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AN INVESTIGATION OF THE EFFECT OF SINGLE-GENDERED INSTRUCTION ON  
ACHIEVEMENT IN MATH AND ENGLISH IN AN URBAN HIGH SCHOOL

A Dissertation  
presented in partial fulfillment of requirements  
for the degree of Doctor of Education  
in the Department of Curriculum and Instruction  
The University of Mississippi

by

BEVERLY S. BACCHUS

August 2015

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## ABSTRACT

Since the inception of the No Child Left Behind Act, many initiatives have been implemented to increase academic achievement. Single-gender education is an initiative that public schools have adopted with the hope of seeing boys and girls achieve significant gains in their core classes. This study explored the achievement levels of 9<sup>th</sup> grade girls and boys in their English I and algebra I classes. After a year of learning in single-gender classes, the students' End of Course scores were compared to the previous cohort of students who were taught in a traditional co-educational format by using an independent t-test. Scores were inputted in SPSS and analyzed. Eight research questions were formed to discover if significant differences from the co-educational year to the single-gender year existed. Results showed that there was a significant difference between the achievement of students who took single-gender English I classes compared to students who took co-educational English I classes, with single-gender English classes outperforming co-educational English classes. Results also showed that there was a significant difference between the achievement of students who took single-gender algebra I classes and students who took co-educational algebra I classes, with co-educational algebra I classes outperforming single-gender algebra I classes. Qualitative research is needed in the future to determine if teacher/ student training and perceptions of single-gender education impacted the data.

## DEDICATION

This work is dedicated to my mother, Irish Crawford. This work would not have been completed without her tireless support and faith. She is truly an angel and I am forever thankful to be blessed with her everlasting love and support. I would also dedicate this work to my loving husband, James Q. Bacchus II and my daughters Brooklynn Irish and Nyshari Bacchus. While working on this dissertation, I became married, birthed my first child, and gained an extremely smart and talented bonus daughter, Nyshari Bacchus. My babygirl, Brooklynn, is the most adorable and loving little person. She has shown me what it means to love unconditionally and is indeed my miracle child. It is my hope that seeing her mother reach the pinnacle of education while also maintaining a full time occupation and household will motivate her to reach even higher goals. My family means the world to me and I hope I made them proud.

Although these life-changing events and subsequent health issues initially disallowed me from continuing to work on my research at a steady pace, it eventually became my motivation to complete my research in a manner that was congruent with my work schedule and hectic life.

## ACKNOWLEDGMENTS

I would like to give thanks to my advisor, Dr. Rosemary Oliphant-Ingham, for her re-directions and support during this process. I truly appreciate all of the assistance and guidance that she offered me in every stage of my research development. Additionally, I would like to give endless thanks to Dr. Larry Hanshaw. Dr. Hanshaw volunteered to assist me with the statistical areas of my research proposal. His feedback was extremely thorough and expeditious. If I am ever in his position, I will follow his lead and assist graduate students with problematic issues that arise within their research proposals. I know many graduate students who are ABD (all but dissertation) and it may only take the guidance of a knowledgeable professor to reduce that statistic. I would also like to thank committee members, Dr. Davis and Dr. Bartee for taking time out of their schedules to serve on my committee. I tried my best to listen to the feedback from my prospectus presentations from all of my committee members in order to perfect my work. I would also like to acknowledge the University of Mississippi and staff members allowing me to conduct research on their campus and for providing me with a quality education. Throughout this process, I have learned patience, humility, and endurance. I will always reflect upon these life lessons throughout the course of my life and career.

## PREFACE

This is an original and unpublished work on the subject of single-gender education in an urban high school. Research results should be of high interest to school leaders who have a large number of African-American males who fall behind females and other ethnic groups. Results may provide school leaders with alternative options and curriculum offerings with the hope of increasing test scores and therefore raising the achievement level.

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## CHAPTER I: INTRODUCTION

The No Child Left Behind Act (NCLB) of 2001 was a transformative, legislative decision by the federal government to close the educational achievement gap of students from various ethnicities, socio-economic levels, and ability levels. The objective was for all students to receive a high-quality education that contained challenging and rigorous academic components (NCLB, 2001). Under the act, each year an increasing percentage of students were to demonstrate academic proficiency until 2014. At that time, every student across the United States was expected to perform at an adequate proficiency level in every tested subject that affects a school's AYP (annual yearly progress), which includes English II, Algebra I, and Biology I (Hurst, 2007). Because of these demands, the pressure for students to perform at adequate proficiency levels on state mandated assessments has increased rapidly for students, teachers, and school districts. Schools that do not make adequate yearly progress for two consecutive years must be publicly identified as a school that is in need of improvement and those students must be given the option of transferring to another public school (US Department of Education, 2003). Additional requirements are imposed for each successive year that a school fails to meet adequate yearly progress goals. Schools failing for five consecutive years are given three options: to re-open as a charter school, replace all or most of the school staff who are relevant to the failure to make adequate yearly progress, or to turn over operations to the state or to a private company with a demonstrated record of effectiveness (Hurst, 2007).

Traditional, co-educational formats are currently the norm in most public schools. Since the

inception of NCLB, many initiatives have been implemented to increase academic achievement. One such trend is the re-establishment of single-gendered schools and classes. The amended regulations to the Department of Education's Title IX legislation granted schools the ability to create single-gendered classes within a co-educational school (Arms, 2007). Originally, Title IX stated that no person in the United States shall be excluded from participation in any educational program that receives federal financial funds based on their gender (Title IX, 1998). The amended regulations required funds made available to local educational agencies under section 5112 shall be used for innovative assistance programs, including programs to provide same-gender schools and classrooms (Title IX, 1998). David Blunkett, the former secretary of education and employment, gave credence to the claims that single-gendered classes increased achievement by urging schools to experiment with the implementation of a single-gendered curriculum.

There are two types of single-gendered curriculum offerings in school systems: single-gendered instruction and single-gendered education (Hoffman, 2008). Single-gendered instruction refers to separating female and male students within a co-educational setting. Single-gendered education refers to an entire school whose student body is exclusive to a single-gender. The latter is seen in many private and charter schools throughout the nation. Both types of instructional practices have been implemented to improve academic achievement and to differentiate the unique needs of male and female students. This study will focus on single-gendered instruction that occurs in a high school with a predominantly co-educational curriculum.

Student enrollment in single-gendered classes must be voluntary and equal to the same

academic standards of co-educational programs. The U.S Department of Education referenced that several protesters of single-gendered education voiced concerns over the lack of safeguards that would be used to ensure that students receiving single-gendered education would receive an equal education. Some wanted to postpone additional conversations and amendments in regard to single-gendered education until more research had been presented on the matter (U.S Department of Education, 2006). Although the Department of Education acknowledged that there was not much research on the benefits of single-gendered education, officials decided to proceed with the amended regulations. Ultimately, it would be the choice of each school to implement single-gendered education based on its unique behavioral and academic needs (U.S Department of Education, 2006).

Proponents of single-gendered education believe that in co-educational classes, the differential nature of teacher interaction, intimidation of girls by boys, and assessment bias are reasons to favor single-gendered education (Hattie, 2002). For girls, separation often means a classroom free from male domination (Hoffman & Badgett, 2008). For boys, separation is often a means to overcome gender (male) stereotypes such as excelling in English or wanting to pursue a career in nursing (Thompson, 2008). Boys who trail girls in reading and writing are more likely to exhibit disciplinary problems or they may be labeled as learning disabled. Boys are also less likely to go to college (Defao, 2007). Researchers believe that single-gendered education offers students the opportunity to concentrate on their studies, as opposed to exerting energy trying to impress the opposite sex (Thompson, 2008).

#### STATEMENT OF THE PROBLEM

Failing state mandated test scores across America have become an epidemic and research has

shown that gender specific classes have the possibility of increasing student achievement (Younger & Warrington, 2006). Research indicates that single-gendered classes promote increased achievement, improved behavior, and increased self-efficacy (Younger & Warrington, 2006). This study, however, will evaluate the effect of single-gendered instruction on the achievement of male and female students in an urban, predominantly African-American high school. Study results will add to the field of research by determining if a significant increase in achievement exists after the implementation of a single-gendered instructional format in English I and algebra I classes.

#### PURPOSE STATEMENT

The purpose of this study is to explore differences in achievement of male and female students who have been separated by gender in their respective algebra I and English I classes. The study seeks to determine if a significant difference in achievement exists between ninth graders who have been taught in a co-educational setting and ninth graders who have been taught in a single-gendered instructional setting in algebra I and English I.

#### COMPARISONS OF STUDENTS BY EDUCATIONAL SETTING

Figure 1 illustrates the foundation later intended for comparisons between male and female students in co-educational and single-gendered instructional settings. The intended comparisons are expressed in research questions and hypotheses provided in the sections below.

**Table 1: *STUDENT GROUP BY INSTRUCTIONAL SETTING***

SINGLE-GENDER FINAL SCORES			&	CO-ED FINAL SCORES	
	GIRLS	BOYS		GIRLS	BOYS
<b>ENGLISH</b>	697.8037	693.1422	<b>ENGLISH</b>	682.1867	662.3832
<b>ALGEBRA I</b>	76.3583	78.4913	<b>ALGEBRA I</b>	81.7236	74.5019

### RESEARCH QUESTIONS

**RQ1:** Is there a significant difference between the achievement (in English I) of students in a co-educational setting and the achievement (in English I) of students in a single-gendered instructional setting.

**RQ2:** Is there a significant difference between the achievement (in algebra I) of students in a co-educational setting and the achievement (in algebra I) of students in a single-gendered instructional setting?

**RQ3:** Is there a significant difference between the achievement (in English I) of female students in a co-educational setting and the achievement (English I) of female students in a single-gendered instructional setting?

**RQ4:** Is there a significant difference between the achievement (in English I) of male students in a co-educational setting and the achievement (in English I) of male students in a single-gendered instructional setting?

