studies at Woodward on single gender and presented at several single gender conferences.

What have you learned about teaching in general and yourself as a result of these experiences?

There are differences in how boys and girls learn, however they all have similarities.

*Boys and girls need breaks throughout the day.

*Boys love Dodge Ball and girls love to chat.

*Tolerance toward excessive movement from boys.

*The realization that they are learning even when they appear to be "zoned out" or distracted.

*Boys can do well in reading and writing and really enjoy it.

*Tap into the competitive nature of boys.

*Boys think they can no matter what--this was so apparent in everything. They could be motivated to do well with encouragement and competition.

*I also learned that boys quickly establish a hierarchy, boys must respect you or they will not listen to you.

Please feel free to share any additional insights, motivating factors, unique experiences, etc. that impacted you or your students.

Girls--I was able to address the girl issues immediately. This prevented major problems with emotionalism. Girls really can be so mean to each other. Girls were so helpful and supportive with each other. Boys sink or swim.

Teacher 5 (Male)

How did you become involved in the single-gender program?

I was influenced by my co-teacher who convinced me that boys and girls do learn differently. Also, the present school system was not meeting the boys' academic needs.

What grade did you (do you) teach?

Which gender do you teach?

I co-taught a fourth grade full inclusion class of 35 boys.

How long did you teach (have you taught) in the single gender program?

3 years [2004-2005, 2005-2006, 2006-2007]

2004-05 fourth grade full inclusion all boys

2005-06 fifth grade full inclusion all boys (looped with fourth grade class)

2006-07 single gender homeroom-all boys; taught mathematics to boys and girls [separately]

What trainings have you participated in that either prepared or informed you about the single gender program?

I read 2 books by Leonard Sax (*Why Gender Matters* and *Boys Adrift*). I read Michael Gurian's book *The Boys and Girls Learn Differently*. I read Ron Clark's book *The Essential 55*. I participated in a book study presented by Woodward Elementary and Stetson University on single gender. I also presented at several single gender conferences.

Tell me about your experiences in the single-gender program.

What have you learned about teaching in general and yourself as a result of these experiences?

Boys are willing to accept their peer's weakness and strengths. They have a hierarchy. Boys are willing to accept who is the best at a particular skill (best reader, mathematics student, dodge ball player, speller, artist, etc...). In general boys have very high self-esteem (I can do anything, bring it on). They are very competitive. You must have a tolerance for movement and be willing to accept what seems like at times they are "zoned out", but will surprise you on their

comprehension. You are the captain of the ship. You lead by example and instruct in an environment that is fair, firm and consistent.

What did (do) you do differently in single-gender classes, than when you taught in a traditional classroom?

If given a choice, I would rather teach an all boys class than a (traditional) one. Boys are more open and willing to accept constructive criticism. They can be re-directed easier. They like competition and will help each other. The boys are the scouts on a wagon train--led me to a new adventure.

Teacher 6 (Female)

How did you become involved in the single-gender program?

The idea of teaching all girls appealed to me, especially after teaching students with emotional disturbances for so many years.

What grade did you (do you) teach?

3rd grade.

Which gender do you teach?

Girls.

How long did you teach (have you taught) in the single gender program?

4 years.

What trainings have you participated in that either prepared or informed you about the single gender program?

I have participated in quite a few book studies, I attended the Eric Jensen Brain Expo and the NASSPE conference three times.

Tell me about your experiences in the single-gender program.

With teaching all girls, I have found creativity to be critical in my daily instruction. Additionally, the girls pay attention to ALL THE DETAILS, so it is important to be aware that they listen and notice everything and its' my job to help them determine what's important and what's not. Also equally important, is

that I encourage them to be independent thinkers and not be afraid to think for themselves and take risks.

What have you learned about teaching in general and yourself as a result of these experiences?

I can be very creative and impulsive and am able to say/do something in a variety of ways that reach all my learners (and it's ok to look silly if it works).

What did (do) you do differently in single-gender classes, than when you taught in a traditional mixed-gender classroom?

Rearrange the furniture more frequently, as the girls tend to become chatty, especially with those that have been in the program together for quite some time.

I do not provide the students with a teacher model, I have them create their sample. Instead, regardless of the subject area, I create my model simultaneously. I found early on that this prevents the girls from copying my paper and work on their own individual work.

Please feel free to share any additional insights, motivating factors, unique experiences, etc that impacted you or your students?

The interactive notebook is a fabulous tool to use with the girls, as it taps on their creative side while allowing them independence.

At times it's necessary to address social skills and "girl issues" that come up in the classroom. Girl drama is inevitable and needs to be addressed when it happens with MANY real world examples. Unlike boys, girl drama is not always noticeable.

Teacher 7 (Female)

How did you become involved in the single-gender program?

I was teaching third grade mixed and had a challenging group of girls and wanted to try all boys.

What grade did you (do you) teach?

third grade.

Which gender do you teach?

Boys.

How long did you teach (have you taught) in the single gender program?

I taught that boys' class one year several years ago and am now teaching single gender girls in first grade.

What trainings have you participated in that either prepared or informed you about the single gender program?

I participated in the book study, Why Gender Matters and I attended a conference on Brain Studies, where they looked at the brains of males and females separately for information.

Tell me about your experiences in the single-gender program.

The boys class proved to be challenging in that they were very competitive and aggressive. Everything was a competition against each other. I had to look at how to get them to improve themselves individually, and not look at someone else as their standard of measurement. Currently I am teaching first grade girls--a whole new ball of wax--and they are, on the other hand, generally very nurturing towards one another. They talk a lot more than the boys did, but we are working on problem solving independently. I enjoy the girls' class, I think because we don't have to deal with the other gender. We can talk about issues and most of the girls have the same perception of it because of their gender.

What have you learned about teaching in general and yourself as a result of these experiences?

Because I taught 3rd grade and now 1st, that in itself is a big change with lots of adaptations and eye-openers. Girls are able to handle the “housekeeping” duties involved in a classroom whereas boys just left a mess and were ok with it. I believe some teachers are “boy teachers” and some are “girl teachers” and some can be either or both. It’s all in how you approach the challenge of working to effect change in the minds and hearts of students.

What did (do) you do differently in single-gender classes, than when you taught in a traditional mixed-gender classroom?

With girls, we can do more of the arts--singing, painting, poetry, etc. . . and they totally enjoy it. Boys weren’t into those types of things as much. Anything I did with the boys that was competitive, they loved and went at it with a vigorous appetite. I couldn’t do that as much in a traditional classroom, because the girls would get their feelings hurt, and have feelings of inferiority, especially when the boys began to boast about how much better they are at something than the girls (math or science, mostly).

Please feel free to share any additional insights, motivating factors, unique experiences, etc... that impacted you or your students?

I feel that sometimes the gender classes are set apart--they are either set up with great students behaviorally and/or academically, or they are a dumping ground for whomever they can get to say yes to the program. Some children shouldn’t be in single gender, for various reasons, but are placed there simply because their parents said “ok”.

Also, I understand this is all about test scores as far as administration goes, but it is the teacher who makes a difference in the classroom--whether single gender or traditional.

