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An Exploration Of Gender-Specific Instructional Practices In A Single-Sex High School

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AN EXPLORATION OF GENDER-SPECIFIC INSTRUCTIONAL PRACTICES
IN A SINGLE-SEX HIGH SCHOOL

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary in Virginia

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

By

John F. DeVault

March 23, 2020

AN EXPLORATION OF GENDER-SPECIFIC INSTRUCTIONAL PRACTICES IN A
SINGLE-SEX HIGH SCHOOL

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Dedication

This work is dedicated to all my friends and family who supported me throughout this journey. I want to thank my Mom and Dad for the encouragement and faith shown from the start, even when things didn't go as planned. To my brother Brian, thank you for listening as I rambled on about research and ideas. To Ford and Davis, thank you for being my source of motivation. I am so proud of you both for who you are, what you do, and how you do it. To Laura, thank you for your love, patience, and understanding. I appreciate the sacrifices you made for me. To my Grammie and Pawpaw and Grandma and Grandpa DeVault, I hope you are looking down and see how you have shaped me to be something I never thought possible. I love all of you and Thank you!

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Abstract

The achievement gap between school-age boys and girls is creating and adding to multiple contemporary cultural issues where underachieving boys have shown statistical links to decreasing workforce outputs, college enrollment and graduation, violence, and increasing prison populations. Current research suggests that single-sex classrooms contribute to larger gains in both mathematics and reading than co-educational classes for both boys and girls. This exploratory program evaluation used a qualitative design to examine the process of implementation in a single-sex academic high school environment. Teachers with experience in single-sex schools were interviewed to identify perceptions and differentiated teaching methods/strategies. Findings did not fully support the program theory. Classroom observations suggest that teachers employ very few gender-specific strategies during classroom instruction, and in cases where they exist, they are not viewed by teachers as gender-specific. Teachers who were found to use gender-specific strategies but primarily relied on their experiences rather than research on the subject. Additionally, the strategies were not consistently applied throughout the classroom observational periods. The findings suggest a relative lack of awareness and implementation of these strategies in this educational setting. Strategies and educational environments that contribute to increased performance for boys, particularly those that engage them in activities related to spatial relationships, literacy skills, hands-on learning in a safe yet structured learning environment, will ensure their readiness for today's workforce leading to more productive contributors to a global society.

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CHAPTER 1

INTRODUCTION

Background

The history of single-sex education begins not in academic settings, but in the homes of ancient cultures, formulated around living conditions, attitudes, and oftentimes, religion (James, 2015). The beginnings of single-sex education (SSE) are linked to ancient cultures where only males were permitted an education; these beginnings have created negative perceptions related to SSE for many in modern society (Salomone, 2003). In the history of the educational system in the United States, single-sex classrooms were common for some subjects until the late 20th century. In 1972, the Office of Civil Rights implemented Title IX, determining that single-sex physical education classes led to an inequitable distribution of opportunities and facilities for girls. While Title IX did not forbid single-sex classes in all subjects, public schools largely avoided the controversy by implementing co-educational courses (Salomone, 2003).

Title IX

Passed by Congress in 1972, the language of Title IX states “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance” (U.S. Department of Education, 1972, Title 20 U.S.C. Section 1681a). Title IX is an addition to the Civil Rights Act of 1964 that prohibits gender discrimination in public education and federally assisted programs. The

purpose was to balance the opportunities for women to attend the school of their choice, develop skills, and use those skills to obtain a job with equal pay for equal work. Implications for Title IX appear in academic, athletic, facilities, and employment opportunities for any institution that receives federal financial assistance. College campuses across the nation have been leaders in directing resources to comply with Title IX and provide women with increased programs (Shelley, 2017). With the implementation of Title IX, specific attention has been on the positive educational advancement of females in academics, athletics, and attention to eradicating sexual harassment (American Association of University Women, 2011). Concerns for the imbalance of female opportunities in education prompted the enactment of Title IX at a time when 59% of all college students were male and 41% female (Ewert, 2012). In 2016, decades after the implementation of Title IX, the statistics have nearly reversed to identify approximately 57% of all college students as female and 43% male (National Center for Education Statistics [NCES], 2018).

The implementation of Title IX has unintentionally resulted in some disproportion in gender-specific programming. The availability of academic, athletic, and educational support programs designed for girls far exceeds those for boys in academic settings (Shelley, 2017). Shelley (2017) reported that “virtually every college or university provides additional services for women, usually in the form of a Women’s Center” (p. 16), identifying great progress for women, but at the same time questioning the amount of similar resources for men. The movement to provide a gender-equitable educational opportunity in education may have swung the pendulum beyond its goal, leaving academic opportunities for males unbalanced (Sax, 2005). An unintended consequence

of Title IX has been the limited focus on resources and academic outcomes for males, specifically how they learn and succeed in the classroom (James, 2015). Unfortunately, males have not had broad increased opportunities, through Title IX, to get the verbal skills needed to better compete in the college admissions process (Gurian, 2017).

In April 2010, the United States Commission on Civil Rights issued a report to the Office of Civil Rights questioning the implementation of Title IX, suggesting that its enactment has exceeded the purpose. The report referenced the “Three Prong Test” used by the Office of Civil Rights (Figure 1), claiming that Title IX has led to discrimination against men and reduced programs for males, rather than increasing opportunities for females.

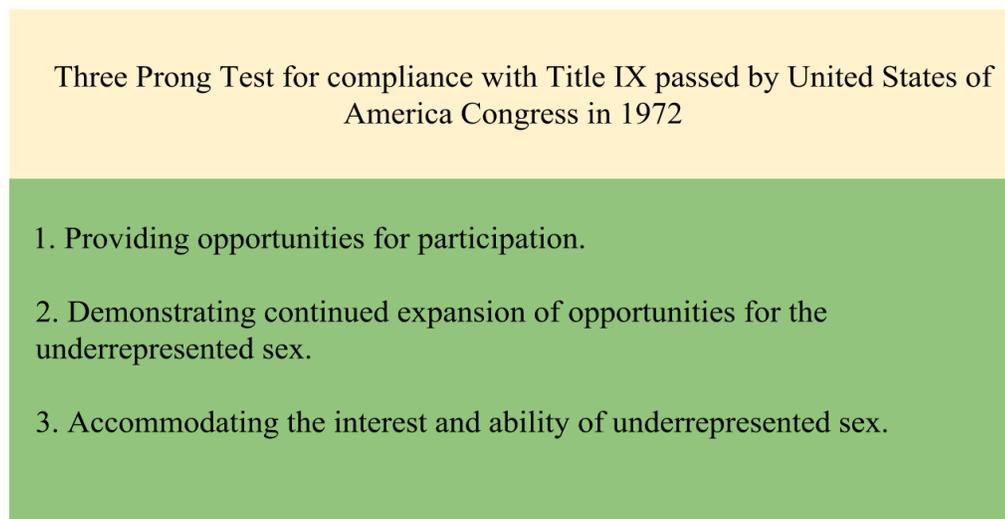


Figure 1. Three Prong Test for compliance with Title IX.

Title IX has shown that when programs are implemented to adjust for gaps between groups, they can be successful (Shelley, 2017). The gap in opportunities between males and females led to the identification of specific gender-achievement gaps, and laws were passed to address this societal problem. The gender-specific programs

used to comply with Title IX to correct differences in academics and educational opportunities has enabled society to become a better place (Ewert, 2012). Many of the applications associated with Title IX specifically identified females and have worked towards reducing identified gender-specific gaps, but many other groups are still in need of research and programs to enable opportunities for all.

The Gender Achievement Gap

Single-sex classrooms and gender-specific instructional strategies have shown to decrease academic achievement gaps for boys and girls across multiple subjects (Gurian, 2017). Marks (2008) reported on findings from the 2000 Programme for International Student Assessment (PISA), in which 172,000 15-year-old students from 32 countries were assessed in reading and mathematics. In 31 of the 32 countries represented, girls outperformed boys in reading by an average of 32 points. Girls underperformed boys in 16 of the 31 countries in the subject of mathematics by an average of 11 points, but in cases where single-sex classrooms have been implemented, such as New Zealand, the gap in math achievement has been reduced or eliminated (Marks, 2008). The PISA report concluded that “observations strongly suggest that the size of gender gaps in reading and mathematics reflect the implementation and success of policies which improve the performance of girls” (Marks, 2008, p. 105). Scheiber, Reynolds, Hajovsky, and Kaufman (2015) measured 1,574 students (793 girls and 781 boys), ages 6 to 21, and found that the achievement gap in reading and writing is minimal before the start of school, but that with writing skills “the female advantage increases with age” (p. 346). Single-sex classrooms and schools have seen a resurgence in response to growing academic achievement gaps between genders (Gurian, 2017). The American Association

of University Women and the National Association for Single-Sex Public Education have bolstered support of single-sex classes, citing that students should have the choice of single-sex classes and that Title IX has gone past its intent of equality between the sexes by directing more resources and programs toward the education of girls, thus potentially contributing to an academic gender gap for boys (Sax, 2005).

For decades, our society has seen a decline in the ways that boys perform and produce in schools and in the workplace (James, 2015). Boys are the recipients of two-thirds of the grades of D and F in school, are twice as likely to be victims of violence, 4 times as likely to commit suicide, and are 14 times more likely to be incarcerated than girls (Gurian, 2017). In 2015, the World Health Organization corroborated research from PISA, showing that boys score lower in most developmental, behavioral, academic, and social markers in all industrialized countries contributing to economic, violence, and health issues across the globe (Gurian, 2017). Although there are differences across academic subjects, boys overall are underachieving in the education systems of most developed countries (Scheiber et al., 2015). This phenomenon has been described as one of the most pressing educational equality challenges of current times (Equality and Human Rights Commission, 2010). The societal effects of underachieving males have links to lower grades in school, decreasing college enrollment, increases in violence, and increased incarceration percentages, where the United States of America has the highest rate of male incarceration per capita of any country in the world (Gurian, 2017).

Critics of Title IX posit that the academic underachievement of boys has developed into a silent crisis with little recognition culturally, politically, or within schools (James, 2015). Researchers suggest this societal trend has the potential to leave

boys feeling flawed when entering an academic environment, reducing traditional masculinity, and creating classroom cultures that favor the ways girls learn (Gurian, 2017). Data from the NCES National Educational Longitudinal Study of 1988, following over 12,000 eighth-grade students through high school and 8 years after high school graduation, were used to identify potential gender gaps in college graduation rates (Ewert, 2012). Ewert confirmed a large gender imbalance on college campuses exists and concluded a potential need for “preferential admissions practices for men” and “possible implications for socio-demographic processes such as marital formation, childbearing, and labor market production.” (Ewert, 2012, p. 841). Ewert attributed a factor to the growing difference in the graduation gap between genders to the “experience of college,” where women have an advantage with the growing number of resources available. Ewert concluded that colleges and universities should create programs that would disproportionately benefit men to improve academic performance, encourage continuous enrollment, and increase social integration, and to reduce the gender gap in college graduation rates (Ewert, 2012).

Gaps in reading and writing. The achievement gap between boys and girls in the subjects of reading and writing is a growing concern in educational post-secondary opportunities for boys. Scheiber et al. (2015) concluded that boys are “at a relatively large disadvantage in one of the most important skills required for success in society” regarding reading and writing skills (p. 346). Analysis of a PISA study found that in 31 of 32 countries, girls outperformed boys by an average of 32 points on reading (Marks, 2008) or the equivalent of 32 more points on the *Evidence-based Reading and Writing* section of the SAT (NCES, 2017).

Increased importance has been placed in the subjects of reading and writing in the college application process, where many elite college and universities require additional testing from the SAT on a separate writing test (SAT Writing and Language), placing boys with reading and writing deficits at a disadvantage for acceptance to the school (Scheiber et al., 2015).

Post-secondary participation. The 20th-century post-secondary trends present a significantly different picture of gender differences in educational opportunity and achievement. In 1972, 59% of enrolled college students were male. In contrast, the majority (57%) of students enrolled in college in 2016 were female (NCES, 2018). For every 100 women who earn a bachelor's degree, only 75 do the same; for every 100 women who earn a master's degree, only 66 men do the same (Gurian, 2017). Women in every higher education degree program (associates, bachelor's, master's, doctorate) show higher percentages, compared to men, in enrolling and degree completion in the United States of America (Gurian, 2017).

Learning differences. Supported by advances in neuroscience research, differences in brain functioning between genders have been noted in several areas: the sequence of neurons firing, connections between the two halves of the brain, and maturation of regions such as the Wernicke and Broca areas found on the left side of the brain (James, 2015). The Wernicke area is thought to be responsible for the understanding of words and the Broca for grammar and the production of words. Research conducted studying 3–6-month-old boys and girls has shown that girls have a better developed left hemisphere of the brain for verbal skills, and boys show higher

response in the right hemisphere used for spatial skills, suggesting a difference in maturity rates (James, 2015; Shucard & Shucard, 1990).

In 2006, the National Institute of Mental Health studied roughly 2000 children and young people, ages 4–22, and found that girls’ brain development for integrating information is “roughly two years ahead of boys” and boys’ brain development with spatial perception and object awareness is “slightly ahead of girls”; however, it was suggested that both gaps could be reduced with gender-specific learning programs (Sax, 2007, p. 17). Similarly, Ingahalikar concluded that “male brains are structured to facilitate connectivity between perception and coordinated action, as opposed to female brains that are designed to facilitate communication between analytical and intuitive processing modes” (Schore, 2017, p. 42). The same research suggested that developmental trajectories of boys and girls separate at a young age, but can be lessened with specific strategies, such as providing boys increased opportunities with language and speech and girls with spatial relations (Schore, 2017).