**RQ5:** Is there a significant difference between the achievement (in algebra I) of female students in a co-educational setting and the achievement (in algebra I) of female students in a single-

gendered instructional setting?

**RQ6:** Is there a significant difference between the achievement (in algebra I) of male students in a co-educational setting and the achievement (in algebra I) of male students in a single-gendered instructional setting?

**RQ7:** Is there a significant difference between the achievement (in English I) of females in a co-educational setting and the achievement (in English I) of males in a single-gendered instructional setting?

**RQ8:** Is there a significant difference between the achievement (in algebra I) of females in a co-educational setting and the achievement (in algebra I) of males in a single-gendered instructional setting?

## HYPOTHESES

**Hypothesis 1:** There will be no significant differences between the achievement (in English I) of students in a co-educational setting and the achievement (in English I) of students in a single-gendered instructional setting.

**Hypothesis 2:** There will be no significant differences between the achievement (in algebra I) of students in a co-educational setting and the achievement (in algebra I) of students in a single-gendered instructional setting.

**Hypothesis 3:** There will be no significant differences between the achievement (in English I) of female students in a co-educational setting and the achievement (in English I) of female students in a single-gendered instructional setting.

**Hypothesis 4:** There will be no significant difference between the achievement (in English I) of male students in a co-educational setting and the achievement (in English I) of male students in a

single-gendered instructional setting.

**Hypothesis 5:** There will be no significant difference between the achievement (in algebra I) of female students in a co-educational educational setting and the achievement (in algebra I) of female students in a single-gendered instructional setting.

**Hypothesis 6:** There will be no significant difference between the achievement (in algebra I) of male students in a co-educational setting and the achievement (in algebra I) of male students in a single-gendered instructional setting.

**Hypothesis 7:** There will be no significant difference between the achievement (in English I) of females in a co-educational setting and the achievement (in English I) of males in a single-gendered instructional setting.

**Hypothesis 8:** There will be no significant difference between the achievement (in algebra I) of females in a so-educational setting and the achievement (in algebra I) of males in a single-gendered instructional setting.

Prior studies on single-gendered instruction have been inconclusive on whether separating genders will increase the achievement of high school students. This study will strive to add to the existing body of research on single-gender education to determine the impact of single-gendered instruction in English I and algebra I.

#### SIGNIFICANCE OF THE STUDY

Educational leaders have been positively and negatively affected by the ever-changing testing regulations associated with NCLB regulations since its inception in 2001. Although the accountability aspect of NCLB requires teachers to take ownership of student academic growth, it has also created increasingly stressful work environments. Teachers are at risk of losing their

employment, not reaching tenure, and schools are at risk of being taken over by the State Department of Education if students do not show academic growth based on NCLB mandates (NCLB, 2002). For example, Memphis, Tennessee established an “Achievement District” which is populated by schools that scored in the bottom 5% of the academic spectrum based on state mandated assessments. Those schools will be populated with new principals and teachers. The rigor of the new assessments has made it difficult for students to reach the benchmarks, specifically in the academic areas of math and English. Math and English are core academic areas that affect the annual yearly progress results for teachers in many states. Research by Niedeile and Vesterlund (2010) support that gender gaps in both subject areas show the need for more research to determine the root of the gap and to affect change. This study is designed to investigate the effect of single-gendered instruction in algebra I and English I as it relates to achievement.

### LIMITATIONS

This study will focus on single-gendered instruction within a co-educational setting in the southern state of Tennessee. Many of the students from private and Catholic school studies are from high socio-economic backgrounds, while fifty-nine percent of the student body in this study are on free or reduced lunch (Hattie, 2002). Difficulty may exist while attempting to draw comparisons between an entirely single-gendered school with an affluent demographic pool to one that is single-gendered in only the core subjects of English and algebra with students from low socio-economic statuses. Another limitation of this study will be the lack of available research studies on single-gendered classes within a co- educational school. A myriad of research exists on schools that are completely single-gendered, while the students in this study will still be

able to socialize with the opposite sex in the hallways and in classes outside of their core classes.

Another limitation to the study is that some readers may oppose single-gender research because of the assumption of gender stereotypes. Also, it is possible that some researchers use their personal opinions to validate or invalidate their data regarding the effectiveness of single-gendered classes. For this reason, research that describes scientific data will be used to support biological gender differences that affect males and females differently (Sax, 2006).

### DELIMITATIONS

One parameter of the study is that Sycamore High School, the subject of this study, is the only school in David County School's system that has integrated single-gendered education into its educational format. Sycamore High is also the only predominantly African-American school in the suburban school district which resides. There is not another high school in the county that has implemented single-gendered course offerings with similar demographics that can be used for comparative purposes. For this reason, convenience sampling will be used.

The researcher will not be able to control for various teaching styles and pre-existing teacher content knowledge that may affect the efficacy and intrinsic motivation of students. Furthermore, the researcher will not be able to control for factors unrelated to school such as parental involvement, home-related stress, and the lack of physiological needs that may affect a student as he or she achieves on high or low levels.

### OPERATIONAL DEFINITION OF TERMS

No Child Left Behind/NCLB- Represents the current U.S federal education policy to improve achievement among low-achieving students in poverty (Forte, 2010)

Single-gendered education- As stated in the NCLB act of 2001, single sex education is an

innovative assistance program that provides same-gender schools and classrooms (NCLB, 2002).

Co-educational schooling- Refers to boys and girls being taught together; an unquestioned aspect of schooling (Tyack, 1990).

School Choice- Vouchers that allow students to attend the school of their choice and force schools to compete for students which results in schools becoming more responsive to the needs of families (Chubb & Moe, 1990).

Title IX- States that no person in the United States, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance (Gates, 2010).

TVASS- Tennessee's value added assessment system tracks student data and teacher affect on vertically aligned tests (Eckert, 2010).

Efficacy- Refers to one's beliefs in his or her ability to perform at a designated level (Bandura, 1997).

Adequate Yearly Progress- AYP is an algorithm that calculates the percentage of students who scored at or above the state proficiency level (Forte, 2010).

## CHAPTER II: LITERATURE REVIEW: HISTORY OF SINGLE-GENDERED EDUCATION

Chapter 2 consists of a review of literature that details the history of single-gendered education and relevant research studies that have been conducted in various schools across the nation. The history of single-gendered education explains the differences between the curriculums of single-gendered education in the colonial years compared to what it consists of in the twenty-first century.

Although co-educational settings are currently the norm in public education, single-gendered education was once the only educational offering for students. Dating back to the early 1600s during colonial days, students were separated by gender in public schools. Academies that stressed core subjects such as math and English, known as town schools, were designed for boys exclusively (Monaghan, 1988). Girls were not allowed to attend these institutions until the 19<sup>th</sup> century (Riordan, 1990). Schools were designed for only male, Caucasian students from prominent families. Girls and boys were educated in dames schools, although these schools did not require girls to be taught a rigorous curriculum; instead, girls were taught homemaking skills and were prepared for professions related to caretaking such as nursing and teaching (Madigan, 2009). By the late 1700s, single-gendered education was allowable for upper and middle class students, both male and female. Elementary schools began forming in the Western World in single-gendered environments (Delemont, 1996). Also in the late 1700s, adventure schools were popularized for girls. These schools were often located in the homes of the teachers, usually

women or married couples. By the 1760s nearly every colonial city had an adventure school (Campbell, 2000). The course of study for girls stressed ornamental education in such areas as music, dancing, and needlework (Campbell, 2000). This reflected the mindset that the ultimate goal for a young lady is to be married and attractive to potential suitors (Campbell, 2000). Higher education was not a consideration for many because women were not equipped with the basic skills to read and write adequately.

Dr. Benjamin Rush, a proponent for female education, was a leader in educational reform efforts for women. He believed that children should be instructed in a way that would promote national prosperity and independence, which could be related to improvements in agriculture, manufactures, or inland navigation (Campbell, 2000). He wanted reading, writing, and arithmetic to be taught to all in hopes that all members of a family, not just the males, would become enlightened (Campbell, 2000). Rush was a supporter of the newly formed Young Ladies' Academy of Philadelphia and spoke at their first commencement. The Female Seminary Movement began around 1815 and was led by activists such as Catharine Beecher, Mary Lyon and Emma Willard (Riordan, 1990). The goal for these women was to form schools that would offer women an education equal to that of men, and they rallied for other academic institutions to aspire for the same principle (Riordan, 1990). At the Seneca Falls women's rights conference in 1848, women continued to rally for co-education in public schools. By 1860, many states rapidly established co-educational public school systems for primary and secondary schools (Riordan, 1990).

In the early 1800's, prestigious universities such as Yale, Harvard, and Princeton catered Caucasian men only. It was not until 1920 that Caucasian women were able to vote, own

property, and attend prestigious universities. Although sexism and racism was still prevalent in the 19<sup>th</sup> century, Oberlin College was the first college to admit both African-Americans and women in 1833. Co-education was the most popular form of education in the late 1800s, until doctors and psychologists reported that co-educational settings had an adverse affect on the health of female students (Riordanm, 2004). Those who opposed co-educational facilities believed that the structure motivated women to enter the workforce at a much higher rate, which was a catalyst for the divorce rate increase (Riordanm, 2004). This prompted many educational leaders to be proponents of single-gendered education in hopes that the classes would teach young ladies how to become better homemakers (Tyack & Hansot, 1990). As a result, boys and girls were taught in co-educational settings, but they were not taught the same curricula. Often times boys would be taught shop classes while girls would take home economics (Arms, 2007) This segregation of vocational classes lasted until the mid 1900's.

As women attempted to gain more rights and power, many rallied for schools to become co-educational because of the belief that single-gendered girls' schools did not adequately prepare women for higher education. In 1972, legislation was passed to protect school-aged children from being discriminated based on their gender (General Accounting Office, 1996). In 1975, Title IX mandated that physical education classes in America were to integrate both sexes (Hansot, 2002). The federal law concluded that no person in the United States would be excluded, denied the benefits from, or discriminated from any educational program that receives federal financial assistance (Title IX of the Education Amendments of 1972). Although some schools may have integrated vocational and physical education classes, the legislation of 1972 prompted educational leaders across America to completely integrate all classes with both males

and females.