Summary

The analysis of the data has been presented in this chapter. It has been organized around the three research questions which guided the study. In the first section of the chapter, the re-analysis of data for 2005-2006, 2006-2007, 2007-2008, and 2008-2009 was presented using a series of tables supported by narrative explanations. The unique preparation and training that, teachers who taught single-gender classes at Woodward

Avenue Elementary School received that other teachers in Woodward Avenue Elementary School did not receive has been described in the second section. The third and final section of the chapter was used to detail the questionnaire responses of teachers at Woodward Avenue Elementary School. Teachers were asked to share their perceptions of the reasons for the gain on FCAT reading and mathematics administrations in 2006-2009 of single-gender or traditional mixed-gender classes.

CHAPTER 5 SUMMARY, DISCUSSION AND RECOMMENDATIONS

Introduction

This chapter provides a summary and discussion of the findings presented in Chapter 4. The chapter has been organized around the three research questions which guided this study. Also included in the chapter are implications for practice and recommendations for future research.

Summary of Findings for Research Question 1

What difference, if any, exists in the reading and mathematics Developmental Scale Scores of third-, fourth-, and fifth-grade students in single-gender and mixed-gender classrooms for FCAT administrations in 2005-2006, 2006-2007, 2007-2008, and 2008-2009 at Woodward Avenue Elementary School?

Summary of Reading and Mathematics Analysis for 2005-2006

Fifth Grade

The analysis of the Reading DSS generated from the 2005-2006 FCAT administration presented in Table 3 indicated that, of the four 5th grade classes, Class 651, a mixed-gender class, had the highest reading mean (1676.8) and the highest reading median (1711.0.). The analysis of the mathematics DSS generated from the 2005-2006 FCAT administration indicated that of the four 5th grade classes, Class 652, a single-gender boys' class, had the highest mathematics mean (1703.7), and Class 651, a mixed-gender class, had the highest mathematics median (1680.5).

Summary of Reading and Mathematics Analysis for 2006-2007

Third Grade

The analysis of the Reading DSS generated from the 2006-2007 FCAT administration presented in Table 5 shows that of the seven 3rd grade classes, Class 730, a mixed-gender class, had the highest reading mean (1442.7). Class 733, a single-gender boys' class, had the highest reading median (1446.0). The analysis of mathematics DSS generated from the 2006-2007 FCAT Administration showed that of the seven 3rd grade classes, Class 733, a single-gender boys' class, had the highest mathematics mean (1591.5) and the highest mathematics median (1603.0).

Fourth Grade

The analysis of the Reading DSS generated from the 2006-2007 FCAT administration presented in Table 6 revealed that of the five 4th grade classes, Class 743, a single-gender boys' class, had the highest reading mean (1617.7) and the highest reading median of (1607.0). The analysis of the mathematics DSS generated from the 2006-2007 FCAT administration showed that of the five 4th grade classes, Class 743, a single-gender boys' class, had the highest mathematics mean (1611.9) and Class 741, a single-gender girls' class, had the highest mathematics median (1608.5).

Fifth Grade

The analysis of the Reading DSS generated from the 2006-2007 FCAT administration presented in Table 7 indicated that of the five 5th grade classes, Class 752, a single-gender girls' class, had the highest reading mean (1720.7) and Class 753, a single-gender boys' class, had the highest reading median (1722.0). The analysis of the mathematics DSS generated from the 2006-2007 FCAT administration revealed that of the five 5th grade classes, Class 753, a single-gender boys' class had the highest mathematics mean (1727.0) and the highest mathematics median (1706.0).

Summary of Reading and Mathematics Analysis for 2007-2008

Third Grade

The analysis of the Reading DSS generated from the 2007-2008 FCAT administration presented in Table 8 shows that of the seven 3rd grade classes, Class 834, a mixed-gender class, had the highest reading mean (1483.0) and also had the highest reading median (1458.0). The analysis of the mathematics DSS generated from the 2007-2008 FCAT administration indicated that of the seven 3rd grade classes, Class 834, a mixed-gender class, had the highest mathematics mean (1585.5) and the highest mathematics median (1587.0).

Fourth Grade

The analysis of the Reading DSS generated from the 2007-2008 FCAT administration presented in Table 9 showed that of the six 4th grade classes, Class 843, a single-gender boys' class, had the highest reading mean (1663.6) and the highest reading median (1672.9). The analysis of the mathematics DSS generated from the 2007-2008 FCAT administration indicated that of the six 4th grade classes, Class 843, a single-gender boys' class, had the highest mathematics mean (1728.0) and the highest mathematics Median (1720.5).

Fifth Grade

The analysis of the Reading DSS generated from the 2007-2008 FCAT administration presented in Table 10 showed that of the four 5th grade classes, Class 852., a mixed-gender class, had the highest reading mean (1643.2) and the highest reading median (1677.0).

The analysis of the mathematics DSS generated from the 2007-2008 FCAT administration revealed that of the four 5th grade classes, Class 850, a single-gender boys' class, had the highest mathematics mean (1681.3). Class 853, a single-gender girls' class, had the highest mathematics median (1720.5).

Summary of Reading and Mathematics Analysis for 2008-2009

Third Grade

The analysis of the Reading DSS generated from the 2008-2009 FCAT administration presented in Table 11 shows that of the five 3rd grade classes, Class 930, a single-gender boys' class, had the highest reading mean (1488.3) and the highest reading median (1509.5). The analysis of the mathematics DSS generated from the 2008-2009 FCAT administration shows that of the five 3rd grade classes, Class 932, a mixed-gender class, had the highest mathematics mean (1678.1) and the highest mathematics median (1686.5).

Fourth Grade

The analysis of the Reading DSS generated from the 2008-2009 FCAT administration presented in Table 12 indicated that of the five 4th grade classes, Class 942, a single-gender boys' class, had the highest reading mean (1659.0) and Class 941, a single-gender girls' class, had the highest reading median (1724.0). The analysis of the mathematics DSS generated from the 2008-2009 FCAT administration showed that of the five 4th grade classes, Class 942, a single-gender boys' class, had the highest mathematics mean (1742.1) and the highest mathematics median (1748.0).

Fifth Grade

The analysis of the Reading DSS generated from the 2008-2009 FCAT administration presented in Table 13 revealed that of the five 5th grade classes, Class 952, a mixed-gender class, had the highest reading mean (1666.4) and the highest reading median (1669.0). The analysis of the mathematics DSS generated from the 2008-2009 FCAT administration showed that of the five 5th grade classes, Class 952, a mixed-gender class, had the highest mathematics mean (1749.4) and the highest mathematics median (1749.0).

Overall Summary of Findings for Reading

In reading at the third grade level, there were 12 opportunities for a class to achieve the highest DSS mean or median. The single gender boys' class achieved the highest DSS nine times and a mixed-gender class achieved the highest DSS three times.

In reading at the fourth grade level, there were 12 opportunities for a class to achieve the highest DSS mean or median. The single-gender boys' class achieved the highest DSS eight times, the single gender girls' class achieved the highest DSS three times and a mixed-gender class achieved the highest DSS once.

In reading, at the fifth grade level, there were 16 opportunities for a class to achieve the highest DSS mean or median. A mixed-gender class achieved the highest DSS 12 times, the single-gender boys' class achieved the highest DSS twice, and the single-gender girls' class achieved the highest DSS twice.

Overall Summary of Findings for Mathematics

In mathematics, at the third grade level, there were 12 opportunities for a class to achieve the highest DSS mean or median. A mixed-gender class achieved the highest DSS seven times and the single-gender boys' class achieved the highest DSS five times.

In mathematics at the fourth grade level, there were 12 opportunities for a class to achieve the highest DSS mean or median. The single-gender boys' class achieved the highest DSS 11 times and the single-gender girls' class achieved the highest DSS once.

