What can School Administrators do to Improve the Math Performance of Black Males?

Felix A. Addo

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

Doctor of Education
In
Educational Leadership and Policy Studies

William Glenn
Walter Mallory
Kami Patrizio
Margaret J. Barco

January 19, 2017
Falls Church, Virginia

Keywords: Algebra 1, Black male students, school leaders

What can School Administrators do to Improve the Math Performance of Black Males?

Felix A. Addo

ABSTRACT (Academic)

School administrators are charged with guiding, overseeing, and ensuring the successful education of all students. They use myriad techniques to this end, though not all students share in the success. For example, Black male students are more likely to underperform than are other groups of students, which places their academic and economic survival at risk (Kirsch, Braun, Yamamoto, & Sum, 2007). The focus of this study was on Black male student performance in Algebra 1.

Algebra 1 plays a pivotal role in academic success and is a leading indicator of a student's likelihood of success in advanced mathematics courses (Wang & Goldschmidt, 2003). Failure to learn and understand the content in Algebra 1 results in limitations on further mathematical opportunities in the short-term, which, in turn, reduces prospects for continued education beyond secondary school.

The purpose of this study was to examine and identify specific school leadership practices that influence and improve the Algebra 1 performance of Black male students. Interviews with principals, lead math teachers, and school counselors provided qualitative data related to school-level leadership practices. Additionally, I conducted document reviews of school newsletters, parent letters, robocall messages, lesson plans, and websites. Analyses of the interviews and documents revealed six themes: (a) effective instructional leadership, (b) culture of collaboration, (c) facilitation and scheduling, (d) parental involvement, (e) intervention and remediation, and (f) resources. This study has

implications and applications for the practices of school leaders, mathematics teaching and learning, and programs to support Black male students.

What can School Administrators do to Improve the Math Performance of Black Males?

Felix A. Addo

GENERAL AUDIENCE ABSTRACT

The Algebra 1 performance gap between Black males and their White counterparts has been well documented by statistical data from national assessment databases (i.e., National Center for Education Statistics [NCES]). Unfortunately, there have been few considerations as to how to combat the issue of low performance in mathematics, specifically Algebra 1, by Black male students. Improving the Algebra 1 performance of Black male students is a priority for many school leaders because of today's high stakes testing and accountability requirements.

The purpose of this study was to examine and identify specific school leadership practices that influence and improve the Algebra 1 performance of Black male students. Interviews with principals, lead math teachers, and school counselors provided qualitative data related to school-level leadership practices. Document reviews included the school newsletters, parent letters, robocall messages, lesson plans, and websites. Analyses of interviews and documents from two schools revealed six themes: (a) effective instructional leadership, (b) culture of collaboration, (c) facilitation and scheduling, (d) parental involvement, (e) intervention and remediation, and (f) resources. Themes are discussed to support the school leadership practices that improve the Algebra 1 performance of Black male students.

DEDICATION

This dissertation is dedicated to my wife, Shawn, for her love, support, and encouragement, and her belief in me that I can do anything that I put my mind to.

To my children, Jessie, Marshall, and Isum, that this inspires them to dream and pursue whatever they want in life.

To my parents, Daniel and Comfort Lartey, I am deeply grateful for you being the example for me. The long hours you worked so your children would have a decent childhood and opportunities.

To my sisters and brothers, Lydia Addo, Ivy Lartey, Irene Lartey, Eric Addo, and Isaac Lartey, for your prayers and support over the years.

Words cannot express how much I love you all.

ACKNOWLEDGEMENTS

First, I would like to thank my Lord and Savior, Jesus Christ, for his love, blessings, grace, and protection. I would like to thank my wife, Shawn, for her patience, encouragement, and support throughout this entire journey of my doctorate degree. Her presence, listening ear, watchful eyes, kind heart, and understanding kept me going when at times I didn't want to continue. Without her, I would not have been able to achieve this doctorate, and I am forever grateful for her sacrifice. I hope that my completion of this degree will inspire my children, Jessie, Marshall, and Isum, in their own education and endeavors in life. I hope to have modeled for them that hard work and effort pay off in achieving your goals.

I am deeply grateful to Dr. William Glenn, my dissertation advisor, for his thoughtful and steady guidance throughout this process. He challenged me to produce a dissertation that I would be proud of and Virginia Tech would also be proud of. I would also like to acknowledge the other members of my committee, Dr. Margaret J. Barco, Dr. Walt Mallory, and Dr. Kami Patrizio. All three took time from their busy lives and careers to encourage me, give me useful, detailed feedback, and all three supported me to the finish line.

I would like to thank my friends, Daria Groover and Clint Mitchell, better known as the "Oreo Consulting Firm," for the continuous laughter on our travels to and from each class and accepting nothing less than completion from me. The memories we created and shared will forever stay with me; so many days at Panera working on statistics, discussions about "sleeping monkeys," and "puppy love." Last, but certainly not least, I would like to acknowledge and thank my cohort members for the support and

encouragement I received. I will treasure the friendships I made throughout the program. I learned so much from each of you.

Rest in peace Carmen, you touched our lives in a mighty way.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I: INTRODUCTION

Statement of the Problem

In 1983, the National Commission on Excellence in Education reported on the trend of poor student performance in math and how the United States was falling behind other countries in the education of young people. The report highlighted deficits in the nation's failing education system that led to increased national attention and many educational reforms. One such reform came in 2001 when the federal government passed the No Child Left Behind (NCLB, 2002) legislation. NCLB required the gathering of data that showed considerable differences in achievement on national and state math standardized assessments between Black male students and their White counterparts. Despite this requirement, the National Governors Association Center for Best Practices and Council of Chief State School Officers (2010) reported that Black male students continue to lag behind their White counterparts in math performance.

Black male students continue to face many obstacles (e.g., basic skills, instruction, support and curricular materials) that hinder their success in mathematics. Some students are able to overcome these obstacles through persistence and exhaustive work, while others continue to struggle, become frustrated, and give up. Research is abundant on the varied deficits that cause students to struggle with math, specifically Black male students (Cheema & Galluzzo, 2013; Kannapel & Clements, 2005; Russo, 2006; Scafidi & Bui, 2010). Successful strategies to combat these complex and myriad reasons are limited. This problem of poor performance by Black males on mathematics standardized tests is not a new area of concern. Therefore, the question becomes, what can school leaders do to combat this issue?

As a high school math teacher, I have found that many students enrolled in Algebra 1 lack the required basic math skills to be successful in the course. As a result of students' lack of a strong foundation of math principles, the majority of instructional time is spent on remedial lessons designed to allow students to grasp number sense, increase mathematical language register, and improve computational skills. Without strong math skills, many Black male students are being condemned to a life of limitations. Increasing the success of Black male students in math will lead to stronger, more productive communities; increased skill sets; reduced unemployment; and avenues opened to additional opportunities and improved sense of worth (Kirsch, Braun, Yamamoto, & Sum, 2007).

Background of the Problem

For decades, researchers have focused on the factors that impede student achievement in math (R. M. Capraro & Capraro, 2006; Hanich & Jordan, 2004; Osterholm, 2006), but little attention has been given to how to combat poor math performance. Researchers (R. M. Capraro & Capraro, 2006; Hanich & Jordan, 2004; Osterholm, 2006) have documented reasons for the low performance in mathematics by children such as deficits in reading comprehension, student self-efficacy, and prior knowledge (R. M. Capraro, Capraro, & Rupley, 2012; Cheema & Galluzzo, 2013; Grimm, 2008). Reading comprehension plays a big role in math proficiency because children with mathematical difficulties and reading difficulties progress academically at a slower rate than children with only mathematical difficulties or children without any difficulties (Hanich, Jordan, Kaplan, & Dick, 2001).

Hailikari, Nevgi, and Komulainen (2008) found that prior mathematics success was consistently associated with mathematics achievement. Wang and Goldschmidt's (2003) investigation of math course selection showed that there were significant differences in math course selections by race. For example, Black male students were overrepresented in remedial math courses and underrepresented in high-level math courses compared to their White peers. These factors present challenges for school leaders and teachers in addressing the performance gap of Black male students.

The National Council of Teachers of Mathematics (NCTM), National Center of Education and the Economy (NCEE), National Mathematics Advisory Panel (NMAP), and National Association of Elementary School Principals (NAESP) have all suggested instructional practices for teachers to use in the classroom to improve student math achievement. The majority of nationally recognized organizations and policy reports indicate teachers should use multiple instructional strategies to improve math performance. However, teachers are uncertain about which instructional strategies work best to improve students' math achievement (Rakes, Valentine, McGatha, & Ronau, 2010). Research shows school leadership plays a vital role in student performance. Marzano, Waters, and McNulty (2004) studied principal practices that improve student learning and suggested 21 responsibilities that are associated with student learning. Key responsibilities of the principal include creating a collaborative culture, focusing on the right work, and supporting students and teachers. Teachers will need the support of committed school leaders to help improve students' math performance.

Significance of the Study

Schools continue to struggle to meet testing benchmarks, especially schools with a large percentage of Black male students. These Black male students continue to perform poorly in mathematics standardized assessments compared to their White peers (Cheema & Galluzzo, 2013; Wei, Lenz, & Blackorby, 2012). Though NCLB (2002) mandates that schools must raise learners' test scores each year, many schools are failing to increase Black male students' mathematics performance (National Center for Education Statistics [NCES], 2013).

Research indicates school administrators' leadership to be the second most impactful factor in student academic success (Leithwood, Harris, & Hopkins, 2008). The first factor is the instructional teacher. As such, researchers have found that successful school administrators engage in certain school-related activities that affect student achievement (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004; Symonds, 2004). However, research focusing on how school administrators can improve the math performance of Black males is scant. With this in mind, I wanted to add to the body of current literature and present school administrators with information about the school leadership practices that most positively influence both teachers and Black students, and ultimately improve math performance.

Purpose of the Study

The purpose of this study was to investigate school-level leadership practices that influence and improve the math achievement of Black male students. I employed a mixed methods research approach to study two high schools that have demonstrated gains in the Algebra 1 performance of Black male students for 3 consecutive years. Results

revealed the specific leadership practices that influenced Black male students' success in Algebra 1 as well as classroom instructional strategies and support services. I used Virginia Standards of Learning (SOL) Algebra 1 data to identify the schools for this study with the following criteria: (a) approximately 30% Black student population, and (b) 3 consecutive years of increased performance by Black males in Algebra 1 on the Virginia SOL assessment. After selecting the schools, I conducted interviews with school leaders and reviewed documents to find answers to the research questions.

Research Questions

The focus of this study was on how the leaders at the selected schools contributed to the improved mathematics performance of Black male students. The research questions were:

1. What role did school leaders play in improving Black male students' Algebra 1 performance?
    a. What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?
    b. What strategies did school leaders undertake to help Black male students' Algebra 1 performance?
    c. What additional strategies did school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?

Definition of Terms

Algebra – a mathematics course required to be successfully completed by middle and high school students that deals with variables and rules to describe relationships

Instructional strategies – a variety of approaches a teacher uses in the classroom to get students to understand and apply the given material.

Mathematics course taking – sequential mathematics course assignments for students.

Mathematical difficulties (MD) – incomplete understanding of the language of math, deficits in computation, transferring knowledge, and making connections.

Mathematics self-efficacy – a student's beliefs or perceptions with respect to his or her abilities in mathematics.

ParentVue – an online tool to help parents monitor their child's education.

Prior knowledge – what a student already knows about the content.

Reading comprehension – the ability to understand and interpret a written passage.

Reading difficulties (RD) – students forgetting what they have read, losing their place while reading, or having the inability to focus and understand the point.

School leaders – educational administrators and professionals who influence groups of people and play key roles in improving Black male students' performance in Algebra 1.

Subgroups – segments of the student body that are identified based on race, ethnicity, educational background, special needs, and socioeconomic status.

Virginia Standards of Learning – expectations for student learning and achievement in grades K-12 in English, mathematics, science, history/social science, technology, the fine arts, foreign language, health and physical education, and driver education.

Limitations of the Study

This study was population and location specific as a result of using the mixed methods approach. Therefore, the findings might not be able to be generalized to other ethnicities or the broader population. However, the findings may still be transferable as they can help school leaders implement proven strategies and practices to improve the Algebra 1 performance of Black males.

Another limitation of this study was the use of only one form of standardized assessment—the Virginia SOL—to determine each school's Algebra 1 performance by Black males. The use of additional standardized assessments to identify schools with consistently high performance in Algebra 1 by Black males could have strengthened the selection sites.

Delimitations of the Study

The study purposely did not cover all math courses offered in high school and was limited to Algebra 1. The consensus of educators and researchers is that success in Algebra 1 leads to success in higher level math courses (Kirsch et al., 2007; Vogel, 2008). Additionally, the data collection was restricted to Black male students, school principals, counselors, and lead math teachers. The rationale, limitations, and strengths for the selection of Algebra 1, Black male students, school principals, counselors, lead math teachers, a mixed methods case study, and the data collection instruments are discussed thoroughly in Chapter II and Chapter III.

Procedures

I identified two high schools based on their students' math SOL performance. The schools had to have 3 consecutive years of Algebra 1 improvement by Black males.

I used a qualitative research method to study the schools through interviews with school administrators, counselors, and lead math teachers. Additionally, I conducted document reviews in each school to gather quantitative data. Finally, I analyzed the data and organized them into themes, which I then examined for patterns. Based on the patterns that emerged from the themes, findings were discovered for each research question.

Summary

This study involved an investigation of what school administrators can do to improve the math performance of Black males. This chapter contained a description of the problem and its background, as well as an explanation of the purpose and significance of the study. Additionally, Chapter I contained the research questions, definitions of terms, procedures, and limitations of the study. The second chapter consists of a review of related literature, including reasons students struggle with mathematics, instructional strategies that work, and leadership practices related to improved student academic performance. The third chapter contains a presentation of the research design, data collection instruments, and data analysis procedures. The fourth chapter presents the findings that emerged from the data collected and analyzed. In the final chapter I share the lessons learned as a result of this research.

CHAPTER II: REVIEW OF RELATED LITERATURE

Research shows that Black male students continue to lag behind in math performance when compared to their White peers (Cheema & Galluzzo, 2013; Scafidi & Bui, 2010; Wei et al., 2012). Longitudinal data from the NCES indicate that between 2009 and 2013, Black male students' progress percentile result remained flat (defined as students scoring above the 75th percentile on the math portion of the NCES). The difference in the national scale score was 25 points between Black male students and their White counterparts (NCES, 2013). Wisconsin and the District of Columbia are jurisdictions that have seen an even more significant gap in scale scores of 36 and 55, respectively (NCES, 2013).

Although much emphasis has been placed on improving the academic success of Black male students since the 1990s (Aud et al., 2010), the statistical data from a national assessment database indicate there is a lag in academic performance by Black male students compared to their White counterparts (NCES, 2013). Years of research in this area have produced few solutions to this mathematical crisis (NCES, 2001; NCTM, 2000; National Research Council, 2001).

As Black male high school students continue their educations and their lives, there is no escaping math, so it will be of great benefit to them and their goals to master the subject. As their future success relies largely on their mathematical proficiency, the attainment of these needed skills should not be left to chance (NCES, 2001, p. 42). Mathematics is everywhere and an integral part of adult life so it is imperative that Black male students are equipped with these skills to position themselves to take advantage of opportunities and successfully function in society. Students who master math skills,

particularly in algebra, are more likely to experience success in postsecondary education and in their careers (Vogel, 2008).

The NCLB federal legislation of 2001 forced states, school districts, administrators, and teachers to be held accountable for improving student performance on standardized tests. Data collected from each state's standardized testing revealed an achievement gap in mathematics tied to socioeconomic status and children with disabilities (NCES, 2013). The NCES (2013) concluded that even though there have been achievement gains by minority groups, specifically Blacks and Latinos, when compared to their White counterparts, the mathematics achievement gap is as large today as it was in 2000. Researchers are trying to address the intricate problem of why students struggle with math achievement while educators and administrators wrestle with the question of what can and must be done to improve Black male students' success (Harper & Kuykendall, 2012, p. 23).

Researchers have documented the reasons for the low performance in mathematics by children (R. M. Capraro & Capraro, 2006; Hanich & Jordan, 2004; Osterholm, 2006). However, there have been few considerations as to how to combat the issue of low performance, specifically by Black males (M. M. Capraro & Joffrion, 2006; Geary, 2011). School administrators can play a pivotal role in addressing and improving the math performance of low performing students, and specifically Black males, in high school (Kannapel & Clements, 2005; Russo, 2006). In order to provide the types of leadership activities and practices that will significantly improve the performance of Black males, it is important to have a thorough understanding of what researchers have determined are factors that contribute to poor mathematics performance. Further, it is

important to have a firm understanding of what researchers believe to be effective instructional strategies to combat this issue. Finally, a review of what school administrators have done to improve student achievement is vital. This review of related literature surrounds the underlying reasons for low mathematical achievement and effective strategies that help improve the math achievement of Black male students.

Why Children Struggle in Mathematics

In the beginning stages of research on mathematics achievement, many researchers focused on factors that impede students' mathematical achievement (Grimm 2008; Hanich & Jordan, 2004; Metallidou & Vlachou, 2007; Osterholm, 2006) and very few solutions were explored (M. M. Capraro & Joffrion, 2006; Jordan, Kaplan, & Hanich, 2002). One factor that received a lot of attention from researchers was the relationship between mathematical difficulties and reading ability (Cheema & Galluzzo, 2013). Other factors that impeded students' mathematical achievement were prior knowledge (Hailikari et al., 2008), prior selection of math courses (Wang & Goldschmidt, 2003), motivation, interest, and achievement-related beliefs (Koller, Baumert, & Schnabel, 2001; Metallidou & Vlachou, 2007; Schiefele, Krapp, & Winteler, 1992).

Reading Comprehension

Research has shown that reading and comprehension skills are fundamental for children to experience academic success in school and specifically in math (R. M. Capraro et al., 2012; Osterholm, 2006). Hanich et al. (2001) examined second-graders with difficulties in mathematics only (MO) and difficulties in both mathematics and reading (R+M). The authors included children with reading difficulties only and normal

achieving students (NA) as comparison groups. The data indicated that on basic calculation and problem-solving, the R+M group performed significantly lower than the other three groups, while the MO group performed significantly lower than the NA group. The assessment of written multi-digit computation, place value, and approximate arithmetic showed that the NA group outperformed the R+M and MO only groups. There was no significant difference in performance results for the R+M and MO only groups (Hanich et al., 2001). Similarly, Fuchs and Fuchs (2002) found that children with math difficulties with or without reading difficulties showed a decline in performance as problem-solving tasks became more difficult.