In the early nineties, researchers made claims that girls were not being taught or given as much attention in the classroom as boys (Separated by sex, 1994). Ironically, research also indicated a decline in the academic achievement of boys. The No Child Left Behind Act of 2001 helped proponents of single-gendered education to reintroduce it with ease. The act mandated that funds made available to local government agencies under section 5112 to be used for innovative assistance programs, including programs to provide same-gender schools and classrooms (NCLB, 2002).

A long-standing myth exists which purports that female students do not excel in math as much as male students (Armstrong, Henson & Savage, 2004). Researchers have found that many female students are not adequately prepared in the classroom because of teacher assumptions that female students do not naturally have the intelligence to perform in subjects such as math. (Armstrong, Henson & Savage, 2004). In some co-educational settings, girls did not perform as well as they should because of the interactions that they have with male students (Lewin, 1999). Lewin reported that girls do not participate in class as much as their male counterparts unless girls populate the majority of the class (1999). Being privy to the research on the benefits of single-gender education, many parents are interested in sending their children to single-gendered schools. In New York, educational leaders have made an effort to ensure that establishing all-girls private schools will not result in leaving girls behind. According to the Educational Records Bureau, between 1990 and 1996, the applications for private school students who are in kindergarten rose 25 percent (Lewin, 1999).

In November of 2006, new regulations to Title IX helped to increase single-gendered

educational offerings. Margaret Spellings, U.S Secretary of Education, stated that single-gendered classes could be created as long as they were substantially related to the achievement of an important objective such as improving the educational achievement of students providing diverse educational opportunities or meeting the particular, identified needs of students (U.S Department of Education, 2006). In 2001, Senator Hilary Clinton and Senator Kay Bailey Hutchison proposed an amendment to the No Child Left Behind Act that would allow public schools to implement single-gendered classes within a co-educational setting.

In 2002, Leonard Sax established a non-profit organization called the National Association for Single-Sex Public Education. Sax's first novel, Why Gender Matters, is a reference for many educators as it discusses biological differences in males and females to validate reasons why single-gendered education is useful (Sax, 2006). Regions of the brain responsible for language, spatial memory, motor coordination, and relationship development grow at varying rates, times, and sequences between the two genders (Sax, 2005). According to Gurian (2006), there are distinct differences between brain functions of boys and girls such as the structure of the retina, the cochlea, and the autonomic nervous system. For example, more blood flow exists to the cerebral cortex in girls. This cortex contains the verbal and sensorial centers. In girls, the system of nerves that connect the right and left brain hemispheres, known as the corpus callosum, is 20% larger on average (Gurian, 2006). Both optically and neurally within the female optic region, girls are dependent upon P cells that connect the color variety with the functioning in the upper portion of the brain. On average, a girl's hearing is significantly more sensitive, especially at the higher frequencies, which are most necessary in speech discrimination. Their stress responses are impacted by the parasympathetic sector of the autonomic nervous system (Sax,

2006). In most cases, girls do not dominantly utilize one hemisphere over the other, while boys' brains are primarily right-hemisphere dominant. Girls are able to discern facial expressions due to different eye chemistry and brain receptors (Sax, 2005). In contrast, the average boys' stress response is controlled by the sympathetic section of the autonomic nervous system (Sax, 2006). Boys rely on M cells, which provide quick accessibility for them in regards to spatial activities and graphic clues (Gurian, 2006). Boys' brains shift into a rest state many times a day, which disengages them in learning (Kommer, 2006). Although their brains may be in a restful state, boys are more likely to appear hyper. This is due to a smaller amount of serotonin moving through the pre-frontal cortex area of the brain. Girls' brains do not rest because their cerebral cortex remains on at all times (Gurian, 2006). Boys' brains develop areas of visual/spatial processing and memory and targeting earlier than girls (Sax, 2005). The specific brain activity accountable for emotion remains in the amygdale area; therefore, the ability to verbalize feelings is more problematic for boys. There are a myriad of findings that highlight the influence of sex on many areas of cognition and behavior relative to girls and boys separately.

## SCHOOL CHOICE

School choice is a major component of discussions surrounding single-gendered education and is the catalyst of policy debates as it relates to K-12 education. It refers to an array of policies that allows students to leave their assigned public school to attend a high achieving school of their choice. School choice allows parents to decide which type of school is the best pedagogical fit for their children and gives students the opportunity to be educated in a high-achieving environment. Some supporters believe that school choice will increase competition among schools, which will ultimately cause an increase in student achievement (Rabovsky,

2011). Belfield and Levin (2002) concluded that competition often improves performance. Additionally, Abernathy (2005) agrees that competition from charter schools has positive effects on students at traditional schools. Like charter schools, private schools, and other types of educational academies, single-gendered classes offer an educational alternative for the purpose of academic achievement.

### GOALS FOR SINGLE-GENDERED INSTRUCTION

For many schools, the goal of single-gendered schools is to increase academic achievement by responding to the needs of each gender. Additionally, the mission of many schools that have implemented a single-gendered curriculum is to not treat boys and girls equally, but equitably, by consciously addressing the specific needs and preferences of boys and girls (Friend, 2007). By obtaining a single-gendered education, students can learn about gender roles from a historical standpoint and will be able to voice their opinions freely in a setting that is specific to their gender. Another goal would be to investigate the various forms of gender stereotyping in their culture and society. In many co-educational settings, students spend a great deal of time worrying about their appearance in order to impress the opposite sex (Hubbard & Datnow, 2004). Minimizing such distractions may lead students to focus more on their academics instead of their hormonal urges (Hubbard, 2004). Research has shown that students in single-gendered classrooms are able to express themselves freely in classroom discussions and are able to participate in school activities without the worry of male/female socialization issues (Hubbard, 2004). Also, in traditional school settings, students feel pressured to fit into the mold of gender stereotypes because of the social pressure of their peers. Research indicates that in all-male classes, boys are able to freely explore the arts. In all-girl's classes, girls are able to explore

subjects such as math and science with confidence (Hattie, 2002). In single-gendered schools, teachers are able to allow students to be themselves without the worry of impressing the opposite sex with machismo or overt femininity (Hubbard, 2004).

Although there is not a myriad of qualitative data on single-gendered education, integrating single-gendered classes into schools will give parents an alternative from which to choose for their children. In an educational arena plagued by issues related to low achievement, violence, drugs, poverty, sexism, and racial and ethnic tension, the emergence of single-gendered education has been regarded by some as a rare glimmer of hope, and a promise of a way out (Haag, 1998). Although there is inconclusive data on whether or not single-gendered classes improve academic achievement, this revitalized trend is another outlet that has been implemented to foster school improvement. In the twenty-first century, schools have become more data-driven. For purposes of gender gaps, schools can analyze standardized testing data while disaggregating it by gender. It is important for school leaders to consider the possibility that separating the genders may lead to improvement in social and academic achievement if it is evidenced by data and theory. The purposefulness of this research is to add to the field of knowledge of the affects of single-gendered instruction.

#### RELATED THEROIES: SOCIAL COGNITIVE THEORY AND THE REPUTATION

#### ENHANCEMENT THEORY

Theoretical perspectives such as the Social Cognitive Theory and the Reputation Enhancement Theory are foundations to investigate single-gendered education in an urban setting. The Social Cognitive Theory provides a framework for understanding, predicting, and positively affecting student behavior as it relates to efficacy and achievement in the classroom.

The theory identifies human behavior as an interaction of personal factors, behavior, and the environment (Bandura, 1986). It also identifies a link among environmental, behavioral, and personal factors that interactively affect human behavior (Burney, 2008). The theory suggests that a person behaves in a certain way based on how society expects them to act (Burney, 2008). A central role to the processes of the social cognitive theory is how an individual can observe the environment, reflect on that observation, and then construct decisions based on the acceptance or disapproval of what was observed (Burney, 2008). Aspects of the Social Cognitive Theory can be applicable to the implementation of a single-gendered curriculum. Research has shown that increased self-efficacy improves achievement in single-gendered classes (Burney, 2008). One view is that single-gendered classes positively affect girls by providing them with an environment in which they can participate with confidence and without the distraction from boys (Spielhofer, 2004). The positive effects of boys in single-gendered classes have been measured in terms of a reduction in classroom management issues. In one qualitative study, the principal suggested that single-gendered education positively affected the entire student body by encouraging educational leaders to model positive behavior, which improved the climate of the school (Marino & Lingard, 2005).

Carroll (2002) suggested a model that integrated components of the reputation enhancement theory and the goal setting theory, which proposed evidence that many adolescents participate in risky behavior to seek acceptance from their peers. The Goal Setting Theory is based on persons setting goals to out perform those who do not set goals. For many adolescents, it is important to maintain a reputation that is acceptable among their peer group. The reputation enhancement theory states that people choose a particular self-image that they wish to promote (Carroll, 2002).

An audience is then necessary to develop and maintain this social identity within a community (Emler, 1990). Adolescent males are well aware of the negative consequences of specific inappropriate at-risk behaviors, and they deliberately set goals related to the participation in such behaviors to establish and maintain inappropriate, non-conforming reputations (Carrol, 2002). Although findings have demonstrated that goal setting contributes to achievement and maintenance of adolescent male reputations, it has been indicated that gender may be critical in understanding adolescent at-risk behavior (Carrol, 2002).