In mathematics at the fifth grade level, there were 16 opportunities for a class to achieve the highest DSS mean or median. The single-gender boys' class achieved the highest DSS nine times, a mixed-gender class achieved the highest DSS five times and the single-gender girls' class achieved the highest DSS two times.

Overall Summary of Findings for Initial and Re-analysis

In summary, on the measures of highest reading mean, reading median, mathematics mean, and mathematics median, the mixed-gender, single-gender boys', and single-gender girls' classes performed as follows for the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years:

In 2005-2006, of the four 5th grade classes, a mixed-gender class scored higher on three of the four measures in the re-analysis. In the initial analysis, the single-gender boys' class scored higher on two of the four measures and a mixed-gender class scored higher on the other two measures. A mixed-gender class scored highest on five of the eight total measures across both analyses.

In 2006-2007, of the seven 3rd grade classes, the single-gender boys' class scored higher on three of the four measures in the re-analysis. In the initial analysis, the single-gender boys' class scored higher on four of the four measures. At the third grade level the single-gender boys' class scored highest on seven of the eight measures across both analyses. Of the five 4th grade classes, the single-gender boys' class scored higher on three of the four measures in the Re-analysis. In the initial analysis, the single-gender boys' class scored higher on four of the four measures. At the fourth grade level the single gender boy's class scored highest on seven of the eight measures across both analyses. Of the five 5th grade classes, the single-gender boys' class scored higher on three of the four measures in the re-analysis. In the initial analysis, the single-gender boys' class scored also higher on three of the four measures. At the fifth grade level, the single-gender boys' class scored highest on six of the eight measures across both analyses.

In 2007-2008, of the seven 3rd grade classes, a mixed-gender class scored higher on all four measures in the re-analysis. In the initial analysis, a mixed-gender class scored higher on two of the four measures, while the single-gender boys' class scored higher on the other two measures. At the third grade level, a mixed-gender class scored highest on six of the eight measures. Of the six 4th grade classes, the single-gender boys' class scored higher on all four of the measures in both the re-analysis and the initial analysis. At the fourth grade level, the single-gender boys' class scored highest on all eight of the measures. Of the six 5th grade classes, the results were spread across all of the classes in both the re-analysis and the initial analysis. A mixed-gender class had the

highest scores on two of the measures, the single-gender boys' class had the highest score on one measure and the single-gender girls' class had the highest score on a measure. At the fifth grade level, the results varied. A mixed-gender class scored highest on four of the eight measures.

In 2008-2009, of the five 3rd grade classes, a mixed-gender class scored higher on two of the four measures, and the single-gender boys' class scored higher on the other 2 measures in both the re-analysis and the initial analysis. At the third grade level, the results were inconclusive with the single-gender boys' class and a mixed-gender class each scoring highest on four of the eight measures across both analyses. Of the five 4th grade classes, the single-gender boys' class scored higher on three of the four measures in the re-analysis. In the initial analysis, the single-gender boys' class scored higher on two of the four measures, and a mixed-gender class and the single-gender girls' class each scored higher on one of the measures. At the fourth grade level, the single-gender boys' class scored highest on five of the eight measures across both analyses. Of the five 5th grade classes, a mixed-gender class scored higher on all four measures in both the re-analysis and the initial analysis. At the fifth grade level a mixed-gender class scored highest on all eight measures across both analyses.

Evaluating the data in its entirety, across all of the years that were the focus in this study, there were 12 opportunities for a given third grade class type to achieve the highest DSS (reading mean, reading median, mathematics mean and mathematics median) for the school years 2006-2007, 2007-2008, and 2008-2009. There were also 12 opportunities for a given fourth grade class to achieve the highest DSS mean or median. There were 16

opportunities for a given fifth grade class to achieve the highest DSS mean or median. There were single-gender and mixed-gender classes in school years 2005-2006, 2006-2007, 2007-2008, and 2008-2009. The data in Table 18 represents the number of times that a given class type (mixed-gender, single-gender boys, or single-gender girls) had the highest DSS mean or median. There were a total of 80 opportunities for a given class type to achieve the highest DSS mean or median.

Table 18

Highest Combined Reading and Mathematics Developmental Scale Scores: 2006-2009

Class Type	Grade 3		Grade 4		Grade 5	
	Re-Analysis	Initial Analysis	Re-Analysis	Initial Analysis	Re-Analysis	Initial Analysis
Mixed Gender	7	4	-	1	9	8
Boys	5	8	10	10	5	6
Girls	-	-	2	1	2	2

Of the 12 opportunities presented in the third grade to have the highest DSS in the re-analysis, a mixed gender class had the highest DSS seven times, and the single-boys' class had the highest DSS five times. In the initial analysis, the single-gender boys' class had the highest DSS eight times, and a mixed-gender class had the highest DSS four times.

Of the 12 opportunities presented in the fourth grade to have the highest DSS, the single-gender boys' class had the highest DSS 10 times in both the re-analysis and the initial analysis. The single-gender girls' class had the highest DSS two times in the re-

analysis. In the initial analysis, the single-gender girls' class and a mixed-gender each had the highest DSS once.

Of the 16 opportunities presented in the fifth grade to have the highest DSS in the re-analysis, a mixed-gender class had the highest DSS nine times, the single-gender boys had the highest DSS five times and the single-gender girls had the highest DSS two times. In the initial analysis, a mixed-gender class had the highest DSS eight times, the single-gender boys class had the highest DSS six times, and the single-gender girls' class had the highest DSS two times.

Though the class type (single-gender or mixed-gender) with the highest DSS reading mean, reading median, mathematics mean, or mathematics median varied from class to class and year to year, it is evident that the boys in the single gender boys' class regularly outperformed the students in both the single-gender girls' class and the mixed-gender class. Of the 80 opportunities to achieve the highest DSS, the single gender boys' class had the highest DSS 44 times (55%). In contrast, the mixed-gender classes had the highest DSS 29 times (36%), and the single-gender girls' class had the highest DSS only seven times (9%).

Summary of Findings for Research Question 2

What unique preparation and training; have teachers who teach single-gender classes at Woodward Avenue Elementary School received that other teachers in Woodward Avenue Elementary School have not received?

Prior to the start of single-gender class offerings in 2005-2006, Woodward Avenue Elementary School (WAES) and Stetson University staff members dedicated a year to research and preparation. A staff member from WAES and Stetson attended the Michael Gurian Institute in 2004 to collect information and speak with other educators who were implementing single-gender programs. In the first and subsequent years, single-gender class teachers participated in several book studies. The book studies included *Why Gender Matters* by Leonard Sax in 2007-2008, *The Boys and Girls Learn Differently* by Michael Gurian (2004), and *Boys Adrift* by Leonard Sax.

Single-gender teachers were also afforded the opportunity to attend a number of conferences. Included were the following: The National Association for Single Sex Public Education (NASSPE) Conferences held in Lincolnshire, IL (2008), and Atlanta, GA (2009); The Eric Jensen's Brain Expo Conference in New Orleans (2007); The K-12 Innovation Conference in Orlando (2006); and The Pink and Blue Workshop presented by Leonard Sax at Stetson University (2007). In addition to attending conferences, several teachers of single-gender students presented papers/led discussions as conference presenters.