Reports from a number of studies indicated that children with MO grow at a faster rate in math achievement than children with R+M (R. M. Capraro & Capraro, 2006; Jordan et al., 2002). In the arena of connections between instructional strategies and math achievement, R. M. Capraro et al. (2012) found that the use of "word identification and vocabulary, language structure, fluency, text organization and summarization" (pp. 104-106) helped to improve mathematical knowledge. On the other hand, Osterholm (2006) investigated how reading mathematical texts with mathematical symbols and reading mathematical texts without mathematical symbols affected reading comprehension. Osterholm concluded that there was no significant difference in reading comprehension of text with symbols of groups with similar prior knowledge; however, there was a significant difference in the reading comprehension of text without symbols.

Research into the relationship between reading comprehension and math achievement led Grimm (2008) to investigate whether children in elementary school who have a higher level of reading skills make greater gains in mathematics. Grimm

concluded that students with higher levels of reading comprehension had greater gains in mathematics into middle school than students with lower levels of reading comprehension. Similarly, Morgan, Farkas, and Wu's (2011) key findings (using data from the Early Childhood Longitudinal Study – Kindergarten Cohort) indicated that by the end of the fifth grade, children in kindergarten who performed well on reading and mathematics achievement assessments had significant gains over and above their peers who performed at a much lower level in kindergarten. Kirsch et al. (2007) inferred that because this pattern continues to play out over the academic life of a student, failure to master reading and basic mathematics skills can negatively affect the child's academic future, personal life, and professional life. However, the exact component of reading that contributes to children's math success continues to be debated.

Osterholm (2006) pointed out that researchers should focus more attention on "how the limitations in reading ability affect learning in mathematics or on readers' misunderstanding of a written task and how this can influence the solving of the task" (pp. 325-326). Similarly, R. M. Capraro et al. (2012) shared that math success may depend on dealing with the specific reading issues or limitations associated with mathematics. In the special education domain, the National Association of School Psychologists (NASP, 2003) stated that over 80% of children identified as having "specific learning disabilities have a disability in the area of reading" (p. 1). While reading comprehension can be seen as one important part in improving students' mathematics achievement, Wang and Goldschmidt (2003) suggested that another important factor that has a great impact on student math performance is prior math courses taken.

For Black students, reading performance data continue to indicate performance below proficient levels at far higher rates than their peers (J. Lee, Grigg, & Dion, 2007). In 2007, the NAEP reading assessment data of fourth-graders and eighth-graders indicated that 14% of Black students scored at or above proficient levels compared to 43% of White students. The data also indicated that 54% of Black fourth-graders read below grade level. In 2011 and 2013, results showed similar performance gaps by Black fourth-graders, eighth-graders, and 12th-graders compared to their White peers. Researchers have concluded that stronger reading ability is correlated to better mathematics performance but the correlation is not a strong one, leaving a high percentage of variation unaccounted for (Rutherford-Becker & Vanderwood, 2009; Villa, 2008). Unfortunately, there is a lack of studies on the correlation between Black students' reading ability and their mathematics performance. Therefore, it is within reason to infer that the lower reading ability of Black students most likely affects their math ability.

Course Selection

Researchers have indicated that course selection is related to achievement (Ballón, 2008; Hailikari et al., 2008; Kelly, 2009). The relationship between advanced and non-advanced course offerings and student achievement is impossible to measure directly because researchers cannot analyze a student's math achievement concurrently in both situations (Leow, Marcus, Zanutto, & Boruch, 2004). Leow et al. (2004) assessed the effects of advanced course completion in math and achievement through the use of a propensity score to correct for any selection bias or background variables. According to Leow et al., a "propensity score sub classification is first used to match students based on

their observed background variables" (p. 463). Based on the data set from Trends in International Mathematics and Science Studies and after controlling for selection bias, the researchers concluded that students taking advanced level courses had consistently higher achievement than students taking non-advanced level courses. As a result, they posited confidently that taking advanced math courses was associated with increased scores on basic achievement tests (Leow et al., 2004, p. 477). They stated that they used observational data only and cautioned readers that without an experimental study, a causal link between course selection and achievement cannot be established. In addition, the results may not generalize to students who are non-White, those with no educational expectations for college completion, and those who are not living in a two-parent household. According to the researchers, the findings were most likely related to background factors and previous learning experience associated with course selection patterns. Similarly, V. E. Lee, Burkman, Chow-Hoy, Smerdon, and Geverdt (1998) investigated the effects of the sequential basis of the high school curriculum and math achievement by the end of high school. Based on the data collected and analyzed, the authors found a consistently strong relationship between students who finish high-level mathematics courses and achievement. Yet, certain minority groups are overly underrepresented in the high-level mathematics course track, thereby hindering their learning trajectory (Wang & Goldschmidt, 2003).

Previous research has clearly shown that Black students take fewer advanced level math courses than their White counterparts (NCES, 2001; Wang & Goldschmidt, 2003). This could be attributed to the poor performance by Black students in prior math courses. Ballón (2008) investigated the relationship between prior middle school math

course completion and high school math tracking assignments into college preparatory courses or honors courses. Ballón concluded that when prior math achievement was controlled, Whites and Asian Americans were overrepresented while Blacks were underrepresented in college and honors track math courses. Additionally, students taking Algebra 1 in middle school were more likely to later enroll in college preparatory and honors math courses.

Similarly, Wang and Goldschmidt (2003) concluded that there were significant differences in math course enrollment by race. African American students were overrepresented in remedial classes and underrepresented in advanced courses compared to their White peers (p. 8). Kelly (2009) examined the gap in mathematics courses taken by White and Black students and found that White students tend to be represented in higher level math courses twice as much as Black students (22.1% to 11.9%, respectively). Additionally, Black students are more likely to take lower level math courses than their White peers (56% to 34.3%, respectively). This significant gap was similar from school to school, especially schools where Black students were in the minority (Kelly, 2009, p. 58).

Tracking

With research exposing the glaring overrepresentation of Black students in lower level math classes, the relationships between mathematics performance, race, and academic tracking have received much attention from researchers (Ballón, 2008; Mickelson, 2001; Welner, 2001). Mickelson (2001) investigated whether Black students with comparable prior mathematics achievement in elementary school were on the same course tracks in high school as their White counterparts. After controlling for family

background and individual characteristics, results showed that Black students who attend and are educated in a racially isolated elementary school experience negative consequences on achievement and track placement (p. 229). The author found that prior achievement was the most powerful predictor of track placement (.442 and $p<.001$) along with a student's cumulative grade point average (.398 and $p<.001$). The author also found that Black students are overrepresented in lower tracks (i.e., remedial and regular courses) and underrepresented in higher tracks (i.e., AP / IB) while their White counterparts are overwhelmingly overrepresented in higher track courses. After controlling for prior achievement, the results remained the same.

Similarly, Welner (2001) conducted a case study of four school districts facing potential legal action on school reform de-tracking to provide better educational opportunities to benefit Black students. The author concluded that there are powerful forces (e.g., parents, policies, groups, tradition) in play to derail any efforts to reform schools in improving the academic performance of Black students. Welner further suggested that those trying to bring about school reform against all odds should be aware of local practices, established norms, and court decisions on school reform to help their efforts. Ballón (2008) found that even after controlling for "prior math achievement, pre-high school composition, student coursework, racial/ethnic discrepancies in track assignment remain unexplained" (p. 285), Black students were underrepresented in college mathematics tracks compared to their Asian and White counterparts.

Wei et al. (2012) examined students with disabilities and their math achievement trajectories by race, gender, and socioeconomic status. The authors found that Black and Hispanic students identified with disabilities performed significantly lower than their

White counterparts on applied problems and calculation problems at age 13. The achievement gap between Whites and Blacks remained constant from ages 7 to 17. Wang and Goldschmidt (2003) investigated how the courses taken by students in middle school affect their high school mathematics growth and achievement. The data from this study showed a significant overrepresentation of White and Asian students taking advanced courses compared to Black students. Conversely, more Black students were enrolled in remedial courses compared to their White and Asian counterparts. When gender was considered, there was no significant difference between boys and girls registered for regular and advanced courses, but boys more heavily populated remedial courses. Course selection is not the only factor that affects students' mathematics achievement. Prior academic success also affects mathematics achievement.

Prior Academic Achievement

Prior academic achievement is the strongest predictor of mathematical achievement, according to ACT (2007). Wang and Goldschmidt (2003) investigated how the courses taken by students in middle school affect their high school mathematics achievement and found that mathematics success in middle school has a substantial impact on high school mathematics achievement. Students who were registered in remedial math courses in eighth grade performed significantly lower in math courses taken in high school than students who were enrolled in regular math courses (Wang & Goldschmidt, 2003, p. 13), while students who were registered in advanced math courses performed better in math courses taken in high school than students who were enrolled in regular math courses (p. 13). Similarly, Murray's (2013) results showed a significant

relationship between students' prior mathematics performance with a correlation of *r* of .553 and first year college math course performance.

Hailikari et al. (2008) investigated the relationships between prior knowledge, academic self-efficacy, success in prior courses in mathematics, and achievement. The researchers concluded that prior knowledge was the strongest predictor of student achievement in mathematics. On the other hand, R. A. Thompson and Zamboanga (2004) suggested that erroneous prior knowledge could impede students' learning and understanding of new information. Along with prior academic achievement, self-efficacy has also been found to affect math achievement significantly (Metallidou & Vlachou, 2007; Usher & Pajares, 2009).

Students' Self-Efficacy and Math Performance

Self-efficacy has been identified as having a significant impact on mathematics achievement (Pajares & Schunk, 2001). The subgroup of Black students with disabilities tends to display negative self-efficacy related to mathematics (Cheema & Galluzzo, 2013; Scafidi & Bui, 2010; Wei et al., 2012). Research completed from the 1980s through the 1990s referenced the definition of self-efficacy theorized by Albert Bandura (1986) as "the belief in one's capabilities to organize and execute the courses of action required in managing prospective situations" (p. 391). Simply put, self-efficacy refers to an individual's belief in his or her ability to do well in different situations. These beliefs shape how people think, feel, and act (Bandura, 1993). Usher and Pajares (2009) hypothesized that not only do the successful results of one's actions build self-efficacy, observing the results of other people's experiences also has an impact. Nicolaidou and

Philippou (2003) found that self-efficacy plays a significant role in achievement motivation and learning attitude.

Bandura (1997) posited that self-efficacy is influenced by four sources: mastery experiences, vicarious experiences, social persuasions, and physiological and emotional stimulation. Bandura explained that mastery experience relates to an individual's successful accomplishment of a task. This reinforces his or her sense of self-efficacy. Conversely, not succeeding at a task will weaken self-efficacy. Vicarious experiences result when an individual observes others complete a task and the resulting success or failure affects his or her self-efficacy. According to Redmond (2010), social persuasions such as positive and negative praise tend to influence self-efficacy. Of the four sources, social persuasion is probably the most commonly used to motivate and improve individual skills. According to Pajares (2002), emotional stimulation refers to the stress and anxiety a person places on him or herself that can inhibit his or her ability to perform a task. Therefore, fearful, stressful, and anxiety-filled situations and how an individual reacts to them can greatly change self-efficacy (Bandura & Adams, 1977).

Margolis and McCabe (2006) concluded that students who do not have confidence in their ability to achieve academic success (i.e., poor self-efficacy) would ultimately demonstrate poor academic achievement and poor academic performance would become their norm. A fifth and equally important factor in a student's academic success is motivation. Metallidou and Vlachou (2007) found motivation to be significant with age but not with gender. Younger children showed more motivational beliefs in the areas of language compared to older children. Older children displayed more test anxiety than younger children. The researchers stated that it is undeniable that motivational

beliefs are mandatory for learning. In addition, Hanich and Jordan (2004) suggested "there are motivational and achievement consequences to children's self- perceptions and perceptions are important predictors of future achievement behavior" (p. 232). Children who are motivated to perform a task will usually do better than unmotivated children (NASP, 2003; Schunk, 2008). According to Koller et al. (2001), unmotivated students negatively affect their own achievement.

In the past 2 decades, very few researchers have explored the self-efficacy of Black students (Eccles, Wigfield, & Sehiefele, 1998; Noble, 2011). Hibbs (2012) investigated the self-efficacy of Black students, comparing those with successful academic experiences to those with poor academic experiences. The researcher found that students with repeated experiences of failure in a math class tended to view themselves as incompetent in mathematics. Additionally, negative vicarious experiences in mathematics by family members were reported by these same students. Noble (2011) reviewed stories of self-efficacy by Black men who had experienced success in secondary mathematics and its impact on their postsecondary mathematics. The researcher found that their vicarious experiences had the largest influence on their mathematics experience. Additionally, a teacher's high demand for success in academic classes had a significant positive impact on the participants' perceptions of their math abilities.

Similarly, Berry (2008) communicated the story of eight middle school Black boys who were successful in mathematics. Five themes materialized from an analysis of data from the eight students and their families that contributed significantly to the students' success: (a) early educational experiences, (b) recognition of abilities and how they were achieved, (c) support systems, (d) positive mathematical and academic identity,

and (e) alternative identities. Based on these five themes, Berry concluded "programs that specifically target the early schooling experiences for Black boys should be considered and educators should become more cognizant of their power to influence or deny access to academic opportunities for Black boys" (pp. 484-485). Additionally, "raising the consciousness of educators, parents and the public about the performance of Black boys must become a significant priority" (p. 484).

Likewise, L. R. Thompson and Lewis (2005) conducted a case study on the quest of a high school student-athlete named Malik to push school administrators to offer a pre-calculus/calculus course to students willing to take high level mathematics courses. Based on the analysis of the data, the researchers concluded that the math success experienced by Malik could be attributed to advanced mathematics enrollment, the relationship between advanced course enrollment and career goals, deep seated goals, and role models. The results of the study led by L. R. Thompson and Lewis indicated that future researchers should focus on: (a) the relationship between the limited availability of advanced mathematics courses offered to Black students and advanced course enrollment, (b) the relationship between advanced mathematics enrollment and science-related career attainment, and (c) the relationship between role models and students' academic achievement.

Across the United States, Black students continue to underperform on mathematical standardized assessments (NCES, 2013). Recent studies into the effects of gender, race, and socioeconomic status on academic performance revealed that Black and Hispanic students continue to lag behind their White peers in math performance (Cheema & Galluzzo, 2013; Scafidi & Bui, 2010; Wei et al., 2012). Poor performance in

mathematics is shared among all subgroups, according to the Programme for International Student Assessment (2012). Years of statistical data and research on mathematics achievement led Stein, Kaufman, Sherman, and Hillen (2011) to suggest future researchers should focus on instructional strategies coupled with student performance results.

Instructional Approaches

As teachers prepare students to master the principles and standards of mathematics for today's high stakes testing, they must find and implement research-based instructional practices that will help students improve their mathematics performance. According to Rakes et al. (2010), mathematics readiness has received little attention by mathematics education researchers when analyzing the instructional practices that are effective in improving student learning.

Explorations into the relationship between reading comprehension and math achievement have revealed some promising results. R. M. Capraro et al. (2012) examined a compilation of studies and research that showed reading comprehension and fluency in mathematical texts enhanced math achievement. The authors proposed a theoretical model of how to help students with mathematical difficulties when solving word problems. Recognizing patterns and cognitive component are multi-layered skills of the theoretical model. These skills involve word identification, vocabulary, semantics/syntax (language structure), songs, rhymes, repeated reading, verb, and subject/noun (p. 101). R. M. Capraro et al. concluded that the model addresses teaching and learning on the elementary level. Moreover, it will assist teachers to better guide students who have difficulties in mathematical problem-solving. Similarly, Silver and

Stein (1996) found that instructional approaches concentrated on problem-solving tasks, student thinking, and discussion led to higher scores for students on standardized tests.

One of the major shifts in mathematics instructional approaches has been increased real life application of the objectives (NCTM, 2006; NCLB, 2002). R. M. Capraro and Capraro (2006) examined how a teacher used children's books to make connections in teaching a unit on the relationships between radius, circumference, and diameter in a geometry class. The authors concluded that data from the posttest showed the class that used the stories made great gains while both of the non-story classes made modest gains. The researchers reported that student interviews showed the students who made real life connections were better able to secure an understanding of mathematical words (p. 32).

Recent studies indicated that teacher-directed instructional practices are associated with high student achievement gains for first- and second-graders with or without prior mathematical difficulties (Morgan, Farkas, & Maczuga, 2014; NCEE, 2013). The National Center for Education Evaluation issued an evaluation brief about the instructional practices that improve student math achievement in first and second grade (Clements, Agodini, & Harris, 2013). Researchers found that certain instructional strategies had a significant impact on student math achievement for all learners (statistically significant at the 0.10 level), specifically modeling mathematical representations, offering specific strategies as corrective feedback on students' work, soliciting responses from students if they agree with another student's answer, differentiated curriculum for high achieving students, and whole-class instruction (p. 8).

Additionally, the researchers suggested that these instructional strategies could be effective in other grade levels when modified (p. 10).

Morgan et al. (2014) conducted a study on the instructional practices that best improve the math achievement of first- and second-graders with or without math difficulties (MD or non-MD). Results from this study showed that teacher-directed instruction had a positive influence on student gains in mathematics by both MD and non-MD students and student-centered instruction had a positive influence on student gains for non-MD students only.

Prior to these studies, Xin et al. (2011) conducted a study into the effectiveness of two instructional strategies believed to improve proficiency in multiplication and division word problems. These are readiness skills needed for Algebra 1 success. Yan Ping Xin created a conceptual story problem-solving approach called Conceptual Model-Based Problem Solving (COMPS) for one group and then utilized a traditional problem-solving instructional approach, general heuristic instruction (GHI), with the other group. According to Xin (2008), "Unlike the rule-driven or arithmetic-oriented approach, COMPS requires expression of mathematics relation in a generalizable conceptual model (e.g., factor-factor-product; it does not rely on solution rules but rather directly drives the selection of the operation for solution" (p. 429). Results showed that the COMPS group improved significantly more than the GHI group from pre- to posttest. The researchers concluded that this study supports prior studies in special education that showed students with math difficulties learn best with explicit instruction and a focus on conceptual understanding.