### RELATED RESEARCH STUDIES

In 1986, Lee and Bryk researched the effectiveness of single-gendered instruction in a private, Catholic high school in Chicago, Illinois. The purpose of this longitudinal study was to investigate a paradigm shift that was established to equalize the academic achievement of female and male students. Additionally, school leaders wanted to reinforce traditional gender roles in the single-gendered educational formats. Lee and Bryk randomly sampled 1087 students from 45 single-gendered schools and 30 co-educational schools to study single-gendered and coeducational schooling in correlation with the National Center for Educational Statistics. The NCES released a document titled High School and Beyond, which is a nationally representative longitudinal study of US high schools and their students (Lee & Bryk, 1986). The study began in 1980 while students were sophomores and student progress was tracked until their senior year in 1982. Quantitative research concluded that compared to peers who were taught in co-educational settings, boys in single-gendered schools achieved higher scores in reading, mathematics, and writing during their sophomore year, and in mathematics for their senior year (Lee & Bryk, 1986). Additionally, the study found that girls at the single-gender schools showed a consistent

and positive attitude toward school, tended to associate with academically minded friends and expressed a greater interest in math and science (Lee & Bryk, 1986). They also found that achievement levels for girls at single-gendered schools amounted to a year's worth of growth, which is fifty percent more than what is typically learned within two years of high school.

In 1992, the American Association of University Women reported a claim suggesting that girls were not being challenged in the classroom as much as their male counterparts (How Schools Change). The findings in the report showed that girls were being called on less frequently and were not as encouraged as males. In 1994, another report involved a three-year study with similar findings. After visiting more than 100 classrooms, Sadker and Sadker (1994) found a lack of equalization in male and female students. Research found that girls defer to boys in co-educational classrooms, are called on less than boys, and are less likely than boys to study advanced mathematics and science (Sadker, 1994). The General Accounting Office also reported that because of these reasons, many educators believe that single-gendered settings can improve girls' academic performance and attitude toward these subjects (Sadker, 1994).

A gender gap exists between male and female students and an even larger gap exists between African-American students and other ethnicities. Historically, gender equity has pertained to improving educational benefits, such as voting and advanced curricula rights, for female students. Current research indicated that boys no longer hold the advantage in academic achievement (Ghatt, 2012). On standardized achievement tests, female students typically surpass males in writing ability, reading achievement, and verbal skills while males surpass females in science and math (Klienfield, 1998). More boys are suspended from school, are held back, and drop out of school. Additionally, more boys are likely to be enrolled in special education

programs and are four times more likely to be diagnosed with Attention Deficit Disorder (Summers, 2000). Research indicates that African-American and Latino students continue to trail their Caucasian counterparts. According to the Schott Foundation for Public Education only 52 percent of Black male and 58 percent of Latino male ninth-graders graduate from high school within four years compared to 78 percent of White, non-Latino male ninth-graders. The report is released every two years and the findings from 2012 reveal that the gap for black males is growing. In 2008, the black male graduation rate was 47 percent (Ghatt, 2012).

Research from Parker and Rennie indicated that the debate about single-gendered education continues, primarily as it benefits girls (2002). This research discusses the difficulties faced by teachers who had to implement gender inclusive practices into the classroom. This study was a part of the Single-Sex Education Pilot Project (SSEPP) in ten high schools in rural and urban Australia (Parker & Rennie, 2002). Both quantitative and qualitative data were used to analyze the study. The study reported that teachers were able to implement gender-inclusive practices in single-gendered classes more frequently than in mixed gender formats. Teachers reported that they were able to address the poor written and oral communication of the boys and increase the experiences for hands on assignments for the girls (Parker & Rennie, 2002). In single-gendered classrooms, it was also reported that sexual harassment, which inhibited girls' learning, was eliminated (Parker & Rennie, 2002).

Mulholland, Hansen, and Kaminski conducted a study in Australia that investigated the achievement of boys in single-gendered schools (2004). This study emerged as an investigation into the discovery of gender differences in the classroom and furthermore examined students' academic performance. The instrument used for data collection was standardized tests in English

and math and interviews with the teachers of single-gendered classes. Results indicated that no significant differences in mathematics achievement were attributed to genders, but scores in English improved for both genders. The improvement for females in the single-gendered educational setting was significantly better than the males in single-gendered classes (Mulholland, Hansen, & Kaminsk, 2004).

A research study investigated the effects single-gendered education and school size on the progress and opportunities of middle school students. Spielhofer, Benton, and Schagen (2004) researched the argument that girls benefit from single-gendered education and are able to participate in class more without distraction from male students. The premise is that single-gendered schools will provide girls with the confidence to actively participate in class with confidence. Researchers used a multi-level modeling approach to analyze several factors as they analyze school size and single-gendered education. The results of the study showed a significant difference between girls in single-gendered schools as compared to girls in co-educational schools. On average, girls in single-gendered schools scored 25% higher than the girls in mixed gender schools (Spielhofer, Benton, & Schagen, 2004)

The science scores from girls who were in single-gendered schools were a third of a grade better than the girls in co-educational schools. This analysis suggests that there is a small, but significant difference in achievement in single versus co-educational schools. Students who previously experienced low achievement made more academic progress in single gendered schools than in coeducational schools. Research findings indicated that the most effective comprehensive schools would be medium-sized and single-gendered (Spielhofer, Benton, & Schagen, 2004).

In a study by Van de Gaer (2004) in Australia, the effects of single-gendered versus co-educational classes in English and math of boys and girls at the end of the second year of secondary education were investigated. Multi-level analyses were carried out on a sample of approximately 4000 pupils, 330 classes (190 single-gendered), 180 teachers and 50 schools (Van de Gaer, 2004). The results indicated that for boys, the gender composition of the class had more impact than the gender composition of the school. For girls, the gender composition of the schools was of more importance. Boys progressed at a higher achievement level and rate in language in their co-educational classes. Girls, on the other hand, made more progress in mathematics in their single-gendered compared to their co-educational schools (Van de Gaer, Pustjens, DeMunter, & Van damme, 2004).

Research has shown that many middle school and high school students prefer single-gendered classes and schools as compared to a traditional co-educational format. Hudson Valley Middle School in New York has a population of approximately 600 students who had the choice of learning in a single-gendered or co-educational format. Hudson's administration decided to implement single-gendered classes because of achievement difficulties on state mandated standardized assessments. The hypothesis for the creation of this format was that a distraction free class would aid the academic achievement for students (Speilhagen, 2006). During an interview with pre-teens and teachers at this school, 6<sup>th</sup> grade male students indicated that all male classes were enjoyable; while 6<sup>th</sup> grade female students indicated that they could participate in all-girl's classes without the fear of being teased by boys (Speilhagen, 2006). The positivity of the responses was more enthusiastic from younger students as compared to older students. A total of 62% of the students agreed that single-gendered classes allowed them to focus on their

schoolwork without distractions from the opposite sex. It could be inferred from other interviews that single-gendered classes were most effective when the individual developmental needs of students were differentiated in the classroom (Spielhagen, 2006). As students began to enter upper middle school and high school, their preference for single-gendered classrooms shifted. Many students entered an awkward state of puberty and began to feel more pressure from the opposite sex to look and behave in a certain way (Speilhagen, 2006). An eighth grade female student mentioned how the “cattiness” of all girls’ classes bothered her on occasion while the boys admitted that bullying was more of a problem in all-boys’ classes. The result of this study showed that single-gendered classes could positively impact students, especially if it was a choice of the student or parents to be educated in that environment.

Jennifer Friend (2006) conducted a mixed methods study that examined the relationship of two single-gendered eighth grade science classes in a public, suburban middle school. The purpose of the study was to examine aspects of same-gender grouping in order to improve the achievement and classroom climate in middle school science classes. The hypotheses of the study were that male and female students enrolled in same-gender science classes demonstrate more positive science academic achievement than their peers enrolled in mixed-gender classes. Also, single-gender grouping of students had a positive effect on the classroom climate (Friend, 2006). Two research questions were addressed: Will single-sex classes of eighth grade science produce significant gains as compared to co-educational groupings and will the classroom climate in all-female and all-male groupings demonstrate significantly more positive findings as compared to co-educational groupings (Friend, 2006). The participants of the study were randomly assigned to a single-gender class by a computerized scheduling program. The first

experimental group consisted of a class of male students (n=20) being taught by a male science teacher. The comparison group consisted of male students (n=42) in co-educational classes taught by the same male teacher. The second experimental group was a class of all female students (n=23) being taught by a female science teacher. The comparison group consisted of female students (n=61) in co-educational classes taught by the same female teacher. Both of the teachers had over fifteen years of teaching experience, had obtained graduate degrees, and access to the same curriculum guide. Although not statistically significant at the 0.05 level, a preliminary analysis of means indicated that the mean scores for females in same gender classes were higher than the means of females in co-educational classes. Data also showed that the mean scores of male students in same gender classes were higher than the mean scores for males in co-educational classes. A Likert scale, t-tests, and two-way ANOVA's were used to analyze data. Using an alpha of 0.05 and null hypotheses, the statistical analyses of the study indicated no significant difference in student science academic achievement and that same-gender classes did not affect the classroom climate positively. In the qualitative portion of the study, the researcher observed that the female teacher conducted herself differently with her all-female class as compared to her mixed gender class. She was more formal and less engaged with the mixed gender class. During a focus group discussion, the teacher indicated that she is able to have a more enjoyable experience with her all girls class because the humor often becomes constant and wild when the boys are included (Friend, 2006). The male teacher observed more incidents of peer intimidation and the rapport being one of hierarchy, with newer and more introverted boys having little to no interaction with the other students. Overall the male teacher thought that same gender grouping was a good experience. A limitation of the study was that the teacher did not

receive any professional development connected to gender equity. Although there were no significant statistical differences, the small increases in achievement for same gender grouping coupled with positive observations did not show evidence that same gender grouping was ineffective.