These professional development activities, the book studies and conferences, served as opportunities for the single-gender staff to dialogue with other education

professionals. The book studies were opportunities for the staff to advance their knowledge regarding current research and share their successes and challenges with colleagues. The conferences and workshops were national opportunities to see research in action and implementation first hand and to dialogue with other educators involved in single-gender education. These unique training and preparation activities provided the single-gender class teachers repeated opportunities to evaluate and re-evaluate their instructional methodologies.

Summary of Findings for Research Question 3

To what do the teachers at Woodward Avenue Elementary School attribute the developmental scale scores on FCAT reading and mathematics administrations in 2006-2009 of single gender or traditional mixed gender classes?

To determine the factors to which teachers attributed the student gains on the FCAT in reading and mathematics, it was necessary to critically examine the teacher's responses on the teacher questionnaire. A close examination of the teachers' narrative statements revealed some of the factors to which they attributed FCAT gains. The researcher identified four essential factors that recurred throughout the teachers' narrative responses. Those factors are: (a) professional development, (b) reflective teaching, (c) environmental, and (d) gender-specific activities. Table 19 contains a summary of the significant factors, frequencies of teacher comments regarding the factors. Selected quotations from teachers' comments are also provided as examples.

Table 19

Summary of Significant Factors and Examples Identified by Teachers

Significant Factors	Frequency	Examples Cited by Teachers
Professional Development	7	Attendance/presentations at professional conferences, book studies.
Reflective Teaching	6	<p>“I have learned to use music and movement as teaching tools.”</p> <p>“I learned to have patience...”</p> <p>“The realization that they (boys) are learning even when they appear to be ‘zoned out’ or distracted.”</p> <p>“I have found creativity to be critical in my daily instruction.”</p> <p>“I had to get them (boys) to improve themselves individually, and not look at someone else as their standard of measurement.”</p>
Environment	6	<p>“Procedures and expectations are a must.”</p> <p>“I give boys the ability to move.”</p> <p>“My seating chart allowed for a lot more group discussion.”</p> <p>“Tolerance toward excessive movement from boys.”</p> <p>“Re-arrange the furniture more frequently, as the girls become chatty.”</p>
Gender specific activities	5	<p>“I now create assignments that focus on the boys’ strengths and likes.”</p> <p>“I was able to have a lot more helper jobs (girls love to help).”</p> <p>“Tap into the competitive nature of boys.”</p> <p>“Boys are more open and willing to accept constructive criticism.”</p> <p>“Girl drama is inevitable and needs to be addressed when it happens with MANY real world examples.”</p>

Professional development was mentioned as a contributing factor by all of the teachers who provided comments (7, 100%). Professional development was evidenced in book studies, attending and presenting at conferences, and interacting with Stetson University staff. The book studies provided an opportunity for teachers to dialogue with each other, study current research, and discuss their successes and concerns. The conferences gave the single-gender teachers an opportunity to dialogue with educational professionals and to tell others about their program. Professional development was accompanied by support and strategies for implementation.

Reflective teaching was mentioned as a contributing factor by six of the seven (86%) single-gender teachers. Reflective teaching has been described as teachers taking a critical look at how, why, and the way that they teach their classes. Reflective teaching allows the teacher to consider classroom generated data from prior activities to improve their instruction. It includes the use of grades, behavior patterns, and incorporates professional development to help teachers learn from their (and their students') past performance. Reflective teaching is a continuous process.

Environment was mentioned by six of the seven (86%) teachers. The environmental factor is closely related to reflective teaching. It pertains to those external conditions that impact student learning and the teacher's use of them to improve student achievement. The environmental factors that the teachers mentioned were the importance for boys, in particular, of competition, movement, order, and structure. For girls, the classroom, desk arrangement, and social issues were of importance.

Gender specific activities were mentioned by five of the seven (71%) teachers. Gender specific activities are also closely related to reflective teaching. The teachers mentioned the importance of incorporating and tailoring classroom activities specific to the gender of the class. Teachers mentioned the importance of focusing on the strengths and preferences of a gender, e.g., the competitive nature of boys and the creative nature and attention to details of girls. Gender specific activities allow the teacher to tailor their classroom activities to their class.

In summary, these four factors were viewed as contributing to the school's and students' FCAT success. The four significant factors to which teachers attributed the gains on FCAT reading and mathematics administrations in 2006-2009 of single-gender or traditional mixed-gender classes were: professional development, reflective teaching, environment, and gender-specific activities.

Discussion of Findings

The purpose of this study was to compare Reading and Mathematics Developmental Scale Scores (DSS) of third, fourth, and fifth grade students on the Florida Comprehensive Assessment Test (FCAT) in one elementary school. The elementary school whose standardized test scores were utilized in this study was comprised of working class families. The study compared the DSS scores of third, fourth, and fifth grade students enrolled in mixed-gender classes, single-gender boys' classes, and single-gender girls' classes during the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years.

The first research question focused on the DSS generated by the third, fourth, and fifth grade students in school years 2006-2009. Prior to this study of the collected data, it was believed by the school's administration, the single-gender teachers, and the university staff that the students in the single-gender classes were out-performing students in the traditional or mixed-gender classes.

The data presented in this study were inconclusive with respect to the advantages of the single-gender educational setting over the mixed-gender educational setting. Analysis of the data showed marked success of the single-gender boys' classes as evidenced by their achievement of the highest reading means, reading medians, mathematics means, and mathematics medians 55% of the time during the school years 2005-2006, 2006-2007, 2007-2008, and 2008-2009. The mixed-gender classes, however, also evidenced relative success by scoring the highest DSS 36% of the time. The single-gender girls' class achieved the highest DSS 9% of the time. According to Sax (2005a), success, such as that achieved by the single-gender boys' class, could be attributed to the level of teacher preparation or the newness of the program. King and Gurian (2004) also noted that schools often experience an increase in their standardized test scores when they implement a single-gender program. Parker et al. (1995) observed that increased standard test scores can also be attributed to the uniqueness of the program.

When a unique type of school organization, such as single-gender, is part of a small sector of school, it may be associated with a distinct learning environment and attract different students than the main body of mixed-sex schools. (p. 469).

The second and third research questions were addressed with the assistance of teacher input. In the second research question, teachers of single-gender classes were queried regarding their preparation and training prior to assuming responsibility in single-gender classes. The third question called for their perceptions as to the factors to which gains on the Florida Comprehensive Assessment Test during the study years could be attributed. There were four factors that the teachers identified as significant: They were: (a) professional development, (b) reflective teaching, (c) environment, and (d) gender-specific activities.

It is noteworthy that teachers placed the highest value on professional development, because their own professional development prior to their becoming involved in the program was planned and carefully developed during the year prior to the program's implementation. During the 2004-2005 school year, teachers attended an institute to collect information and speak with others educators who were implementing single-gender programs. The relationship with Stetson University (2010) was very beneficial as was the involvement of recognized experts in the area of single-gender education at conferences on the Stetson Campus and in various locations.

Throughout the period of 2006-2009, teachers were provided with continued targeted professional development through book studies and conference attendance where they were able to share their growing wealth of experience and interact with colleagues involved in single-gender programs. Of the seven teachers who responded to the questionnaire, all seven noted the importance of professional development both for

themselves and for their students. Sax (2005a), also noted the importance of what he called teacher preparation.