SSE Programs

SSE is a program design that provides an academic environment in which students are segregated by their sex (male or female). Achievement gaps in academics between girls and boys have been identified, specifically for the subjects of mathematics, reading, and writing (James, 2015). SSE settings and teaching strategies have been purported to have an impact on leveling achievement gaps between boys and girls for multiple subjects and increasing overall performance indicators (Dustman, Ku, & Kwak, 2017). In a meta-analysis conducted by the United States Department of Education comparing grades and behavioral reports of SSE schools to co-education schools, 41% of

the data favored SSE, 45% found no difference, and only 8% favored coeducation (U.S. Department of Education, 2005). Researchers compared data from 1996-2009 College Scholastic Aptitude Tests taken by 12th graders from 140 schools in South Korea and found that boys from SSE schools perform at 5-10% of a standard deviation better than boys at co-ed schools (Dustman et al., 2017). Research suggests that teaching methods are important for students and that a teacher trying to teach a mixed-gender class takes more time to figure out the needs of students than a single-sex class (Dustman et al., 2017). Specific applications that have been shown to encourage academic growth for boys are increased classroom discipline and structure, identifying and correcting gender stereotypes, differentiated instruction, use of spatial relationship tools (hands-on projects), and increased opportunities to engage in reading and writing (Gurian, 2017; James, 2015; Sax, 2007). These suppositions regarding gender-specific strategies are the basis for the program under evaluation. The logic model (Figure 2) illustrating the SSE program theory posits:

1. Creating environments that incorporate spatial relationships in different SSE classrooms will promote student engagement.
2. Identifying and mitigating academic stereotypes of boys in SSE schools through direct and indirect instructional strategies will promote student engagement in learning beyond traditionally male interests and roles, leading to a long-term outcome of improved student achievement.
3. Providing opportunities for hands-on learning and physical activities.
4. Increasing classroom structure by providing concise directions one at a time, shorter segments of instruction, structured exercise breaks, small group

competitions, and teachers using a louder voice to help boys with their less sensitive hearing.

5. Implementing both reading and writing labs will contribute to the product of improved student achievement.
6. Providing support for teachers by having professional development sessions about gender-specific instruction will result in the implementation of gender-specific learning strategies to classrooms and curriculum.

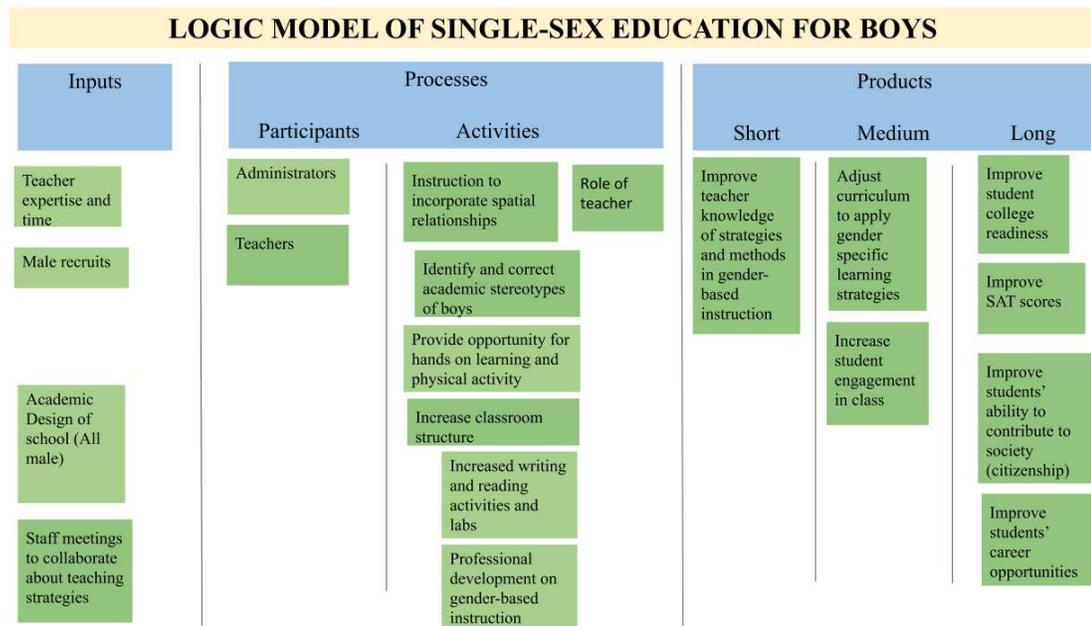


Figure 2. Logic model for the program of single-sex education.

Context. The program evaluated for this study is an SSE design implemented in a private residential secondary school (BMS Academy) serving students in Grades 7 through post-secondary. The academic design of the school focuses on a college preparatory academic curriculum using a single-sex student body, mostly residential environment, military-style structure, and a single-course studies plan. The school was first established as a co-educational school but has been a single-sex school for over 100

years. The single-course studies plan was implemented in 1950 and has been followed since that time. The school is a member of the Association of Military Colleges and Schools of the United States (2017) and has a military structure in which students and most faculty wear military uniforms and are required to have a student (cadet) rank system modeling military hierarchy, but has no affiliation with any branch of the United States of America military system. The school is also identified as a Christian school, where students are mandated to attend chapel three times each week, and a religion course is a graduation requirement. The school is academically accredited and is evaluated by an external accreditation team from the Virginia Association of Independent Schools in 5- and 10-year assessments that include campus visits.

The school is situated in a rural community, maintaining a campus of over 1,000 acres. The student body, enrolled in Grades 7 through post-secondary, consists of young men from across the United States and countries throughout the world. The post-secondary program is designed to give students a year in between high school and college to mature and develop academic habits; many students are aspiring college-level athletes. Anecdotal information collected by the researcher during the admissions interview process suggests that families choose the school because they seek an academic environment with fewer distractions and a more structured school culture, as compared to coeducational options, so their young men can develop the knowledge and skills needed to enter college. Tuition and fees for the school are approximately \$40,000 for one year, including room and board, uniforms, meals, and textbooks. Many families qualify for need-based financial assistance, with the average amount of assistance being close to \$10,000. No data for racial or ethnic background was collected or given by the school.

Enrollment trends (Figure 3) from 2014 to 2018 show a 31% drop in overall student enrollment of the school, but no rationale was given for the decline.

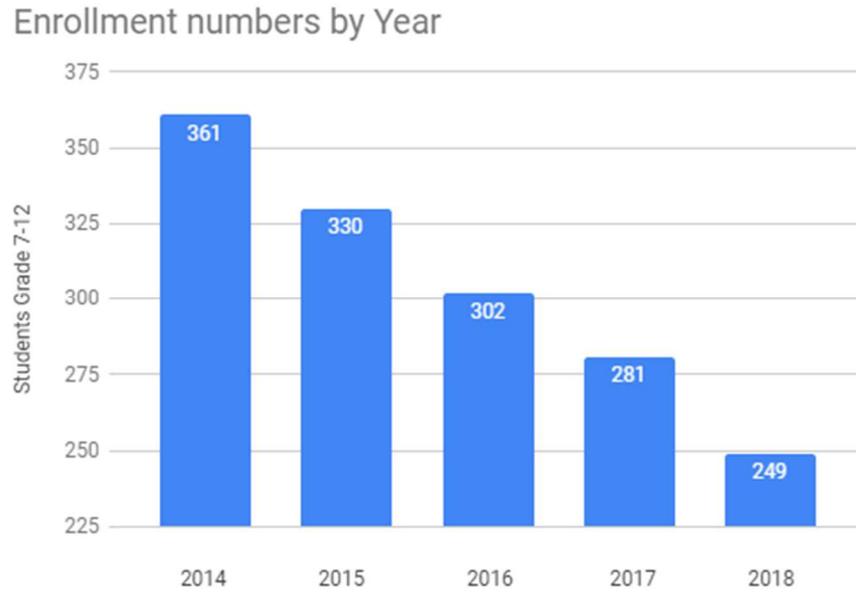


Figure 3. Total enrollment at BMS Academy by year.

Program structure. The academic goal of BMS Academy is to provide all students with a curriculum preparing them to enter and maintain successful college enrollment. The school uses an SSE setting and is all boys. The class structure represents a single-course studies plan where academic classes are taken one at a time, in concentration, for approximately seven weeks. Boarding students—that is, those who live on campus—attend mandatory study hall on Sunday through Thursday for approximately two hours each night. The school year is divided into five terms, and students take one class each term. The school offers 14 honors courses, seven advanced placement courses, and 23 college-level courses for high school students to take. BMS Academy is a private school and as such is not obligated to follow, but does review in the

admissions process, individualized education program (IEP) and 504 plans. The school is populated by mostly (over 90%) boarding students from many different states and countries throughout the world, providing a diverse student body. The clientele of the school is set by guiding college-ready academic principles where the admissions department is tasked with finding young men who are deemed mission-ready to perform at the required academic levels of the school. Mission-ready refers to those students who align with the guiding principles of the school in which high-quality academics and athletics are supplemented by character development, self-discipline, responsibility, leadership development, and Christian values.

Achievement. Analysis of the SAT scores in both critical reading and math for the student class of 2018 identified little growth (22.8 points in critical reading, and 15.3 points in math) from those students who have attended the school between 3-7 years and those from 1-2 years in both subjects (Figure 4).

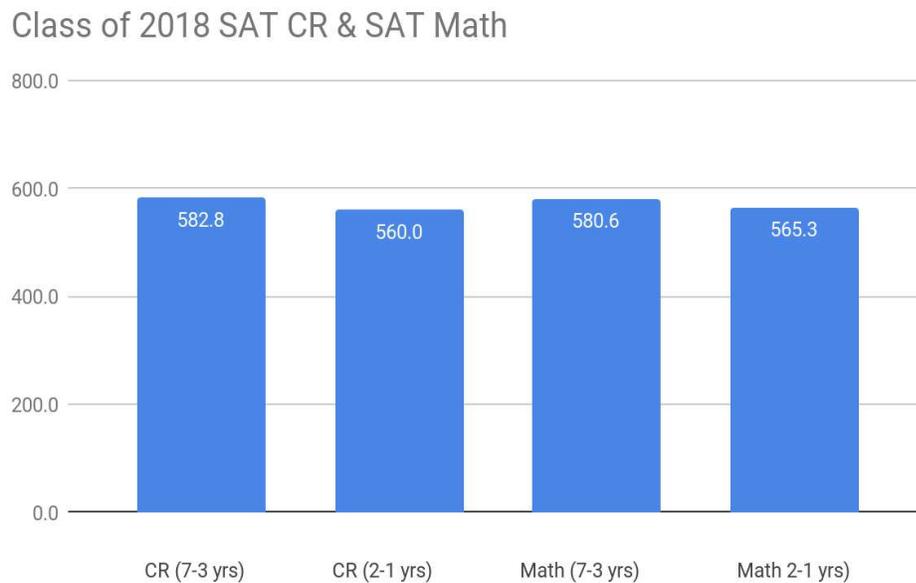


Figure 4. Class of 2018 SAT critical reading and math scores.

According to the CollegeBoard SAT website, the critical reading section has 96 questions, and the math has 58 for the 2018 test, making each question for the critical reading section worth approximately eight points, and, for the math section, 14 points (College Board, 2018). The difference in student SAT scores for graduating students of the 2018 class, attending the school for 7-3 years versus 2-1, is less than three correctly answered questions for the critical reading and less than one for math. SAT scores have become an important part of the college admissions process, where a higher score increases the opportunities for acceptance, which is aligned with the mission of BMS Academy.

Faculty and staff. Teachers at the school, according to the Academic Dean, are required to have at least a bachelor's degree (BA or BS), preferably in the discipline that will be taught. Teachers are not mandated to be licensed to teach, nor are they obligated to attend professional development. At the time of this study, there were 38 teachers at the school, 23 report having advanced degrees. Teacher hiring criteria are also reported to be focused on spiritual alignment with the principles of the school, friendliness during the interview, and passing a background check. Table 1 represents the demographics of the faculty at BMS Academy at the time of this study.

Table 1

Faculty Demographics at BMS Academy

No. of Teachers	Combined Years Teaching	Combined Years Teaching SSE	Highest Degree Obtained
38	498	249	No Degree = 1 Bachelor of Art = 8 Bachelor of Science = 6 Master of Arts = 6 Master of Science = 5 Master of Education = 12

Note. SSE = single-sex education

Overview of the Evaluation Approach

Program evaluations are designed to identify both intended and unintended changes in a given program (Mertens & Wilson, 2012). When viewed through a pragmatic paradigm, the findings from a program evaluation should provide stakeholders and key decision-makers with information regarding the program processes and outcomes that will be useful in the decision-making process (Mertens & Wilson, 2012). This program evaluation will focus on the process of the single-sex academic program being implemented by exploring the experiences of the participants (teachers) and conducting observations of the classroom environment to identify gender-specific instructional practices. Effective program evaluations should focus not only on the process of the program’s implementation, but the inputs, product, and context to provide the best opportunity for program success (Mertens & Wilson, 2012). The process evaluation findings will be used to strengthen both the staff practices and the program (Mertens & Wilson, 2012).

Program evaluation model. The CIPP program evaluation model is used to improve practice, encourage others to evaluate their work, and provide opportunities for

systematic influence in order to better the program (Mertens & Wilson, 2012). Use Branch theorists searching for an expanded role of the evaluator designed this approach to be “geared toward the provision of information that would be useful to decision-makers” (Mertens & Wilson, 2012, p. 92). The CIPP model enables evaluators to better assess a program by expanding the information gathered, determining the role of many parts of a program in its implementation and outcomes. A process evaluation “focuses on the appropriateness and quality of the project’s implementation” (Mertens & Wilson, 2012, p. 106), making it a valuable tool for stakeholders by providing a record of the program’s progress to guide implementation, strengthen the program design, and increase the potential for attaining desired outcomes.

Context evaluation. Context identifies the assets and resources of a defined environment to develop plans that better meet that community’s needs (Mertens & Wilson, 2012). The design of Context evaluation is to provide the evaluator a better overall picture to ensure the program and the evaluation fit (Mertens & Wilson, 2012). For the evaluator to conduct a thorough assessment, data collection for background information, interviews of program leaders, interviews with other stakeholders, and assessment of program goals are suggested. Data collection can occur through several processes and multiple formats, including case studies, review of existing documents, and interviews (Mertens & Wilson, 2012). The process encourages continuous exchanges of information with the client to meet the needs of the stakeholder, reflecting the CIPP design purpose of providing useful information for a given program (Mertens & Wilson, 2012).

Input evaluation. In the input phase, information is collected regarding the project's mission, goals, plan, and resources of the program (Mertens & Wilson, 2012). The purpose of this step is to assess strategies and work plans already in place to better identify the effectiveness and offer alternative strategies found in similar programs. The intent is to increase feasibility where effective strategies increase the likelihood of valuable evaluation (Yarbrough, Shulha, Hopson, & Caruthers, 2011). The inputs for this program evaluation are teacher expertise and time, the school's population of boy students, gender-specific pedagogy, staff meetings, and the academic design of the school. The academic design of the school is that of an all-boy residential secondary school that provides a rigorous, comprehensive academic program of study, using Christian values as a foundation and providing a military structure. The school identified for this evaluation employs a strategy and work plan that reflects the schedule and merit of the program (Mertens & Wilson, 2012).