As students learn to fully understand how to translate mathematical words to mathematical symbols (M. M. Capraro & Joffrion, 2006), it is important to provide multiple instructional strategies, according to Lynch and Star (2013). In their exploratory study, Lynch and Star interviewed middle school students who were having difficulties in mathematics to gain insight into their views about learning multiple strategies to solve mathematical problems. The researchers found that a majority of the students preferred learning multiple strategies and when multiple strategies were used there was noticeable improvement in attitude, understanding of important concepts, problem-solving achievement, and reflective practice. Lynch and Star concluded that learning multiple ways of solving a problem has more advantages than disadvantages for students having mathematics difficulties.

Nationally recognized organizations and policy reports such as those authored by the NCTM (2006), the National Research Council (200l), the National Governors Association Center for Best Practices (2010), and Common Core Standards all emphasize the importance of incorporating multiple teaching strategies in the classroom. Similarly, Star and Rittle-Johnson (2008) pointed out that the practice of teachers using multiple strategies to teach students how to solve problems supports improved student success rates. They concluded that "both teacher-directed and student discovery learning of multiple strategies improved knowledge development in equation solving" (Star & Rittle-Johnson, 2008, p. 574). A review of 82 relevant studies by Rakes et al. (2010) surrounding the relationship between instructional practices and student achievement in algebra revealed five categories of intervention used to improve student achievement: the implementation of new curricula, technology-based curricula, instructional strategies,

manipulatives, and technology tools. The researchers found that all five categories exhibited average effect sizes in one model.

The Education Alliance's (2006) extensive review of multiple research studies on best instructional practices in mathematics endorsed the following: focus lessons on specific concepts and skills that are standards-based, differentiate instruction through flexible grouping, individualize lessons, use compacting, use tiered assignments, and vary question levels. The researchers suggested that teachers must ensure that instructional activities are:

> Learner-centered and emphasize inquiry/problem-solving use experience and prior knowledge as a basis for building new knowledge; use cooperative learning strategies and make real-life connections; use scaffolding to make connections to concepts, procedures, and understanding; ask probing questions which require students to justify their responses and emphasize the development of basic computational skills. (Education Alliance, 2006, p. 17)

Another study conducted by the National Center for Educational Achievement (NCEA, 2009) on higher performing schools in California, Florida, Massachusetts, Michigan, and Texas found similar instructional strategies in use as those recommended by the Education Alliance (2006). The researchers found that these schools showed a "high level of student engagement, demanded higher-order thinking and followed an inquiry-based model of instruction – including a combination of cooperative learning and direct instruction" (p. 24). These practices were tied to the utilization of "labs or hands-on investigations and manipulatives; connect to students' prior knowledge to make meaningful real-world applications and integrate literacy activities into the courses –

including content-based reading strategies and academic vocabulary development" (p. 24).

Similarly, Hattie (2008) synthesized over 800 research studies on teaching and student achievement and found the following teaching strategies had medium to high effect sizes range from 0.33 to 0.77 on learning outcomes: using simulations and gaming, teacher expectations, phonics instruction, providing worked examples, direct instruction, cooperative learning, concept mapping, teacher–student relationships, reciprocal teaching, and feedback. Despite the great deal of evidence showing the importance of using multiple strategies and good instructional practices, they are not being used with fidelity to the detriment of many students, specifically Black male students (NCES, 2013).

What Instructional Strategies Work Best for Black Males?

Researchers have looked at the instructional strategies that improve Black male students' academic achievement (Battey, 2013; McKinley, 2007; Wilson-Jones & Caston, 2004). Wilson-Jones and Caston (2004) examined the relationship between cooperative learning and the academic success of Black males in Grades 3 through 6 and found that students favor group work with peers and project assignments. Additionally, Black males desire limited interaction with their teachers and prefer their teachers to act as a facilitator (Wilson-Jones & Caston, 2004, p. 282). McKinley's (2007) study on raising the achievement of Black male students showed that 42 strategies had a significant impact on increased student achievement. McKinley concluded that teachers must use interdisciplinary lessons, engage in collaborative team teaching, and use curriculum materials that describe historical, social, and political events from a wide range of racial,

ethnic, cultural, and language perspectives. Additionally, teachers must call on every student regularly; frequently call for extended substantive oral and written responses; promote a group-centered collaborative approach toward learning; incorporate student preference for oral and verbal expression; and engage all students by using meaningful, relevant, and challenging curriculum, content, and instructional activities. Finally, using speech and expressions familiar to students and providing small group instruction in cooperative and problem-solving groups are important. As a result, McKinley suggested a teacher who models an "attitude of hope and optimism and develops positive personal relationships with students" (Figure 1) will greatly improve his or her students' achievement.

Recent studies have been conducted to investigate how relationships improve student achievement. Battey (2013) examined how relational interactions between teachers and students during instruction affect student performance and concluded that positive teacher relational interactions with students during mathematics instruction had a significant impact on student performance in several ways, including "through addressing behavior, framing mathematics ability, acknowledging student contributions and attending to language and culture" (p. 142). D. B. Martin (2012) suggested that teachers, researchers, and educational leaders must consider "Black children's social realities and how forces, discourses, and ideologies in the larger society influence those realities" (p. 60).

School Leadership's Influence on Student Achievement

The relationship between school leadership and student achievement has been studied with mixed results (Ash, Hodge, & Connell, 2013; Leithwood et al., 2004).

Leithwood et al. (2004) stated that the quality of instruction was first and school leadership was second in student learning and achievement. School-level administrators do not have a direct impact on student achievement but indirectly affect achievement through their guidance of teachers (Ten Bruggencate, Luyten, Scheerens, & Sleegers, 2012). Researchers have found that successful school administrators engage in certain school-related activities that affect student achievement (Leithwood et al., 2004; Symonds, 2004).

For example, Carter (2000) used a case study to share the story of 21 high-performing, high-poverty schools that utilized effective practices to ensure student success. These schools had leaders who established a culture of high expectations and standards for all. This culture acted as an incubator for increased math achievement for all students. Based on the data analysis from all 21 schools, five effective practices emerged that made the schools successful: (a) parental accountability, (b) teacher quality, (c) effective diagnostic testing, (d) an emphasis on basic skills, and (e) the effective allocation of funds. Because of these themes, Carter suggested other school reform models for readers such as Roots and Wings, Modern Red School House, and Success for All.

Symonds (2004) used case studies to investigate school-level policies and strategies that help close the achievement gap. Results from a survey of 32 K through 8 schools in San Francisco showed there were significant differences in school-level policies and instructional strategies between gap-closing schools and non-gap-closing schools. The differences between the schools were grouped into three categories: (a) teacher support for the use of data, (b) leadership for equity, and (c) school focus. Based

on these categories, Symonds concluded that teachers in the gap-closing schools frequently used data to understand the gaps in the skills of low performing students and administered frequent assessments of students. Additionally, teachers collaborated with peers to analyze student data, received professional development linking low-performing student data with instructional strategies, and had school leaders who encouraged and led with a focus on closing the gap. According to Russo (2006), school leadership is a key component in improving students' academic progress.

The relationship between the practices of school-level administration and student achievement has recently received some much needed attention from researchers (Dufour & Mattos, 2013; Shatzer, Caldarella, Hallam, & Brown, 2013). Marzano et al. (2004) examined years of research on the relationship between school leaders and student achievement. The researchers found 21 responsibilities of school-level administrators that have a significant effect on student learning. The most significant responsibilities were: (a) knowing the difference between first- and second-order change, (b) determining how to choose the right work to focus on, (c) thoroughly considering the advantages and disadvantages of comprehensive school reform models, (d) 11 leadership actions that help take a site-specific approach to improving student achievement, and (e) developing the five-step plan for effective school leadership.

More recently, Ash et al. (2013) examined case studies, conducted observations, and interviews of principals to uncover the relationship between school administrative practices and increased student achievement. The authors found there are five essential principal leadership practices that significantly help to improve student achievement: (a) focus on the direction, (b) build a powerful organization, (c) give life to data, (d) ensure a

student-focused vision, and (e) lead learning. The researchers concluded that a school-level administrator engaged in these practices is a highly effective individual who will increase student achievement in his or her school.

Similarly, Ten Bruggencate et al. (2012) used data from 97 secondary schools in the Netherlands to examine principals' leadership practices and their impact on student achievement. Based on the data, the researchers concluded that a school principal's leadership had a small but significant impact on student achievement. Additionally, principal leadership had no significant impact on student performance scores on standardized assessments. However, a positive and significant relationship was found when principal leadership practices included focused goals, collaborative culture, and internal process. On the other hand, the data showed that principal leadership without focused goals or collaborative culture had a negative direct impact on student achievement. Leadership support of teachers and students is another key area in increasing student achievement (H. E. White, 2009). Finally, increasing student achievement will require that school leaders understand and acknowledge the benefit of frequent student assessments and use student performance data to guide effective instructional strategies. An administrator's focused vision and action, encouragement of teachers' professional development through a collaborative culture, support for teachers and students, and shared decision-making in school matters will allow him or her to ensure the academic success of all students.

Summary

The federal government has called upon states and school districts to meet higher standards in secondary mathematics (National Commission on Excellence in Education,

1983; NCLB, 2002; Rabe, 2006). Additionally, the NCTM, NMAP, and NCEA have called for improvement in Black students' math performance. Researchers have examined the reasons for and suggested ways to combat the low performances of Black students (R. M. Capraro & Capraro, 2006; Hanich & Jordan, 2004; Osterholm, 2006). Data collected from the Programme for International Student Assessment, NCES, the Early Childhood Longitudinal Studies, and other national data centers have linked poor math performance and certain ethnic groups.

The slight increase in Black male achievement paired with the same slight increase in performance by their White counterparts continues to allow the achievement gap to remain constant (NCES, 2013). It is imperative to address the factors that enable this gap to remain. Research has shown that there are complex and multi-faceted connections between a student's math performance and reading comprehension, interests, motivation, self-efficacy, relational interactions, instructional strategies, and an established school climate (Carter, 2000; Hanich & Jordan, 2004; Wang & Goldschmidt, 2003). In order to combat the issue of continued poor math performance by Black students, school administrators must engage in effective practices such as focused goals, instructional personnel collaboration, frequent assessments and analysis of student performance data, ensuring adequate resources, and providing appropriate professional development to teachers (Ash & Hodge, 2012; Russo, 2006).

CHAPTER III: METHODOLOGY

Purpose of the Study

Mathematics is an integral part of adult life. Students must be equipped with Algebra 1 skills, as the successful completion of Algebra 1 is a prerequisite for higher-level math courses such as Geometry, Algebra 1, Algebra 2, Math Analysis, and Calculus. These advanced math courses position students to take advantage of opportunities and successfully function in society. Students who master mathematical skills like abstract reasoning, decision-making, analysis using appropriate math formulas, and the ability to understand graphs are more likely to experience success in postsecondary education and in their careers (Vogel, 2008). Yet, national reports show continued low performance in Algebra 1 by high school students, specifically Black males (NCES, 2013).

School leaders must identify and implement practices, interventions, and policies that have a track record of success in combating poor math performance, specifically with Black male students (Marzano et al., 2004; Symonds, 2004). The purpose of this study was to examine specific school leadership practices that influence and improve the performance of Black male students in Algebra 1. The study involved the identification of the classroom instructional strategies and support services that have been shown to be successful in improving Black male students' achievement in Algebra 1.

Research Questions

The focus of this study was on how leaders at the selected schools contributed to the improved mathematics performance of Black male students. The research questions were:

1. What role did school leaders play in improving Black male students' Algebra 1 performance?
    a. What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?
    b. What strategies did school leaders undertake to help Black male students' Algebra 1 performance?
    c. What additional strategies did school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?

This research was conducted using a mixed methods case study methodology. The focus of the study was on what actions school leaders (i.e., principals, counselors, and lead math teachers) take to improve the Algebra 1 performance of Black male students. In this chapter, I discuss the role of the researcher, provide an explanation of the research design and rationale, and describe the procedures used to conduct the study. The procedures include how I selected the sites, an explanation of the instrumentation, methods used, and the data analysis process. I also address the dependability and trustworthiness of the study by providing the steps taken to ensure that the study could be replicated using the same data collection instrumentation. Finally, I discuss issues related to researcher bias.

Role of the Researcher

As both a high school mathematics teacher and an administrator for nearly 20 years, I have witnessed the need to improve the mathematics achievement of Black male students. My experience has been that many school leaders struggle to meet the

challenge of guiding school personnel in fostering the success of Black male students, particularly in Algebra 1.

As a high school mathematics teacher, I found that most students who have basic skill deficits in mathematics are Black males. The gaps in Black male students' understanding of mathematics hinder their success. Teachers often have to spend extra time in and out of class to address their weaknesses in mathematics through intervention and remediation. It is evident that my fellow mathematics teachers are often frustrated with the lack of mathematics progress from Black students. I often wondered what school leaders could do to ensure that Black male students experienced mathematics success.

As a high school administrator and supervisor of the mathematics department, I implemented several programs, provided professional development to mathematics teachers, and worked with counselors to improve the math performance of subgroup students. Although my school experienced some success in improving the success of some subgroups, the performance of Black male students remained stagnant at the below proficiency level. I worked with school administrators who were frustrated with this issue as well. Additionally, I witnessed the implementation of new programs each year that claimed to produce results in improving the mathematics performance of subgroup students but the performance data remained the same. I found that some school administrators led schools that consistently showed improved mathematics success by subgroup students, particularly Black male students. This piqued my interest. The current study was designed to identify school leadership practices that improve the math performance of Black male students.

Research Design and Rationale

Mixed methods case study methodology is valuable for educational researchers because it allows them to use multiple data gathering methods to investigate or explain a phenomenon in context (Baxter & Jack, 2008). According to Yin (2009), researchers should consider using a case study method when: (a) the focus of their study involves questions of "how and why," (b) they cannot manipulate the behavior of those involved in the study, (c) they want to cover the contextual conditions they believe are relevant to the phenomenon under study, or (d) the boundaries are not clear between the phenomenon and context. According to Baxter and Jack (2008) and Patton (2002), a mixed methods case study approach with multiple cases provides an opportunity for the researcher to analyze within the cases separately, between the different cases, or across all of the cases.

A mixed methods case study was appropriate for this study because I wanted to find out what school leaders have done and are doing to improve the Algebra 1 performance of Black male students. A review of the literature pertaining to school administrators' influence on student success revealed a desperate need to find practices, policies, or programs that can be implemented by school administrators that have a track record of success for Black male students in Algebra 1. I studied two high schools that have demonstrated high performance on the Algebra 1 Virginia SOL by Black male students to examine and find answers to the research questions (Yin, 2009). This research was designed to be beneficial to school districts, schools, administrators, and teachers in improving the math performance of Black male students in Algebra 1.

Site Selection

The cases and sites were chosen carefully as these selections were extremely important to the integrity of the research (Creswell, 2013). Herriott and Fireston (1983, as cited by Yin, 2009) stated, "The evidence from multiple cases was often considered more compelling, and the overall study was therefore regarded as being more robust" (p. 53). Creswell (1998) posited that characteristics of good qualitative research include "detailed methods, a rigorous approach to data collection, data analysis, and report writing" (p. 21). I used the Algebra 1 SOL assessment for Virginia Public Schools to select the schools for this study.

The following criteria were used to identify the sites: (a) the Black student population was above 30%, and (b) the schools had 3 consecutive years of increased performance by Black males in Algebra 1 on the Virginia SOL assessment. For this study, increased performance was defined as schools that surpassed the state performance average by at least 5% each year. The top two schools were then selected as cases for this study.

The Algebra 1 SOL assessment has a multiple-choice format. According to the Virginia Department of Education (2015), 15% of the math assessment comprises technology-enhanced instruments in which students have to "drag and drop" items. Students are able to highlight, use coordinate planes to graph, fill-in-the-blank, and answer open-ended questions. Each test item and technology-enhanced item is field tested with students in prior years. Every student in a Virginia public school is required to pass the Algebra 1 SOL in order to graduate high school. Therefore, using the Algebra

1 SOL was appropriate for the selection of the cases and sites. The following data collection tables show each school's performance from 2013 to 2016.

Table 1

Algebra 1 SOL Pass Rate for Black Students

School	2013-2014	2014-2015	2015-2016
Ebenezer High School	91%	97%	96%
Knoxboro High School	87%	92%	92%
State of Virginia	68%	74%	75%

Note. Pseudonyms were used for each school.

Table 2

Algebra 1 SOL Pass Rate for Black Male Students

School	2013-2014	2014-2015	2015-2016
Ebenezer High School	86.89%	96.43%	93.94%
Knoxboro High School	82.89%	88.12%	89.91%
State of Virginia	63.46%	68.82%	70.02%

A letter of permission to conduct the study was obtained from each identified school and each participant (See Appendix A). The letter explained the purpose of the study and how the study would benefit schools, participants, education in general, and, most importantly, Black male students. In the following sections, I discuss the unit of analysis, data collection methods, and how I analyzed the data. Finally, I address dependability and trustworthiness and followed by researcher bias.

Unit of Analysis

The unit of analysis is defined as the "who" or "what" a researcher is analyzing in a study (Yin, 2009). My research questions were related to the role school leaders played in improving the Algebra 1 performance of Black male students and how the school

leaders influenced Algebra 1 teachers' instructional practices to improve Black male students' performance. My research questions also focused on what other steps school leaders can take to help improve Black male students' success in Algebra 1. Additionally, the questions were used to probe for additional steps the school leaders thought were necessary to continue the improvement in Black male students' performance in Algebra 1. Therefore, school leaders were the unit of analysis for this study.

Data Collection

The four commonly used methods to collect qualitative data are interviews, observations, document review, and audio-visual materials (Creswell, 2013). Within these four categories, a researcher can utilize a host of collection approaches. Yin (2009) posited that data collection in a case study comes from multiple sources and recommended six forms of data collection: interviews, direct observation, participant observation, documentation, archival records, and physical artifacts. According to Patton (2002), in a case study, interviews are at the center of data collection and deserve extra devotion.