Reflective teaching was considered significant by six of the seven teachers, environment was also noted as being significant by six of the seven teachers, and gender-specific activities were noted as being significant by five of the seven teachers. The importance of gender-specific activities and the environment have also been referenced by researchers (Gurian, 2003; Sax, 2005b). In a sense, given the differences that have been noted regarding boys' and girls' preferences, all of these factors could be related or placed under the umbrella of professional development. Teachers through their advanced preparation, continuing study, and professional interactions during their single-gender teaching experiences were being reflective in their approach to their classroom activities. Certainly, the information they gained from conference attendance, book studies, and shared experiences contributed to their knowledge of the importance of environmental factors and gender-specific activities.

Implications for Practice

The data presented in this study were inconclusive with respect to the merits of the single-gender educational setting over the mixed-gender educational setting. The data presented, however, indicated marked success of the single-gender boys' classes in mathematics. The highest reading mean, reading median, mathematics mean, or mathematics median were observed 55% of the time in a single-gender boys' class during the school years 2005-2006, 2006-2007, 2007-2008, and 2008-2009. Mixed-gender

classes, however, also evidenced relative success scoring the highest developmental scale scores (DSS) 36% of the time. The single-gender girls' class achieved the highest DSS 9% of the time. Thus, though standardized test data were inconclusive for much of the population in this study, the success of the single-gender boys' class on the standardized test is worthy of note. Boys, especially those in inner city urban areas have often underachieved (Cooper, 2003). A single-gender program may be a viable option for at-risk students, failing schools, or a failing school system.

The national perception has been that public education is failing children in the United States. Public education has failed to deliver academic rigor and relevance and has allowed the decline of morals and values. As part of the solution, single-gender education has been suggested by the National Association for Single Sex Public Education (2007). Single-gender education, though popular in private institutions and many foreign countries, has been met with resistance because of perceived sex discrimination. Sex discrimination was greatly reduced with Title IX of the Educational Amendments. Title IX of the Educational Amendments of 1972 prohibited educational programs that receive federal funds from discriminating on the basis of sex. However, the Act excluded from its coverage the admissions policies of secondary and elementary schools.

Although Title IX did not explicitly bar single-gender schools, it did maintain that any and all benefits that are made available to one sex also be made available to the other sex. Though single-gender classrooms might be a viable option for educators, it should not be viewed as a panacea for the ills of public education. Instead, single-gender

education should be viewed as an opportunity to gain additional insight into how boys and girls learn differently and how that information and those classrooms fit into both the grand and local scheme of education (Gurian, 2003). School districts and school officials must evaluate their social backdrops and make appropriate educational decisions to address their unique academic and social challenges. Single-gender education appears to be one avenue that will assist educators in achieving their goals. The educating and re-educating of all stakeholders must occur. Research methodologies and studies nationally and abroad must continue to be conducted and evaluated.

Single-gender classrooms and schools are not, in and of themselves, the answer. For single gender classrooms to be successful, the faculty, staff, and parents must be educated to the various educational methods used for the different genders. As a society, the United States citizenry has continuously searched for ways to improve the nation's educational system. Single-gender classrooms and schools may be appropriate if these classrooms and schools fit into the educational framework of the school or the district and can increase student achievement.

Recommendations for Future Research

1. There continues to be a limited amount of research on single-sex education in the United States. School- and district-based administrators should continue to monitor their single-gender classes and school programs and to contribute to program evaluation and research initiatives as opportunities become available.

2. This study was greatly enhanced by its relationship with one university and its faculty. Researchers and/or colleges should explore collaborative opportunities with interested school districts to participate in single-gender program implementation and monitoring.
3. Because the available prior research was limited, prospective researchers might consult with the National Association for Single Sex Public Education to identify programs nationally. This could lead to a variety of studies involving students, teachers, and administrators in single-gender programs.
4. This study could be replicated in similar schools in Florida, and results could be compared.
5. Four factors were identified by the participants in this study as being important to the success of single-gender education. These factors could provide a basis for further study and experimentation in regard to single-gender education from both students' and teachers' perspectives.

Summary

The purpose of this study was to compare the reading and mathematics developmental scale scores (DSS) on the Florida Comprehensive Assessment Test (FCAT) of third, fourth, and fifth grade students in one Florida public elementary school. Differences were explored for students who were enrolled in (a) single-gender all boys' classes, (b) single-gender all girls' classes, and (c) mixed-gender or traditional classes that contained both boys and girls. The study was guided by three research questions

related to differences in scores, the preparation of teachers of single-gender classes, and teachers' perceptions as to significant factors contributing to FCAT developmental scale scores over the study period.

The problem and its clarifying components were presented in Chapter 1. A review of the literature and related research was contained in Chapter 2. Chapters 3 and 4 were used to describe the methodology used to conduct the study and the analysis of the data, respectively. This chapter has presented a summary of the analysis of the data, discussion, implications, and recommendations for future research.

APPENDIX A
SCHOOL DISTRICT APPROVAL TO CONDUCT THE STUDY



Dr. Margaret A. Smith
Superintendent of Schools

P.O. Box 2118
DeLand, Florida 32721-2118

DeLand
(386) 734-7190

Daytona Beach
(386) 255-6475

New Smyrna Beach
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200 North Clara Avenue
DeLand, Florida 32720

School Board of Volusia County

Ms. Candace Lankford, Chairman
Mr. Stan Schmidt, Vice-Chairman
Mrs. Diane Smith
Ms. Judy Conte
Dr. Al Williams

March 23, 2010

Mr. Lloyd Haynes
1201 S. Woodward Avenue
DeLand, FL 32720

Dear Mr. Haynes:

I have received your request to conduct research within Volusia County Schools. I have approved your request to conduct research on the topic of "The Impact of Single Gender Classrooms on the Reading & Mathematics Gains on the FCAT for 2005-09 in one Elementary School." As with all requests to do research; participation is at the sole discretion of the principals, teachers and parents of all students involved. Parent Consent Forms will be necessary for all data gathered from the students of Volusia County Schools.

By copy of this letter, you may contact the school principals who allow this research to be conducted with their faculty and students. We request that you conduct your survey with as little disruption to the instruction day as possible.

I would appreciate receiving a copy of your project at the completion of your study.

Sincerely,

Chris J. Colwell, Deputy Superintendent
Instructional Services

CJC/mh

Woodward Avenue Elementary School

1201 South Woodward Avenue • DeLand, Florida 32720
Telephone (386) 943-7910

Torrence E. Broxton
Principal

Lloyd G. Haynes
Assistant Principal

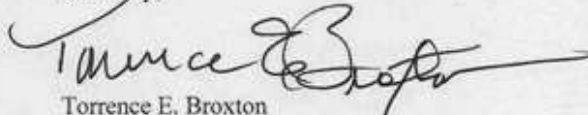
July 9, 2010

To Whom It May Concern:

This letter confirms my approval for Mr. Lloyd Haynes (doctoral candidate) to use FCAT scores and data for the school years of 2005-2006, 2006-2007, 2007-2008, and 2008-2009 for all 3rd, 4th, and 5th graders in both the single-gender and mixed-gender classes at Woodward Avenue Elementary. Please understand that the information used will be de-identified.

If you have any questions or concerns, please feel free to contact me. Thank you.