Process evaluation. A process evaluation studies the program's implementation with a focus on quality (Mertens & Wilson, 2012). The evaluator, in collaboration with the program's staff, develop and make record of the progress, program events, and allocations (Mertens & Wilson, 2012). Information collected should be chosen in a way that addresses pertinent questions and increases the utility of evaluation findings (Yarbrough et al., 2011). In this study, the focus was on the process component of the CIPP model. The evaluator will interview teachers and observe classrooms to assess the implementation of research-supported, gender-specific educational strategies. Activities suggested to implement successful single-sex schools include gender-specific instruction to incorporate spatial relationships (using two- and three-dimensional objects for

learning); identifying and correcting academic stereotypes; providing increased opportunities for hands-on learning; increasing classroom structures, including providing concise directions one at a time, shorter segments of instruction, structured exercise breaks, small group competitions, and teachers using a louder voice to help boys with their less sensitive hearing; writing and reading labs; and providing teachers professional development using research-driven, high-yield practices on gender-specific instruction.

Product evaluation. An evaluation of the product component of the CIPP model assesses the positive and negative outcomes of the program, identifying both intended and unintended outcomes (Mertens & Wilson, 2012). During this final stage of the CIPP model, drafts of impact evaluations are made to determine the extent to which the program met its goals and how the program is used in the community. The evaluator assesses and makes judgments of the effectiveness of the program using the program's intended mission and beneficiaries (Mertens & Wilson, 2012). Evaluations may be technically sound but need to show attention to the stakeholders to increase the opportunity of meeting stakeholders' needs and providing higher value and significance of the product (Yarbrough et al., 2011). The logic model (Figure 2) shows the intended outcomes from the program evaluation of SSE. A short-term goal is to improve teacher knowledge of strategies and methods used in SSE classrooms. The expected outcomes that encompass the medium term are that teacher instruction will reflect knowledge and skillsets and apply gender-specific learning strategies in the classroom, and that student engagement will increase. Long-term outcomes are to improve student SAT scores, improve student college and career readiness, and to better enable students to become producing contributors to a global society.

Purpose of the evaluation. The purpose of this program evaluation is to examine process components of the program's implementation, specifically to identify gender-specific instructional strategies being used in the classrooms (Mertens & Wilson, 2012). This study of one single-sex academic setting was intended to benefit the school's stakeholders, specifically teachers, by observing classroom instruction for the use of selected research-based, gender-specific teaching strategies that promote the short-, medium-, and long-range outcomes of the program model and by analyzing data related to teacher knowledge, understanding, and perceptions of gender-specific instruction and single-sex education. The study assessed whether those five strategies were being implemented in the classroom. The findings are intended to inform program implementers and school leaders to set priorities for professional development.

Focus of the evaluation. The study used the CIPP program evaluation design to investigate the implementation of the program. This process evaluation focused on the delivery of the educational program related to gender-specific instructional design to determine whether the actions of the participants and classroom instructional activities align with research-based practices in gender-specific education as well as the intended academic design of the school. This study followed a pragmatic worldview by taking multiple sources of data, then applying contextual information to develop a solution (Mertens & Wilson, 2012). The use of conceptual, practical, and political knowledge are combined to better understand the academic structure of SSE in this setting. Conceptual knowledge is gathered by conducting research into strategies used in SSE classrooms, practical is identifying what can be used the most efficiently and effectively, and political is adjusting for teachers' beliefs of effective instruction in the setting.

Evaluation questions. This study was designed to inform stakeholders about the process of implementing SSE environments. Questions 1 and 3 were answered by observing the classroom environment. Questions 2, 4, and 5 are related to selected teachers' perceptions of effectiveness of gender-specific instructional practices. The following program evaluation questions guided this study:

1. What are the gender-specific strategies being implemented in the classrooms?
2. What gender-specific strategies do teachers self-identify as being used in the classroom?
3. To what degree do the observations' articulated gender-specific instructional strategies align with extant body of literature on gender-specific strategies?
4. What are teachers' perceptions of gender-specific strategies?
5. How have teachers come to their conclusions about gender-specific strategies?

Definitions of Terms

Academic program design: A process and product whereby a school organizes teaching and learning around identified best practices aligned with their environment or culture (Hattie, 2009; Mertens & Wilson, 2012; Preskill & Jones, 2009)

Gender-specific instruction: The use of teaching strategies that are found to be more successful for a specific gender (Salomone, 2013).

Perceptions (n.d.): A mental image: Awareness of the elements of environment: a capacity for comprehension

Professional development: Specialized training used with the intent to help teachers and school personnel improve professional knowledge, skills, and effectiveness

Single-sex education (SSE): A class or school that is composed of students of only one sex; that is, only male students or only female students (James, 2015).

Spatial relationships: The ability to be aware of your relationship with yourself to the environment and using two-dimensional and three-dimensional objects as learning tools (James, 2015).

CHAPTER 2

REVIEW OF RELATED LITERATURE

“The roots of education are bitter, but the fruit is sweet.” *Aristotle*.

Many in current society associate all-boy single-sex classrooms with privileged, male sexist cultures, and times where educational equality was only a dream (James, 2015). The beginnings of single-sex education (SSE) are linked to ancient cultures where only males were allowed to go to school and have created negative perceptions for many but have also provided useful gender-specific teaching strategies (Salomone, 2013). History tells us the bitter roots of schooling exclusive to males is not good for our culture, but the lessons learned on how to educate boys are sweet. No longer are boys the only benefactors of single-sex schools; girls are also finding the value of gender-specific educational environments and teaching strategies. Boys and girls have been shown to possess similar academic abilities, but research supports specific teaching strategies and environments that are more conducive for adolescent learning for each sex (Sax, 2007). Single-sex schools provide opportunities for gender-specific teaching strategies and an environment that leads to the optimization of academic potential for students compared to co-educational schools (James, 2015). Developing a better understanding of how academically effective single-sex schools are will enable schools and teachers to become more efficient and give boys and girls better opportunities for academic success (Gurian, 2017). The U.S. educational system focuses on standardizing the material taught in schools but establishes accommodations, with great success, for certain identified groups,

such as students with learning differences, low socioeconomic status, and even ethnicity. The same accommodations are suggested for addressing gender differences: when a learning environment (a school or classroom) is developed around the gender of students, their academic performance has shown to increase and gender achievement gaps decrease in countries that implemented programs such as New Zealand, South Korea, and Finland (Marks, 2008).

For decades, data have shown that girls have been outperforming boys in courses that focus on reading and writing skills while boys do better in courses that focus on math skills. Both boys and girls have proven through multiple studies to have equal overall intelligence and ability (Scheiber et al., 2015), but standardized test scores for the subjects of math and reading demonstrate differences. A meta-analysis (Marks, 2008) of 15-year old students using data from PISA for 32 countries showed that all girls scored better than boys in reading and that boys in 30 of the countries scored better than girls in math.

History of SSE

The history of SSE begins not in academic settings, but in the homes of ancient cultures formulated around living conditions, attitudes, and oftentimes, religion (James, 2015). In many ancient cultures, boys were taught how to succeed in work and war while girls were taught how to take care of home and children, making SSE the most efficient way to provide for the culture (Rury, 2008). The beginnings of SSE are linked to ancient cultures where only males were allowed to go to school and have created negative perceptions from many in modern society (Salomone, 2013).

In the history of the U.S. educational system, single-sex classrooms were common throughout the 18th and 19th centuries, but coeducational schools became more popular for both religious and financial reasons (Rury, 2008). Until the early 1970s, single-sex classrooms were used for some subjects. In 1972 the Office of Civil Rights implemented Title IX, determining that single-sex physical education classes led to an inequitable distribution of opportunities and facilities for girls. While Title IX did not forbid single-sex classes in all subjects, public schools avoided the controversy and went to all co-educational subjects (Salomone, 2003).

Political Discord in SSE

Schools have been on the front lines of the battlefield for equality in our nation. In 1954, *Brown v. Board of Education of Topeka* saw racial desegregation of schools and its opponents fighting, sometimes literally, over the equal rights to education. More recent battles have been the rights of the learning and physically challenged as exemplified by *Public Law 94-142*. In many ways, the current educational system has been forged in the furnace of social equality by demanding the best possible environment for students.

Single-sex academic programs and schools have shown a reduction in achievement gaps between boys and girls across multiple subjects (Scheiber et al., 2015). However, the controversy over the single-sex academic environment delves into religious, cultural, and political differences rather than data, creating overall attitudes and underlying justifications that hinder studies (Salomone, 2013). Debates about SSE are often clouded by research that combines issues that are related to academics, but not unique to it. Instead of a focus on academic benefits, there is a deflection to possible

implications of SSE settings that encompass budgetary problems, social norms, and other issues. Salomone (2013) communicate the issues of politics by stating:

The debate over single-sex schooling as vigorously played out in the American press, blogosphere, and scholarly journals is not merely myopic on the domestic front. More specifically, it fails to address how cultural, religious, and political differences color overall attitudes and underlying justifications for separate schooling and consequently affect policies as well as educational outcomes and lifelong opportunities. (p. 1013)

The political differences of opinion often lead to the perception of poor validity of the research and fail to address the findings. While the cultural, economic, and political variables are an important part of the SSE debate, they have been used to justify to disregard for legitimate research and possible educational implementations that could benefit children.

Opposing views on the subject of SSE are heated with extreme views evident on both sides of the debate (Salomone, 2013). Rather than a model of increasing opportunities for both male and female students, there are arguments made that one side will be poorly served by new accommodations designed for the other. Title IX requires equal opportunity in schools, including sports programs, based on the gender makeup of the school, but does not take into account that equal opportunity does not reflect desired participation. In a 2014-15 report from the National Federation of State High School Associations, “4,519,313 boys participated in high school sports versus 3,287,725 girls. Because of Title IX, that ratio is, in effect, governmentally reversed in college” (Shelley,

2017, p. 15). Public high schools have made the decision not to take this option for demonstrating compliance with Title IX for athletics.

Mills and Keddie (2010) found evidence of opposing perspectives in which one group refers to a subset of boys as “poor boys,” and the other calls them “at-risk.” This type of labeling epitomizes the arguments presented by both sides that ignore the research and instead play to political agendas. Because SSE promotes the classroom separation of sexes, historic policy goals promoting “separate but equal” are frequently cited as a rationale to keep the status quo. When given data displaying a gender gap in writing scores between boys and girls, critics of SSE argue that “not all girls are achieving, and not all boys are underachieving” (Francis, 2006, p. 188). The counterargument claims that mixed-sex schools are not optimum for boys because they teach them how to deal with emotions like girls do, and therefore schools are taught with feminist and liberal approaches (Francis, 2006). The pro and con arguments in the SSE debate rely heavily on anecdotal evidence and political agendas but far less on empirical research that shows that, for a variety of reasons, some students benefit academically from a single-sex educational environment. Unfortunately, the actual value of the research of gender-specific learning environments is lost in the political exchange, leaving students unable to benefit from those strategies (Salomone, 2013).

Gender Gap in Academic Settings

Research indicates that before Title IX was implemented in 1972, men earned 59% of bachelor’s degrees; in 2006, men earned only 42% of bachelor’s degrees (Ewert, 2012). Further, fewer men attended college, possibly because they do not think they have the specific reading and writing skills necessary to succeed (Gurian, 2017). Critical

reading and writing have increased value for college acceptance because of standardized testing (both the SAT and ACT). It is not known when the achievement gap between genders was first identified, but a growing body of research identifies an academic performance gap in the subjects of reading and writing between boys and girls, demonstrating as much as a one standard deviation difference in reading scores (Marks, 2008). The National Commission on Writing in America's Schools and Colleges has recognized writing for boys as the "Neglected R," noting that the girl advantage increases with age (Scheiber et al., 2015). Statistics confirming an academic gap begins in research of elementary school students and reflect data gathered about high school-aged boys. However, testing from preschool students to assess reading and writing is shown to be equal, and the achievement gap decreases between boys and girls after secondary school (James, 2015).

Researchers have found that gender gaps do exist in classrooms by subject but can be mitigated and corrected. Marks (2008) reviewed data from 32 countries and found:

The gender gaps in reading in some countries are large, considering that a one hundred score point difference is equivalent to one standard deviation difference.

These differences tend to be larger than the gender differences in reading reported in previous cross-national studies of reading. (p. 91)

In addition to data regarding gender gaps, Marks recorded progress where implementations of gender-specific programs were made for academic performance gender gaps with success. Policies designed to decrease gender disparity for girls reported: "These results probably reflect the success of policies in individual countries promoting the educational outcomes of girls" (Marks, 2008, p. 106). These outcomes

demonstrate that each gender does have the capacity to develop skills for subjects where they are traditionally delinquent (math for girls and writing for boys). The material covered in the accommodation programs was the same intensity and overall material, but the teaching methods were gender-specific.

One example of a program that has reduced, and in some cases, eliminated, an academic achievement gap has been in South Korea, where girl students participated in a single-sex classroom math program (Marks, 2008). To strengthen math skills, participants attended a classroom environment comprised of only girl students, and gender-specific instructional practices were employed. The material and amount of time remained constant compared to schooling offered to coeducation students. At the conclusion of the program, the girl students were able to substantially reduce (in some cases eclipse) the achievement gap between boys and girls in mathematics.

Similarly, data revealed a difference in critical reading skills between boys and girls, where girls outperform boys, and the achievement gap grows during middle and high school age students (Scheiber et al., 2015). The gender achievement gap applies to multiple areas of education, where objective and subjective grading are combined with the teacher and other school personnel. Boys have lower performance indicators than girls throughout their academic careers, including grades, behavioral marks, and standardized test scores (James, 2015). The gap accentuates societal expectations that boys do not write or read well. Boys are perceived as and taught that they are inferior to girls in the subjects of reading and writing beginning at the elementary level; this impression grows throughout the middle and high school years (Klecker, 2005). The

difference in skill level decreases as boys get older, providing a rationale to the thought that boys just need to mature and that they “grow out of it” (Sax, 2007).