I used multiple data sources in this study. I interviewed the principals, lead math teachers, and school counselors in each school and reviewed documents utilized within each school. Within the case study of each school, the interviews and document reviews provided strong evidence of what school leaders did to improve the Algebra 1 performance of Black male students. Lesson plans provided a descriptive account of the instructional practices of Algebra 1 teachers. School documents such as information on the school's website, flyers, pamphlets, lesson or unit plans, and modes of

communication from the school to parents and families provided evidence of multiple ways in which the school leaders attempted to improve the Algebra 1 performance of Black male students.

Interviews

> Creswell (1998) suggested using interview protocols as a way for a researcher to: Log information learned during the observation or interview and to take notes during the interview about the responses of the interviewee. They also help a researcher organize thoughts on items such as headings, information about starting the interview, concluding ideas, information on ending the interview, and thanking the respondent. (pp. 126-127)

The interview protocols allowed for a deeper understanding of the role school leaders play in improving Black male students' Algebra 1 performance (See Appendices B, C, & D). I prepared probes to use for clarification or to increase the depth of responses.

Open-ended semi-structured interviews were conducted with school leaders. The interviews consisted of six to eight questions. The interviews took approximately 45 minutes. All interviews were audio recorded and transcribed. All participants were asked to be thoughtful in their responses and answer all questions truthfully. A copy of the transcribed interview was shared with each interviewee.

Some individuals were not willing to participate in this research without receiving the interview protocols in advance. The interview protocols were supplied to each participant 3 to 4 days in advance for review. This allowed the participants to reflect deeply about their responses to the questions and provide in-depth answers and alleviated any anxiety or fear of the interview process. While the preparation process was

beneficial for much more well-rounded answers, I also saw the preparation process as an avenue where genuine responses could be compromised.

In addition to the predetermined interview questions, the protocol documents included "a header to log information about the study and participant, information about starting the interview, concluding ideas, information on ending the interview and thanking the participant" (Creswell, 1998, p. 126). Each interview was conducted at each participant's respective school as recommended by Stake (1995), or another place that was convenient to the interviewee.

I took handwritten notes throughout each interview and wrote concluding ideas after the interview (Yin, 2009). Creswell (1998) suggested that while listening intently, the interviewer must probe further for clarification and provide "verbal transitions from question to question" (p. 126). Because it was challenging to ask questions, take notes, maintain eye contact, and maintain a good rapport and flow throughout the interview, I used an Etekcity 2-in-1 8GB mini portable rechargeable digital audio recorder and USB 2.0 flash drive to record the interviews. Using an audio recorder allowed me to be attentive to the responses of the participants and project a welcoming interview setting. Additionally, the audio recorder captured all responses that were transcribed later (Creswell, 1998; Stake, 1995; Yin, 2009). In Table 3, I present the relationships between Patton's (2002) six kinds of questions that can be asked during an interview and my interview questions. Q1 to Q8 are abbreviations for questions 1 to 8 in each interview protocol.

Table 3

Patton's Six Types of Questions Aligned to Interview Protocols

Patton's Question Focus	Interview Questions for Principal	Interview Questions for Counselor	Interview Questions for Lead Math Teacher
Behaviors/experiences	Q1, Q2, Q3, Q4, Q5, Q6, Q7	Q1, Q2, Q3, Q5, Q6	Q1, Q2, Q3, Q4, Q5, Q6, Q7
Opinions/values	Q3, Q5, Q6, Q7	Q1, Q4, Q5, Q6	Q5, Q6, Q7
Feelings/emotions	Q2, Q6	Q1	Q6
Knowledge	Q3, Q4, Q5, Q7	Q1, Q3, Q4, Q5, Q6	Q1, Q2, , Q3, Q4, Q5, Q7
Sensory	Q3, Q6		Q3, Q6
Background	Q1, Q2, Q5	Q1, Q3	Q1, Q2, Q4

Document Review

According to Patton (2002), documents provide a "rich source of information about many organizations and programs" (p. 293). Documents such as lesson plans, worksheets, handouts, lab sheets, written communications, brochures, professional development programs, memos, flyers, and minutes from meetings generated by or for improving Black male students' performance in Algebra 1 supplemented and complemented the data collected from interviews. Access to these documents was negotiated with each school principal as all the documents were kept in each school by the school leaders. Finally, I utilized a lesson plan analysis protocol, document analysis authenticity protocol, and website analysis authenticity protocol to provide additional information on events or processes and their relationship to other documents, interviews, and observations (See Appendices E, F, M, & N).

Data Analysis

Yin (2009) described data analysis as "examining, categorizing, tabulating, testing or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study" (p. 109). Therefore, the type of analysis is determined by the case (Baxter & Jack, 2008; Yin, 2009). I used a multi-step process for data analysis in this study. The Virginia SOL was used for the quantitative part of this study. End of course Algebra 1 data from VDOE were analyzed to determine the two schools that met the selection criteria for this study. The qualitative data collected through interviews from principals, lead math teachers, and counselors were transcribed by a professional transcriber. I used my research questions to develop the interview protocols that addressed each question. The following tables helped to organize and align my research questions and interview questions. Q1 to Q8 are abbreviations for questions 1 to 8 on each interview protocol.

Table 4

Alignment of Research Questions to Principal Interview Protocols

Research Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7
What role did school leaders play in improving Black male students' Algebra 1 performance?	X	X		X	X	X	X
What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?	X	X	X	X		X	X
What strategies did school leaders undertake to help Black male students' Algebra 1 performance?			X	X	X		X
What additional strategies do school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?	X	X	X	X	X	X	X

Table 5

Alignment of Research Questions to Counselor Interview Protocols

Research Questions	Q1	Q2	Q3	Q4	Q5	Q6
What role did school leaders play in improving Black male students' Algebra 1 performance?	X	X	X	X	X	X
What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?					X	X
What strategies did school leaders undertake to help Black male students' Algebra 1 performance?			X	X		X
What additional strategies do school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?	X	X	X	X	X	X

Table 6

Alignment of Research Questions to Lead Math Teacher Interview Protocols

Research Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7
What role did school leaders play in improving Black Male's Algebra 1 performance?		X	X	X	X	X	X
What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?	X	X				X	X
What strategies did school leaders undertake to help Black male students' Algebra 1 performance?			X	X			X
What additional strategies do school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?	X	X	X	X	X	X	X

By doing this, I was able to cross reference all responses as they pertained to each research question (See Appendix O). Leech and Onwuegbuzie (2007) posited that constant comparison analysis "is the most commonly used type of analysis for qualitative data" (p. 565). Miles and Huberman (1994) used the term "coding" when referring to this analytic strategy. I used the constant comparison analysis strategy to find codes

based on the phrases in the data. Creswell (2013) stated that it is important to develop codes or categories as part of the data analysis process. I highlighted phrases of the data. I assigned a code to each highlighted phrase. Using the combined codes that emerged from the phrases, I uncovered themes that addressed each research question. The following tables demonstrate the coding and theme organization (Adapted from Leech & Onwuegbuzie, 2007).

Table 7

Emergent Codes for Research Question 1 of Principals

Phrase	Code
Focusing on all students	Focused on all students
Quality instruction	Instructional practices
Dynamic individuals delivering instruction	Instructional practices
So we provide them opportunities to communicate	Opportunities to talk
Opportunities to share ideas	Opportunities to talk
To talk strategies during, before and after school	When and where to talk
To facilitate an instruction	Facilitate instruction
To make sure that the rigor	Rigor in instruction
Our instructional day is protected	Protect instructional day
Have a very strong remediation and extra help programs	Strong remediation programs
We meet our kids where they are	Kids where they are
Strive every day to take them to where they need to be	Where they need to be
Director of instruction, help our teachers to develop strategies in order to address those needs	Help teachers with strategies
So there is no shortage of help, availability	
We need the resources that they can provide	Need resources provided
We need money that they can provide in order to fund some of the programs	Need money to fund programs

(continued)

Table 7 (continued)

Emergent Codes for Research Question 1 of Principals

Phrase	Code
I am in the process of developing another pilot, a credit recovery program	A credit recovery program
Important that we emphasize attendance here	Emphasize attendance
Our environment is one that is conducive to learning	Conducive to learning
If they are not here, then we hold parents accountable	Hold parents accountable
I have at least two teachers, who on their own, conduct tutoring	Instruction
We here are gifted with a lot of resources here	No shortage of help
I believe all students can succeed	All students can succeed
Try to support them with what we call equity funds	Equity fund: Resources
So I really support keeping in contact with parents	Communicate with parents
We have a 2.0 requirement for sports	Expectation

Themes from combined codes included instructional issues that affect student achievement, resources and funds for programs, implementation and monitoring of the curriculum, provide opportunity for teachers to communicate, and the expectation that all students will be successful

Table 8

Emergent Codes for Research Question 1 of Counselors

Phrase	Code
Schedule the students during the summer	Schedule students to be successful to be successful in their Algebra class
Place the student with the teacher who	Place student with specific teacher I know that they will be successful
I just try to fit the right student with the right teacher	Place student with specific teacher
We support it by meeting with the parents	Meeting with parents
Parent-teacher conferences making sure that the students and the parents have a way for before and after school remediation	Facilitate meetings and provide support
All the time. All the time. Weekly, daily, with the teachers, the parents	Frequent facilitation of meetings
And tell parents to, please, stay on line	Communication with parents
They can check their child's progress, email the teacher, email me, call me, let's set up a conference, parent-teacher conferences, PTA meetings	Communication with parents
We place them in the courses	Schedule students
So basically the role for the counselor is just to place them in the course and then advise them when they need help to stay after school	Schedule students and provide support
We place the kids and then advise them during the school year	Schedule student and provide support

Themes from combined codes included scheduling of students into courses, advise students struggling academically, facilitate meetings with parents and teachers, and communicate with parents.

Patton (2002) stated that "the process of qualitative analysis involve both technical and creative dimensions" (p. 466). I used Stake's (2006) worksheet 2 (See Appendix G) to organize the themes. I then used worksheet 3 (See Appendix H) to determine the prominence of each theme. By using the highlighted phrases from the data

in relation to the research question, combined with the themes I discovered, I was able to determine the importance of each theme. Patton (2002) referred to this type of analysis of the themes as "determining substantive significance" (p. 467). Using "interocular significance" (Patton, 2002, p. 467), the findings became apparent. Patton described "interocular significance" as meaningful information that is easy to notice. I also analyzed and coded documents for the emergence of themes. I used the following documents to support the findings. The findings are discussed in Chapter 4.

Table 9

Reviewed Documents

Document	Research Questions (Q)	Codes
Lesson Plan 1	Q1, Q1a, Q1b	Instruction and planning
Lesson Plan 2	Q1, Q1a, Q1b	Instruction and planning
Lesson Plan 3	Q1, Q1a, Q1b	Instruction and planning
Unit Four: Functions	Q1, Q1a, Q1b	Instruction and planning
Unit One: Expressions and Operations	Q1, Q1a, Q1b	Instruction and planning
PLC worksheet Algebra 1A	Q1, Q1a, Q1b	Collaboration and data analysis
PLC worksheet Algebra Part 1	Q1, Q1a, Q1b	Collaboration and data analysis
Collaborative Planning Template	Q1, Q1a, Q1b	Collaboration and data analysis
Instructional Unit Design: Unit 1	Q1, Q1a, Q1b	Collaboration and data analysis
Robo call message	Q1, Q1b, Q1c	Communication about activities
After School Enrichment Pamphlet	Q1b, Q1c	Communication and remediation
Newsletter	Q1, Q1b, Q1c	Communication of all activities
Schedule Request form	Q1, Q1c	
Scheduling Process Information	Q1, Q1c	
ASPIRE Flyer	Q1, Q1b, Q1c	Communication and mentorship
Guidance Bulletin	Q1, Q1c	
Ebenezer High School Website	Q1, Q1a, Q1b, Q1c	Communication
Knoxboro High School Website	Q1, Q1a, Q1b, Q1c	Communication
After School Tutoring Information	Q1, Q1b, Q1c	Remediation
SOL Tutoring Schedule	Q1, Q1b, Q1c	SOL Tutoring
ParentVue and StudentVue Access	Q1	Communication

Dependability (Reliability)

In quantitative research, the term *reliability* is used for testing the quality of the study, while in qualitative research the term that is appropriate to evaluate quality is *dependability* (Golafshani, 2003). Stenbacka (2001, p. 550) explained the purpose of dependability as "generating understanding." According to Golafshani (2003), "If we are dealing with a stable measure, then the results should be similar" (p. 599). Similarly, Stenbacka (2001) asserted that a good quality study consists of the researcher revealing the entire process, "to include preparation, data gathering and analysis" (p. 552). In this research, I used criterion-referenced assessment data (i.e., SOL), interview protocols, document review protocols, and content analysis protocols to ensure that another researcher would have the step-by-step information needed to repeat this study. Yin (2009) stated that the quality of reliability is important so another investigator will be able to follow the same steps with the same information and reach the same findings. Another way to increase the quality of the study is to address trustworthiness, also known as validity.

Trustworthiness (Validity)

Validity is the qualifying measure and an important factor for any researcher while designing, conducting, and analyzing the results of a study (Patton, 2002). In qualitative research, the concept of validity is described as trustworthiness, quality, rigor, credibility, confirmability, and data dependability (Davies & Dodd, 2002; Stenbacka, 2001; U.S. Government Accountability Office, 1990; Yin, 2009). R. B. Johnson (1997, p. 283) concluded that a "credible and defensible result" through quality qualitative research may lead to generalizability. Therefore, my use of criterion-referenced

assessment data for the selection of the schools established validity for the selection of each case.

My analysis of multiple data sources of evidence, including interviews and document reviews, was a major strength to satisfy the requirements for dependability, rigor, quality, credibility, and trustworthiness. Yin (2009) suggested that through triangulation, a researcher will enhance the quality. Similarly, Patton (2002) suggested that data triangulation, or using multiple data sources, "essentially provides multiple measures of the same phenomenon" (p. 117). In order to strengthen my research, I used triangulation of multiple data sources to cross-reference the same information. I organized and documented my case study database into materialized themes and patterns. By using the process mentioned, trustworthiness was satisfied. Other types of validity are important to qualitative research and must be addressed. These types are descriptive validity, interpretive validity, and theoretical validity. In the following sections, I discuss these three types of validity in addition to the traditional internal and external validity.

Descriptive Validity

R. B. Johnson (1997) defined *descriptive validity* as "the factual accuracy of the account as reported by the researcher" (p. 284). Similarly, Huberman and Miles (2002) referred to descriptive validity as "what the researcher having seen or heard (or touched, smelled and so on)" (p. 45). As mentioned previously, all interviews were audio recorded and transcribed by a professional transcriptionist. Additionally, the transcripts of the interviews were provided to each participant to check for accuracy. This process ensured the information collected was accurate.

Interpretive and Theoretical Validity

Interpretive validity refers to the degree to which the researcher accurately understands the research participants' viewpoints, thoughts, feelings, intentions, and experiences as reported (Huberman & Miles, 2002; B. Johnson & Christensen, 2012; R. B. Johnson, 1997). B. Johnson and Christensen (2012) stated that *theoretical validity* is "obtained to the degree to which a theory or theoretical explanation developed from a research study fits the data and is therefore credible and defensible" (p. 313). For interpretive validity, I used descriptive words to capture each participant's body language, mood, tone of voice, and other gestures for each interview question. Additionally, the information collected was provided to participants for feedback as a method of member checking (Lincoln & Guba, 1985). In terms of theoretical validity, this study was not designed to find a theory or theoretical explanation from the research.

Internal Validity

In qualitative research, *internal validity* refers to how well the research is conducted. According to Huberman and Miles (2002), the evaluation criteria for internal validity in qualitative research are: Do the results of the research make sense? Are the results credible to the participants in the study and others who read the study? In other words, the focus is on whether the research was done properly and can be replicated by others. My research was designed to determine the role school leaders play in and the influence of Algebra 1 teachers' instructional strategies, implemented programs, and support services on the improved performance of Black male students in Algebra 1. Using Huberman and Miles's evaluation criteria, I used multiple data sources, including interviews and document reviews, to facilitate a deeper understanding of what school

leaders do to improve the math performance of Black male students. Additionally, I gave participants the opportunity to correct errors in the report. The process of member checking and using multiple data sources ensured that my study had internal validity (Creswell, 2013).

External Validity

Yin (2009) defined *external validity* as how well a study's results can be generalized to other people, other places, and at other times. To improve external validity, I studied two high schools and three school leaders from each school. Additionally, I used multiple data sources, specific data collection, and content analysis methods. My detailed description of the data collected from the interviews and document review was important to increase the understanding and interpretation of the results. Because generalization is based on similarities to other people, settings, times, and contexts in a qualitative study (Onwuegbuzie & Leech, 2010), the selected sites, participants from each school, the use of multiple data sources, specific data collection methods, and content analysis method to find common themes allowed for the generalization of the findings based on similarities.

Researcher Bias

As a high school mathematics teacher, I have had the opportunity to work with students who were at risk of being unsuccessful in Algebra 1 and gained valuable knowledge of what worked and did not work for my students. My experiences as a math teacher and as an administrator responsible for the supervision of mathematics teachers have given me valuable insight into programs and instructional strategies that have proven to be successful with Black male students. I expected to find school leaders who

built positive relationships with students; provided support services for academic, social and emotional needs; and used student performance data to address student academic needs.

To address my biases and assumptions, I adhered to my research design protocols and "procedures for minimizing investigator bias" (Patton, 2002, p. 545). Similarly, Creswell (2013) discussed the importance of using multiple and different sources of data to corroborate evidence and therefore minimize researcher bias. In addition, I used a reflexive journal to document my thoughts, views, and opinions throughout the study (See Appendix I). I used the reflexive journal after each interview and analysis of each case study as a self-reflective practice to monitor any possible bias (Creswell, 2013; Patton, 2002). In the course of the research, I followed the Virginia Tech Internal Review Board approved protocols and supporting documents (See Appendices J & K). Initial contact with participants was by email (See Appendix L).

Summary

This chapter contained a discussion of the purpose of the study, research questions, research design, and rationale for using a case study. It also included the units of analysis, procedures, site selection, selection of cases, data collection and analysis, reliability and validity, and my biases. The focus of this study was on what school administrators do to improve the Algebra 1 performance of Black male students. The study also involved an exploration of the role school leaders play, issues school leaders perceive as relevant, and strategies to improve the performance of Black male students in Algebra 1. Quantitative data were used to select the cases and sites and qualitative data were used to answer the research questions. The issues of reliability and validity were

addressed through triangulation. Finally, the chapter included a discussion of how I avoided bias through triangulation.