### EFFECTS ON ACHIEVEMENT

A longitudinal research study was developed at Stetson University in Deland, Florida (Cable & Spradlin, 2008). The study lasted for three years and compared single-gendered classrooms with traditional classrooms at a local elementary school. The study focused on fourth graders who were randomly assigned to single-gendered or co-ed classrooms. The researchers made sure to eliminate as many differences as possible by matching the class size, demographics, and similar professional development for all teachers. Students were taught the same curriculum and students who received special education services were included in the study. The assessment test that is taken in Florida is called the Florida Comprehensive Assessment Test (FCAT). The disaggregated data showed that single-gendered classes had a higher proficiency rate than traditional classes. Of the male participants, 86% were proficient while only 37% of the boys in traditional classes were proficient on the FCAT (Cable & Spradlin, 2008). Girls in traditional classes were 59% proficient as compared to a 75% proficiency rate for girls in single-sex classes (Cable & Spradlin, 2008).

A study conducted in England by Malacova (2007) investigated if students in single-gendered schools performed at higher proficiency levels in efforts to receive their General Certificate of Secondary Education compared to students educated in a co-educational setting. Additionally, Malacova investigated if the impact of single-gendered schooling is different in a selective or

non-selective environment (2007). The General Certificate of Secondary Education is an assessment taken by high school students at the end of their eleventh grade year for every subject. Using student performance on the GCSE, study results concluded that single-gendered schools were more effective than co-educational schools in promoting learning and development in high school students (Malacova, 2007).

Hoffman (2008) conducted a mixed-methods design to evaluate the effectiveness of single-gendered instruction within the time span of two years on achievement, instructional practices, and efficacy at an urban high school with students from disadvantaged populations. Students received single-gendered instruction in their algebra I and English I classes and were compared to co-educational students by various assessment measures. The achievement results were inconsistent. Two independent t-tests were performed to determine whether there was a significant difference in achievement between students in single-gendered classes compared to those in co-educational classes. Within the first year, there was a significant difference in the between subjects effect for algebra students achieving higher grades than the control group  $t(303) = 4.083, p < .001, \text{Cohen's } d = .464$  (Hoffman & Badgett, 2008). Students had significantly higher mean grades after receiving single-gendered instruction for algebra I ( $M = 1.91, SD = 1.12$ ) compared to those who were in co-educational classes ( $M = 1.50, SD = 0.56$ ). Study results for year 2 indicated significantly higher composite grades for students who were enrolled in co-educational classes.

## SCHOOL CHOICE

School choice has had a monumental impact on schools implementing single-gendered classes within a co-educational format. In this study, Shar and Conchar investigated factors that

influenced students and parents to choose single-gendered educational formats as an educational institution (2008). The study took place in a multi-ethnic urban community. The study was designed to investigate the views and perspectives of stakeholders regarding single-gendered education (Shah & Conchar, 2008). The data collection method consisted of 5670 questionnaires and focus group discussions with 1045 responses to survey questions (Shah & Conchar, 2008). Single-gendered schooling emerged as “very important/important” to 58.6 % of the adult respondents and was considered to be more favorable by males. Fifty-five point five percent of women indicated that single-gendered education was important compared to 69% of men. A high majority of minority participants favored single-gendered education with the perception that students in single-gendered environments are high achievers.

The University of California at Los Angeles’ Higher Education Research Institute conducted a survey that compared the backgrounds, aspirations, and behaviors of entering college freshman who graduated from private single-gendered high schools and private co-educational high schools. The survey participants included 6,552 female graduates of 225 single-gendered schools and 14, 684 female graduates of 1,169 private co-educational high schools (Sax, 2009). Survey results indicated many distinctions between the two groups that favored single-gendered institutions. Based on survey questions that indicated academic engagement, female graduates of single-gendered schools spent more time doing homework, having discussions with their professors outside of class time, and participating in group study sessions. Sixty-two percent of graduates from independent single-gendered schools reported that they spent 11 or more hours per week studying or doing homework in high school, compared to 42 percent of independent co-educational graduates (Sax, 2009). Comparatively, study results are lower among Catholic

school alumnae, though the gap between single-gendered and co-educational graduates remains significant with 35 percent for Catholic single-gendered graduates compared to 24 percent of Catholic co-educational graduates (Sax, 2009). Survey results indicated that students from single-gendered schools are more likely to engage in group study, with 53 percent of independent single-gendered graduates reporting that they study with other students consistently, compared to 45 percent among independent co-educational graduates (Sax, 2009). Single-gendered graduates also reported more time talking with teachers outside of the classroom setting. Thirty-seven percent of single-gendered graduates reported spending three or more hours per week meeting with teachers away from class compared to 30 percent among women graduates of independent co-educational schools (Sax, 2009). Additionally, female college freshman who attended single-gendered schools outscored students from co-educational schools on the SAT. Mean SAT composite scores were 43 points higher for single-gendered graduates within the independent school sector, and 28 points higher for single-gendered alumnae in the Catholic school sector (Sax, 2009).

### CHAPTER III: METHODOLOGY AND DATA ANALYSIS

Because human subjects were involved in this educational research study, IRB permission was obtained by attaching a thorough explanation of the research details concerning the participants and by explaining that no human subjects would be directly involved. The researcher obtained permission from the local school board and building principal to conduct the study. The local school board approved the researcher's retrieval of data from the RANDA website.

#### PURPOSE

The purpose of this study was to determine if a significant difference in achievement exists between English I and algebra I scores of 9<sup>th</sup> graders after the implementation of a single-gendered curriculum compared to the previous cohort of 9<sup>th</sup> graders who were educated under a co-educational curriculum. Additionally, the study investigated the possibility of a gap that existed between male and female students on their algebra I and English I assessments. Study results illustrated the difference in mean achievement scores based upon standardized test results on state mandated assessments in algebra I and English I for male and female students.

#### RESEARCH DESIGN

The research design of this study was an ex post facto quantitative design. Specifically, it began with causes (different educational settings) and investigated the effects. Additionally, the influences of different settings on achievement in English and math were investigated.

According to Gay, Mills, & Airasion (2006) the type of variation, which starts with causes and

investigates effects, is called prospective causal-comparative research” (pp. 217).

#### POPULATION

Sycamore High School (pseudonym) sits on a 3,000-acre campus in an unincorporated suburb of Memphis, Tennessee. The school has a population of approximately 2,000 students. The school is a Title 1 school, which means that 80% of the student body receives free or reduced lunch. Ninety-five percent of the student body is African-American, three percent are of Latin descent, and two percent of other ethnicities. Data was generated from freshman students who were taught algebra I and English I in a co-educational format during the 2009-2010 school year and freshman students who were taught algebra I and English I in a single-gendered format during the 2010-2011 school year. Each freshman class consisted of approximately 500 students. Gender-based classes were implemented for freshman students during the 2010-2011 school years in the academic areas of algebra I and English I.

#### GROWTH MEASURE

In Tennessee, a rigorous growth measure was used to distinguish whether a school has met annual measurable objectives (AMO) based on year-to-year school achievement and student growth that is predicted from TVAAS. The methodology the Tennessee Department of Education has used to establish targets for the 2012 to 2013 school year allows for the state and districts to annually set targets based upon the previous year’s achievement levels. Each year, state and district achievement goals was set to reduce the percentage of students scoring basic or below basic on state administered assessments by half over the following eight years.

This study utilized a similar year to year tactic in accordance with Tennessee's educational growth methodology to determine if significant achievement growth from the co-educational school year to the single-gendered school year for students in algebra I and English I occurred.

## PROCEDURE

Until the 2010-2011 school year, students in the urban high school of Sycamore High School in Memphis, Tennessee were taught in a co-educational format in every subject area. In the 2010-2011 school year, SHS experimented with single-gendered education in the core classes of English 9 and algebra I. Students who took standard 9<sup>th</sup> grade English and algebra I participated in single-gendered instruction. Throughout the year, teachers taught the curriculum based on state performance indicators that were developed through the Tennessee State Department of Education. Those indicators were organized by nine weeks grading periods in pacing guides that teachers were required to follow. This ensured that every child was taught the same standards at the same time. State mandated End of Course assessments were given to students in the month of May to test their proficiency on the state standards. End-of-Course test results are kept in the Tennessee Department of Education's RANDA database.

Data was collected from End-of-Course assessments in the subject areas of ninth grade English and algebra I. This data was compared with students who took the same courses in a co-educational format the previous year. The researcher was not able to control for various teaching personalities related to teaching strategies and styles. Upon IRB approval and approval from the Shelby County Board of Education, the research process began May of 2013.

## PARTICIPANTS

The participants of the quantitative study included approximately 750 students. There were 350 students from the 2009-2010 co-educational school year, and 400 students from the 2010-2011 single-gendered school year. At the end of the academic school year, freshman students were required to take an algebra I and English I assessment. These assessments were used to measure the schools' growth and to determine whether the school met its annual measurable objectives (AMO).

## INSTRUMENTATION

Data was gathered from the 2009-2010 and the 2010-2011 school report card that shows state test results in the areas of algebra I and English I. Test scores from the co-educational year will be compared to test scores from the single-gendered school year to determine if a significant difference in achievement exists. Furthermore, each assessment was compared by gender to investigate the gender gap between male and female students on each assessment.

Prior to taking the state-mandated assessment for algebra I and English I, a random selection of both co-educational 9<sup>th</sup> graders and single-gendered 9<sup>th</sup> graders will be made (n=170 and n=200, respectively) to form two comparison groups to determine if they are initially significantly different from one another prior to comparing them on the basis of state-mandated assessments. For all students in both groups, final semester grades for (n=170) 9<sup>th</sup> grade students from the 2009-2010 school year and (n=200) 9<sup>th</sup> grade students from the 2010-2011 school year were randomly chosen to form the two comparison groups. Mean semester grades for the two groups at the p= 0.05 level of significance will be compared using a t-test for Independent groups. No significance between the means indicate group equivalence prior to either group's

involvement in the two different educational settings being compared in this research.