If the achievement gap is minimal to non-existent before elementary school and reduces after high school, it stands to reason that the actual problem is not with the students. An external variable is contributing to the academic achievement gap between boys and girls in the subject of reading and writing. Childs and McKay (2001) stated, “Many teachers do appear to be stigmatizing these boys, albeit unwittingly” (p. 313). With the standardization of instruction that most students receive, little space is given for how the brains of different genders work. A study done by the National Institute of Mental Health in 2006 revealed differences in the development of boys' and girls' brains. The same children took a brain scan once a year over consecutive years. Scientists concluded that there were large differences in the sequence and tempo at which each gender's brains developed (Sax, 2007). In time, the brains of each sex balanced, but during maturation, they progressed at different paces in various regions (Sax, 2007). Although these, “differences do not imply an order of rank” (Sax, 2007, p. 17), the data from the study suggested that the pace of girls were approximately two years ahead of boys with integrating information and the pace of boys were ahead of girls with spatial perception and object recognition. Understanding this trend in brain development and applying it to the typical classroom setting, where a crucial skill is to integrate information, gives compelling rationale on why girls are perceived to be more interested in schools by their teachers. Additionally, some common forms of assessment, such as those requiring students to integrate and synthesize information in writing, reflect the

skill areas in which girls' brains develop earlier. This developmental difference between girls and boys contributes to the performance differences (Sax, 2007).

Gender stereotypes. In a series of three studies in Great Britain, researchers showed boys were not achieving as well as girls and investigated the relationship between this achievement gap and gender-specific stereotypes (Hartley & Sutton, 2013). Each of the three studies was designed to build upon the findings of the previous study, with the first investigating the age at which children develop the stereotype that boys do not do as well as girls in school. Researchers presented 238 British schoolchildren with a scenario and asked each child to identify which gender was associated with the story. The researchers found that “as children progress through school, they increasingly endorse the stereotype that girls are academically superior to boys” (Hartley & Sutton, 2013, p. 1721). In the second study, the same researchers set out to determine whether stereotypes could influence children's academic performance. Each participant received a booklet with the same standardized questions. The experimental group was told, “we have found that girls do better than boys. Boys don't do as well” (Hartley & Sutton, 2013, p. 1723). The control group did not receive this disclaimer. In both groups, girls performed “significantly better” than boys, but boys in the experimental group did “significantly worse in the experimental stereotype threat condition ($M = -.13$, $SD = .70$) than in the control group ($M = .14$, $SD = .64$)” (Hartley & Sutton, 2013, p. 1724). The third study was designed to see whether boys' performance could be improved by providing positive messages to counteract the stereotype threat. The results suggest that girls are not hurt by academic stereotypes, but boys are, causing a misrepresentation of their academic potential. The studies demonstrate similar trends in the effectiveness of stereotype threat

where the performance of boys is hindered by perceptions; however, the findings also suggest that interventions can be made to reverse these effects.

Similarly, in an evaluation of teacher-assigned marks (i.e., grades), researchers concluded that “gender differences favored females in all fields” and “the female advantage in school marks has remained stable across the years of data retrieved (from 1914-2011)” (Voyer & Voyer, 2014, p. 1194). These data reflect the overall classroom with social implications for how the teacher perceives boys and girls. Voyer and Voyer (2014) linked the data to why boys feel negative about school and do not perform as well. James (2015) states, “boys report that the teacher is a major factor in how they view the class and their participation in it” (p. 165). Findings from Voyer and Voyer (2014) and James (2015) demonstrate that teachers’ perceptions of students’ play a significant role in student development. If the teacher has a negative perception of a student, then the student is likely to participate less and be less enthusiastic about school, leading to poor performance and causing a downward spiral. It appears this problem negatively affects boy students more than their girl peers.

To demonstrate a pattern of boys continuing education, Ewert (2012) analyzed historical data from the National Center for Education Statistics (NCES) and found men earned 57% of bachelor’s degrees in 1967. By 2006, men earned only 42% of bachelor’s degrees. The statistics reflect not only a decrease in the percentage of men attending college but also a decrease in graduation rates: “Therefore, it is primarily educational experiences during college rather than concurrent life course events related to family formation and work that account for the gender gap in degree completion” (Ewert, 2012, p. 842). Ewert (2012) further concluded, “Gender segregation in college majors does not

contribute to the gender gap in graduation” (p. 842), reinforcing that the variable is the educational experience of college, not the specific degree programs.

Another researcher who assessed college attendance and dropout rates found that, of those men who did go to college, more men than women dropped out, contributing to larger gaps between men and women in college completion (Shelley, 2017). With fewer men entering college and fewer graduating, gender disparity in education widens. Post-secondary education has a direct relationship to the quality of life and salary of an individual (Zimmerman, Woolf, & Haley, 2015). If the opportunity to enter and finish postsecondary education for men is reduced, so are their future paths. The ripple effect of fewer men entering and finishing post-secondary education could have lasting effects on the global economy, where an increasing number of professions require an advanced degree for entry-level positions.

Gender Differences in Learning

The boy's and girl's brains look physically similar, but how they function is very different, opening the debate on brain gender differences (James, 2015). Many cognitive differences (e.g., verbal, spatial, logic, responses to stress) exist between boys and girls, but the construct of those differences is debated between those who assign blame to nature or nurture (James, 2015). Girls typically score better on reading and writing assessments, but boys typically do better with math, reinforcing accepted social stereotypes (Voyer & Voyer, 2014).

At one time, researchers believed children's brains were born androgynous, and that differences between the sexes were socially constructed, but advancements in neuroscience have shown otherwise (James, 2015; Sax, 2005). Neuroscience studies

have supported the idea that the developing boy brain matures more slowly than the girl's brain, making males more vulnerable to stress in their social environment (Schoore, 2017). The rates and order of maturation in the major developmental areas of the brain—language, spatial memory, motor coordination, and social interactions—are found to be very different between boys and girls, suggesting the social and emotional needs of each sex should be specifically nurtured (National Association for Single-Sex Public Education, n.d.). This is particularly important for school-aged children since brain development is influenced by sex hormones, and the brains of both sexes are typically not fully matured until the age of 30 (Sax, 2005).

Contributing to the debate over the gender performance gap in schools are societal factors such as stereotyping and role assignment (Gurian, 2017). Boys in Grades K-12 in the U.S. are found to have 80% of all disciplinary referrals, significant disadvantage on school marks across all subjects, and are 5 times more likely to be expelled or suspended from school (Gurian, 2017; Voyer & Voyer, 2014). A study of 15 elementary schools in Australia found that boys ages 5-7 identified themselves as distractible and indicated it was a “key issue for them in their transition to school” (Childs & McKay, 2001, p. 309). Additionally, teachers were “biased against boys generally in terms of their distractible behavior” (Childs & McKay, 2001, p. 311), and their unfavorable impressions of boys were more stable and long-lasting.

Literacy achievement. According to Scheiber et al. (2015), current research says that boys are more vulnerable to writing failures than girls. Analysis of the National Assessment of Educational Progress reading scores from 2002, 1998, 1994, and 1992, across Grades 4, 8, and 12, found a statistically significant difference between genders;

the advantage for school-age girls increased as grade level increased (Klecker, 2005, p. 7). Possible causes of this range from teachers' perceptions of boys' processing ability to a lack of gender-specific teaching strategies being used in the classroom. The National Commission on Writing in America's Schools and Colleges has recognized writing as the "Neglected R" for boys (Scheiber et al., 2015). In examining this neglect, a significant finding emerged: boys are at a "relatively large disadvantage in one of the most important skills required for success in society" (Scheiber et al., 2015, p. 346). The consequences of this information go far beyond just the grammar school subject of writing. Gurian (2017) posits that since many college entrance exams (SAT and ACT) include writing samples to assess knowledge, this may place some boys at a distinct disadvantage. Scoring poorly on college entrance exams decreases opportunities for college acceptance, leading to decreased opportunities for better-paying jobs and fewer opportunities for boys to become positive contributors to society (Gurian, 2017).

Gender-specific Instruction

Gender-specific instructional practices are those that a teacher uses for a specific gender (Salomone, 2013). Studies have shown that when gender-specific instructional practices are used, teacher effectiveness and student performance improve (Marks, 2008). Neuroscience has shown that the sequencing and tempo of parts of the brain have significant differences between boys and girls (Schore, 2017). These differences in brain neuroactivity can then be linked to strategies that are most effective for each sex (James, 2015).

Spatial relationships. Spatial relation relates to the spatial place at which something exists. This includes things like the placing of furniture in a classroom or the

way in which content material is presented using visual models during a lesson. During development, young children learn to make sense of objects situated in space. They gain knowledge through visual and tactile experiences with objects around them, assigning attributes, identifying patterns, and organizing things in their world (Ben-Chaim, Lappan, Houang, 1988). Boys tend to be more right-brained and have strong targeting and spatial awareness skills compared to their girl peers (National Association for Single-Sex Public Education, n.d.). When comparing brain structures, the part having the strongest boy advantage is with spatial skills (James, 2015).

School-age boys develop “significant spatial-mechanical and visual-graphic centers that girls often do not develop as completely there because they develop more word centers” (Gurian, 2017, p. 190). Boys brains are well-matched to instruction that involves diagrams, pictures, movement, and symbols rather than classrooms driven by lecture and verbal interactions (Gurian, Stevens, Henley, & Trueman, 2011) These findings of the boy brain provide reasoning for why many mechanical engineering jobs are dominated by males (Gurian, 2017). Classrooms that have STEM labs, manipulative learning opportunities, and provide opportunities for boys to use their spatial skills encourage engagement for increased academic effectiveness (James, 2015). Classroom strategies that promote spatial relationship skills can be dynamic or passive. Dynamic strategies that support boys’ development in spatial relationships include opportunities to build and create, for example, using models to represent complex concepts. Teachers might offer students the opportunity to solve puzzles or creating graphs that represent data. More passive strategies provide some benefit, as well. Boys also benefit from instructional practices that include working with patterns and presenting course materials

in ways that concepts can be sorted, grouped and organized (Kohen, Amram, Dagan, & Miranda, 2019)

Structured classrooms. The “best classroom management plan is based on learner engagement” (James, 2015, p. 185). Boys tend to be more physically aggressive and engage in hands-on learning activities rather than adhering to common classroom expectations of sitting still for long periods of time and using quiet voices (Sax, 2005). Classroom management is often attributed to classroom and curriculum design that does not support the way young boys develop (Sax, 2005). Physiologically, boys’ brains operate differently than girls, whose brains have more blood flow and but are less structured to compartmentalize learning. As a result of these differences, boys are less likely to multitask well, demonstrating more attention problems and lesser abilities to make swift transitions (Havers, 1995)

Boys may also be resistant to their teachers because of their belief that it is socially unacceptable to have close relationships with authority figures (Sax, 2005). Gender-specific strategies for boys related to classroom management include providing concise directions one at a time, shorter segments of instruction, structured exercise breaks, small group competitions, and teachers using a louder and easily audible voice to help boys with their less sensitive hearing (Gurian, 2017; James, 2015; Sax, 2005). Teachers using easily audible voices have been noted as specifically effective for boys because of the development of boys’ ears, and hearing sensitivity is lesser than girls (Sax, 2005). Children, boys especially, learn to tune out yelling, so it is important for the teacher, when speaking, to increase the volume, use clear pronunciation, and face the students when talking, (James, 2015). Additionally, activities that promote even low

levels of competition between boys can increase engagement and reduce off-task behavior by providing boys with elevated emotional responses (Gurian, 2017; James, 2015; Sax, 2005). Effective classroom management has been found to have dramatic positive effects on student learning with a teacher's ability to identify and act quickly to solve problems being a crucial part of establishing a positive learning culture (Hattie, 2009).

Increased Literacy Instruction

Reading. Increased engagement in reading activities has shown to be effective in not just developing reading skills but also writing skills (James, 2015). Boys are “usually attracted to nonfiction, biography, science, space topics, and action stories” (James, 2015, p. 199). Teachers should develop a culture of readers by providing opportunities for boys to develop reading skills and making reading materials that boys find interesting more available. Within these literacy-rich classrooms, boys should be provided with choices. Gurian and Stevens (2010) suggest literature choices should include a wide variety of options to include both traditional and non-traditional options, such as comics, graphic novels, and magazines.

Writing. Boys may also be more vulnerable to writing failures than girls, making them less likely to seek out opportunities for help (Scheiber et al., 2015). Boys tend to approach the writing process differently than girls and tend to do better with action rather than emotional themes. Hattie (2009) found that students who struggle with writing should be taught strategies for planning, revising, and editing. Effect sizes are high for strategies such as summarizing reading material, working in small groups to develop plans, creating drafts, and revising. These strategies are strongest when teachers provide

clear, concise, logical steps to those students who are struggling (Hattie, 2009). Boys typically do better when asked to write directions, make predictions of a given situation, and use mind maps to show relationships in a story (James, 2015). To encourage student engagement in both reading and writing, teachers should allow students to choose both the reading literature and the writing topics fifty percent of the time (Gurian & Stevens, 2010).

Correcting academic stereotypes of boys. Studies identified trends in the effectiveness of stereotype threat where the performance of boys is hindered by perceptions of roles, strengths, and interests; however, the findings also suggest that interventions can mitigate these effects (Hartley & Sutton, 2013). The more teachers can do to combat negative stereotypes; the more boys feel comfortable to explore academic subjects that may tend to be more intimidating for them. Teachers can accomplish this task not just through in-class activities, but also by fostering a positive classroom culture that encourages exploration and challenges stereotypes when they arise. Children will often hold each other accountable to stereotypical roles and expectations. Teachers must foster a safe environment by addressing these behaviors when they hear them, offering a counterexample from the real world. Classroom instruction should include real-life examples and models that challenge stereotypes, including topics for student work and visitors who may share experiences (James, 2015; Marx, 2008). In addition to the teacher addressing negative stereotypes verbally, other classroom art and décor can serve as a corrective device such as posters or having designated comfortable reading areas with access to a wide variety of reading choices. Boys “are usually attracted to nonfiction, biography, science, space topics, and action stories” (James, 2015. p. 199).

Teachers can make the most of books and other reading material by choosing content that may be considered non-traditional for boys and by addressing stereotypes directly through in-class discussions (Gurian & Stevens, 2010).

Opportunities for hands-on learning. Hands-on learning is defined here as learning by doing. Research has proven that providing opportunities for students to interact with their environment will have a lasting impact on learning and motivation to learn (Bredderman, 1982; Hmelo-Silver, 2004). In a meta-analysis of research on the advantages of hands-on learning, Bredderman (1982) found that students engaged in activity-based learning performed up to 20% higher than students exposed to text-based traditional approaches. Hands-on learning experiences respond to kinesthetic and tactile learners' desire for movement and increase opportunities for deeper retention of material, fosters creativity, and develop critical thinking skills (Boykin & Noguera, 2011).