CHAPTER IV: FINDINGS

The purpose of this study was to investigate school-level leadership practices that influence and improve the Algebra 1 performance of Black male students. The first three chapters of this dissertation offered an introduction to the problem surrounding the poor performance by Black males on mathematics standardized tests, a review of the literature surrounding school leadership that improves student achievement, and the methodological design that was used for this study.

This chapter presents the findings that emerged from the data collected and analyzed using the conceptual framework that was constructed for the purpose of this study. I conducted a qualitative study employing a mixed methods case study with data collected and analyzed from interviews and documents (Merriam, 2009; Yin, 2009). Pseudonyms for each participating school, school principal, counselor, and lead math teacher were created to ensure that all participants' identities were kept confidential.

The background of each school is presented followed by the participants. The findings are presented in relation to the research questions (Yin, 2009). Finally, a summary of practices and programs implemented by school leaders that produced success for Black male students in Algebra is presented following the presentation of the findings for each school. All findings serve to answer the following research questions:

1. What role did school leaders play in improving Black male students' Algebra 1 performance?
    a. What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?

b. What strategies did school leaders undertake to help Black male students' Algebra 1 performance?
c. What additional strategies did school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?

Background of Schools

I gathered data from two high schools in the same district for this study. Ebenezer High School and Knoxboro High School are two of seven high schools in the district nestled in a diverse city ranging from the very urban to the very rural. The population at Ebenezer High School is approximately 2,300 students, of which 43% are Black, 48% White, and 5% Hispanic. Twenty-three percent of the student population receives free and reduced lunch. Approximately 12 miles east of Ebenezer High School, in a community of single family homes, townhomes, and apartments, is Knoxboro High School. Composed of 45% Black students, 41% White students, and 8% Hispanic students, Knoxboro High School has maintained a student population of approximately 1,550 over the years. Thirty-eight percent of the student population receives free and reduced lunch.

Both high schools have achieved the highest level of math proficiency. Based on 2015-2016 Virginia SOL assessments for mathematics, there was no significant achievement gap between ethnicities in both high schools. Ebenezer and Knoxboro High Schools are outperforming most high schools with similar populations and have consistently demonstrated increased improvement over time (Virginia Department of Education, 2015).

Research Participants

The research participants at each school consisted of the principal, the school counselor, and the math lead teacher. Each participant volunteered to take part in the study and provided documents for analysis that supported the success of Black males in Algebra 1. The information gathered from all interviews and document analyses is presented in the following sections.

Research Question 1

Research Question 1 delved into the role played by school leaders in improving Black male students' Algebra 1 performance. Interviews with principals, school counselors, and math lead teachers as well as the document analysis were used to determine the role of school leaders. An examination of the data collected showed that each participant defined his or her role differently. The principals saw their role as instructional leaders and managers. Math lead teachers saw their role as working alongside other math teachers and guiding them in various ways to improve teaching and learning. The school counselors saw their role as scheduling students into the correct classes with the right teachers and then providing support.

Principals

As instructional leaders, the principals established clear and high expectations for the implementation of the curriculum, provided a forum for teacher collaboration, and allocated resources to enhance teaching and learning. According to both principals, the quality of instruction and clear expectations for student learning were central to the success of their schools. Setting high expectations, the effective allocation of resources, and providing opportunities for teacher collaboration are effective leadership practices

that are discussed consistently through the literature (Ash & Hodge, 2012; Carter, 2000; Leithwood et al., 2004; Symonds, 2004).

George, the principal of Knoxboro High School, stated that his expectation was to ensure "the rigor is there" in lesson plans and the delivery of instruction. Additionally, George made sure "teachers are adhering to the blueprint in the curriculum framework and that they are teaching students in that subject." Stephanie, the principal of Ebenezer High School, had high academic expectations for all and extended them to all extracurricular sponsors and coaches. Stephanie shared a story of some struggling athletes and her expectations of all involved:

> We have a 2.0 requirement for sports. And all of our coaches are very aware of it. And if we see any of our athletes getting behind—I'll let coaches know, "Hey, you know the athletes are getting behind." I encourage teachers, if their athletes are missing assignments or getting behind because they have a delayed class to get to their athletic meets, make sure you keep in contact. And our coaches are very supportive.
>
> This past year some of the teammates, they were falling behind, so rather than leave early to get to the meet, they had to stay behind and make sure they were in class because they were committed to keeping them not only eligible, but they work with their schedule as far as what event they were actually participating. And they really try to encourage them to keep their grades up.

Furthermore, George and Stephanie both provided an environment where teachers could collaborate to share ideas, instructional strategies, and analyze student performance data. According to Stephanie, teacher collaboration was a significant contributor to their

success. She explained, "We have all of our teachers participate in PLCs and part of the focus of the PLC is to look at data to discuss strategies, share classroom practices that are working." Likewise, George talked about teacher collaboration in his building as an important component in improved student achievement:

> So they, therefore, will research and try to speak among their colleagues to try to find exactly what the issues are. So we provide them opportunities to communicate, opportunities to share ideas, to talk strategies during the day before school, during school and after school through our PLC formats that we have designed here. So, professional learning community is a big thing here.

Another area identified by the principals that contributed to improved Black male students' Algebra 1 performance was the allocation of resources. Staffing needs and funding for programs are critical resources in implementing successful programs to help fill in student learning gaps. Stephanie shared that equity funds were provided to her school to pay tutors "who meet one-on-one with students during lunch or before school where they can assist [students] with math and help them with their individual needs." Additionally, Stephanie talked about using a percentage of the equity funds to hire a graduation coach who was also a math certified teacher. She explained:

> We have a graduation coach who works one-on-one or in small group setting during every lunch. So we have a table, it's right outside my door that they come to him. He is a certified math teacher. In addition to that, on Saturdays, I have at least two teachers, who on their own, conduct tutoring. They meet students at the local library, one of them is the local church, in which they offer their assistance to students to come up and work on some of the skills they are struggling with. It

> is not mandatory, but the teachers do ensure that they share that information with particular students they see are not being very successful.

George added that resources to fund remediation programs and compensation for teachers to tutor ensured that they met kids "where they are and strive every day to take them to where they need to be."

Last, effective communication from school to home was important to the principals. Stephanie believed it was her responsibility as principal to ensure that parents received timely information from the school on academic programs and how to help their child to be successful.

> So I really support keeping in contact with parents. We do provide a lot of information online as far as websites that parents can go to and we promote that you do homework outside of class. I mean, you can't get everything in the classroom. You have to work outside of the class.

A closer analysis of each school's website revealed there is a plethora of information for parents and students. The websites contained weekly calendar events, gradebook access for student academic performance, the 2016-2017 school calendar, news and updates, sports schedules, and various links to the after school enrichment schedule, scholarship lists, and more. The websites were updated frequently. In conjunction with the websites, information about math tutoring and remediation sessions was communicated through automated telephone calls, or robocalls. Additionally, the completed collaborative planning templates and unit planning templates support the existence of formal collaborative meetings focused on student performance data and instructional planning. (See Appendices P & Q).

Lead Math Teachers

While George and Stephanie both demonstrated and effectively communicated clear and high expectations, teacher collaboration, and allocation of resources, Timothy and Heather, the math lead teachers, were the lynchpins to carrying out the departments' instructional practices. In their role as lead math teacher, they encouraged shared responsibility for making decisions about teaching and learning and represented their respective departments within the school. Timothy explained:

> Well, I'm the department head, but it's like I tell my teachers I'm working alongside with them. So I tell them that their most important job is from the beginning of the classroom, bell ringing, to the end of the classroom, bell ringing. And that's where I want them to put their focus at and I try to handle as much of the stuff that I can outside of that area, just to allow them to concentrate on what's most important. Because those test scores are what we're being judged on and in education, we got too much paperwork and stuff that weigh us down and take our time away. I try to do as much of that as I can for them and let them concentrate on the stuff in the classroom.

Further, Heather and Timothy made sure that the pacing of instruction was appropriate in Algebra 1 and the curriculum standards were taught. They both facilitated the use of common assessments in order for collaborative teams to analyze student data and identify weak performance areas. Algebra 1 teachers had a scheduled monthly collaborative team meeting but talked daily in passing or at lunch about instructional strategies, pacing, and student performance.

Heather shared that the PLC meetings were of fundamental importance to the success of Algebra 1 teachers and ultimately students. Algebra 1 teachers met to analyze student performance data, share instructional strategies, and figure out what was and was not working. Another important factor in the success of Black males in Algebra 1 was the teachers themselves. The teachers did whatever was necessary to see their students experience success in Algebra 1. Heather explained how the Algebra 1 teachers went the extra mile for students:

> If we know one student is struggling, if I think another teacher might be able to help them, I might ask them during our planning to tutor because we do give up our planning time sometimes to help students that aren't even our students.

A review of collaborative unit plans showed detailed instructional planning covering eight to 10 class sessions. The unit plans addressed skills students were expected to master, SOL standards, vocabulary, formative and summative assessments, project-based learning, technology adaptations, printed materials, supplies, Internet resources, textbook correlation, and differentiated instruction for struggling students.

School Counselors

The same dedication to help Black male students be successful was demonstrated by the school counselors. Mary and Margaret each described their role similarly. Mary explained her role as school counselor as follows:

> We place them in the courses. It's based on what we call their academic yearly progress (AYP) from the previous year. So basically the role for the counselor is just to place them in the course and advise them when they need help to stay after school.

Mary provided an example of the appropriate placement of Black male students:

> If you go into [teacher's] classes, you're going to see the majority is Black, especially males because she works very well with the males. She had a 100% pass rate last year on her SOLs so she got them all through the Algebra 1 class and the SOL because she works with them. So I think altogether here, between us, the teachers and the administration, we do well placing our kids with specific teacher if we know they have difficulties in those classes.

Making sure students were placed in the correct classes, especially with the correct teacher, was a common message from the counselors. Hence, the counselors saw their role as scheduling Black male students into the appropriate Algebra class with the right teacher. Further, they provided support services to students through consultation, scheduling and facilitating conferences, and directing students to tutoring or remediation sessions. A review of the scheduling information packet revealed the scheduling process and guidelines, a scheduling information night, standard and advanced diploma requirements, college and career pathways, dual enrollment, online classes, and academic and career plans. Additionally, the scheduling information packet stated that during the scheduling process, counselors would have the opportunity to work with students on their academic and career plans.

Summary

Based on the responses and document analyses, the school leaders played an important role in improving Black male students' Algebra 1 performance. The principals established clear and high expectations for the implementation of the curriculum, provided a forum for teacher collaboration, and ensured the allocation of resources to

improve teaching and learning. The math lead teachers worked with the Algebra 1 teachers to make sure the curriculum standards were taught and to ensure teachers were administering common assessments, collaborating to share instructional strategies, and analyzing student data with an eye on improving and removing the obstacles that hindered daily instruction. Last, the school counselors said their priority was appropriate student course placement and providing support services to the students throughout the year. The roles these school leaders played were consistent with the literature on effective leadership practices (Carter, 2000; Fullan, 2001; Leithwood et al., 2004).

Research Question 1a

Research Question 1a was designed to uncover the strategies school leaders implemented to influence Algebra 1 instructional practices. The information collected indicated the principals, math lead teachers, and school counselors all had some impact on the instructional practices of Algebra 1 teachers.

Principals

The principals influenced instructional practices through establishing a culture of collaboration, hiring additional math staff for remediation, providing technology for the classroom, and offering teacher training. Stephanie spoke about the benefits of collaborating through professional learning communities "to look at data, discuss strategies and share classroom practices that are working." Similarly, George talked about the strong collaboration of all Algebra 1 teachers. He shared that it was a common practice for Algebra 1 teachers to analyze student performance data and communicate to determine "what strategies are successful, what strategies are not successful, and then talk about individual kid strengths and weaknesses." Ultimately, the Algebra 1 teachers used

student performance data to make decisions about instructional practices. George explained:

> So we provide them opportunities to communicate, opportunities to share ideas, to talk strategies during the day before school, during school and after school through our PLC formats that we have designed here. So, professional learning community is a big thing here. My math faculty staff is phenomenal. If their kids are not succeeding, then they don't feel that they are successful as a teacher. So they, therefore, will research and try to speak among their colleagues to try to find exactly what the issues are.

A key influence on the instructional practices of Algebra 1 teachers in both schools was the creative scheduling of Algebra 1 courses and the hiring of additional math staff specifically for remediation. According to Stephanie, hiring a graduation coach with a math certification proved to be instrumental for struggling Algebra 1 students as he "work[ed] one-on-one or in small group settings during every lunch" with struggling students. Stephanie used a percentage of the school's grant (i.e., equity funds) money to pay teachers to tutor struggling students. She explained:

> On Saturdays, I have at least two teachers, who on their own, conduct tutoring. They meet students at the local library and a local church, in which they offer their assistance to students to come up and work on some of the skills they are struggling with.

Another strategy Stephanie and George spoke about that was successful for Black male students' achievement in Algebra 1 was the implementation of a two-part Algebra 1 class called Algebra Part A and Algebra Part B for students who needed more time on

task in Algebra 1. Students took these two courses sequentially and with the same teacher to earn an Algebra 1 credit. Because of the fast pace of instruction in a 4x4 block scheduling, the two-part classes provided an opportunity for the Algebra 1 teacher to be with the same students for the entire school year and helped to strengthen the personal relationships between teachers and students.

In addition to PLCs and the hiring of additional staff, Stephanie and George talked about the importance of technology in each classroom. Stephanie revealed the type of technology the Algebra 1 teachers utilized:

> We have the MOBI boards [mobile interactive whiteboards]; we have smart boards in all of our classrooms and laptop carts. One teacher has the TI navigator in her classroom. We here are gifted with a lot of resources here in our school. The students are all issued calculators TI-83, 84 calculators.

A review of lesson plans and unit plans showed that teachers incorporated various technology tools into lessons to enhance teaching and learning. Technology tools included computers, Internet resources, Smartboards, TI-83, TI navigator, and Exam view.

Although technology has become a tool for teachers to enhance teaching and learning, the principals believed continuous teacher professional training was just as important. George explained the value of professional development in core subjects:

> We have a very good relationship with our director of instruction, with our assistant superintendent of curriculum instruction, and with the supervisors that go out and work with those particular departments—curriculum instruction. We have that relationship and we can basically share with them what we experience

and share with them some of the concerns that we have with regards to instruction, especially mathematics.

And they will come and help our teachers to develop strategies in order to address those needs. So there is no shortage of help, availability. Our teachers do a lot on their own, but sometimes we need that extra push from outside, we need the resources that they can provide, we need money that they can provide in order to fund some of the programs.

Stephanie echoed the same message that the central office was very supportive in providing training and resources for her school. According to Stephanie:

> They also provide training to administrators in understanding diversities, understanding struggles. In fact we are going to equity training next week. So I'll be with them . . . They are really proactive and being on the cutting edge of what is best practices. So they try to keep us all trained.

Lead Math Teachers

The math lead teachers influenced instructional practices by participating in collaborative team meetings, communicating with school administration about teachers' needs, and handling any issues that arose. Heather explained:

> We collaborate and have a monthly meeting so that we can get together and talk about our data. Compare what works for some students, what didn't work for other students so that we can share methods to help each other. We share common assessments. We have a share drive on our server where we put everything in because we don't all have the same planning so that we all have access to that. And I think communication is really important. We communicate

frequently, not just the monthly meetings, but probably every couple of days just passing in the hall.

Like the principals, Heather stated that teachers received training on using CRISS (CReating Independence through Student owned Strategies) instructional strategies that they then implemented in the Algebra 1 classrooms. A review of lesson plans showed that CRISS strategies such as Venn diagrams, scaffold notes, foldables, pairing, and sharing and songs were incorporated. She explained, "It is kind of meta-cognition helping them learn how they think, learn how they have learned, what style works best for them in different strategies that we as teachers can use to get quick feedback." Heather concluded that the help her school received from the state and local city in creating formative assessments for students and using data to identify areas of weakness in student performance and areas of instruction to modify were keys to the school's success. Timothy attributed the school's success to teacher collaboration as a team. "We try to keep everybody on the same pace, on their pacing guides. We try to use common assessments." It became evident that collaborative learning teams and student performance data analysis had a significant impact on the Algebra 1 instructional practices that helped improve Black male students' performance.

As a result of informal and formal collaboration among Algebra 1 teachers, long- and short-range instructional plans were developed. An analysis of the short- and long-range lessons revealed the following area of focus for Algebra 1 teachers: Virginia SOL, key topics within the standards, printed materials needed, resources, Internet and computer resources, students will be able to do, vocabulary, knowledge and skills (what students will know at the end of the unit), Bloom's taxonomy levels, assessment

(formative and summative), project-based learning approach, accommodations for differentiated instruction, and daily activities.

Additionally, the Algebra 1 collaborative team at Ebenezer High School created a PLC template to help the team reflect, understand, set student performance goals, and focus their lessons for mastery. The template consisted of six components: (a) SMART goal, (b) what do we want students to learn, (c) how will we know they are learning, (d) how will we respond when they do not learn, (e) how will we respond when they do learn, and (f) feedback. Using the unit plan template in collaborative team meetings, teachers developed long range planning over several class sessions to address how students would master the objectives. When asked about some of the instructional strategies utilized by Algebra 1 teachers, Heather responded:

> We have music in the classroom. Some of us use songs and videos. We do a lot of chunking with the algebra students, foldables, some of the teachers do interactive notebooks. We stress the vocabulary because a lot of times the student only knows how to do the math, but they don't know what the question [is] asking them. So we do put a lot of emphasis on vocabulary for the students. And try to give them multiple ways that they can use what we call their tools in their toolbox so that there is more than one way to solve a problem.

Heather and Timothy believed the culture of teacher collaboration was the powerful force behind the improved student achievement at their respective schools.

School Counselors

Margaret and Mary, the school counselors, shared that their influence on the instructional practices of Algebra 1 teachers was limited. However, they expressed that

through the support of students by facilitating conferences with Algebra 1 teachers and parents to find ways for struggling students to be successful, the school counselors influenced Algebra 1 instructional practices. Margaret spoke of how she supported the instructional practices of Algebra 1 teachers:

> We support it by meeting with the parents, the parent–teacher conferences, making sure that the students and the parents have a way to after school remediation and before school remediation. I am just making sure that these students are aware of the resources available to them in the building and also what they can do at home to practice their math.