#### APPARATUS AND INSTRUMENTATION

Within this ex post facto design, causal relationships were investigated using state report card data from the 2009-2010 school year and 2010-2011 school year. The instrument that was used is the Tennessee End of Course state mandated algebra I and English I assessment that includes standards based questions in a multiple-choice format. Being that EOC assessments have to be returned to the state department immediately after testing, a copy cannot be provided. In this study, achievement is measured by the percentage of students scoring “proficient” or “advanced” on the state assessments on a norm-referenced scale that ranges from below basic, basic, proficient, and advanced. NCLB establishes the measurement criteria of proficient and advanced as a benchmark that indicates a level of adequate achievement. The State Board of Education in Tennessee constructs the assessments, which are measured for reliability and validity.

#### DATA ANALYSIS

Data retrieved for each research question was analyzed and disaggregated based on student performance on the Tennessee State Department of Education’s mandated End of Course Assessments in English I and algebra I. An independent t-test is a statistical test used to analyze the difference between the means of two independent groups on a continuous variable. A p-value of 0.05 was used to determine if a significant difference exists between mean scores based on gender for English I and algebra I. SPSS will be the statistical program used in this study. An independent t -test will be used to compare the achievement of 2009-2010 9<sup>th</sup> grade students who were taught algebra I and English I in a co-educational setting with the mean achievement of the 2010-2011 cohort 9<sup>th</sup> grade students who were taught the same subjects in a single-gendered

setting. An independent t-test will also be used to discover if significant differences exist in the achievement for girls compared to boys in two different, instructional settings. A thorough analysis of quantitative data results will be discussed in Chapter IV.

## CHAPTER IV: ANALYSIS AND FINDINGS

Chapter four describes the analyses conducted to test the research questions and hypotheses that are listed in chapter three. Sample information and variable descriptive statistics will be included. Chapter four will conclude with a summary of analysis and findings.

### INSTRUMENT

The Tennessee Department of Education requires that every student who is enrolled in algebra I and English I to take an end of year assessment that covers the state performance indicators that were taught that year. Each assessment contains 60 questions and is untimed. Test security measures are taken before the assessment to ensure that test proctors are trained and that academic materials are removed the testing site. The Department of Education sends various versions of assessments to protect the integrity of the tests. Test administrators and proctors are prohibited from looking at test questions; this act can lead to a testing violation.

### SAMPLE

The sample size consists of 1634 ninth grade students. The sample size for single gender algebra I and English I consisted of (n=945) students. The sample size of students taught in co-educational algebra I and English I classes consisted of 689 students. Scores from co-educational students surveyed in the year 2008-2009 consisted of 372 co- educational algebra students and 317 English students. Scores from the single- gendered school year surveyed in 2009-2010 consisted of 506 algebra I students and 439 English students. To further breakdown each group

by gender, the ninth grade class of 2009-2010 consisted of 214 female and 225 male students who were taught in single-gendered English classes. The algebra I class of 2009-2010 consisted of 240 female students and 266 male students who were taught in single-gendered classes. The following codes are used to describe each variable within in the SPSS tables below: *1=Males 2=Females 3=Coed Females 4=Coed Males 5=Single Gendered Males 6=Single Gendered Females 7=Coed Male & Female 8=Single Gendered Male and Female.*

**Table 2: CO-EDUCATIONAL SAMPLE SIZE**

<b>CO-EDUCATIONAL 2008-09</b>			
	<b>Male</b>	<b>Female</b>	<b>Class Total</b>
<b>English I</b>	167	150	317
<b>Algebra I</b>	173	199	372
<b>TOTAL</b>			<b>689</b>

**Table 3: SINGLE-GENDER SAMPLE SIZE**

<b>SINGLE- GENDER 2009-2010</b>			
	<b>Male</b>	<b>Female</b>	<b>Class Total</b>
<b>English I</b>	225	214	439
<b>Algebra I</b>	266	240	506
<b>TOTAL</b>			<b>94</b>

## DATA ANALYSIS

**RQ1:** Is there a significant difference between the achievement (in English I) of 317 students in a co-educational setting and the achievement (in English I) of 439 students in a single-gendered instructional setting.

The first hypothesis states that there will be no significant differences between the achievement (in English I) of students in a co-educational setting and the achievement (in English I) of students in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F= 11.24$ ,  $p= .001$ , indicated that group variances are different and significantly so. The ANOVA test is robust enough, even if a significant p-value is found for Levene's Test of Homogeneity of Variance (Pallant, 2010)). The results of the independent t-test of means,  $t(754)= -8.54$ ,  $p= .000$  (equal variances assumed) and  $t(571.6)= 8.20$ ,  $p= .000$  (equal variances not assumed), indicated that there was a significant difference in the achievement of co-educational students ( $M= 671.8$ ,  $SD= 42.89$ ) and single-gendered students ( $M= 695$ ,  $SD= 33.21$ ). Independent T-Test results rejected the null hypothesis and indicated that there is a significant difference between male and female students who were taught English I in a co-educational format and male and female students who were taught English I in a single-gendered format. Students in the single-gender English classes outscored students in the co-educational class.

**Table 4: HYPOTHESIS I DATA ANALYSIS**

*Group Statistics*

Gender Code	N	Mean	Std. Deviation	Std. Error Mean
7.00	317	671.7539	42.89237	2.40908
8.00	439	695.4146	33.21841	1.58543

*Independent Samples test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Test Scores	Equal variances assumed	11.242	.001	8.543	754	.000	-23.66064	2.76964	29.09775	18.22352
	Equal variances not assumed			8.204	571.637	.000	-23.66064	2.88396	29.32509	17.99618

**RQ2:** Is there a significant difference between the achievement (in algebra I) of students in a co-educational setting and the achievement (in algebra I) of students in a single-gendered instructional setting.

The second hypothesis states that there will be no significant differences between the achievement (in algebra I) of students in a co-educational setting and the achievement (in algebra I) of students in a single-gendered instructional setting. Levene's test results for Equality of Variances,  $F= 31.972$ ,  $p=.000$ , indicated that group variances were different and significantly so. The ANOVA test is robust enough, even if a significant p-value is found for Levene's Test of Homogeneity of Variance (Pallant, 2010). The results of the independent t-test of Means,  $t(876)=-6.335$ ,  $p=.000$  (equal variances assumed) and  $t(607.9)=-5.97$ ,  $p=.000$  (equal variances not assumed) indicated that there was a significant difference in the achievement of co-educational students ( $M=75$ ,  $SD= 13.9$ ) and single-gendered students ( $M=80.22$ ,  $SD=13.9$ ). The independent t-test results rejected the null hypothesis and indicated that there is a significant difference between the achievement of algebra I students in a co-educational setting and algebra I students in a single-gendered setting. Algebra I co-educational male and female students outperformed single-gender male and female algebra I students.

**Table 5: HYPOTHESIS II DATA ANALYSIS**

*Group Statistics*

	Gender Code	N	Mean	Std. Deviation	Std. Error Mean
Test Scores	8.00	506	75.2352	9.34965	.41564
	7.00	372	80.2204	13.94579	.72306

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Test Scores	Equal variances assumed	31.972	.000	-6.335876		.000	-4.98525	.78693	-6.52974	-3.44076
	Equal variances not assumed			-5.977	607.932	.000	-4.98525	.83401	-6.62314	-3.34737

**RQ3:** Is there a significant difference between the achievement (in English I) of female students in a co-educational setting and the achievement (English I) of female students in a single-gendered setting?

Hypothesis Three states that there will be no significant differences between the achievement (in English I) of female students in a co-educational setting and the achievement (in English I) of female students in a single-gendered instructional setting. Levene's Test for Equality of Variances ( $F=.157$ ,  $p=.682$ ) results indicated that group variances were different, but not significantly so. The results of the independent t-test of Means,  $t(362)=4.334$ ,  $p=.000$  (equal variance assumed) and  $t(320.4)=4.3$ ,  $p=.000$  (equal variances not assumed), indicated that there was a significant difference in the achievement of co-educational female students ( $M=682$ ,  $SD=33.87$ ) and single-gendered female students ( $M=697.8$ ,  $SD=33.81$ ). Independent T-Test results rejected the null hypothesis and showed that there is a significant difference between the achievement of female students in a co-educational setting and the achievement of female students in a single-gendered setting. Female students in single-gender English I classes outperformed females in co-educational single-gender classes.

**Table 6: HYPOTHESIS III DATA ANALYSIS**

*Group Statistics*

Gender Code		N	Mean	Std. Deviation	Std. Error Mean
Test	3.00	150	682.1867	33.87331	2.76574
Scores	6.00	214	697.8037	33.81264	2.31138

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Test Scores	Equal variances assumed	.157	.692	-4.334	362	.000	-15.61707	3.60328	-22.70306	-8.53108
	Equal variances not assumed			-4.333	320.462	.000	-15.61707	3.60442	-22.70839	-8.52576

**RQ4:** Is there a significant difference between the achievement (in English I) of 167 male students in a co-educational setting and the achievement (in English I) of 225 male students in a single-gendered instructional setting?

Hypothesis Four states that there will be no significant differences between the achievement (in English I) of male students in a co-educational setting and the achievement (in English I) of male students in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F = 15.79$ ,  $p = .000$ , results indicate that group variances are different and significantly so. The ANOVA test is robust enough, even if a significant p-value is found for Levene's Test of Homogeneity of Variance (Pallant, 2010)). An independent t-test of Means,  $t(390) = -7.57$ ,  $p = .000$  (equal variances assumed) and  $t(275.72) = -7.17$ ,  $p = .000$  (equal variances not assumed), indicated that there was a significant difference in the achievement of co-educational students ( $M = 662.38$ ,  $SD = 47.80$ ) and single-gendered students ( $M = 693.14$ ,  $SD = 32.55$ ). Independent T-Test results reject the null hypothesis and show that there is a significant difference between the achievement of male students in a co-educational setting and male students in a single-gendered setting. Males in single-gender English I classes outperformed males in co-educational English I classes.