Boys are generally found to need increased movement and physical manipulatives in the classroom to promote active learning (James, 2015). While science and math classes are readily adaptable to the use of manipulatives, other content areas can also use map-making or, "even writing is a physical activity and most boys are more than willing to write if that gives them access to a computer" (James, 2015, p. 40). The simple act of getting a student out of their seat to go to the board increases physical activity leading to kinesthetic learning, and when paired with learning tasks will enhance student performance (Gurian, 2017). Project-based learning experiences are becoming more common in classrooms and provide an example of integrating the desired tactile stimulation with student-centered learning. These projects are designed to involve students in the planning, designing, and solving of a complex problem. Students engage

in performance tasks, such as drawing, building, applying math skills, writing, and working with manipulatives (Condliffe, Visher, Bangser, Drohojowska, & Saco, 2015).

Summary

Teachers can be very effective with diverse students as long as the teachers are willing to take the time to understand students' needs (James, 2015). Advances in education methods and strategies have enabled many groups to be better served by educators giving each child the opportunity to achieve his or her best. Students who have identified alternative needs are placed on Individual Education Program (IEP) or 504 plans to provide a learning environment where they are better enabled to be successful. Aspiring teachers are trained to identify the needs of the students to provide an academic environment and optimize resources.

Hattie (2009) found that educators with multiple teaching strategies have demonstrated higher effect sizes for their students. Further, when gender-specific policies in reading and mathematics are applied, they promote positive educational outcomes for the group, reducing and often eliminating gender gaps in academic subjects (Marks, 2008). In response to educational programs, using a combination of research, teaching strategies, and ingenuity, many students are finding success with single-sex classroom settings (Gurian, 2017; Gurian & Stevens, 2010).

Students will benefit from teachers' increased knowledge of academic environments and differentiated teaching practices to support increased critical reading and writing performance (Sax, 2005). Teachers should remember that "there are no differences in what girls and boys can learn. But there are big differences in the best ways to teach them" (Sax, 2005, p. 106). Childs and McKay (2001) suggested practical

solutions to combat academic gender gaps are likely to involve a fundamental change in teaching strategies, where teachers adjust their methods to better serve the needs of the student.

Differences in the ways boys and girls learn are supported by empirical evidence (Sax, 2007). Although brain capacity and intelligence have been found to be no different, the sequence and tempo of development for certain areas are vastly different, with boys showing advancement in spatial perceptions and girls in integrating information. These differences are reflected in the academic performance of boys and girls, and current testing practices are designed for integrating information.

Data show that discrepancies in academic performance for boys exist, especially in reading and writing, but these discrepancies are sometimes clouded by opposing research that has a political agenda with persuasive verbiage and little valid academic substance. Researchers have also found that when gender-accommodative measures are enacted, the academic performance of that gender increases not just for the subject of focus, but for other subjects as well (Marks, 2008). Single-sex classrooms that reflect the unique needs of students may mitigate any gender-related opportunity and achievement gaps by addressing the unique physiological and developmental differences between school-age boys and girls. For boys, this means that classrooms should be abundant in activities that fill the need for a dynamic and active classroom. The literature suggests that classrooms that are rich with opportunities to work with spatial relationships are organized and structured for both content material and classroom set up, provide increased opportunities for both reading and writing, provide a climate that combats and

corrects negative stereotypes, and provide hands-on learning opportunities may be useful in mitigating learning disparities and promote academic success for boys.

CHAPTER 3

METHODS

A program is defined as “the systematic application of resources guided by logic, beliefs, and assumptions identifying human needs and factors related to them” (Yarbrough et al., 2011, p. xxiv). Programs are developed to enable stakeholders with better opportunities to reach specific goals set by the organization in its context. The evaluation of a program is a systematic inquiry to determine its level of contributions to the organization and typically assess a wide variety of information within the program, using specific tools to determine merit or worth (Mertens & Wilson, 2012). Researchers develop methods and practices to provide information that has utility, feasibility, propriety, and accuracy, promoting accountability for the findings of the program evaluation (Yarbrough et al., 2011). The type of research conducted is considered “ex post facto” (Hoy, 2010, p. 17), where the independent variable of school setting has already happened.

Evaluation Questions

The questions for this study were designed to explore the processes component specifically of the single-sex academic component of the school. Evaluation Questions 1 and 3 were designed to examine teacher practices and identify gender-specific teaching approaches used for SSE classrooms, thus assessing implementation of the program’s stated intentions. Evaluation Questions 2, 4, and 5 examine teachers’ perceptions of

single-sex classrooms for student effectiveness. The following program evaluation questions guided this study:

1. What are the gender-specific strategies being implemented in the classrooms?
2. What gender-specific strategies do teachers self-identify as being used in the classroom?
3. To what degree do the observations' articulated gender-specific instructional strategies align with extant body of literature on gender-specific strategies?
4. What are teachers' perceptions of gender-specific strategies?
5. How have teachers come to their conclusions about gender-specific strategies?

Participants

The participants in this study were teachers with at least five years of teaching experience in single-sex schools. Teachers at the study school are required to have a minimum of bachelor's degree (B.A. or B.S.), preferably in the discipline they teach. Teachers are not obligated or mandated to be licensed to teach. Teacher hiring criteria provided by the Academic Dean of the school through personal communication was reported to focus on spiritual alignment with the principles of the school, friendliness during the interview, and passing a background check. All of the teacher participants have taught at the school long enough to have experience teaching boys and have developed an understanding of the academic design of the school, made the choice to work at a college preparatory, private, military school, demonstrating consistency, making them a purposive group for the evaluation (Mertens & Wilson, 2012). Data regarding the teachers' years of teaching (Single-sex and at Co-ed), grade level, and academic background are represented in Table 2.

Table 2

Profiles of Participants

Participant	Years Teaching	Years Teaching SSE	Education
1	14	12	B.A. (Communication Studies)
2	45	45	B.A. (History), M.A. (Political History)
3	21	18	B.A. (English), M.Ed. (Secondary Education)
4	8	5	B.S. (Interdisciplinary Studies)
5	14	9	B.A. (Middle Childhood Ed.), M.S. (Coaching Education)
6	19	13	B.A. (German, Spanish), M.Ed. (Secondary Education)
7	23	9	B.A. (English), M.A. (Religion), M.S. (Health/PE)
8	14	14	B.S. (Math), M.S. (Math)

Note. SSE = Single-sex education; B.A.= Bachelor of Art; B.S.= Bachelor of Science; M.A.= Master of Arts; M.S.= Master of Science; M.Ed.= Master of Education

Data Sources

This study followed a humanistic approach to research design with the intent to use qualitative data to enhance meaning through inquiry (Creswell, 2014). Multiple forms of data were used to answer the evaluation questions; data was collected through participant interviews and classroom observations within the school setting. Given that data will focus on perceptions of individuals, data collection relied heavily on rich interactions with the participants in the study.

Teacher interviews. Individual semi-structured pre-observation interviews were conducted with teacher participants to record perceptions, differentiated teaching methods, and strategies used in single-sex classrooms. The following interview questions were asked:

1. What motivated you to teach at a single-sex school?
2. How do you define the academic design of the school?
3. What is your perception of how well single-sex classrooms provide support in an academic environment?
4. What benefits do you see in single-sex classrooms?
5. What are your perceptions of the differences in teaching practices between co-ed and single-sex classrooms?
6. How have you modified your instructional strategies to meet the needs of boy students?
7. What gender-specific teaching strategies have you used that you perceive to be successful in the classroom?
8. Have you been presented with instructional strategies specifically about gender-specific teaching?
 - a. What instructional strategies have you been presented with, and from what sources?
 - b. How have you used these strategies in your teaching practice?
 - c. How effective do you perceive them to be?
9. Have you gathered information on gender-specific instructional strategies on your own?

- a. What instructional strategies did you gather, and from what sources?
- b. How have you used these strategies in your teaching practice?
- c. How effective do you perceive them to be?

10. What challenges have you seen in single-sex classrooms?

11. What unintended outcomes have you experienced, resulting from single-sex classrooms?

12. Thank you for this valuable information. Is there anything else you would like to share?

Classroom observations. Classroom observations were conducted in participants' classrooms during two scheduled instructional periods. Observation data included observed instructional practices in order to assess implementation of the program's stated intentions and compare findings against gender-specific strategies found in the literature, with analysis to uncover themes of agreement or difference. Additionally, observation data included gender-specific instructional strategies that were self-reported by teachers during the pre-observation interview.

Data Collection

Interviews. The individual semi-structured interviews provided qualitative understanding of teachers' self-reporting of the use of gender-specific instructional strategies for boys as well as teachers' perceptions of the effectiveness of the academic environment and research-supported single-sex teaching methods used at the school. Interviews were pre-arranged and conducted in the teachers' classroom prior to a classroom observation to share the purpose and scope of the study. The interviews will provide a forum in which teachers may share their perceptions of gender-specific

instructional strategies used in the classroom and identify gender-specific strategies being used in practice. The interviews were conducted over four contacts (the first by email, the second to obtain consent to the study, the third to interview, and the fourth to review accuracy of recorded responses), as suggested by Corbin and Morse (2003). This approach provided teachers opportunities to build understanding of the program evaluation intent, provided informed consent, and built trust with the interviewer (Preskill & Jones, 2009).

Interview questions were externally reviewed by a group of five teachers and administrators experienced in SSE practices to ensure the questions adequately addressed the evaluation questions as intended. Table 3 represents a Table of Specifications showing the alignment of the interview questions with the research questions.

Table 3

Table of Specifications: Alignment of Interview Questions with Research Questions

Research Question	Interview Questions
1. What are the gender-specific strategies being implemented in the classrooms?	5, 6, 8b, 8c,
2. What gender-specific strategies do teachers self-identify as being used in the classroom?	5, 6, 8b, 8c, 9b, 9c
4. What are teachers' perceptions of gender-specific strategies?	2, 3, 4, 6, 7, 8c, 10, 11, 12
5. How have teachers come to their conclusions about gender-specific strategies?	1, 2, 3, 7, 10, 11, 12

Note. Research Question 3 is answered only through classroom observation and left out of Table 3.

First contact took place by emailing each selected teacher outlining the purpose of the study, asking for them to volunteer to participate in the study, and provided the participants with the Focus Interview Protocol and Participant Informed Consent Form (Appendix A and C). Next, the evaluator met to review the scope of the evaluation and

obtained written consent on the Participant Informed Consent Form (Appendix C). The interviews were conducted by establishing a specific time and place to meet one on one with the participant (preferably in the teacher's classroom). All interviews were audio-recorded. Finally, a follow-up meeting was scheduled after each interview to conduct member-checking and assure accuracy of responses. In this process, the evaluator reviewed the interview responses for clarity and communicated appreciation to the participant for his or her contribution (Mertens & Wilson, 2012).

Classroom observations. To better understand the practice of gender-specific instruction in this context, it was necessary for the evaluator to immerse into the classroom setting. Observations were conducted over the course of two instructional periods in each participant's classroom during a designated time in which gender-specific instruction will be taking place. Each observation lasted 40 minutes and were intended to provide a comprehensive view of classroom instructional strategies and the presence or absence of gender-specific instruction. The classroom observation form (Appendix B) was used to record the presence of the five identified gender-specific strategies defined in the literature as well as emergent and/or self-reported strategies identified during the pre-observation interviews. Along with the interview responses (Appendix A), I participated in notetaking/memoing during all observations to improve the qualitative reliability of the research (Creswell, 2014). Descriptive and reflective notes were kept apart from the instructional notes to separate observable traits from personal impressions (Creswell, 2014).

Data Analysis

Qualitative data was generated through teacher interviews. The questions focus on teachers' perceptions of effectiveness of single-sex academic environments along with teaching strategies used specifically in single-sex classrooms. Questions 4 and 5 are intended to evaluate teachers' perceptions of how single-sex classrooms influence their choice of teaching strategies classroom practices. Open coding, selective coding, and axial coding are three techniques used to identify common themes and patterns found throughout interview data (Corbin & Morse, 2003). I sought to derive general patterns or processes used by the sample group by analyzing two data sources (teacher interviews and classroom observations) independently and then bringing them together (Creswell, 2014). I reflected on the meaning of the data to decipher or decode its core meaning, then determined the appropriate code and labeled it, a process known as encoding (Saldaña, 2016). Protocol coding "a priori coding" was used to compare data to other researcher's assumptions, projections, and biases (Saldaña, 2016).

Classroom observations were conducted to record the degree of alignment between stated practices in interviews and classroom implementation of gender-specific strategies and methods. Qualitative interpretation consisted of recording and transcribing interview data to increase reliability, identifying themes, and organizing themes into larger units (Creswell, 2014). Analysis of the data was conducted in three stages: reading the transcript, reflection, and interpretation of data to construct meaning (e.g., Miller & Crabtree, 1999). The process was repeated for data gathered during classroom observations. Activities shown in the Logic Model of SSE for boys (Figure 2 in Chapter 1) was used as a guide to determine the degree of alignment between high-yield strategies

from the literature and observed teacher practices of gender-specific strategies in the classroom. The summary of findings includes personal experiences, classroom observations, beliefs, and perceptions related to single-sex schools from the focus group. Data from interviews and observations was coded to identify patterns, create common themes, establish relationships in the data, and make literature-based interpretations about how the themes relate to each other (Creswell, 2014). The use of multiple data sources for comparison enhanced the credibility of the qualitative data (Mertens & Wilson, 2012). Table 4 provides a summary of the evaluation questions, data collection, and method of data analysis.

Table 4

Data Collection and Analysis Methods for Evaluation Questions

Evaluation Question	Data Collection	Data Analysis
1. What are the gender-specific strategies being implemented in the classroom?	Classroom observations and teacher interviews	Qualitative analysis and interpretation of observations from the classroom through open, selective, a priori, and axial coding.
2. What gender-specific strategies do teachers self-identify as being used in the classroom?	Teacher interviews	Qualitative analysis and interpretation of teachers' responses from interview compared to classroom observations through open, selective, a priori, and axial coding.
3. To what degree do the observations and articulated gender-specific instructional strategies align to the academic design of the school and the extant body of literature on gender-specific strategies?	Classroom observations	Qualitative analysis and interpretation of classroom observations looking for themes of agreement or difference.
4. What are the teachers' perceptions of gender-specific strategies?	Teacher interviews	Qualitative analysis and interpretation of teachers' responses from interview through coding.
5. How have teachers come to their conclusions about gender-specific strategies?	Teacher interviews	Qualitative analysis and interpretation of teachers' responses from interview through coding.

Delimitations, Limitations, and Assumptions

Delimitations. The delimitations that influence this study include the choice of identifying single-sex educational strategies being implemented in the school and identifying five gender-specific teaching strategies to identify being used in the classroom. Another delimitation is the purposive selection of participants that have at least five years of SSE classroom experience. This study did not seek to evaluate nor judge the quality of the implementation of the high yield strategies, but rather this was an exploratory investigation to determine what gender-specific strategies are being implemented during instruction. The results of this study could be used to provide educators who teach boys, specifically at an all-boy student school, more effective and efficient teaching practices.