Sincerely,



Torrence E. Broxton

APPENDIX B
UCF INSTITUTIONAL REVIEW BOARD APPROVAL



University of Central Florida Institutional Review Board
 Office of Research & Commercialization
 12201 Research Parkway, Suite 501
 Orlando, Florida 32826-3246
 Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1
 FWA00000351, IRB00001138**
 To: **Lloyd G. Haynes**
 Date: **July 09, 2010**

Dear Researcher:

On 7/9/2010, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
 Project Title: THE IMPACT OF SINGLE GENDER CLASSROOMS ON THE READING AND MATHEMATICS GAINS ON THE FLORIDA COMPREHENSIVE ASSESSMENT TEST FOR 2005 – 2009 IN ONE ELEMENTARY SCHOOL.
 Investigator: Lloyd G. Haynes
 IRB Number: SBE-10-06949
 Funding Agency:
 Grant Title:
 Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

NOTE: Per our 7/9/2010 phone conversation, please provide to the IRB office, a letter or e-mail from school principal that confirms that the data that you will obtain is de-identified.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 07/09/2010 04:20:43 PM EDT

IRB Coordinator

APPENDIX C
TEACHER QUESTIONNAIRE

TEACHER QUESTIONNAIRE

How did you become involved in the single-gender program?

What grade did you (do you) teach?

Which gender do you teach?

How long did you teach (have you taught) in the single gender program?

What trainings have you participated in that either prepared or informed you about the single gender program?

Tell me about your experiences in the single-gender program.

What have you learned about teaching in general and yourself as a result of these experiences?

What did (do) you do differently in single-gender classes, than when you taught in a traditional mixed-gender classroom?

Please feel free to share any additional insights, motivating factors, unique experiences, etc... that impacted you or your students?

APPENDIX D
INITIAL ANALYSIS OF FCAT READING AND MATHEMATICS
DEVELOPMENTAL SCALE SCORES: 2005-2009

This appendix contains a summary of the initial analysis of the data. It has been organized to present a summary for the years 2005-2006, 2006-2007, 2007-2008, and 2008-2009.

Initial Analysis: 2005-2006 FCAT Reading and Mathematics
Developmental Scale Scores (DSS)

Initial Analysis for Fifth Grade Students

The data for the initial analysis of 2005-2006 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fifth graders are displayed in Table 1. The reading DSS mean class scores of the four 5th grade classes ranged from 1617.4 to 1647.9. This range of scores fell into the Level 3 category, which was in the average range. Of the four classes, Class 651, a mixed-gender class, had the highest reading mean DSS of 1647.9. The reading DSS medians of the four 5th grade classes ranged from 1615.0 to 1680.0.0. Of the four classes, Class 651 also had the highest reading DSS median of 1680.0.

The mathematics DSS means of the four 5th grade classes ranged from 1608.2 to 1718.2. All of these scores fell into the upper Level 2 to mid Level 3 category, which was in the average range. Of the four classes, Class 652, a single-gender boys' class, had the highest mathematics DSS mean of 1718.2. The Mathematics FCAT DSS median class scores of the four 5th grade classes ranged from 1628.5 to 1692.0. Of the four classes, Class 652 also had the highest mathematics DSS median of 1692.0.

During 2005-2006, of the 5th grade classes, Class 651, a mixed-gender class, had the highest reading mean DSS and reading DSS median, Class 652, a single gender boys' class, had the highest mathematics DSS mean and mathematics DSS median.

Appendix Table 1
 Initial Analysis of 2005-2006 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 5

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
650 Mixed	24	1631.1	251.4	1669.0	-.606
651 Mixed	22	1647.9	262.3	1680.0	-.356
652 Boys	24	1625.5	179.0	1615.0	.173
653 Girls	21	1617.4	201.8	1660.0	-.106
Mathematics					
650 Mixed	24	1688.7	179.9	1628.5	-.541
651 Mixed	22	1680.5	255.8	1680.5	-.359
652 Boys	24	1718.2	147.1	1692.0	.231
653 Girls	21	1608.2	148.9	1664.0	-.938

Initial Analysis: 2006-2007 FCAT Reading and Mathematics
 Developmental Scale Scores (DSS)

Initial Analysis for Third Grade Students

The data for the initial analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for third grade students are presented in Table 2. For 2006-2007, the reading DSS mean class scores of the seven 3rd grade classes ranged from 1249.5 to 1459.7. These scores fell into the Level 3 category, which was in the average range. Of the seven classes, Class 733, a single-gender boys' class had the highest reading mean DSS of 1459.7. The Reading FCAT Median DSS class scores of the seven 3rd grade classes ranged from 1282.0 to 1455.0. Class 733, also had the highest reading DSS median of 1455.0.

For 2006-2007, the mathematics DSS means of the seven 3rd grade classes ranged from 1244.2 to 1568.2. These scores spanned the high Level 2 to low Level 4 category, which was in the average range. Of the seven classes, Class 733, a single-gender boys' class, had the highest mathematics mean of 1568.2. The mathematics DSS medians of the seven 3rd grade classes ranged from 1231.0 to 1602.0. Of the seven classes, Class 733, also had the highest mathematics DSS median of 1602.0.

For 2006-2007, of the 3rd grade classes, Class 733, a single-gender boys' class, had the highest reading mean DSS, reading DSS median, mathematics DSS mean, and mathematics DSS median.

Appendix Table 2
 Initial Analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 3

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
730 Mixed	19	1371.3	364.6	1421.0	-2.514
731 Mixed	20	1368.2	264.9	1367.0	.586
732 Mixed	19	1249.5	297.9	1282.0	-.080
733 Boys	20	1459.7	332.4	1455.0	.791
734 Girls	17	1251.0	272.2	1300.0	-.791
735 Mixed	17	1259.3	346.6	1343.0	-.589
736 Mixed	21	1305.7	319.6	1318.0	-.646
Mathematics					
730 Mixed	19	1368.2	318.8	1397.0	-1.693
731 Mixed	20	1517.5	205.9	1482.5	.855
732 Mixed	19	1345.2	246.9	1332.0	-.075
733 Boys	20	1568.2	211.4	1602.0	-.240
734 Girls	17	1470.1	253.1	1471.0	1.185
735 Mixed	17	1244.2	457.1	1231.0	-.285
736 Mixed	21	1459.0	198.4	1453.0	.200

Initial Analysis for Fourth Grade Students

The data for the initial analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fourth grade students are presented in Table 3. For 2006-2007, the reading DSS mean class scores of the five 4th grade classes ranged from 1435.8 to 1575.3. These scores fell into the upper Level 2 to Level 3 category, which was in the average range. Of the five classes, Class 743, a single-gender boys' class, had the highest reading mean DSS of 1573.3. The reading DSS medians, of the five 4th grade classes ranged from 1408.0 to 1604.0. Of the five classes, Class 743, also had the highest reading median score of 1604.0.

For 2006-2007, the mathematics DSS means of the five 4th grade classes ranged from 1365.8 to 1637.3. These scores fell into the mid-Level 2 to upper Level 3 category, which spanned the low average to upper average range. Of the five classes, Class 743, a single-gender boys' class, had the highest mathematics DSS mean of 1637.3. The Mathematics FCAT DSS median class scores ranged from 1434.0 to 1624.0. Of the five classes, Class 743, also had the highest mathematics DSS median of 1624.0

For 2006-2007, of the 4th grade classes, Class 743, a single-gender boys' class, had the highest reading mean DSS, reading DSS median, mathematics DSS mean, and the highest mathematics DSS median.