**Table 7: HYPOTHESIS IV DATA ANALYSIS**

*Group Statistics*

Gender Code		N	Mean	Std. Deviation	Std. Error Mean
Test Scores	4.00	167	662.3832	47.80794	3.69949
	5.00	225	693.1422	32.55568	2.17038

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Test Scores	Equal variances assumed	15.796	.000	-7.572	390	.000	-30.75899	4.06201	-38.74516	-22.77282
	Equal variances not assumed			-7.171	275.727	.000	-30.75899	4.28915	-39.20262	-22.31536

**RQ5:** Is there a significant difference between the achievement (in algebra I) of 199 female students in a co-educational setting and the achievement (in algebra I) of 240 female students in a single-gendered instructional setting?

Hypothesis Five states that there will be no significant differences between the achievement (in algebra I) of female students in a co-educational setting and the achievement (in algebra I) of female students in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F= 2.960$ ,  $p= .086$ , results indicate that each of the two groups variances are different, but not significantly so. The results of the independent t-test of Means,  $t(437)= -5.50$ ,  $p= .000$  (equal variances assumed) and  $t(371.6) = -5.38$ ,  $p= .000$  (equal variances not assumed), indicated that there was a significant difference in the achievement of co-educational students ( $M= 76.36$ ,  $SD=8.98$ ) and single-gendered students ( $M=81.72$ ,  $SD= 11.44$ ). Independent T-Test results failed to reject the null hypothesis and show that there is not a significant difference between the achievement of female students in a co-educational setting and the achievement of female students in a single-gendered setting. Female students in co-educational algebra I classes outperformed female students in single-gender algebra I classes.

**Table 8: HYPOTHESIS V DATA ANALYSIS**

*Group Statistics*

Gender Code	N	Mean	Std. Deviation	Std. Error Mean
6.00	240	76.3583	8.98422	.57993
3.00	199	81.7236	11.44283	.81116

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
Test Scores	Equal variances assumed	2.960	.086	5.502	437	.000	5.36528	.97524	7.28202	3.44855
	Equal variances not assumed			5.381	371.690	.000	5.36528	.99715	7.32604	3.40453

**RQ6:** Is there a significant difference between the achievement (in algebra I) of 173 male students in a co-educational setting and the achievement (in algebra I) of 266 male students in a single-gendered instructional setting?

Hypothesis Six states that there will be no significant differences between the achievement (in algebra I) of male students in a co-educational setting and the achievement (in algebra I) of male students in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F=38.48$ ,  $p=.000$ , results indicate that each of the two group variances are different and significantly so. The ANOVA test is robust enough, even if a significant  $p$ -value is found for Levene's Test of Homogeneity of Variance (Pallant, 2010). The results of the independent  $t$ -test of means,  $t(437)=3.465$ ,  $p=.000$  (equal variances assumed) and  $t(250.378)=3.126$ ,  $p=.002$  (equal variances not assumed), indicated that there was a significant difference in the mean achievement of co-educational students ( $M=78.49$ ,  $SD=16.24$ ) and single-gendered students ( $M=74.50$ ,  $SD=9.57$ ). The independent  $t$ -test results reject the null hypothesis and show that there is significant difference between the achievement of male students in a co-educational setting and the achievement of male students in single-gender classes. Male students in co-educational setting outperformed male students in single-gender settings.

**Table 9: HYPOTHESIS VI DATA ANALYSIS**

*Group Statistics*

	Gender Code	N	Mean	Std. Deviation	Std. Error Mean
Test Scores	4.00	173	78.4913	16.22180	1.23332
	5.00	266	74.5019	9.57156	.58687

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Test Scores	Equal variances assumed	38.484	.000	3.465	437	.001	4.26952	1.23209	1.84797	6.69108
	Equal variances not assumed			3.126	250.378	.002	4.26952	1.36583	1.57954	6.95951

RQ7: Is there a significant difference between the achievement (in English I) of 150 females in a co-educational setting and the achievement (in English I) of 225 males in a single-gendered instructional setting?

Hypothesis Seven states that there will be no significant differences between the achievement (in English I) of females in a co-educational setting and the achievement (in English I) of males in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F=141$ ,  $p= .708$ , results indicate that each of the two group variances were different, but not significantly so. An independent t-test of means,  $t(373)=3.14$ ,  $p= .002$  (equal variances assumed) and  $t(310.65)=3.12$ ,  $p= .002$  (equal variances not assumed), indicated that there was a significant difference in achievement of co-educational female students ( $M= 682.9$ ,  $SD= 33.87$ ) and single-gender male students ( $M= 693.14$ ,  $SD= 32.56$ ). The independent t-test results rejected the null hypothesis and shows that there is a significant difference between the achievement of females in a co-educational setting and the achievement of males in a single-gendered setting. Males in single-gendered English I classes outperformed females in co-educational English I classes.

**Table 10: HYPOTHESIS VII DATA ANALYSIS**

*Group Statistics*

Gender Code		N	Mean	Std. Deviation	Std. Error Mean
Test Scores	3.00	150	682.1867	33.87331	2.76574
	5.00	225	693.1422	32.55568	2.17038

*Independent Samples Test*

Levene's Test t-test for Equality of Means for Equality of Variances										
		F	Sig.	T	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper	
Test Scores	Equal variances assumed	.141	.708	-3.141	373	.002	-10.95556	3.48782	-17.81380	-4.09731
	Equal variances not assumed			-3.116	310.653	.002	-10.95556	3.51566	-17.87308	-4.03803

**RQ8:** Is there a significant difference between the achievement (in algebra I) of 199 females in a co-educational setting and the achievement (in algebra I) of 266 males in a single- gendered instructional setting?

Hypothesis eight states that there will be no significant differences between the achievement (in algebra I) of females in a co-educational setting and the achievement (in algebra I) of males in a single-gendered instructional setting. Levene's Test for Equality of Variances,  $F= 4.51$ ,  $p=.034$ , results indicate that each of the two group variances are significantly different from each other. The results of the independent t-test of Means,  $t(463)=7.687$ ,  $p=.000$  (equal variances assumed)  $t(381.445)=7.493$ ,  $p=.000$  (equal variances not assumed) indicated that there was a significant difference in the achievement of co-educational female students ( $M= 81.72$ ,  $SD=11.44$ ) and single-gendered male students ( $M=74.22$ ,  $SD=9.57$ ). Independent T-Test results rejected the null hypothesis and indicated that there is a significant difference between the achievement of females in the co-educational setting and achievement of males in the single-gendered setting. Females in the co-educational setting outperformed males in a single-gendered setting.

**Table 11: HYPOTHESIS VIII DATA ANALYSIS**

*Group Statistics*

Gender Code	N	Mean	Std. Deviation	Std. Error Mean
3.00	199	81.7236	11.44283	.81116
5.00	266	74.2218	9.57156	.58687

*Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Test Scores	Equal variances assumed	4.518	.034	7.687	463	.002	7.50181	.97597	5.58393	9.41969
	Equal variances not assumed			7.493	381.445	.000	7.50181	1.00120	5.53325	49.47037

## CHAPTER V: RESEARCH SYNOPSIS

The purpose of this study was to explore differences in the achievement of male and female students who have been separated by gender in their respective algebra I and English I classes. The study attempted to determine if a significant difference in achievement exists between ninth graders who had been taught in a co-educational setting and ninth graders who had been taught in a single-gendered instructional setting in algebra I and English I.

Failing state-mandated test scores across America has become an epidemic and research has shown that gender specific classes have the possibility of increasing student achievement (Younger & Warrington, 2006). Research has indicated that single-gendered classes have promoted increased achievement, improved behavior, and increased self-efficacy (Younger & Warrington, 2006). This study investigated the effect of single-gendered instruction on the achievement of male and female students in an urban, predominantly African-American high school. Study results sought to add to the field of research by determining if a significant increase in achievement exists after the implementation of a single-gendered instructional format in English I and algebra I classes.

The No Child Left Behind Act (NCLB) of 2001 was a transformative, legislative decision by the federal government to close the educational achievement gap of students from various ethnicities, socio-economic levels, and ability levels. The objective was for all students to receive a high-quality education that contained challenging and rigorous academic components (NCLB,

2001). Traditional, co-educational formats are currently the norm in most public schools. Since the inception of NCLB, the No Child Left Behind Act, many initiatives have been implemented to increase academic achievement. One such trend is the re-establishment of single-gendered schools and classes. The amended regulations to the Department of Education's Title IX legislation granted schools the ability to create single-gendered classes within a co-educational school (Arms, 2007). Originally, Title IX stated that no person in the United States shall be excluded from participation in any educational program that receives federal financial funds based on their gender (Title IX, 1998). The amended regulations required funds made available to local educational agencies under section 5112 shall be used for innovative assistance programs, including programs to provide same-gender schools and classrooms (Title IX, 1998).

Table 12: Summary of findings for each hypothesis

Subject	Condition	Result
English I	All students in co-educational setting vs. All students in single-gender setting (HYP 1)	Single- gender males and females outperform co-educational male and female students.
Algebra I	All students in co-educational setting vs. All students in single-gender setting	Co-educational males and females outperformed males and females in the single-gender algebra I
English I	Co-educational females vs. single-gender females (HYP 3)	Single-gender females outperformed co-educational females in English I
English I	Co-educational males vs. single-gendered males (HYP 4)	Single-gender males outperformed co-educational males in English I
Algebra I	Co-educational females vs. single-gendered females (HYP 5)	Co-educational females outperformed single-gendered females in algebra I
Algebra I	Co-educational males vs. single-gendered males (HYP 6)	Co-educational males outperformed single-gendered males in algebra I
English I	Co-educational females vs. Single-gendered males (HYP 7)	Single- gender males outperformed Co-educational females
Algebra I	Co-educational females vs. Single-gendered males (HYP 8)	Co-educational females in Algebra I outperformed males in single-gendered algebra I classes.

## Implications

Study results indicated that male and female students who were taught English I in a single-gender format scored significantly higher than male and female students who were taught in traditional co-educational classes. This is consistent with results from a study conducted in England by Malacova (2007) that investigated students in single-gendered schools who performed at higher proficiency levels than students educated in a co-educational setting. Additionally, study results indicate that males in single-gender English I classes outscored female students in co-educational English I classes. This research is beneficial to educators who struggle to encourage young men to appreciate and understand literature and grammatical usage.