Limitations. The validity of information given by interview participants of the school at which they are employed could create bias based on limiting factors of the employment hiring process. The use of only qualitative data sources is inherently limiting because the “qualitative data collection will be smaller than that for the quantitative data collection” and is more limiting when used exclusively (Creswell, 2014, p. 222). Teachers with less exposure to the academic program may have less informed perspectives to identify whether the outcomes are being achieved. The voluntary nature of the study could create a confirmation bias in responses where teachers focus on preconceived notions of the program. The role of the researcher as participant is limiting and creates potential for bias in the collection, analysis, and reporting of the study findings. A response to this limitation is detailed below under Ethical Considerations.

Assumptions. I assumed the academic climate of the school is similar to what is stated on the mission statement and information provided by the school's administrators. It is assumed that the responses of the participants are presented both truthfully and accurately. Finally, there is an underlying assumption that private tuition-based educational organizations that offer specialized programs associated with quality outcomes are important to stakeholders and that evaluation findings will be of use to decision-makers.

Ethical Considerations

The Joint Committee on Standards for Educational Evaluation gives program evaluations conceptual and practical foundations to improve quality. The study adhered to the Program Evaluation Standards during the design stage and throughout the evaluation to minimize evaluator bias, establish evaluator credibility, ensure the worth of evaluation outcomes, and clearly review the scope and purpose of the study with the stakeholders with transparency (Mertens & Wilson, 2012).

Utility. The utility standards are focused on the value of the evaluation processes to the stakeholder to develop professional development sessions to improve instructional practices. Teachers were provided with pre-observation notice and a structured, risk-free environment for sharing views in the focus groups. The findings of this study were made available to the participants, school leaders, and other stakeholders to be used for program improvement.

Feasibility. Feasibility standards relate to whether a program operates with a balance of individual needs and cultural interests, demonstrating effectiveness and efficiency. These standards were adhered to by limiting disruptions to classroom

instruction by creating a schedule that met student and teacher needs. The focus groups were designed to maximize data necessary to answer the research questions gathering yet minimize the amount of time they would be inconvenienced. As values are an important aspect of this standard, the focus group protocol included open-ended questions which allowed for participants values, beliefs, perspectives, and experiences to come through.

Accuracy. Accuracy standards ensure that the evaluation design is viable, and the analysis will be based on reliable information. To strengthen reliability, the study design included peer review of interview and classroom observation protocol, audio recording of interviews, and detailed notetaking of classroom observations to provide focus on the intended purpose of the program evaluation and its consistent intended use of information. The methodology outlines a clear description of the context, participants, steps in data collection, and analysis. The study is clear in its purpose and focus in examining classroom practices in a one single-sex educational setting. The findings are not intended to be generalizable; rather, they are aimed at program improvement in this context.

Propriety standards. Propriety standards focus on open, honest agreements regarding the use of data and anonymity of the participants before the interview process begins for each teacher. These standards were met by emphasizing the fairness and rights of the participating school, ensuring the appropriate and specific use of data for the purpose of this program evaluation only. My professional affiliation with the school enabled a collegial relationship with the teachers interviewed and reinforced my qualifications and credibility to conduct a program evaluation (e.g., Yarbrough et al., 2011). School administrators in the context of this study were sent emails with

information regarding the purpose of the program prior to being asked for permission to conduct the study and the intention to share the findings (Creswell, 2014). School administrators were also promised a complete report of the findings of the evaluation designed to be responsive to the school's stakeholders, along with any real or perceived conflicts of interest.

To further guard against ethical impropriety, the research proposal for this study was reviewed by a committee that includes experts in qualitative research methods and professionals from the field of K-12 education. I also submitted the program evaluation research proposal to William & Mary's Institutional Review Board (IRB). Once the IRB approval was obtained, then permission to conduct the study was granted by the administrators at BMS Academy.

Positionality

The role of the evaluator is to “establish social relations with stakeholders and monitor those relations” (Mertens & Wilson, 2012, p. 45). My dual role as program evaluator and as a professional working with the study school could impact teachers' responses during the interview and observations. For nearly 20 years, I have worked with teachers at every grade level of the school and multiple departments (Academic, Admission, Athletic, and Guidance). My experience as a single-sex educator and my review of literature on the subject of SSE settings create likely biases in my views of the value and benefit of single-sex education. In order to mitigate this bias during data collection and analysis, I employed strategies of memoing and reflexive journaling as means of self-reflection to unearth my beliefs and biases. The methods of analysis purposively included predetermined (a priori) codes or themes emerging from the

collective body of research (Saldaña, 2016). This elemental coding method provided clear guideposts for my interpretation and analysis of the data. The interview data was member checked to confirm and validate the themes associated with the analysis of interview responses.

CHAPTER 4

FINDINGS

This formative program evaluation examined the implementation of gender-specific teaching strategies in a single-sex school, as observed during classroom walkthroughs and reported by teachers during interviews. This chapter reports the qualitative analysis of the data and provides a discussion of the findings related to the research questions that guided the study. The data collected were analyzed to identify, describe, and determine gender-specific teaching strategies that were implemented in order to inform stakeholders responsible for the academic design and long-term success of BMS Academy and its students. Classroom observations and interviews captured instructional variations in teaching strategies or methods used in single-sex academic settings.

Multiple forms of data were collected through individual interviews and two 40-minute classroom observations of each participating teacher. Classroom observation data were collected to look for evidence of five research-based strategies associated with highly effective instruction in same-sex schools: spatial relationships, structured classrooms, opportunities for reading and writing, manifestations of stereotypes for boys, and hands-on activities. I did not assess the quality of the implementation of the strategy or delineate if the strategy was an in-class activity, rather it was recorded only if evidence of the strategy was present in the classroom. Both dynamic and passive representations

of each strategy were recorded in alignment with the literature. For example, even though the teacher may not have addressed a stereotype during instruction, the accessibility of reading materials that reflect non-traditional roles and interests were included. Some evidence of strategies, such as posters that combat stereotypes or posted class schedules for structured classrooms present as part of the classroom culture created by the teacher and not necessarily an in-class activity, were counted only once as evidence of the strategy. The interviews sought data related to participants' perceptions of single-sex teaching strategies as well as teachers' choices in instructional approaches in the single-sex school setting. Interviews for each teacher took place before the observations were scheduled or conducted. The interviews were scheduled for a time that was selected by the teacher and conducted in their classroom.

Descriptive data and quotations were analyzed to establish coding and identify patterns. The analysis presented in this chapter provides the statistics of coding theme occurrences and supporting quotations directly from the interview transcripts. Summaries, codes, and quotations obtained from the analysis are used to represent and illustrate the findings. The associated figures that depict coding themes represent the number of participants and their responses, along with observed teaching practices used in the interview and classroom observations ($n = 8$).

Teachers with at least five years of experience, assumed to be the most familiar with the principles of single-sex education and the program goals at BMS Academy, were invited to participate in this qualitative study through individual interviews and classroom observations. Participants' experiences in a single-sex academic setting ranged from 5 to

45 years, with six of the eight teachers having earned an advanced degree. Participant demographics are represented in Table 2 of Chapter 3.

Evaluation question #1: What are the gender-specific strategies being implemented in the classrooms?

Five strategies were selected to observe based on findings from the literature review related to successful single-sex teaching strategies: spatial relationships, structured classrooms, opportunities for reading and writing, combating negative stereotypes of boys, and opportunities for hands-on learning (James, 2015). To determine the presence of gender-specific strategies during instruction, two 40-minute classroom observations were conducted in each participant's classroom during an instructional block. The observation data suggests that participating teachers chose high yield strategies that have been found to be effective in gender-specific classrooms. Several strategies were observed or noted to be a part of the classroom environment created by the teacher.

In order to improve the accuracy and trustworthiness of the observation data, parameters were set to identify use of gender-specific strategies. For example, *spatial relationships* were considered to be present when the teacher used any sort of visual aid to support student learning; graphs, diagrams, organizational charts, or outlines. A *structured classroom* was identified when the teacher used a high-volume audible voice or set expectations by posting classroom rules and schedule in view of the students. *Opportunities for reading and writing* were identified when students were given a specific assignment, either to be done during the instructional block or outside class, that required reading or writing. The teacher was considered to be *combating stereotypes*

about boys when literature or posters in the classroom demonstrated academic success of boys. An example of this strategy might be a poster of a male sports star who is shown engaged in a task that is viewed to be outside a typically male assigned role, such as reading or cooking. Encouraging and assigning tasks related to literacy skills also promotes long-term retention and deeper learning (Hattie, 2009).

Hands-on learning was recorded for both kinesthetic and experiential learning related activities. For example, teachers provided opportunities for students to get up and move about during the instruction block, as well as when students were presented with an action oriented activity related to the content material, such as drawing or writing. I did not identify the quality or effectiveness of the strategy, only the presence of the strategy in each of the two 40-minute observational periods. Strategies considered to be present in the observational periods could have been dynamic or passive. Dynamic use of strategies is when teachers are actively performing the specific strategy in the classroom, such as use of a more audible voice. Passive use of strategies was recorded when the strategy was included as part of the classroom instruction, evident in reading materials, and included in posted rules or visuals that promote positive gender stereotypes. Table 5 represents the presence of the strategies observed in each classroom observation.

Table 5

Gender-specific Strategies Used in the Classroom

Gender-specific strategy	Teacher							
	1	2	3	4	5	6	7	8
Spatial Relationship	1		1	1		1, 2	1	1, 2
Structured Classroom	1, 2	1, 2		2	1, 2	1, 2		
Opportunities for Reading and Writing	1, 2	1, 2	1, 2		1, 2	1, 2	1, 2	
Combating stereotypes about boys	1, 2	1, 2	1, 2			1, 2	1, 2	
Hands-on learning		1	1			1	1	

Note. For each of the gender-specific strategies, 1 indicates the strategy was observed during the first classroom observation and 2 refers to the second classroom observation.

Spatial relationships. The use of spatial relationships was found in 8 of the 16 observations. Six of the eight teachers used some sort of visual-graphic during at least one classroom observation. Teachers implemented this strategy in a variety of ways, including use of a whiteboard, diagrams, or printed hand-outs for students. However, only two of these six teachers were observed using the strategy during both observations, showing inconsistent implementation or no use of the strategy for six of the eight teachers.

Structured classroom. Nine of 16 observations showed evidence of a structured classroom. Teachers were identified as using a more audible voice and providing small group competitions as part of the lesson. A teacher being identified as using an audible

voice was operationally defined as clear, understandable, and able to be heard over the students talking. Five of eight teachers used the strategy, with four of them demonstrating consistency by using it during both observational periods. One teacher was observed using the strategy of having small group competitions. The use of providing students shorter segments of instructional time or exercise breaks was not found to be present, either dynamic or passive, during any observation.

Increased Literacy Instruction

Reading. The strategy of providing time for assigning reading and was found in 12 of the 16 observations, making it the most frequently identified strategy. Six of eight teachers used the strategy by having a classroom with variety of reading materials and scheduled reading time during the class day. This strategy was the most consistently applied, with six teachers applying the strategy during both observational periods.

Writing. The strategy for providing writing time was found in 4 of the 16 observational periods. One teacher was observed dynamically teaching part of the writing process where students were creating a journal based on the reading used in the class. The other observations were passive in the use of the strategy to incorporate assigned writing time that was not observed but identified as part of the daily schedule. Blocks of assigned writing times ranged from 15 to 30 minutes, as posted on the daily schedule in three teachers' classrooms.

Manifestations of stereotypes. During 10 of 16 observations, teachers corrected or used corrective devices to negative academic stereotypes of boys' reading and writing skills. Teachers were found to talk to their students about writing and find ways to relate reading and writing with the students. Five of eight teachers used the strategy, with the

most common application being in the form of posters in the classroom. Four of the eight classrooms had posters on the wall showing a celebrity with a book, helping with consistent applications of the strategy for both observations. Three classrooms had a small section of books that ranged from, biographies of famous athletes, to political figures, to science fiction. The books were a passive implementation of the strategy but were a part of the classroom culture created by the teacher.

Hands-on learning. Hands-on learning, including kinesthetics activities, was used as a strategy for the fewest observations, only 4 of the 16. Four of the eight teachers were observed using the strategy. For example, one teacher had each student take a turn to write and solve a math problem on the board that involved making a graph. This enabled students to not only get out of their seats but also to write the steps to the problem and make a graph. The strategy of hands-on learning was the least consistently applied, with no teacher using this strategy during the second round of observations. None of the teachers used manipulatives or materials to construct something in the classroom. There was also no evidence of hands-on learning time posted on the daily schedules.

Overall use of gender-specific strategies. Of the identified strategies observed in classrooms, providing opportunities for reading was seen most consistently, however, most often passively. This strategy was observed in 12 of the 16 observations across 6 of 8 teachers. Three of the six teachers who were observed using this strategy had assigned time in the posted schedule for students to write in a daily journal. Only one teacher was observed using the strategy directly for increased writing time, where creative time, drafting, and editing skills were being discussed in class. Another teacher provided

students with opportunities to actively engage in writing activities, including students stepping to the board to revise sentences but had no feedback or editing skills reinforced.

One of the eight teachers used all five selected single-sex strategies in the classroom, and four teachers showed the implementation of four strategies (Table 5). Teacher 6 was the only teacher observed to use all five strategies, and Teacher 8 was observed using only the strategy of spatial relationships and none of the other four.

In the second observation, each teacher was found to use at least one gender-specific strategy. In comparison to the first observation, Teachers 1-7 used fewer identified strategies, and Teacher 8 used the same number. The reported data show that Observation 1 had six of the eight teachers using some sort of spatial relationship and in Observation 2, only two teachers used the strategy. Observation 1 showed four teachers providing opportunities for hands-on learning, and Observation 2 had zero teachers using the strategy in the classroom.

The strategies of providing opportunities for reading and writing, along with correcting negative stereotypes of boys, were the most consistently observed. Giving students increased time to read or write was a part of a visible daily schedule and classroom culture and seen as passive implementation of the strategy, rather than dynamic specific lesson. Evidence of correcting stereotypes of boys was observed in literature found in the classroom, posters on the wall, and specific teacher-led discussions. The strategy of using hands-on learning was observed in 4 of the 16 observations and only used by 4 of the 8 teachers.

Evaluation question #2: What gender-specific strategies do teachers self-identify as being used in the classroom?