A website review of the counseling pages showed resources to help struggling students taht included an after school tutoring schedule, community agencies that provide academic assistance, as well as Internet resources.

Summary

Based on the existing research and data analysis of the responses, school counselors, math lead teachers, and principals are instrumental in supporting and influencing the instructional practices of Algebra 1 teachers. Principals provided training, funds for remediation programs, and technology in addition to encouraging a collaborative culture to inspire and enrich teaching and learning. Being an active participant in collaborative teams means communicating department needs to school administration and taking care of small issues that arise, thus preventing them from becoming large bureaucratic barriers. Math lead teachers afforded teachers access to a variety of instructional methods. Finally, school counselors were the conduit for the free

flow of information to students, teachers, and parents. They ensured that all had the opportunity to be successful.

Research Question 1b

Research Question 1b was designed to ascertain the strategies school leaders undertook to help improve the Algebra 1 performance of Black male students. The information gathered indicated that summer intervention programs, mentorships, and parental involvement helped to improve Black male students' Algebra 1 performance.

Principals, Stephanie and George, believed the recent implementation of a summer Algebra 1 academy called the "Reach Program" contributed to the continued success of Black male students in Algebra 1. George explained:

> And recently, a year and a half ago, we developed a summer reach program for math. And it focuses on building algebra concepts. So that program is designed for kids that have demonstrated specific instructional struggles in mathematics and we provide them the remediation that they need prior to them entering the high school. So we are bridging the gap, so to speak. When they are released for the summer, those kids that scored a certain range are encouraged to participate in this summer program. And they participate in that summer program for a specific number of weeks. And from that program, they move right into what the expectations are here at the high school. So we give them that bridge and that support that they need in order to be successful.

Like George, Stephanie discussed the importance of the summer program. Student performance data indicated Algebra 1 had been an area of weakness for years; to combat this problem, the district implemented this program for all high schools. According to

Stephanie, “The summer program is something that’s been rolled out from our central office and it is there to target our struggling students and to increase their performance on Algebra 1.” The summer program pamphlet described the benefits as: (a) free to participants, (b) increase proficiency levels in basic arithmetic and algebra, (c) increase proficiency levels in writing and comprehension, (d) receive academic planning and advising, (e) become familiar with campus resources, and (f) build a support network with students, faculty and staff.

The summer program combined with mentorship for Black male students, had profound effects. Although Stephanie’s school did not have a structured mentorship program, she spoke of teachers mentoring informally daily. George, on the other hand, identified a formal mentor program that had proven to be successful for Black male students. He spoke of the National Honor Society students mentoring through tutoring, their community business partnerships, teacher mentors, and peer mentors. George explained:

> We have a mentorship program and we encourage our teachers to take a vested interest in the kids and communicate with them and support them and to go to many of the activities that outside of school. We try to develop a very positive relationship with the parents, the guardians of our kids. We try to use peer tutors, individuals, upperclassmen that will tutor kids before practice, or after practice, or during the course of the day. There are a number of programs that we have implemented: National Honor Society, well, students that are in National Honor Society will go in and help team teach to—or to partner with a teacher to work one-on-one with kids in a small group setting and to help them with different

> mathematical concepts. So we use all of our resources available. And because it takes a village, we also have volunteers who come will come here from time to time and work with our kids.

The school's website provided a list of clubs and organizations for Black male students sponsored by teachers with local business involvement. The mission of one of the organizations was to help support male students academically, professionally, and socially and prepare them with the life skills the would need to be successful after high school.

Another strategy school leaders believed to be crucial in improving the Algebra 1 performance of Black male students was parental involvement. Carter's (2000) study on 21 high-performing, high-poverty schools revealed parental accountability to be one of the effective practices that made schools successful. All participants discussed the importance of parental involvement in each student's academic success. Mary shared:

> I feel the parent needs to be just as involved as actually the child does in education. Because a child is a child, so they need to be on what we call Parent Vue, checking their grades, requesting conferences with the teachers, coming to all the things we do up here at night as far as Back to School Night. I think it's very important for a parent to be a part of a child's education because they still are a child until they—18 is still child too to me, but I think when we take everything you have with the child and the parent is not involved, you see the child slip and go a different way. When the parent is involved with the child and their education, you see the success of that child throughout their school years here.

Margaret added how she continually told parents to go online, sign up for ParentVue to check their child's academic progress, e-mail the teacher, or e-mail or call her to set up a conference to talk about their child's academic progress. She encouraged parents to attend parent–teacher conferences and PTA meetings. She simply tried to communicate the message that they needed to stay involved. She spoke of her recent message to a new parent who enrolled her child the week of the interview, stating that she told the parent to "make sure that you are updated on any work that they have to do before and after school. Just stay involved, not just in math, but for everything."

Summary

Based on the information gathered, participants believed programs targeting struggling students, such as creative scheduling, allocated funds, and parental involvement, helped to improve the math performance of Black male students. Principals must implement remediation programs to help students who are having difficulty learning algebra and must find the funds to compensate teachers for tutoring or to hire extra help to work with students outside of instructional time. Last, school leaders must continue to find creative ways to get parents involved in their child's school affairs. This is crucial to the success of the child.

Research Question 1c

Research Question 1c was designed to uncover the strategies school leaders planned on implementing to continue the improvement in Black male students' Algebra 1 performance and why. An examination of the data revealed that additional strategies to improve the Algebra 1 performance of Black male students included creative remediation programs, increasing parental involvement, building positive personal relationships

between school leaders and students, hiring highly trained math teachers who could work with a diverse population, and acquiring more resources and funds.

Intervention and Remediation

All participants believed that tutoring outside of the classroom instructional time was essential to the success of Black males. According to George, school leaders must "develop programs that will be able to bridge the gap and to meet the needs of the kids once they get into the high school setting." Therefore, developing and implementing creative programs such as tutoring, remediation, and intervention to support Black male students in Algebra 1 is required. Schools must create opportunities for Black male students to fill in learning gaps during the school day, before or after school, and outside of school. According to Heather, the extra help was central to the success of Black males. The success of Black males in Algebra 1 often times depends on tutoring. Heather explained that in her school, the extra help was needed and it had proven successful to "have the tutoring, have the equity tutors come in and the after school remediation."

Stephanie and George suggested implementing a Freshman Seminar program that identifies a cohort of rising ninth-graders in need of additional support in all core areas. The cohort of students can be scheduled with a cohort of core teachers to meet their specific needs. George explained:

> We have freshman seminar. We have Interactive Academy that's designed for struggling learners. We have a cohort of students that they will have a set or group of teachers. They would have four teachers that will work with them throughout the year, provide them what they need in order to prepare them for the

other 3 years that they're facing. But many of these students that are selected for this Interactive Academy have not received a lot of success prior to Knoxboro High School. They generally are turned off with school. They haven't set any goals, they're not thinking about college, and they're not thinking about their future. They're just surviving day to day. Those are the kids that are in the Interactive Academy. They're not failing, they're borderline. They're right on the fence. They're D students or low C students. Some of them have experience of A, but when they get into that Interactive Academy, they're surrounded by a group of teachers that simply change their lives.

Stephanie also talked about the foundation of the success of their Freshman Seminar program. The focus of the Freshman Seminar program was to provide differentiated instructional strategies, organizational skills, conflict resolution, career strategies, and motivational guest speakers for the cohort of students. George communicated that, "Once they're successful during that summer program experience, they're successful for the remaining 3 years that they have because a light bulb goes on." A closer examination of the Freshman Academy at both schools revealed that the focus was to address the transition problems associated with students going from middle school to high school. The programs provided a more intimate environment with a core group of teachers. A review of the literature on freshman academies indicated that these programs do have a significant impact on student achievement (Biermann, 2010; Fulco, 2009; Ringstaff, 2008). The after school tutorial schedule and National Honor Society tutoring schedules were Tuesday to Thursday from 3:45 p.m. to 4:30 p.m. and the SOL tutoring

schedule was from November 14 through January 13 from 3:30 p.m. to 4:30 p.m. or 7:30 a.m. through 8:30 a.m. Transportation was provided.

Parental Involvement

The principals also recommended implementing creative strategies for parental involvement. Mary, a school counselor, stated that "when the parent is involved with the child and their education, you see the success of that child throughout their school years here." Stephanie understood that in most households parents could not help their struggling students with Algebra 1 assignments. School leaders must find a way to increase the knowledge of parents in mathematics in order for them to help their children at home. Stephanie described her experience with parental involvement as follows:

> One of the things that I find, just in struggling students in general is the parental support. Algebra is one of those math areas where when they leave this building and they get home, the number one thing like most parents share with us is they don't know how help their kids because they don't know the math themselves.

Her goal was to provide more online resources for parents and programs outside of school where parents could get assistance, such as Saturday tutoring sessions at the local library. She believed this area was probably the biggest challenge for school leaders. George echoed the importance of parental involvement and described his strategy for parental involvement:

> We just really have conversations with them. If we have a concern, whether it's attendance or whether it's behavior, whether it's a lack of performance, we set up meetings and we meet with our parents. If our parents could not come here, then we will have a phone conference. If they are not available for a phone

> conference, then we are not immune to coming and setting up appointments on Saturdays and going to the homes and sit down and talk to parents. I think it is important that we make the connections and their parents understand that they are part of the process as well.

The suggestion from all participants to improve parental involvement was not surprising, according to the literature. Keith et al. (1993), Hong and Ho (2005), and Henderson and Mapp (2002) suggested that greater parental involvement in student academic affairs is a powerful indicator of student academic achievement. Another powerful indicator of student academic achievement is building positive relationships with students (Marzano, 2003; J. Thompson, 1998).

Building Positive Relationships

Four out of the six participants highlighted the significance of building positive relationships between school leaders and students. All participants believed it was their responsibility to get to know students academically, personally, and socially. Building personal relationships is an example of what McKinley (2007) suggested instructional leaders must do to raise the achievement of Black students. Mary talked passionately about the positive outcomes and sense of community that is developed when school leaders build positive relationships with students:

> I think you just have to know—like I know each student. You have to know each student separately so I think what I would tell school leaders, is get to know your students and their learning habits. Some kids may move faster than other kids. So don't place them with a teacher that likes to move fast through the curriculum.

> Put them with the teacher that knows how to break it down and work with them, has a time in class to work with them one-on-one. You just have to be aware.

Staffing Math Positions

Margaret suggested school leaders need to hire strong math teachers who care about all students regardless of their background. The teachers must "know their content and know that each student learns differently, that they are willing to do things differently and come out of the box sometime with different students." Margaret also spoke passionately about ensuring math teachers understand that students come from different backgrounds and may require different teaching methods to be successful. In addition, the hiring practices of math teachers must include "just making sure that people really want to—you know, they are in it and it's from the heart," according to Margaret. George's recommendation to school leaders was to make sure that "classrooms are equipped with teachers that care about kids that could truly teach. I like to hire people that are called to teach, that they were placed on this Earth to teach, that they are passionate about teaching." Similarly, Stephanie shared that a big task for school leaders was "being able to provide highly-trained people in math." She saw this area of need as a lack of resources as a result of the shortage of math teachers.

Resources

Stephanie and George also suggested the need to increase staffing in terms of specialists such as a graduation coach and funds to adequately compensate teachers for tutoring sessions. Stephanie saw staffing as a major lack of resources to address areas of need in her school. For example, she would like to have staffing to focus on specific areas such as attendance, teaching conflict resolution, organizational skills, and career

strategies. Another area Stephanie would like to staff was a mentor coordinator, "someone that coach[es] not like a sports coach but an academic coach." According to Stephanie, this position would be similar to the graduation coach who "really builds that bond in that relationship with struggling students to help them want to be successful, to help them really engage."

Summary

Based on the responses from the participants, in order to continue the Algebra 1 success of Black male students, it is crucial for school leaders to implement strategies that build personal relationships between school leaders and students. In addition, school leaders must meet the challenge of increasing parental involvement and support. Last, they must acquire more resources and hire highly trained math teachers who care about the success of all students regardless of their background or current circumstances.

Summary

The focus of this chapter was to present the data collected through interviews with school leaders and document reviews. The interviews were transcribed and probed for major themes. The documents were analyzed using the document analysis protocol. The themes that emerged from the interviews and document reviews confirmed the existing research pertaining to which practices of school leaders improve the Algebra 1 performance of Black male students. The findings of this research showed that school leaders play a pivotal role in the success of Black male students. Effective school leader practices include providing instructional direction and a favorable learning environment, promoting a culture of collaboration, and supplying resources to support students' academic needs. Additionally, the findings revealed the importance of providing

technology, allocating funds for remediation programs, and holding high expectations for all. School leaders must be creative in scheduling students with a history of low performance in math and in finding ways to increase parental involvement. Last, school leaders should hire knowledgeable math teachers who can teach to and build positive personal relationships with a diverse population of students.

CHAPTER V: DISCUSSION

In this study, I investigated the school-level leadership practices that influence and improve the math performance of Black male students. I focused on the roles of school leaders, how they influence Algebra 1 teachers' instructional practices, and what school leaders see as necessary steps for the continuous improvement of Black male students' math performance. I used a mixed methods case study methodology to answer the following research questions:

1. What role did school leaders play in improving Black male students' Algebra 1 performance?
    a. What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?
    b. What strategies did school leaders undertake to help Black male students' Algebra 1 performance?
    c. What additional strategies did school leaders plan on implementing to continue the improvement in Black male students' Algebra 1 performance and why?

The purpose of this final chapter is to share the lessons learned as a result of this research. Additionally, the chapter contains a summary of the findings of the research, implications for school leaders, and recommendations for action. Finally, directions for future research and personal reflection are offered.

Discussion of Themes

Data from interviews with six participants and documents collected from the two schools were used to answer the research questions. Pseudonyms were used to protect

the confidentiality of the school divisions, schools, and participants. All interviews were audio recorded, transcribed, and analyzed for themes. The documents collected were reviewed and analyzed with attention to themes that emerged from the interviews using the analysis of themes template adapted from Stake (2006). The following themes emerged from the collected data: (a) effective instructional leadership, (b) culture of collaboration, (c) facilitation and scheduling, (d) parental involvement, (e) intervention and remediation, and (f) resources and additional steps.

Effective Instructional Leadership

Traditionally, effective instructional leadership has been associated with the responsibilities of school principals as evaluators, managers of the curriculum, and allocators of resources. Because this important role has a significant impact on the success of the school and student achievement, it now involves other school leaders such as guidance counselors and lead teachers. Results from the current research revealed that instructional leadership is shared in two ways—leadership and management—that cannot be separated.

Effective instructional leadership is defined as the ability of school leaders to manage the school to improve teaching and learning (Horng & Loeb, 2010). Research conducted by King (2002) and Elmore (2000) showed that the crucial role of leading the school organization to success cannot rest solely with the school principal. Success and sustained improvement require the input of additional stakeholders, such as lead teachers, counselors, and staff members directly responsible for implementing the instructional strategies. Researchers have found that successful instructional leaders engage in certain school-related activities that affect student performance (Leithwood et al., 2004;

Symonds, 2004). For example, Marzano et al.'s (2004) meta-analysis of 35 years of research on school leadership revealed 21 types of behaviors that have a significant impact on student achievement. Chief among the behaviors were high expectations for student learning, shared leadership, shared decision-making, staff empowerment, and a norm of continuous improvement. Additionally, Ash et al. (2013) found that there are five essential principal leadership practices that significantly help improve student achievement: (a) clear and focused direction for teaching and learning, (b) build a powerful organization, (c) give life to data, (d) ensure a student-focused vision, and (e) and lead learning. Ten Bruggencate et al. (2012) posited that school leadership's impact on student achievement occurs through their guidance of teachers. This requires principals to also focus on the effective management of resources, such as funds, programs, and the hiring and developing of people, particularly in establishing a collaborative environment. Carter (2000) suggested that high-achieving schools have school leaders who establish a collaborative culture of high expectations and effectively allocate funds to improve student learning. Based on these results, effective instructional leadership is a necessary characteristic of school leaders if they are to improve the math performance of Black male students.

My findings aligned with much of the existing research (Ash et al., 2013; Carter, 2000; Ten Bruggencate et al., 2012). Information gleaned from the interviews and documents supported that the schools had organizational structures that focused on student learning by hiring quality teachers, frequent analysis of student performance data, supportive programs that helped close learning gaps, and staff collaboration, all of which led to marked improvement in Black male students' Algebra 1 performance. The

principals talked about the established culture of collaboration in their schools. The teachers worked together with a focus on student performance data to improve teaching and learning. They also spoke about intervention programs such as after school tutorial sessions and a summer "Interactive Program" to help students who were struggling with Algebra 1. One principal shared made sure that students who were struggling in Algebra 1 were provided with help through the tutoring program before, during, and after school.

Additionally, both principals spoke highly of their math teachers and how they went above and beyond for each student regardless of his or her ethnicity or background. According to the lead math teachers, frequent communication with peers regarding student performance data and recommended actions was a key to their success. These practices were validated by the research of high-performing schools by Carter (2000). Similarly, Symonds (2004) suggested that school leaders must use student performance data to guide the direction of student achievement.

According to the NCES (2013), Black male students are performing below their White counterparts. It is vital that school leaders understand how to combat this issue by implementing proven organizational practices (The Education Alliance, 2006). This research offers proven instructional leadership practices. Additionally, school leaders must understand that the road to improving the math performance of Black male students "extends beyond the scope of the school principal to involve other school leaders" (SEDL, 2005, p. 1).

A Culture of Collaboration

A culture of collaboration occurs when school leaders foster a climate of working together (Hughes & Pickeral, 2013). This takes place when members of a school

community work together as equals with a common focus—to help students succeed in the classroom (Davis, 2000). Marzano et al. (2004) found that a key responsibility of school leaders in improving student learning is creating a collaborative culture. Symonds's (2004) case studies on school-level policies and strategies that help close the achievement gap revealed that one of the critical contributors is teacher collaboration with peers to analyze data and link low-performing student data with effective instructional strategies. Additionally, Ten Bruggencate et al.'s (2012) research on the impact of a principal's leadership practices on student achievement showed that principal leadership without focused goals or a collaborative culture can have a direct negative impact on student achievement.