Appendix Table 3
 Initial Analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 4

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
740 Mixed	19	1493.1	248.8	1443.0	-.047
741 Girls	21	1549.8	299.2	1601.0	-.515
742 Mixed	19	1485.3	251.3	1461.0	.277
743 Boys	20	1575.3	257.0	1606.0	-1.744
744 Mixed	19	1435.8	200.7	1408.0	.123
Mathematics					
740 Mixed	19	1513.9	198.9	1495.0	1.135
741 Girls	21	1555.2	232.4	1604.0	.762
742 Mixed	19	1450.6	178.7	1447.0	.378
743 Boys	20	1637.3	184.9	1624.0	.655
744 Mixed	19	1365.8	242.5	1434.0	-.665

Initial Analysis for Fifth Grade Students

The data for the initial analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fifth grade students are presented in Table 4. For 2006-2007, the reading DSS mean class scores of the five 5th grade classes ranged from 1579.6 to 1724.3. These scores fell into the mid to upper Level 3 category, which was in the average range. Of the five classes, Class 752, a single-gender girls' class, had the highest reading mean DSS of 1724.3. The reading DSS medians ranged from 1621.0 to 1722.0. Of the five classes, Class 753, a single-gender boys' class, had the highest reading median score of 1722.0.

For 2006-2007, the mathematics DSS means of the five 5th grade classes ranged from 1591.1 to 1727.0. These scores fell into the mid Level 2 to mid Level 3 category,

which was in the average range. Of the five classes, Class 753, a single-gender boys' class, had the highest mathematics DSS mean of 1727.0. The mathematics DSS medians ranged from 1579.0 to 1706.0. Of the five classes, Class 753 also had the highest mathematics median score of 1706.0.

For 2006-2007, of the 5th grade classes, Class 752, a single gender girls' class, had the highest reading mean DSS. Class 753, a single-gender boys' class, had the highest reading DSS median, mathematics DSS mean, and mathematics DSS median.

Appendix Table 4
Initial Analysis of 2006-2007 FCAT Reading and Mathematics Developmental Scale Scores: Grade 5

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
750 Mixed	23	1579.6	251.2	1621.0	-.826
751 Mixed	21	1622.0	214.7	1644.0	-.845
752 Girls	22	1724.3	186.5	1700.0	.156
753 Boys	21	1709.3	225.0	1722.0	-.551
754 Mixed	23	1616.5	274.7	1621.0	.440
Mathematics					
750 Mixed	23	1591.1	200.1	1579.0	-.249
751 Mixed	21	1648.0	194.9	1640.0	-.267
752 Girls	22	1697.8	152.8	1647.0	1.499
753 Boys	21	1727.0	108.4	1706.0	.482
754 Mixed	23	1662.8	201.9	1598.0	.826

Initial Analysis: 2007-2008 FCAT Reading and Mathematics
Developmental Scale Scores (DSS)

Initial Analysis for Third Grade Students

The data for the initial analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for third grade students are presented in Table 5. For 2007-2008, the reading DSS mean class scores of the seven 3rd grade classes ranged from 1213.8 to 1452.2. These scores fell into the Level 3 category, which was in the average range. Of the seven classes, Class 834, a mixed-gender class, had the highest reading mean DSS of 1452.2. The reading DSS medians ranged from 1181.5 to 1451.5. Of the seven classes, Class 830, a single-gender boys' class, had the highest reading DSS median of 1451.5.

For 2007-2008, the mathematics DSS means of the seven 3rd grade classes ranged from 1381.3 to 1585.5. These scores fell into the mid-Level 3 to lower Level 4 category, which was in the average range. Of the seven classes, Class 834, a mixed-gender class, had the highest mathematics DSS mean of 1585.5. The mathematics DSS medians ranged from 1395.0 to 1587.0. Of the seven classes, Class 834 also had the highest mathematics DSS median of 1587.0.

For 2007-2008, of the 3rd grade classes, Class 834, a mixed-gender class, had the highest reading mean DSS, mathematics DSS mean, and mathematics DSS median.

Class 830, a single-gender boys' class, had the highest reading DSS median.

Appendix Table 5
 Initial Analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 3

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
830 Boys	14	1448.7	246.1	1451.5	.655
831 Mixed	17	1381.5	282.7	1391.0	-.102
832 Mixed	16	1331.0	242.8	1391.0	.686
833 Mixed	16	1213.8	213.4	1181.5	.093
834 Mixed	15	1452.2	214.9	1440.0	.122
835 Girls	15	1305.8	424.5	1434.0	-1.844
836 Mixed	16	1276.1	371.1	1288.0	-2.185
Mathematics					
830 Boys	14	1530.5	174.7	1536.0	.085
831 Mixed	17	1457.3	228.2	1504.0	-1.168
832 Mixed	16	1474.0	232.7	1473.5	.260
833 Mixed	16	1381.3	295.3	1395.0	-.398
834 Mixed	15	1585.5	106.3	1587.0	.024
835 Girls	15	1485.4	197.4	1457.0	.375
836 Mixed	16	1496.8	292.6	1515.0	-.613

Initial Analysis for Fourth Grade Students

The data for the initial analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fourth grade students are presented in Table 6. For 2007-2008, the reading DSS mean class scores of the six 4th grade classes ranged from 1536.0 to 1663.6. These scores fell into the Level 3 category, which was in the average range. Of the six classes, Class 843, a single-gender boys' class had the highest reading mean DSS of 1663.6. The reading DSS medians ranged from 1490.0 to 1672.0. Of the seven classes Class 843 also had the highest reading DSS median of 1672.0.

For 2007-2008, the mathematics DSS means of the six 4th grade classes ranged from 1448.1 to 1704.6. These scores fell into the Level 3 to mid Level 4 category, which was in the average range. Of the six classes, Class 843, a single-gender boys' class, had the highest mathematics DSS mean of 1704.6. The DSS medians ranged from 1478.0 to 1701.0. Of the six classes, Class 843, a single-gender boys' class, also had the highest mathematics DSS median of 1701.0.

For 2007-2008, of the 4th grade classes, Class 843, a single-gender boys' class, had the highest reading mean DSS, reading DSS median, mathematics DSS mean, and mathematics DSS median.

Appendix Table 6
Initial Analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale Scores: Grade 4

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
840 Mixed	17	1536.1	263.3	1490.0	-.348
841 Mixed	18	1598.0	270.1	1651.0	-.279
842 Girls	19	1536.0	325.7	1642.0	-3.335
843 Boys	15	1663.6	200.7	1672.0	.135
844 Mixed	17	1488.4	270.7	1537.0	-.691
845 Mixed	19	1551.7	300.3	1595.0	-.636
Mathematics					
840 Mixed	17	1649.1	182.4	1679.0	.133
841 Mixed	18	1647.6	161.3	1661.0	-.498
842 Girls	19	1490.4	146.7	1478.0	-.503
843 Boys	15	1704.6	142.9	1701.0	-.516
844 Mixed	17	1604.4	168.1	1561.0	.417
845 Mixed	19	1448.1	355.9	1517.0	-1.406

Initial Analysis for Fifth Grade Students

The data for the initial analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fifth grade students are presented in Table 7. For 2007-2008, the reading DSS mean class scores of the four 5th grade classes ranged from 1531.8 to 1618.7. These scores fell into the Level 3 category, which was in the average range. Of the four classes, Class 852, a mixed-gender class, had the highest reading mean DSS of 1618.7. The reading DSS medians ranged from 1532.0 to 1649.0. Of the four classes, Class 852, a mixed-gender class, also had the highest reading DSS median of 1649.0.