In order to determine how teachers in a single-sex school make instructional decisions about the use of gender-specific instructional strategies, teachers participated in individual semi-structured interviews. Teachers were asked a series of questions about their knowledge, perceptions, and use of gender-specific teaching strategies that best match the learning styles of boys in their single-sex classrooms (Appendix A). Teachers reflected on their classrooms and the use of gender-specific strategies. When asked what gender-specific teaching strategies they perceived to be successful in the classroom, seven of the eight teachers stated they did not know of any specific strategies they used in their classrooms that were gender-specific. All eight felt they probably use some gender-specific teaching strategies, but “just didn’t know it.” One teacher said that even though they teach at a single-sex school, they don’t “think in terms of gender when teaching.” When asked what they specifically thought they did to modify instructional strategies for boy students, two teachers self-identified that they tried to do more hands-on lessons and use the whiteboard to “keep the students moving.”

Teachers were asked if they had gathered information on gender-specific instructional practices. Seven of the eight teachers had not investigated this topic. Teacher 3 had learned gender-specific strategies from a class taken for a master’s degree. Teacher 3 also identified the strategy of using short blocks of time for lessons and added, “I wish I had researched more but hadn’t thought about it until now.” Teacher 3 used four out of five strategies during the observations but was not observed using the one strategy they said they knew. The use of shorter blocks of time for lessons was not used

by any teacher or observed as part of the daily schedule and is categorized in the strategy of having a structured classroom.

Although six of the eight teachers did not report using gender-specific teaching strategies, all eight used at least one identified strategy during at least one of the observational periods. Six of the eight teachers observed in their classrooms provided opportunities for reading and writing and incorporated the use of spatial relationships.

Question 8 asked if the school had presented instructional strategies that were gender-specific, and all eight participants stated “no.” One teacher shared, “I wish we would have been presented with something. I feel like I should know some of these things so I could help these boys.”

Teachers were also asked what gender-specific strategies they use and perceive to be successful. Teacher 1 did not know any but assigned writing time every day where students are given writing prompts, and they relate their experiences to the prompt. Teacher 3 had not thought about gender-specific instructional strategies but reported trying to find “guy approved” books and reading material that the students might be more interested in for class. In both observations, Teachers 1 and 3 were recorded as giving opportunities for reading and writing and having material to combat negative stereotypes about boys.

Evaluation question #3: To what degree do the observations’ articulated gender-specific instructional strategies align with extant body of literature on gender-specific strategies?

To answer Evaluation Question 3, the data from the observations of classrooms in a single-sex school were compared with the literature focused on gender-specific learning—specifically, those instructional strategies determined to be best aligned with the learning styles of boys. Despite teachers reporting little in the way of identifying specific gender-specific strategies as a deliberate choice for classroom instruction, the data from classroom observations suggested that these research-based instructional approaches exist as part of the participants’ repertoire. The observation data showed that at least one gender-specific instructional strategy was being used in each classroom, even though teachers were not cognizant of them during the interviews.

Spatial relationships. To incorporate spatial relationships, six of the eight teachers used resources to increase spatial relationships. Classrooms that provide opportunities for boys to use their spatial skills encourage engagement for increased academic effectiveness (James, 2015). Six of the participating teachers used some type of visual (chart or graph), and two of them used the interactive whiteboard in the classroom to present content in accessible ways, such as presenting patterns or models. Instruction, using this strategy, is delivered in such a way that it supports students’ ability to categorize, assign attributes, and identify patterns to specific concepts and learning objectives. Teacher 6 used this strategy in a passive manner to deliver content and, through a PowerPoint presentation, provided an outline on the whiteboard and gave each student a handout of the notes. When the teacher first gave the assignment, the students

asked multiple questions, but as the teacher explained the outline on the board, they appeared to begin to understand. When the teacher asked if they understood the process to complete the work, the class answered “yes.”

Structured classrooms. The teaching structure of the classrooms varied from very logically organized to loosely structured game time. Boy-specific strategies for classroom management include: providing concise directions one at a time, shorter segments of instruction, structured exercise breaks, small group competitions, and teachers using a louder voice to help boys with their less sensitive hearing (Gurian, 2017; James, 2015; Sax, 2005). Effective classroom management has been found to have dramatic positive effects on student learning; a teacher’s ability to identify and act quickly to solve problems is a crucial part of establishing a positive learning culture (Hattie, 2009). Three of eight teachers used louder, clearly heard, and understandable voices to get the students’ attention, which is a gender-specific instructional strategy. Two of the eight had the daily schedule posted on the wall, along with classroom standards and rules. Other strategies that were used by two teachers in the classroom were asking many questions to random students to keep them on task and group work.

Increased Literacy Instruction

Reading. Increased reading has shown to be effective in developing not only reading, but also writing skills (James, 2015). Looking at the students’ desks, most had a library book, and in two of the eight classes, time was reserved in the class day, according to the daily schedule, for them to read. There is a policy at BMS Academy for every student to sign out a library book.

Writing. The strategy to provide increased time with writing was practiced by three of the eight teachers. Teachers 1, 2, and 6 had daily requirements for students to write in a journal that is used as a graded assignment. One teacher provided students with chances to go to the board and revise sentences as part of a game being played before lunch by the entire class.

Manifestation of Stereotypes. Literature as well as books and posters on the wall appeared to combat negative academic stereotypes of boys in five of the eight classrooms. Additionally, books that are closely aligned with boys' interests also appeared in these classrooms. Boys are "usually attracted to nonfiction, biography, science, space topics, and action stories" (James, 2015, p. 199). One teacher was using *The Old Man and the Sea* to talk about life's hardships and related it to a sporting event, before having the students write about hardship in their lives. The teacher was able to promote a reversal of stereotypes of boys not being able to write well by helping them relate to a subject and showing relationships to classical literature. Researchers have suggested the performance of boys is hindered by negative perceptions; however, interventions can be made to reverse these effects (Hartley & Sutton, 2013).

Hands-on activities. This strategy encourages both kinesthetic and manipulative approaches to learning that will engage boys in the classroom. Kinesthetic activity was present in four of eight classrooms. Students were permitted to get out of their seats and go to the board to draw or create groups by moving their desks together. Teacher 3 allowed the students to sit on top of their desks during a classroom activity. This strategy was absent in all classrooms for the second observation. Boys tend to be more physically aggressive and engage in hands-on learning activities rather than adhering to common

classroom expectations of sitting still for long periods of time and using quiet voices (Sax, 2005). There was no evidence of the use of manipulatives or activities that engaged students in the creation of models or project-based learning activities during the observation periods.

Evaluation question #4: What are teachers' perceptions of gender-specific strategies?

During the individual interviews, teachers reflected on their use of gender-specific teaching strategies. While they did not knowingly implement many research-based practices, they believed that a single-sex educational environment was positive for academic growth. When asked, "What is your perception of how well single-sex classrooms support an academic environment?" teacher responses ranged from "it supports it," to "it is extremely effective." The scale was measured based on teacher responses to the question and categorized from 0-5 (0 = *not effective*; 1 = *little effect*; 2 = *does support*; 3 = *it's good*; 4 = *very good*; and 5 = *extremely effective*). Teachers 1 and 2 stated that single-sex classrooms do support an academic environment but gave parameters that it was only for high school students. Teachers 4, 5, and 6 said that it was "good." Teachers 7 and 8 said they believed single-sex classrooms did very good and Teacher 3 said they were "extremely effective." Figure 5 represents the Likert-scale responses to teachers' perception of how well single-sex classrooms support an academic environment.

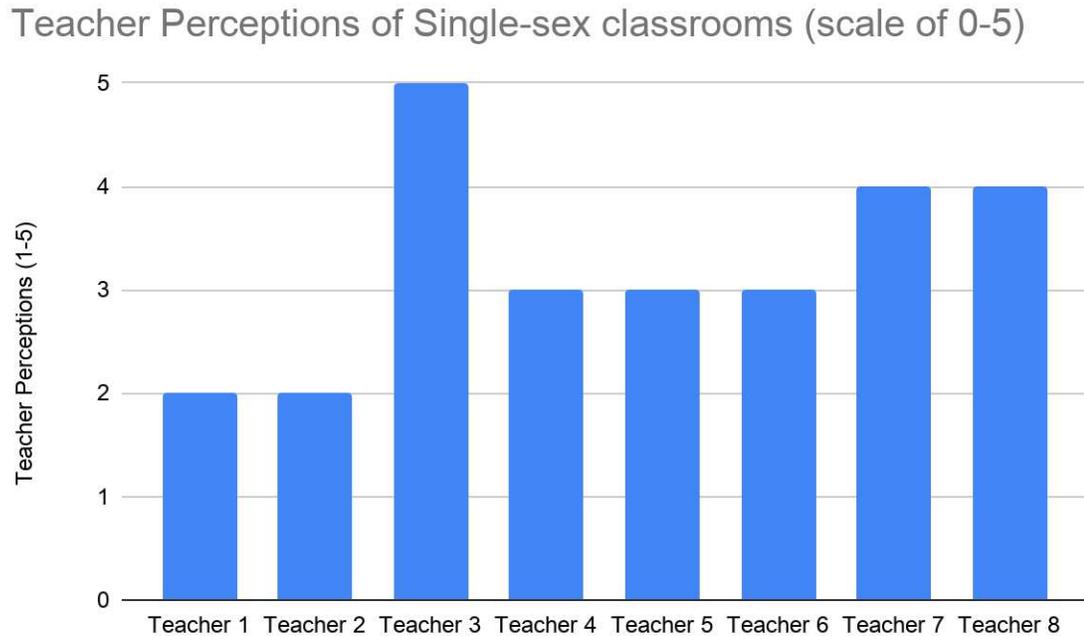


Figure 5. Teacher perceptions of single-sex classrooms.

Question 11 asked teachers about unintended outcomes of single-sex academic settings for boys. Teachers 1, 2, 3, and 4 stated positive comments, noting that boys seemed more confident in class, worked harder and wrote more. In response to Question 10, Teachers 1, 3, 5, 6, and 7 shared that one challenge of single-sex classrooms is that boys can sometimes become too competitive in class and can get loud. One teacher suggested that “while it reduces distractions to not have girls in the classroom, it would be good on occasion to help the boys calm down.”

Evaluation question #5: How have teachers come to their conclusions about gender-specific strategies?

Although teachers were not able to articulate their classroom strategies to be gender-specific approaches, they all perceived a same-sex learning environment to be helpful to boys. Responding to Question 4—“What benefits do you see in single-sex

classrooms?”—all participants had positive opinions of single-sex classrooms stating things like, “it provides fewer distractions,” it “helps boys focus,” and it “supports what boys need.” Interview Question 1 asked, “What motivated you to teach at a single-sex school?” Teachers 1, 4, 5, and 8 had attended a single-sex school and felt it was good for them. The remaining teachers stated that they were just looking for a job and were not concerned about the school being co-educational or single-sex.

The teachers’ tenure and experience in same-sex schools were important to their development of perceptions of the effectiveness of gender-specific schools. Their perceptions were formed almost exclusively by their experiences either as a student or teacher, rather than research. These perceptions are reflected in participants’ responses to Interview Questions 8 (“Have you been presented with instructional strategies specifically about gender-specific teaching?”) and 9 (“Have you gathered information on gender-specific instructional strategies?”). All eight teachers stated that BMS Academy had not given them any research on gender-specific classroom strategies. Teacher 3 was the only one of the eight teachers who had gathered research while enrolled in a Master’s level program.

Effectiveness of gender-specific strategies. Teachers were asked about their perceptions of the differences in teaching practices between co-ed and single-sex classrooms. Interview Question 7 asked teachers about their perceptions of single-sex classrooms compared to co-educational settings. Only two teachers said they perceived single-sex teaching practices as more effective compared to co-ed strategies. The other six said they were not sure if one is more effective or not.

Summary of Findings

Single-sex teaching strategies are being inconsistently implemented at BMS Academy, with five of the eight teachers exhibiting four of the five strategies during recorded observations. Gender-specific teaching strategies were found in only 43 or the 80 possible observations. Additionally, of the 43 observed strategies, 21 were found to be passive or part of the overall classroom design or culture, not active teaching. When teachers were found to use gender-specific teaching strategies in their classrooms, they did not know they were doing so according to their interviews. Additionally, teachers' perceptions of the effectiveness of single-sex classrooms were positive, but five of the eight rated it at a 3 or below on a 5-point scale (Figure 5).

Themes that developed were that teachers had not been provided resources to improve the implementation of gender-specific teaching strategies. Overwhelmingly, teachers were unaware of specific teaching practices that matched the context of their single-sex classrooms. Although the teachers were unaware of gender-specific teaching strategies, there were patterns of useful strategies being utilized in the classroom. Teacher knowledge about single-sex classroom instruction came about as a result of their experiences as a student or teacher, rather than from a review of research or professional development. Teachers 1, 2, 3, 6, and 7 implemented the strategies of providing opportunities for reading and writing and combating stereotypes of boys in each observational period. Three of the five strategies were inconsistently applied or not applied at all during classroom observations. Opportunities for teachers to develop increased knowledge and more consistent implementation of gender-specific teaching strategies give boy students a better chance for academic success (James, 2015).

Teachers in this study felt a single-sex classroom was effective based on their experience but had no evidence or research to justify their responses. With the population of teachers interviewed and observed having at least five years of teaching experience in a single-sex school, their perceptions and teaching practices have been formed by their experience rather than research. Only one of the eight teachers had researched gender-specific teaching strategies, and none had been provided research through BMS Academy, reinforcing the idea that teachers relied on their experiences when teaching. Experience without research often provides inaccurate perceptions of critical awareness and increased arrogance on the effectiveness of classroom teaching methods. Experiences are encoded solely through the lens of self, leading to limited viewpoints and justification of success or failure rather than insightful dialogue and looking for solutions from outside sources.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

The mission of the BMS Academy is to prepare boys for college by providing a college preparatory academic program in a mostly residential, Christian, military-style structured environment with a single-sex student body. The Academy uses strict guidelines and follows an interview process through an Admissions department, to ensure that each boy has the potential for success at the school. The program's logic model hinges on the premise that all accepted students align with the guiding principles of the school in which high-quality academics and athletics are supported by character development, self-discipline, responsibility, leadership development, and Christian values. The program's context, inputs, and activities are assumed to align with the desired outcomes for students and the mission of the school.