My findings showed that school leaders at Ebenezer and Knoxboro High Schools established a culture of collaboration where faculty and staff had a voice in the crafting of school and instructional practices, which contributed significantly to their success in improving student achievement. Such a collaborative culture nurtured teacher creativity and sparked innovation in the sharing of ideas, practices, and planning for instruction. A culture of collaboration also allowed teachers to gather and analyze student data to determine what was and was not working and to make any needed adjustments to their teaching strategies (Russo, 2006; Symonds, 2004). The principals spoke passionately about their dynamic teachers' eagerness to collaborate, analyze student data, and share instructional strategies to fill in learning gaps. The lead math teachers also talked about their monthly scheduled PLC meetings and non-scheduled conversations about student academic performance based on data. It was commendable and inspiring to hear the lead math teacher say, "We give up our planning time sometime to help students that even

aren't our students." The teachers went above the call of duty to help tutor students who were struggling in Algebra 1.

My findings in this research were consistent with much of the existing research that showed a culture of collaboration contributes significantly to improved student achievement (Russo, 2006; Symonds, 2004; Ten Bruggencate et al., 2012).

Facilitation and Scheduling

Appropriate placement in math courses is critical for the success of Black male students. According to Ballón (2008), course selection is related to student achievement. Research regarding course selection and student achievement showed there is a strong relationship between students who take regular or advanced level courses and achievement (V. E. Lee et al., 1998). Black students have been shown to be overrepresented in remedial courses and underrepresented in advanced level courses (NCES, 2001; Wang & Goldschmidt, 2003). This important information, coupled with programs that bridge the gap of poor prior math performance, must receive a great deal of consideration by school leaders when addressing Black male students' Algebra 1 performance.

One finding that would benefit from additional consideration is the statement by school counselors at Ebenezer and Knoxboro High Schools regarding spending time to help students' select appropriate courses and schedule some students into appropriate classes, specifically Black male students into Algebra 1. The American School Counselor Association (2012) counseling model states that school counselors design and implement school programs to help students in the following ways: remove barriers to academic achievement, support social/emotional development, and guide college and

career readiness. The model suggests that "certain non-school-school-counseling tasks should be reassign such as coordinating paperwork and data entry of all new students, signing excuses for students who are tardy or absent, teaching classes when teachers are absent and serving as a data entry clerk". The posted job description of the counselors on the schools' websites stated that counselors counsel students in all areas, enroll and schedule new students, check senior credits against schedules, hold parent and student conferences and send weekly progress reports to parents (when requested), responsibilities that do not include scheduling existing students. School counselors that I interviewed found value in the process of working with students that accompanied scheduling, though not perhaps in the act of scheduling itself.

Research suggests that the fact that these counselors schedule students is not outside of the norm despite the model discouraging it. Often, counseling and the administrative task of scheduling occur simultaneously. While meeting and discussing student's needs, abilities and goals counselors have the distinct opportunity to guide a students' academic progress as they advise on course selection. Combining these duties can be a much more efficient and productive use of a counselors time. Hepp's (2013) study on the preferences of secondary school counselors and secondary school principals regarding school counselor activities and roles showed that 89% of the survey participants regularly scheduled students for classes. Additionally, 56.73% of the 89% of counselors stated that, of the administrative duties, they preferred to regularly schedule students for classes.

Counselors provided support for students throughout the year. Students who were falling behind academically were notified of tutoring programs and other available help.

When necessary, a conference was held to include parents, teachers, the student, and the counselor to determine a path for student success. I found that school counselors at Ebenezer and Knoxboro High Schools played a vital role in helping students find the correct math courses and with the right teachers. One counselor talked about how she used students' prior academic performance and the knowledge of teachers' teaching strengths and weaknesses to determine the math course placement of Black male students. Mary explained:

> Some kids may move slower than other kids. So don't place them with a teacher that likes to move fast through the curriculum. Put them with the teacher that knows how to break it down and work with them, has the time in class to work with them one-on-one. You just have to be aware.

The focus of the counselor in making sure that students were placed correctly in courses for success was consistent with much of the research that showed the relationship between course selection and student achievement to be significant (Ballón, 2008). While facilitating support for student success was the focus of the counselors, they also emphasized the importance of getting parents engaged in the educational process.

Parental Involvement

The data from this research showed that parental involvement is a significant contributor to Black male students' Algebra 1 success. This conclusion was consistent with the findings of Carter (2000) and Henderson and Mapp (2002). When schools and families partner to support learning, students are likely to do better academically. Years of research have demonstrated that parental involvement in their children's education significantly contributes to success in school (Christenson & Sheridan, 2001; Drake,

2000; Kellaghan, Sloane, Alvarez, & Bloom, 1993; L. J. White, 1998). Simon's (2001) research on family involvement in high school showed that, after controlling for race and ethnicity, family structure, gender, and the influence of students' prior achievement and socioeconomic status, parental involvement contributed significantly to higher grades in mathematics.

In order for school leaders to ensure the success of Black male students in Algebra 1, it will take a culture of collaboration and it is undeniable that parents and families are cornerstones of this process in supporting student learning. According to Drake (2000):

> The challenges that students in America's public schools face cannot be solved by educators alone; nor can these problems be solved by parents or families alone. Students in schools across this nation are confronted by critical social, emotional, and environmental problems. More collaboration between the school and home will need to be focused on dealing with these problems. (p. 34)

There is much work to be done. School leaders must find creative ways to engage and involve parents and families by improving school communication and providing opportunities for parents and families to actively participate in the decision-making process to improve student achievement. This is an area of challenge for school leaders.

My research showed that parental involvement was improved in both schools by a host of efforts, such as meeting parents at the local library, community center, or in their homes to have meaningful conversations about their child's academic success and how the school could provide support. School leaders spoke of making sure parents were part of their child's education. The principals talked about making sure information was

communicated to parents and families through all available communication modes. The data revealed that school leaders utilized the school website greatly to communicate with parents and families. Additionally, social media, robocalls, school newsletters, and providing parents access to their child's current academic performance improved parental involvement in both schools. One principal explained:

> I think it is important that we make the connections and that parents understand that they are part of the process as well. If we have a concern, whether it's attendance or whether it's behavior, whether it's a lack of performance, we set up meetings and we meet with our parents. If our parents could not come here, then we will have a phone conference. If they are not available for a phone conference, then we are not immune to coming and setting up appointments on Saturdays and going to the homes and sit down and talk to parents.

As a result of these findings, school leaders who recognize the significance of an effective partnership between schools and parents and families and value what parents and families bring to the table will maximize Black male students' performance in Algebra 1.

Intervention and Remediation

Another area school leaders recognized as significant in improving the Algebra 1 performance of Black male students was supportive programs. Intervention and remediation are instructional approaches focused on identifying students who are underperforming or with learning gaps and then developing specific instructional strategies to help them improve. Gersten et al.'s (2009) research on how to assist students who are struggling with mathematics revealed specific steps of intervention and

remediation for school leaders: (a) screen all students to identify those at risk for potential mathematics difficulties and provide interventions to those students; (b) instruction during intervention or remediation should be explicit and systematic and should include models of thought processes, guided practice, and corrective feedback; and (c) frequent cumulative review.

Tutoring is a frequently used intervention to remediate low performance. Rothman and Henderson (2011) examined whether tutoring worked for students who did not meet an established proficiency level on standardized assessments. They found that students who received tutoring outperformed students who did not receive tutoring on the retake. Hock, Pulvers, Deshler, and Schumaker (2001) concluded from their study that struggling students with poor academic performance earned better grades if they received tutoring from trained adults. Additionally, they found the strategies learned by students after participating in tutoring helped them be successful after tutoring ended. Therefore, leadership support of students through the implementation of effective tutoring programs is another key area in increasing student achievement (H. E. White, 2009).

My findings from this research showed that tutoring as an intervention and remediation contributed significantly to Black male students' Algebra 1 success. School leaders spoke passionately about the intervention (i.e., tutoring) program in place for struggling students throughout the school day and after school. The results of the tutoring programs at Ebenezer and Knoxboro High Schools were consistent with existing research that showed there is a strong relationship with increased student math performance (Hock et al., 2001; Rothman & Henderson, 2011).

The "Interactive Program" offered during the summer for rising ninth-graders provided a great opportunity for students identified as at-risk who were having difficulties in mathematics to receive help to build their foundational mathematical skills prior to taking Algebra 1. Additionally, the program gave students the opportunity to stay engaged in learning mathematical concepts and minimize regression. One principal shared that on Saturdays she had at least two teachers "who, on their own, conduct tutoring at the local library and church."

Finding creative ways to intervene academically for student success is yet another positive outcome of a culture that encourages collaboration. While the intervention practices in this study were successful, it would be a mistake to overlook the resources required to make the intervention successful. One principal insisted that, "We can come up with a number of programs that are going to be successful but the bottom line is, will we have the funding to implement these programs."

Resources

Efforts to support schools to improve student achievement have been well meaning but inadequate to meet the needs of all students. For schools to be successful, an effective school leader must make good use of the available resources, specifically funds for the implementation of programs. It is crucial that school leaders allocate funds for hiring dynamic teachers who specialize in specific content areas and for the implementation and monitoring of programs.

Many researchers have studied the relationship between school resources and student achievement with mixed results. Hedges, Laine, and Greenwald's (1994) meta-analysis of studies on this topic showed that there is a positive correlation between

resources for school and student learning. Similarly, Archibald (2006) suggested that there is a strong relationship between per pupil spending and student achievement at the school level. On the other hand, other researchers claimed that there is no relationship between school resources and student learning (Hanushek, 1997; Hanushek & Luque, 2003).

My research findings were in line with studies that showed a positive relationship between school resources and student performance (Archibald, 2006; Hanushek, 1997; Hanushek & Luque, 2003). In particular, funds to provide at-risk Black male students with tutoring sessions and the summer intervention program resulted in improved Algebra 1 performance. The most effective allocation occurs when funds are provided for teachers to plan lessons targeting at-risk students, highly-qualified tutors are obtained, and proven programs and technology for the classrooms are implemented.

In this research, the principals and lead math teachers talked about the importance of the equity funds needed to hire additional math tutors and compensate teachers for after school tutoring. According to both principals, equity funds were not a huge amount of money but the money was helpful to keep the tutoring programs running effectively. Stephanie, principal of Ebenezer High School, explained:

> We try to support them with what we call equity funds or any resources that we have available that can help fill some gaps that they have in their individual learning repertoire. Where they'd be missing, whether it is school supplies that we always keep a pile on hand to be able to provide them with what they need, whether it's a snack, whether it's lunch, whether it's just some support.

It is crucial that funds are made available to compensate teachers to tutor students before and after school, provide student supplies or incentive support, and hire specialty staff that focus on an identified area of student need such as Algebra 1. For example, a math coach or any other hires who have a math background who can assist in tutoring struggling students throughout the day and after school would be advantageous for the success of Black male students in Algebra 1. Carter's (2000) research on lessons from 21 high-performing, high-poverty schools showed that the effective allocation of funds by school leaders contributes significantly to student achievement. In this research, school leaders' effective use of funds to support student needs was crucial to the success of Black male students in Algebra 1.

School Leaders Continued Future Improvement

The findings related to the final research question showed that there is still work to be done to ensure that 100% of Black male students improve their Algebra 1 performance. The data also support that it is essential for the development of Black male students that school leaders build positive personal relationships with them. Klem and Connell (2004) suggested that "students need to feel teachers are involved with them – that adults in school know and care about them" (p. 262). While examining the topic of promoting the success of African American boys by understanding and reducing stigmas and stereotypes, the National Education Association (2011) recommended that school leaders "build a strong, knowledgeable, empathetic caring relationship with students" (p. 6). Mary, a school counselor, said it best: "I think just getting to know each kid is most important." The evidence from this research supports that school leaders need to build positive relationships with students.

Another area that needs much attention by school leaders, according to the data, is the hiring of teachers who thrive and are motivated by a diverse student population and are able to use proven instructional strategies that work for Black male students. McKinley's (2007) study on raising the achievement of Black male students revealed that it is important to have teachers who are cognizant of a student's background to include racial, ethnic, and cultural and language perspectives. This will allow teachers to individualize instruction to meet the needs of all types of learners. Battey's (2013) study on how the relational interactions between teachers and students during instruction affect student performance showed that teachers who thrive in a diverse student population are able to address students' social realities. Addressing students' social realities means meeting students where they are and helping them understand themselves, their reality, society, and the world. Therefore, school leaders must make it a priority to hire motivated teachers who are able to teach in a diverse student population.

Implications

My findings from the analysis were able to help answer the research questions and provide school leadership practices and actions that improve the math performance of Black male students. Examining the role of school leaders and their practices provides others with some direction to improve the Algebra 1 performance of Black male students. These findings offer several implications for school leaders. It is important that school leaders consider how any new program fits with current practices.

Internal Stakeholder Collaboration

The old adage is true that "it takes a village to raise a child." In this case, it takes committed educators, parents, and families who are willing to work together to make a

difference. Traditionally, school leaders are defined as principals, assistant principals, and central office personnel. My data led me to expand this definition to include all members of collaborative teams based on the instructional nature and the in-depth work that generates ideas, plans, and analysis of student performance data. Darling-Hammond (1998) posited that when teachers collaborate and learn together they can create a reflective learning culture that will lead to changes in practice and growth. Leaders from both schools spoke passionately about the importance of the collaboration that took place to meet the needs of students. Teachers were planning lessons together; sharing ideas; administering common assessment; analyzing data; communicating with school counselors, administration, and parents; and learning together. Ultimately, all students, regardless of race, gender, or ethnic background, will benefit.

Professional Development

School leaders must provide ongoing training regarding proven instructional practices for Black male students, how to work with a diverse population, reliable assessments, data analysis, and effective collaborative teams focused on student performance data. My research showed that the continuous training of school leaders is vital to the success of students. The lead math teachers talked about participating in formative assessment teams with the state and local government agencies to assess students and analyze data. The principals spoke about participating in a professional development about a summer "Interactive Program" specifically for rising ninth grade students with math difficulties. Much of the research on professional development showed that teacher ongoing training is essential to teacher learning, the improvement of schools, and ultimately student achievement (Borko, 2004; Guskey, 2002). School

leaders must know what instructional strategies work for Black male students, how to work with and properly assess a diverse population, and how to analyze data to design creative programs that help fill in the learning gaps in order to improve Black male students' Algebra 1 performance.

Intervention and Remediation Programs

In this research, participants talked about the importance of their tutorial programs before, during, and after school. They also talked about their successful summer "Interactive Program" that targeted rising ninth-graders with math difficulties. The evidence from this research did not reveal one best intervention or remediation program to meet the needs of Black male students; in fact, the finding that one school used a graduation coach to tutor kids during their lunch time and the other school relied on after school tutoring and teachers tutoring during their planning indicated that the design and approach must work for the school. There is a growing body of literature that supports the need for and importance of interventions and remediation programs specific to the academic needs of struggling students (Gersten et al., 2009; Rothman & Henderson, 2011; H. E. White, 2009).

Parent/Family Communication and Involvement

The results of this study indicated that communication with parents and families and parental involvement are priorities for school leaders. In this research, school leaders understood the importance of providing parents and families with information in many ways. School leaders sent home letters, made phone calls, posted information on the school website, used social media, and met with parents to communicate school information. Providing school information to parents and families frequently, coupled

with parental involvement, helps students do better in school. One principal shared that the school leaders went as far as visiting parents' residences to discuss their children's academic or behavior concerns. They had scheduled conferences with parents on Saturdays because they believed it was that important for the school and parents to work together for the success of the child. The research on parental involvement is significant, suggesting a great contribution to students' success in school (Christenson & Sheridan, 2001; Simon, 2001).

Student Academic Implications

Results of this research have implications for student academic and social success in years to come. Success in Algebra 1 may lead to future success in higher level math courses. Hailikari et al. (2008) found prior mathematics success to be consistently associated with mathematics achievement. Similarly, Vogel (2008) posited that students who master math skills, particularly in algebra, are more likely to experience success in postsecondary education and in their careers. Student success may help to increase motivation, interest, and achievement-related beliefs (Koller et al., 2001; Metallidou & Vlachou, 2007; Schiefele et al., 1992).

Finally, this research has implications for broadening Black male students' academic and professional opportunities. These opportunities now provide Black male students an alternate path to the one flunking Algebra 1 provides. The path of failure historically has led this population down a path of school disciplinary issues, an increased dropout rate, and engagement with the criminal justice system (Miller, 1997). Algebra 1 is a prerequisite for high school graduation. Increased pass rates for this course will

increase Black male students' graduation rates, which will afford Black male students additional opportunities to be successful both economically and socially.

Recommendations

Because establishing a culture of collaboration is a key to success in teaching and learning, school leaders must create a school environment of shared decision-making. This starts with creating collaborative instructional teams of same content area teachers with scheduled monthly meetings before, during, or after school. The collaborative instructional teams can meet to share proven instructional strategies, analyze student data and performance through common assessments, plan for instruction based on student performance data, and learn together. Additionally, school-wide parent and family communication protocols regarding when, how many times, and under what conditions to contact parents must be established. The following recommendations are offered for school leaders:

- It is undeniable that some students will need additional assistance to fill in learning gaps. Therefore, creative remediation programs and activities that meet the needs of students are critical. Leaders need to design and implement intervention/remediation tutorial programs before, during, and after school. Any intervention/remediation program must address specific student learning gaps based on analyzed student performance data. School leaders have to be cognizant of the programs already in place and how to incorporate new remediation programs to best meet the needs of each student.
- Resources, financial and otherwise, are essential as they are needed to hire additional support staff, provide technology in the classroom, and obtain

rewards to maintain student motivation. The funds could be acquired either through grants or the school system's central office. Apply for state or national grants to address the need of improving Black male students' math performance. Request additional math staffing from central office to specifically address Black male students who are struggling with Algebra 1.

- Ebenezer and Knoxboro High Schools provide parents and the community with information in a variety of ways. Utilize Facebook, Twitter, e-mail, robocalls, the school website, school newsletter, letters, and newspapers to communicate with parents and families. Additionally, provide an online tool for parents and families to help monitor their child's education.
- Rising ninth-graders identified with math difficulties based on their math performance in middle school must be hand scheduled into the correct math class with the correct teacher. Additionally, design and implement a summer bridge program that specifically addresses Black male students' learning gaps and prepares them for Algebra 1. Frequent monitoring by teachers, school counselors, and parents to provide additional needed support will be beneficial.
- In addition to collaborative teams, provide professional development in the following areas: proven instructional strategies for a diverse population, how to assess students and analyze student performance data, and how to create effective collaborative teams.
- Additionally, school leaders have to be cognizant that other school leaders such as lead math teachers and counselors carry out the vision and mission of

the school by facilitating collaboration and ensuring that student performance is the focus. Therefore, school leaders must focus their efforts toward creating a culture of collaboration where teachers can work together to improve their instructional strategies, analyze student performance data, and fill in learning gaps.