Historically, girls have not performed as well as boys in math classes because of the interactions that they have with male students (Lewin, 1999). In this study, single-gender female students outperformed co-educational males in Algebra I classes. Although these results are positive for female students, males have been consistently falling behind female students academically. Research has shown that the achievement gap between girls and boys (in favor of the girls) has been growing (Ghatt, 2012). This research should be useful to educational leaders whose passion is for at-risk urban young men who are falling behind academically.

In a study by Van de Gaer, Pustjens, DeMunter, & Van damme (2004), girls who were taught math in single-gendered classes outperformed girls in co-educational classes. This contradicts this research by indicating that female students in co-educational algebra I classes outperformed female students in single-gendered classes. Results in this study suggest that female students may not significantly benefit from single-gendered algebra I classes. More research is needed in this area to investigate factors that prevented female students in Algebra I classes from scoring at the

same or higher proficiency levels than female students in co-educational classes.

Results within this study suggest that male and female students may benefit from single-gender English I classes. Study results suggest that male and female students may not benefit from single-gender algebra I classes. Study results are consistent with a study from Australia that indicated that no significant differences in mathematics achievement were attributed to genders, but scores in English improved for both genders (Mulholland, Hansen, & Kaminsk, 2004).

#### Recommendations for Future Research

This study was a quantitative study that used standardized testing data to discover significant differences in student achievement in ninth grade students who were separated by gender. Qualitative research will be needed in the future to determine why male and female students showed a significant difference in achievement in single-gender English I classes and not in algebra I classes. Qualitative data can provide insight to numerical data and often discovers pertinent information from participants that cannot be discovered with quantitative data. For example, small discussion groups of the participating teachers could give the observer information about their single-gender training, common assessment planning, etc. It is important to know if the teachers planned collaboratively and made a valid effort to teach in a similar fashion.

The interactions of the teachers and students, and teacher/student perceptions were not taken in consideration in this study. Future research is needed to discover how teachers who led single-gender classrooms perceived the experience. It will be important to know if the teachers had any pre-existing feelings or ideas about single-gender education. Teachers who are open to new and

innovative teaching methods may be also open to actively participating in single-gender instruction. This may lead to increased efficacy to teach single-gender classrooms without feeling burdened by yet another program that will come and go. Also, many elementary and middle school students are still in the stage where they are not overly upset about not learning in the same space their opposite sex. In high school, students often want to be in class with the opposite sex and shun single-sex education without giving it a chance. Qualitative research concerning teacher and student perceptions will add to the existing body of research and provide more insight into single-gender vs. co-educational achievement.

Critics often mention that single-gender education is not largely supported due to the myriad of factors that effect a child's education beyond gender. Future research should include an investigation of the effect of factors that affects student achievement. For example, intrinsic motivation is defined as the internal drive a person has that makes them achieve. People who are intrinsically motivated achieve success without being overly concerned about the outcome. Extrinsic motivation is when a person engages in a behavior to avoid punishment or to earn external rewards. A myriad of existing research does not contain information that details how intrinsic and extrinsic motivation is related to single-gender education. Many researchers do not know if the sampled students are intrinsically or extrinsically motivated. In reality, these factors may hinder or propel the academic success for female and male students in a single-gendered setting. A qualitative study can be designed to measure how motivated a person is before beginning a course that is separated by gender.

STEM is becoming an initiative in many states, including Tennessee. STEM is an acronym that describes science, technology, engineering, and math. Research indicates that single- gender

education is viewed as a way to enable female students excel in math and science, which will allow them to fulfill careers in a field where females are underrepresented. Although STEM is not a single-gender initiative, one of the goals of STEM is to ensure that female students are equal participants in projects that include stereotypical male equipment and actions. For example, reputable companies across the world have STEM positions that are related to engineering and robotics. Early research in single-gender education indicated that girls felt ignored in school and less likely to be interested in subjects such as math and science (Sadker, 1994). Future research could include a qualitative study on single-gender education compared to female students in a co-educational STEM school. Research could follow students who matriculated through the STEM program during high school to discover which gender is more likely to fill STEM related positions.

Research that compares single-gender charter schools with students that have similar demographics with students in urban high schools could possibly yield intriguing results. An all boys' school in Chicago, Urban Prep, has a reputation of ensuring that graduating seniors are college-ready and college-bound. In 2013, Urban Prep graduated its 4th year of seniors and all (n=167) of those students graduated from high school and were college bound. Similarly, the Young Women's Leadership School in East Harlem celebrated its 19<sup>th</sup> anniversary this year. The school was a source of controversy when it first opened. A clear indication of the low socio-economic conditions of the students was that approximately 85% of the population qualified for free lunch. In spite of this, the school's graduation rate was 100 % in 2007. Future research could include a mixed- methods longitudinal study that follows urban students who began their 9<sup>th</sup> grade in a single- gender high school and urban students who began their 9<sup>th</sup> grade year in single-

gender classes within a co-educational school.

Future research is needed to discover whether a correlation exists between a reduction of behavior incidents and the implementation of single-gender education. Existing research purports that middle school boys and girls find it difficult to concentrate on their studies while they are in the same classes because of their innate differences. Boys are often rambunctious in class, which requires the teacher to focus on them more than the girls. This leads girls to feel ignored or overlooked in the classroom (Separated by sex, 1994). Students who suffer with behavioral disabilities such as attention deficit disorder or oppositional defiance disorder are often sent out of the classroom more than regular education students. Students who are in In-School Suspension do not receive direct instruction from their teachers. Furthermore, students who receive out of school suspensions are not guaranteed to receive makeup work from their teachers. This type of data would be beneficial in studies that seek other factors that may affect single-gender data. The school's discipline database could also be analyzed to discover students with a high frequency of behavior problems. Small groups and observations would also be useful data to code student reasons for student disciplinary infractions.

The researcher was unable to conduct a comparison of semester averages between the comparison groups because, Powerschool, the system that holds grades, was not available after the merger of Shelby county Schools and Memphis City Schools. Comparison averages could be found within a multi-year study that can provide important information on whether single-gender education affects student achievement. Many past research articles that focus on students who are participants in single-gender education for a long period of time do not factor in teacher stability. Looping is an instructional method that refers to teachers who move from grade level to

grade level with the same set of students, would ensure that the same instructor teach the same set students for many years. Research could begin in a freshman English I class and those students could be followed until they reach their senior year. The goal of high school is to prepare students for post-secondary training or college. A longitudinal study could also track students who were taught in a single-gender school in high school and how they cope with being students in co-educational universities.

Although single-gender education was the norm in the early 1900's, males and females were taught with extremely different intentions. Girls were molded to be mothers and wives while men were molded to be caretakers. Currently, students are able to attend single-gender public schools, single-gender private schools, and are able to take single-gender courses within various high school programs. Single-gender classes were re-introduced as an instructional format in public schools in the late 80's to early 90's to combat gender bias and to support gender differences. Single-gender charter schools are also becoming wide spread and many have seen significant increases in graduation rates and achievement. Single-gender private schools are popular models of academia, especially for wealthy families. Future data could include both quantitative and qualitative data concerning student achievement, teacher training, and student experiences in each of the three single-gender education formats. This data will add to current bodies of research by investigating three different types of single-gender instructional models.

Leonard Sax, one of the leaders of the single-gender education movement, has written several articles and books about the innate differences that affect how boys and girls learn. More information is needed to discover if those differences can cause significant variations in the achievement in girls and boys. For example, some studies suggest that boys thrive in cold

temperatures in the classroom while girls pay attention in warm temperatures. Kunjufu (2011) discusses how it is not enough to know that boys and girls are different and not allow for those differences. Teachers could go to professional development sessions to be trained on the biological differences that may affect the achievement of male and female students. Future research is needed to test the theories surrounding biological differences between genders and how it affects their academics. Many single-gender leaders have written that separating students by gender without properly training teachers is useless. If teachers are not properly trained, the implementation of single-gender education may not lead to positive results. Research can also discover if teachers are actually teaching male and female students differently based on research and if not, how to make the necessary changes.

Future research needed to discover if the teachers who are participants in single-gender research studies have similar educational attainment. Many past research studies do not discuss whether teachers have earned advanced degrees or not. It is also important to know the years of experience of the teachers in the research study. The researcher could observe classes to discover and code teaching methods and create a table that tracks the teachers by educational attainment. This will allow educational leaders to determine which types of teachers are best fit for single-gender education according to data.

In a future qualitative research study, it will also be important for researchers to observe and code the teaching strategies of the single-gender teachers. Teachers with poor classroom management and dated teaching strategies often spend an excessive amount of time disciplining students. Non-traditional methods of instruction such as small group instruction, project-based learning, and discovery learning are recommended as best practices. Teachers often stray from

non-traditional methods of teaching when it is difficult to control the classroom. Poor classroom management often equates to low achievement, which can skew the data of a single-gender study. This may be a factor that may impact achievement results.

### Conclusion

The purpose of this ex post facto quantitative study was to investigate if a significant difference was discovered after a single-gender educational format was established in algebra I and English I classes within a co-educational school. Study results indicate that single-gender education is a promising educational method that may increase educational achievement in schools across the nations that are striving to achieve educational gains in English I. Both male and female students who took English I classes in a single-gender format scored significantly higher than students who took English I the previous year in a co-educational format. Research indicated that male and female students who took algebra I in a single-gender format did not outperform students who took algebra I in a co-educational format significantly. More research is needed to determine if teacher or student interactions, student behavior, or teacher training impacted the data.

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### **Education**

*Tennessee State University (2000)*

Major: English

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*Middle Tennessee State University (2004)*

Major: Special Education with a concentration on visual disabilities

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### **Employment**

*Ridgeway High School (2000- 2007)*

Position: English Teacher

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