Single-sex schools provide opportunities for gender-specific teaching strategies and an environment that leads to the optimization of academic potential for students compared to co-educational schools (James, 2015). Boys and girls have been shown to possess similar academic abilities, but research supports specific teaching strategies and environments that are more conducive to adolescent learning for each sex (Sax, 2007). Through classroom observation and interviews, teachers were found to use gender-specific strategies, but were inconsistent with their applications and not able to identify what those strategies were. From the teachers' responses, it was discovered that their perceptions were limited to their own experiences rather than informed by relevant

research. The findings of this study are the result of a small-scale evaluation of the implementation of the overall program at a comprehensive single-sex school, specifically the practices of teachers in choosing gender-specific teaching strategies for instruction.

Additionally, BMS Academy was found not to have provided professional development or opportunities for teachers to discover research-based gender-specific teaching strategies. Teacher 2 has 45 years of teaching experience at BMS Academy (Table 2 in Chapter 3) and stated during the interview that the school had not provided information on gender-specific strategies during their tenure at the school.

The focus of this section is to provide a summary of the findings of the study and give specific recommendations to improve the effectiveness and efficiency of the implementation of gender-specific teaching strategies in a single-sex school. It is suggested that when teachers use gender-specific teaching practices in the context of single-sex classrooms, the gains of students are increased compared to using teaching methods for co-ed classrooms (James, 2015). Additionally, administrators are encouraged to not only give information on teaching strategies for the school's population, but they are also expected to ensure its implementation through formal assessment and classroom observations.

Discussion of Findings

The purpose of this study was to examine gender-specific instructional strategies being implemented in a single-sex school. Specifically, five gender-specific teaching strategies were identified and looked for during classroom observations. In addition, classroom teachers were interviewed to gather their knowledge of gender-specific strategies for boys and to learn their perceptions of the benefits of single-sex education

(SSE). The participants in this study were teachers with at least five years of teaching experience in single-sex schools. All of the teacher participants have taught at the school long enough to have experience teaching boys and to have developed an understanding of the academic design of the school. The general findings of each research question, along with related recommendations for each finding is represented in Table 6.

Table 6

Summary of Research Findings and Recommendations

Findings	Practice Recommendations	Program Recommendations
Question #1: Research-based gender-specific teaching strategies are not consistently being used in the classroom.	Teachers should learn gender-specific teaching strategies and provided ways to implement them into the classroom. Follow up is necessary to ensure implementation.	Review the program logic model for alignment with the mission of the school.
Question #2: Teachers are unaware of many gender-specific teaching strategies. Some teachers have used a few strategies, but only through trial and error associated with teaching experience.	Develop a mentor program to provide new teachers gender-specific teaching strategies enabling better implementation from the beginning of their teaching career in single-sex schools.	Administrators should provide professional development to increase awareness and help implement gender-specific teaching strategies to align with the academic setting.
Question #3: Teachers lacked practical knowledge of gender-specific teaching strategies. Those who did implement high yield practices could have been more effective with increased knowledge.	Provide teachers access to gender-specific teaching strategies enabling more efficient practices. Administrators should assess gender-specific teaching practices being used in the classroom.	Review the current instructional practices to identify the effectiveness related to program outcomes. Examine the need and/or necessity of using gender-specific strategies for the school and students.
Question #4: Teachers did not have many perceptions about the effectiveness of the strategies because they were mostly unaware of gender-specific strategies.	Provide research-based gender-specific strategies used in other schools and relate to academic success in the context of the school.	Administrators should provide formative feedback in teacher evaluations on the implementation of gender-specific teaching strategies and encourage teachers to become inquirers of their own pedagogical practice.
Question #5: Teachers perceive that single-sex academic settings are good, but do not really know why.	Provide research showing the effectiveness of single-sex education. Emails, professional development, and staff meetings are all good places to learn about gender-specific teaching strategies that follow the context of the school and its students.	Examine student performance data to determine if the program processes are well-aligned with outcomes.

Policy/practice recommendation #1. Teachers should be presented with gender-specific teaching strategies and provided ways to implement them into the classroom.

Follow up is necessary to ensure implementation. As teachers are presented with gender-

specific teaching strategies, any strategy that is already being used should be recorded and shared with all teachers to begin discussion and shared learning opportunities.

Policy/practice recommendation #2. Develop a mentor program to provide new teachers gender-specific teaching strategies enabling better implementation from the beginning of their teaching career in single-sex schools. Identify veteran teachers that are willing to serve as mentors and provide additional training to assist them assess the needs of the new teacher(s) and discover ways to implement strategies in the school.

Administrators should provide professional development to increase awareness and help implement gender-specific teaching strategies to align with the academic setting.

Policy/practice recommendation #3. Provide teachers access to gender-specific teaching strategies enabling more efficient practices. Professional development programs enable teachers to become more effective, leading to increased skills and overall work attitudes (Hattie, 2009). Administrators should assess gender-specific teaching practices being used in the classroom and provide formative feedback on their implementations.

Policy/practice recommendation #4. Provide research-based gender-specific strategies used in other schools and relate to academic success in the context of the school. Teachers should also be given the opportunity to share strategies they have used and perceptions of success or failure.

Policy/practice recommendation #5. Provide research showing the effectiveness of single-sex education. Emails, professional development, and staff meetings are all good places to learn about gender-specific teaching strategies that follow the context of the school and its students. Align and show all professional development with the mission statement and long-range plans of the school.

Recommendations for Future Research

This formative program evaluation of the implementation of gender-specific teaching strategies in a single-sex school is relatively small and limited. Given the unique context of a single-sex school, the results provide important information for stakeholders to engage in a more rigorous and comprehensive program improvement process. Although there is evidence of gender-specific teaching strategies in the classrooms at BMS Academy, the findings suggest that these practices exist more by accident rather than as part of a school-wide pedagogical approach aligned with the program's intended outcomes. Recommendations for future research in this context include repeating the study after teachers have participated in professional development on gender-specific teaching strategies. Additionally, increasing the sample to include more teachers and other stakeholders would provide a broader look at the program. A more rigorous examination of other high-yield strategies may increase teacher buy-in for professional development and increase the repertoire of skills for teachers.

Quantitative data. Because this study focused on the teachers' implementation of five gender-specific strategies, a quantitative evaluation of program outcomes could assist in determining the school-wide impact of these strategies as well as the overall program. In addition, formative and summative classroom data could be analyzed to determine the effectiveness of gender-specific strategies, as well as other instructional strategies being used by teachers as they relate to student performance.

Conclusions

This study provided insight into gender-specific instructional practices being implemented at BMS Academy. The program theory that supported the study stated that

teachers who used gender-specific teaching strategies in their classrooms would provide better opportunities for academic success for their students. Findings did not fully support the program theory. Teachers were found to use gender-specific strategies but primarily relied on their experiences rather than research on the subject. Additionally, the strategies were not consistently applied throughout the classroom observational periods.

Teachers' perceptions of the effectiveness of single-sex classrooms and gender-specific teaching strategies were positive. This supports the idea that they are open to professional development on the subject and are more likely to implement strategies to improve efficiency and effectiveness in the classroom. When teachers improve, students improve, providing better opportunities for them to become strong contributors to society.

This study aligned with the pragmatic paradigm with the purpose of providing feedback that might inform stakeholders and decision-makers about the program processes that lead to intended outcomes. The findings of this study could be used to strengthen the overall program design of the school. Improvements in instruction that foster student achievement also promotes positive teacher involvement that leads to a better overall school culture (Hattie, 2009).

Since BMS Academy is a private school and relies on tuition to maintain a budget, actions taken to develop gender-specific teaching strategies could be used to market the school as an innovator in the private school sector, specifically all-boys' schools. As professional development is implemented for gender-specific teaching strategies, other implementations could be explored that match the context of the school.

As part of a continuous improvement process, actions might be designed to match the context of the school to provide specific courses of action for school improvement to assist in achieving the school's long-range strategic plan, specifically the outcomes of the beneficiaries of the program.

APPENDIX A

Teacher Interview Protocol

Thank you for taking the time today to speak with me about your experience with a Single-sex educational program. Today, I would like to ask you questions about your work and observations. Your responses will become part of my doctoral research on program processes. Our conversation today should take no more than one hour. I am audio-recording our session for transcription and analysis. Please note that I have completed training regarding the research of human subjects, that all of your responses will remain confidential, and identifying information will be redacted in the transcript. You may withdraw from this interview at any time without penalty.

Before we begin, I'd like to share several norms:

- There are no right or wrong answers.
- Please do not identify other people by name. You may refer to them instead as “a student” or “a principal” or “a teacher.”
- In order to maintain confidentiality, please do not share or discuss with others the specific ideas or information shared in this session.

As we begin the interview, I'd like to share with you the purpose of this study. *Current research suggests that single-sex classrooms contribute to larger gains in both mathematics and reading than co-educational classes for both boys and girls. Strategies and educational environments that contribute to increased performance in critical reading for boys will provide opportunities for skills needed for today's workforce leading to more productive contributors to a global society.* To get started, I will ask you a few questions about single-sex education and the academic program at this school.

1. What motivated you to teach at a single-sex school?
2. How do you define the academic design of the school?
3. What is your perception of how well single-sex classrooms might provide support in an academic environment?
4. What benefits do you see in single-sex classrooms?

At this point in the interview, I am going to ask you some questions about high yield strategies specifically identified with positive outcomes for boys. There are multiple practices that have been identified to have academic success in single-sex classrooms. This study seeks to identify if 5 research-based gender-specific teaching strategies are being used in the classroom:

1. Instruction to incorporate spatial relationships, 2. structured classrooms, 3. increased opportunities for reading and writing, 4. increased opportunities for hands-on learning, and 5. correcting academic stereotypes of boys.

5. What gender-specific teaching strategies have you used that you perceive to be successful in the classroom?
6. How have you modified your instructional strategies to meet the needs of boy students?
7. What are your perceptions of the differences in teaching practices between co-ed and single-sex classrooms?
8. Have you been presented with instructional strategies specifically about gender-specific teaching?
 - a. What instructional strategies have you been presented with, and from what sources?
 - b. How have you used these strategies in your teaching practice?
 - c. How effective do you perceive them to be?
9. Have you gathered information on gender-specific instructional strategies on your own?
 - a. What instructional strategies did you gather, and from what sources?
 - b. How have you used these strategies in your teaching practice?
 - c. How effective do you perceive them to be?
10. What challenges have you seen in single-sex classrooms?
11. What unintended outcomes have you experienced, resulting from single-sex classrooms?

12. Thank you for this valuable information. Is there anything else you would like to share?

If I have any questions or problems that may arise as a result of my participation in the study, I understand that I should contact John DeVault, the researcher at 434-989-1458 or jfdevault@email.wm.edu or Dr. Margaret Constantino, his dissertation chair at 757-221-2323 or meconstantino@wm.edu or Dr. Tom Ward, chair of EDIRC, at 757-221-2358 or EDIRC-L@wm.edu.

My signature below signifies that I am at least 18 years of age, that I have received a copy of this consent form, and that I consent to participating in this research study.

DATE _____ Signature of Participant _____

DATE _____ Signature of Researcher _____

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON 2019-06-08 AND EXPIRES ON 2020-06-08.

APPENDIX B

Gender-specific Instruction Classroom Observation Form

Teacher _____

Dates and Times of Observation #1 _____ #2 _____

Observer _____

Gender-specific Strategy	Observation 1	Observation 2	Field Notes
<u>Spatial Relationships</u> Ex: Reading and interpreting maps, graphs, puzzles, mental images, diagrams			
<u>Structured Classroom</u> Ex: Concise directions Sequencing Short segments of instruction Structured breaks Small group work periods Teacher voice: tone and volume			
<u>Opportunities for Reading and Writing</u> Ex: Planning, drafting, revising and editing process Summarizing Clear process steps			

<p><u>Identifies and corrects stereotypes for boys</u> Ex: Classroom reflects a safe environment for learning Stereotypes are corrected when heard or exhibited Stereotypes are talked about Evidence of a range of role models Books & materials reflect a challenge to stereotypes Inclusive language</p>			
<p><u>Opportunities for hands-on learning</u> Ex: Use of manipulatives, tactile activities, creating, constructing and building,</p>			
<p><u>Self-Reported Strategies</u></p>			

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON 2019-06-08 AND EXPIRES ON 2020-06-08.

APPENDIX C

Participant Informed Consent Form

I, _____, agree to participate in a research study involving school teachers who are instructors of a Single-sex educational program. The purpose of this study is to inform the effectiveness of meeting the learning outcomes and to gain teachers' perspectives on the knowledge and skills acquired as a result of the program.

As a participant, I understand that my participation in the study is purposeful and voluntary. Participants were selected to represent key individuals currently teaching the *Investigations* curriculum. I understand that approximately 15 teachers will be selected to participate in this study.

I understand that I will be expected to participate in one (1) semi-structured interview related to my knowledge and implementation of a Single-sex educational Program, and (1) classroom observation of my classroom instructional practices and/or my involvement in the assessment of student development.

I understand that the interviewer has been trained in the research of human subjects, my responses will be confidential, and that my name will not be associated with any results of this study. I understand that the data will be collected using an audio recording device and then transcribed for analysis. Information from the audio recording and transcription will be safeguarded so my identity will never be disclosed. My true identity will not be associated with the research findings.

I understand that there is no known risk or discomfort directly involved with this research and that I am free to withdraw my consent and discontinue participation at any time. I agree that should I choose to withdraw my consent and discontinue participation in the study that I will notify the researcher listed below in writing. A decision not to participate in the study or to withdraw from the study will not affect my relationship with the researcher, the College of William and Mary generally or the School of Education, specifically.

If I have any questions or problems that may arise as a result of my participation in the study, I understand that I should contact John DeVault, the researcher at 434-989-1458 or jfdevault@email.wm.edu, Dr. Peggie Constantino, dissertation chair at 757- 221-2323 or meconstantino@wm.edu. You may also contact Dr. Tom Ward, chair of EDIRC, at 757-221-2358 or EDIRC-L@wm.edu.

My signature below signifies that I am at least 18 years of age, that I have received a copy of this consent form, and that I consent to participate in this research study.

Signature of Participant

Date

Signature of Researcher

Date

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON 2019-06-08 AND EXPIRES ON 2020-06-08.

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Ed.D. – Planning, Policy, and Leadership, K-12 Administration and Supervision	
University of Virginia , Charlottesville, VA	2013
M.Ed. – K-12 Administration and Supervision	
Fairmont State University , Fairmont, WV	1995
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WORK EXPERIENCE

Director of Guidance	2018- Present
Guidance Counselor	2005- 2018
Director of Summer School	2005- 2015
Assistant Director of Admission	2002-2005
Teacher	2000-2002
Longwood University	
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