In 2007-2008, the mathematics DSS means of the four 5th grade classes ranged from 1628.0 to 1695.7. These scores fell into the high Level 2 to Mid-Level 3 category, which was in the average range. Of the four classes, Class 850, a single-gender boys' class, had the highest mathematics DSS mean of 1695.7. The mathematics DSS medians ranged from 1640.0 to 1716.0. Of the four classes, Class 853, a single-gender girls' class, had the highest mathematics DSS median of 1716.0.

For 2007-2008, of the 5th grade classes, Class 852, a mixed-gender class, had the highest reading DSS mean and reading DSS median. Class 850, a single-gender boys' class had the highest mathematics DSS mean. Class 853, a single-gender girls' class, had the highest mathematics DSS median.

Appendix Table 7
 Initial Analysis of 2007-2008 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 5

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
850 Boys	23	1531.8	274.6	1532.0	-.089
851 Mixed	23	1546.8	197.3	1537.0	-.390
852 Mixed	21	1618.7	209.8	1649.0	-.675
853 Girls	25	1560.9	235.6	1577.0	-.020
Mathematics					
850 Boys	23	1695.7	150.4	1664.0	.290
851 Mixed	23	1628.0	178.0	1640.0	.181
852 Mixed	21	1658.6	137.1	1668.0	-.234
853 Girls	25	1646.8	211.4	1716.0	-.861

Initial Analysis: 2008-2009 FCAT Reading and Mathematics
 Developmental Scale Scores (DSS)

Initial Analysis for Third Grade Students

The data for the initial analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for third grade students are presented in Table 8. For 2008-2009, the reading DSS mean class scores of the five 3rd grade classes ranged from 1347.7 to 1488.3. These scores fell into the Level 3 category, which was in the average range. Of the five classes, Class 930, a single-gender boys' class, had the highest reading mean DSS of 1488.3. The reading DSS medians ranged from 1361.0 to 1509.5. Of the five classes, Class 930 also had the highest reading DSS median score of 1509.5.

For 2008-2009, the mathematics DSS means of the five 3rd grade classes ranged from 1439.8 to 1626.4. These scores fell into the mid Level 3 to mid Level 4 category, which is in the above average range. Of the five classes, Class 932, a mixed-gender

class, had the highest mathematics DSS mean of 1626.4. The mathematics DSS medians ranged from 1453.0 to 1684.0. Of the five classes, Class 932 also had the highest mathematics DSS median of 1684.0

For 2008-2009, of the 3rd grade classes, Class 930, a single-gender boys' class, had the highest reading DSS mean and reading DSS median. Class 932, a mixed-gender class, had the highest mathematics DSS mean and mathematics DSS median.

Appendix Table 8
Initial Analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale Scores: Grade 3

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
930 Boys	14	1488.3	261.3	1509.5	.016
931 Mixed	16	1457.0	230.4	1485.0	-.316
932 Mixed	15	1399.1	313.6	1421.0	-1.038
933 Mixed	15	1347.7	346.5	1361.0	-.634
934 Girls	17	1387.8	185.0	1391.0	.193
Mathematics					
930 Boys	14	1587.7	237.9	1566.0	.188
931 Mixed	16	1527.5	253.4	1478.0	1.186
932 Mixed	15	1626.4	359.7	1684.0	-.133
933 Mixed	15	1542.4	260.0	1568.0	-.354
934 Girls	17	1439.8	293.3	1453.0	-.862

Initial Analysis for Fourth Grade Students

The data for the initial analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fourth grade students are presented in Table 9. For 2008-2009, the reading DSS mean class scores of the five 4th grade classes ranged from 1581.6 to 1663.0. These scores fell into the Level 3 category, which was in the average range. Of the five classes, Class 940, a mixed-gender class, had the highest reading mean DSS of 1663.0. The reading DSS medians ranged from 1572.0 to 1724.0. Of the five classes, Class 941, a single-gender girls' class, had the highest reading DSS median of 1724.0.

For 2008-2009, the mathematics DSS means of the five 4th grade classes ranged from 1602.0 to 1746.0. These scores fell into the upper Level 3 to mid Level 4 category, which is in the above average range. Of the five classes, Class 942, a single-gender boys' class, had the highest mathematics DSS mean of 1746.0. The mathematics DSS median class scores ranged from 1613.0 to 1784.0. Of the five classes, Class 942 also had the highest mathematics DSS median of 1784.0

For 2008-2009, of the 4th grade classes, Class 940, a mixed-gender class, had the highest reading mean DSS. Class 941, a single-gender girls' class, had the highest reading DSS median. Class 942, a single-gender boys' class, had the highest mathematics DSS mean and mathematics DSS median.

Appendix Table 9
 Initial Analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale
 Scores: Grade 4

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
940 Mixed	20	1663.0	266.4	1613.0	.647
941 Girls	21	1660.3	214.7	1724.0	-.076
942 Boys	21	1659.0	237.0	1654.0	-.058
943 Mixed	18	1589.7	209.1	1615.5	-1.291
944 Mixed	18	1581.6	151.1	1572.0	-.218
Mathematics					
940 Mixed	20	1630.9	209.7	1630.5	-.262
941 Girls	21	1613.7	146.2	1631.0	-.119
942 Boys	21	1746.0	237.3	1784.0	.073
943 Mixed	18	1637.6	167.7	1613.0	.691
944 Mixed	18	1602.0	194.8	1607.0	-.886

Initial Analysis for Fifth Grade Students

The data for the initial analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale Scores (DSS) for fifth grade students are presented in Table 10. For 2008-2009, the reading DSS mean class scores of the five 5th grade classes ranged from 1524.1 to 1664.0. These scores fell into the Level 3 category, which was in the average range. Of the five classes, Class 952, a mixed-gender class, had the highest reading mean DSS of 1664.0. The reading DSS medians ranged from 1459.0 to 1669.0. Of the five classes, Class 952 also had the highest reading DSS median of 1669.0.

For 2008-2009, the mathematics DSS means of the five 5th grade classes ranged from 1616.2 to 1732.4. These scores fell into the high Level 2 to upper Level 3 category, which was in the average range. Of the five classes, Class 952, a mixed-gender class, had

the highest mathematics DSS mean of 1732.4. The mathematics DSS medians ranged from 1626.0 to 1742.0. Of the five classes, Class 952 also had the highest mathematics DSS median of 1742.0.

For 2008-2009, of the 5th grade classes, Class 952, a mixed-gender class, had the highest reading DSS mean reading DSS median, mathematics DSS mean and mathematics DSS median.

Appendix Table 10
Initial Analysis of 2008-2009 FCAT Reading and Mathematics Developmental Scale Scores: Grade 5

Class	N	Mean	Standard Deviation	Median	Skew
Reading					
950 Boys	20	1524.1	272.1	1459.0	.580
951 Mixed	22	1619.8	277.9	1615.5	-.232
952 Mixed	22	1664.0	182.9	1669.0	-.477
953 Mixed	21	1590.1	214.6	1532.0	.883
954 Girls	21	1602.7	212.1	1610.0	.861
Mathematics					
950 Boys	20	1684.5	162.1	1680.0	-.698
951 Mixed	22	1669.6	170.6	1708.5	-.549
952 Mixed	22	1732.4	155.7	1742.0	-.629
953 Mixed	21	1616.2	205.9	1626.0	-.297
954 Girls	21	1710.5	131.8	1692.0	.944

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