Directions for Future Research

This research involved an examination of what school leaders did to improve the Algebra 1 performance of Black male students to reveal the common practices and activities that emerged from the collected data. Years of research in this area have produced few solutions to this mathematical crisis (NCES, 2013). As Black male students continue to face challenges while attempting mathematics success, these recommendations will serve to guide school leaders in improving the Algebra 1 performance of Black males by incorporating some of the proven strategies employed by Ebenezer High School and Knoxboro High School. Ultimately, the success of Black male students in mathematics will greatly increase their opportunities for future success.

School leaders must consider current school practices when incorporating the recommendations from this research. Future studies would further benefit from examining how the other school leaders and central office personnel contribute to the success of Black males in Algebra 1. Additionally, studies of more schools that meet the criteria established for this research will help to confirm the recommendations presented herein. Valuable information and additional recommendations can be gained by future researchers who are able to observe classroom instructional practices as they relate to instructional lesson plans, observe PLC sessions, and observe remediation sessions.

Additionally, any specialists hired for the purpose of improving Black male students' Algebra 1 performance must be included. Another direction for future research would be to examine any contributing factors that lead Black males to enter a career that requires a strong mathematics background. A closer look at Black males in careers such as math teacher, software engineer, actuary, computer systems analyst, computer programmer, and mathematician could provide value for school leaders in implementing programs or support services for Black male students.

Personal Reflection

In thinking about this research process and the information gained, I have considered my role as a school leader as I look toward the future. I also pondered my leadership practices and how they contribute to student achievement. The process of investigating what school administrators do to improve the math performance of Black male students has been invaluable. I learned the messy nature of the research process. It is time consuming, frustrating at times, and tedious, yet at other times intriguing and rewarding.

The research process helped me gain valuable knowledge of how school leaders affect student learning, particularly Black male students in Algebra 1. This process reaffirmed and brought to life the idea that it takes a village. The data collected revealed the importance of a culture of collaboration joined with a focused direction. I have adopted some of the practices of school leaders from this research for immediate implementation in the math and science departments in my school. Some of the practices from this research are already in place in my school, such as PLCs, the use of student performance data, intervention, and tutoring programs, but they all need a "face lift." For

example, teachers meet monthly to plan, share, and analyze student performance data on common assessments to drive instruction and fill student learning gaps. The difference now is the addition of discussions around analyzed student performance data. This pivotal piece was largely missing in our PLC sessions. Additionally, we have created support classes for current Algebra 1 and Geometry students to immediately and specifically address their learning gaps. I have also begun to examine our intervention programs and practices and how we can improve them to support struggling students outside of the instructional day.

This research process also challenged my thinking on how I communicate with parents and families and the community. As a school leader, am I using all modes of communication available to me to share information with parents, families, and communities? Getting parents involved is a challenge but it is necessary for the success of all students and we must find other ways to engage them. I am cognizant of the fact that this will take time and will not happen overnight or in one school year. It is important to start with a focus on collaboration and using student performance data. My hope is that we experience incremental student success and ultimately improved student performance on standardized assessments before tackling other areas.

Finally, I have a tremendous respect for those who have completed this journey and earned this distinguished doctorate degree. While this research revealed what school leaders do to improve the math performance of Black males, it taught me how to persevere, manage my time, and set benchmarks that I held myself accountable to meet. The process of counting on other people in the collection of data proved to be challenging because my passion and the importance of this research were not shared by potential

participants. Several people simply told me they did not have 30 minutes for an interview. Fortunately, other potential participants were eager and proud to share their success stories and what they had done to improve the math performance of Black male students.

Summary

For many years, researchers have focused on why children struggle in mathematics, specifically Black male students (Cheema & Galluzzo, 2013; Kannapel & Clements, 2005; Russo, 2006; Scafidi & Bui, 2010). While most schools are struggling to meet Algebra 1 testing benchmarks, especially schools with large populations of Black male students, there are schools that continue to not only meet testing benchmarks, but have surpassed state averages in Algebra 1 by Black male students. Ebenezer and Knoxboro High Schools have demonstrated high performance on Algebra 1 testing benchmarks by Black male students for 3 consecutive years. It appears that their culture of collaboration, focus on student work, intervention, scheduling, parental involvement, and building personal relationships between school leaders and students have been successful in improving Black male students' success in Algebra 1. These should be key responsibilities of school administrators.

A major goal of school leaders who want to improve the Algebra 1 performance of Black male students should be implementing strong PLCs among teachers, which would work toward creating a school-wide culture of collaboration for all staff. In the PLC sessions, teachers will frequently analyze student performance data and plan instructional strategies to move students forward. A strong culture of collaboration is the key to the success of not only Black male students, but all students. Teachers must have

the support of committed school leaders to help improve Black male students' math performance. This research illustrated the importance of school administration, counselors, teachers, and parents working together to improve Black male students' math performance.

This research also revealed that school leaders can implement other practices and strategies to improve student performance. First, ensuring that Black male students are scheduled into the correct courses with the right teachers can promote a good beginning. Identifying teachers' instructional strengths and weaknesses is the responsibility of school leaders and will allow for proper student placement when scheduling. Second, school leaders must have intervention programs that target struggling students and address their specific learning gaps. Ebenezer and Knoxboro High Schools sponsor strong tutoring programs during school and after school to meet the needs of struggling students. Additionally, building a partnership with parents and families and the community at large contributes to the success of students as confirmed by several studies (Christenson & Sheridan, 2001; Drake, 2000; L. J. White, 1998). Finally, student success starts with effective communication via all available vehicles, to include social media. Parents must understand and accept that they are an important part of their child's education and the process. Gaining parental involvement will also require school leaders to invite parents and families to events and activities that will benefit their child and the school. All participants in this study spoke about the importance of getting parents involved through communication, ParentVue, robocalls, visitation to their homes if necessary, and inviting them to stay in touch with their child's teachers.

In this research, all participants had ideas of what school leaders must do moving forward to continue to improve the math performance of Black male students. The principals insisted that there is still more work to be done in increasing parental involvement. They also talked about finding creative ways to help struggling students through intervention programs and acquiring the necessary resources to support these programs. As shared by the principals, funds to support any program are vital for success. Furthermore, school leaders must hire teachers with a solid understanding of students of diverse backgrounds and who can successfully work with a diverse population. It is important for school leaders to build positive personal relationships with students. All participants expressed that this critical practice contributes to the success of Black male students and the research of Payne (2003) confirmed this need.

Finally, in order for school leaders to improve Black male students' math performance, they must understand, in-depth, the specific practices used by school leaders who have experienced success. This knowledge will help the school administrators implement proven practices and strategies to improve the math performance of Black male students in Algebra 1 as well as other groups in other content areas. The lessons learned from this research are important for school leaders who are working to improve Black male students' math performance.

REFERENCES

ACT. (2007). The role of nonacademic factors in college readiness and success. *Issues in College Success*. Retrieved from http://www.act.org/research.policymakers /pdf/nonacademic_factors.pdf

American School Counselor Association. (2012). *The ASCA national model: A framework for school counseling programs* (3rd ed.). Alexandria, VA: Author.

Archibald, S. (2006). Narrowing in on educational resources that do affect student achievement. *Peabody Journal of Education, 81*(4), 23–42.

Ash, R. C., Hodge, P. H., & Connell, P. H. (2013). The recruitment and selection of principals who increase student learning. *Education, 134*(1), 94–100.

Aud, S., Hussar, W., Planty, M., Snyder, T., Bianco, K., Fox, M., . . . Drake, L. (2010). *The condition of education 2010* (NCES 2010-028). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Ballón, E. G. (2008). Racial differences in high school math track assignment. *Journal of Latinos and Education, 7*(4), 272–287.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28,* 117–148.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research, 1*(4), 287–310.

Battey, D. (2013). Good mathematics teaching for students of color and those in poverty: The importance of relational interactions within instruction. *Educational Studies in Mathematics, 82*(1), 125–144.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544–559.

Berry, R. Q. (2008). Access to upper-level mathematics: The stories of successful African American middle school boys. *Journal for Research in Mathematics Education, 39*(5), 464–488.

Biermann, B. R. (2010). *A descriptive study of public high school freshmen transition programs in the Kansas City metropolitan area* (Unpublished doctoral dissertation). University of Kansas, Lawrence, KS. Retrieved from https://kuscholarworks.ku.edu/bitstream/handle/1808/6748/Biermann_ku_0099D_10953_DATA_1.pdf?sequence=1

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33*(3). Retrieved from http://edr.sagepub.com /cgi/content/abstract/33/8/3

Capraro, M. M., & Joffrion, H. (2006). Algebraic equations: Can middle-school students meaningfully translate from words to mathematical symbols? *Reading Psychology, 27*, 147–164.

Capraro, R. M., & Capraro, M. M. (2006). Are you really going to read us a story? Learning geometry through children's mathematics literature. *Reading Psychology, 27*, 21–36.

Capraro, R. M., Capraro, M., & Rupley, W. (2012). Reading-enhanced word problem solving: A theoretical model. *European Journal of Psychology of Education, 27*(1), 91–114.

Carter, S. C. (2000). *No excuses: Lessons from 21 high-performing, high-poverty schools*. Washington, DC: Heritage Foundation.

Cheema, J. R., & Galluzzo, G. (2013). Analyzing the gender gap in math achievement: Evidence from a large-scale US sample. *Research in Education, 90*, 98–112.

Christenson, S. L., & Sheridan, S. M. (2001). *Schools and families: Creating essential connections for learning*. New York, NY: Guilford Press.

Clements, D. H., Agodini, R., & Harris, B. (2013). *Instructional practices and student math achievement: Correlations from a study of math curricula* (NCEE Evaluation Brief. NCEE 2013-4020). Washington, DC: National Center for Education Evaluation and Regional Assistance.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Darling-Hammond, L. (1998). Teacher learning that supports student learning. *Educational Leadership, 55*, 6–11.

Davies, D., & Dodd, J. (2002). Qualitative research and the question of rigor. *Qualitative Health Research, 12*(2), 279–289.

Davis, D. (2000). *Supporting parent, family, and community involvement in your school*. Portland, OR: Northwest Regional Educational Laboratory.

Drake, D. D. (2000). Parents and families as partners in the education process: Collaboration for the success of students in public schools. *ERS Spectrum, 18*(2), 34–39.

Dufour, R., & Mattos, M. (2013). How do principals really improve schools? *The Principalship, 70*(7), 34–40.

Eccles, J. S., Wigfield, A., & Sehiefele, U. (1998). Motivation to succeed. In N. Eisenberg (Ed.), *Handbook of child psychology (Vol. 3). Social, emotional, and personality development* (5th ed., pp. 1017–1095). New York, NY: Wiley.

The Education Alliance. (2006). *Closing the achievement gap: Best practices in teaching mathematics*. Retrieved from http://www.gram.edu/sacs /qep/chapter%204/4_1EducationAlliance.pdf

Elmore, R. (2000). *Building a new structure for school leadership*. Washington, DC: The Albert Shanker Institute.

Fulco, C. M. (2009). *The impact of a freshman academy small learning community on student achievement and engagement* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Global. (819688758)

Fuchs, L. S., & Fuchs, D. (2002). Mathematical problem-solving profiles of students with mathematics disabilities with and without comorbid reading disabilities. *Journal of Learning Disabilities, 35*, 563–573.

Fullan, M. (2001). *Leading in a culture of change*. San Francisco, CA: Jossey-Bass.

Geary, D. C. (2011). Consequences, characteristics, and causes of poor mathematics achievement and mathematical learning disabilities. *Journal of Developmental and Behavioral Pediatrics, 32*, 250–263.

Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). *Assisting students struggling with mathematics: Response to intervention (RtI) for elementary and middle schools* (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/

Gerstl-Pepin, C. I., & Patrizio, K. (2009). Learning from Dumbledore's pensieve: Metaphor as an aid in teaching reflexivity in qualitative research. *Qualitative Research, 9*(3), 299–308.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report, 8*(4), 597–606. Retrieved from http://nsuworks.nova.edu/tqr/vol8/wass4/6http://nsuworks.nova.edu /tqr/vol8/wass4/6

Grimm, K. J. (2008). Longitudinal associations between reading and mathematics achievement. *Developmental Neuropsychology*, *33*(3), 410–426.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice, 8*(3), 381–391.

Hailikari, T., Nevgi, A., & Komulainen, E. (2008). Academic self-beliefs and prior knowledge as predictors of student achievement in mathematics: A structural model. *Education Psychology, 28*(1), 59–71.

Hanich, L. B., & Jordan, N. C. (2004). Achievement-related beliefs of third-grade children with mathematical and reading difficulties. *The Journal of Educational Research, 97*(5), 227–233.

Hanich, L. B., Jordan, N. C., Kaplan, D., & Dick, J. (2001). Performance across different areas of mathematical cognition in children with learning difficulties. *Journal of Educational Psychology, 93*(3), 615–626.

Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis, 19*(2), 141–164.

Hanushek, E. A., & Luque, J. A. (2003). Efficiency and equity in schools around the world. *Economics of Education Review, 22*, 481–502. doi:10.1016/S0272-7757(03)00038-4

Harper, S. R., & Kuykendall, J. A. (2012). Institutional efforts to improve Black male student achievement: A standards-based approach. *Change, 44*(2), 23–29.

Hattie, J. A. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York, NY: Routledge.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23*(3), 5–14.

Henderson, A. T., & Mapp, K. L. (2002). *A new wave of evidence: The impact of school, family, and community connections on student achievement. Annual synthesis 2002*. Austin, TX: National Center for Family and Community Connections with Schools.

Hepp, E. C. (2013). *Secondary school counselor and principal preferences regarding key school counselor roles* (Unpublished doctoral dissertation). Ohio University, Athens, OH.

Hibbs, D. F. (2012). *An investigation of the self-efficacy beliefs of Black and Hispanic students that have experienced success or failure in mathematics* (Unpublished doctoral dissertation). Seton Hall University, South Orange, NJ. Retrieved from http://scholarship.shu.edu/dissertations/1836

Hock, M. F., Pulvers, K. A., Deshler, D. D., & Schumaker, J. B. (2001). The effects of an after school tutoring program on the academic performance of at risk students and students with LD. *Remedial and Special Education, 22*(3), 172–186.

Hong, S., & Ho, H-Z. (2005). Direct and indirect longitudinal effects of parental involvement on student achievement: Second-order latent growth modeling across ethnic groups. *Journal of Educational Psychology*, *97,* 32–42.

Horng, E., & Loeb, S. (2010). New thinking about instructional leadership. *Phi Delta Kappan, 92*(3), 66–69.

Huberman, M., & Miles, M. B. (2002). *The qualitative researcher's companion.* Thousand Oaks, CA: SAGE.

Hughes, W., & Pickeral, T. (2013). School climate and shared leadership. In T. Dary, & T. Pickeral (Eds.), *School climate practices for implementation and sustainability,*

a school climate practice brief, number 1 (pp. 26–29). New York, NY: National School Climate Center.

Johnson, B., & Christensen, L. (2012). *Educational research: Qualitative, quantitative and mixed approach* (4th ed). Thousand Oaks, CA: SAGE Publication.

Johnson, R. B. (1997). Examining the validity structure of qualitative research. *Education, 118*(2), 282.

Jordan, N. C., Kaplan, D., & Hanich, L. B. (2002). Achievement growth in children with learning difficulties in mathematics: Findings of a two-year longitudinal study. *Journal of Educational Psychology, 94*, 586–597.

Kannapel, P. J., & Clements, S. K. (2005). *Inside the black box of high-performing high-poverty schools: A report from the Prichard Committee for Academic Excellence*. Lexington, KY: Prichard Committee for Academic Excellence.

Keith, T. Z., Keith, P. B., Troutman, G. C., Bickley, P. G., Trivette, P. S., & Singh, K. (1993). Does parental involvement affect eighth-grade student achievement? Structural analysis of national data. *School Psychology Review, 22*(3), 474–496.

Kellaghan, T., Sloane, K., Alvarez, B., & Bloom, B. S. (1993). *The home environment and school learning: Promoting parental involvement in the education of children*. San Francisco, CA: Jossey-Bass.

Kelly, S. (2009). The Black-White gap in mathematics course taking. *Sociology of Education, 82*, 47–69.

King, D. (2002). The changing shape of leadership. *Educational Leadership, 59*(8), 61–63.

Kirsch, I., Braun, H., Yamamoto, K., & Sum, A. (2007). America's perfect storm: Three forces changing our nation's future. *Educational Testing Service*. Retrieved from https://www.ets.org/Media/Education_Topics/pdf/AmericasPerfectStorm.pdf

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health, 74*(7), 262–273.

Koller, O., Baumert, J., & Schnabel, K. (2001). Does interest matter? The relationship between academic interest and achievement in mathematics. *Journal for Research in Mathematics Education, 32*(5), 448–470.

Lee, J., Grigg, W., & Dion, G. (2007). *The nation's report card: Mathematics 2007* (NCES 2007-494). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Lee, V. E., Burkman, D. T., Chow-Hoy, T., Smerdon, B. A., & Geverdt, D. (1998). *High school curriculum structure: Effects on course-taking and achievement in mathematics for high school graduates*. Washington, DC: U.S. Department of Education, Office of Educational Research and Development, National Center for Education Statistics.

Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative analysis tools: A call for data analysis triangulation. *School Psychology Quarterly, 22*, 557–584. doi:10.1037/1045–3830 .22.4.557

Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership and Management, 28*(1), 27–42.

Leithwood, K., Seashore Louis, K., Anderson, S., & Wahlstrom, K. (2004). *How leadership influences student learning*. New York, NY: Wallace Foundation. Retrieved from http://www.wallacefoundation.org/

Leow, C., Marcus, S., Zanutto, E., & Boruch, R. (2004). Effects of advanced course-taking on math and science achievement: Addressing selection bias using propensity scores. *American Journal of Evaluation, 25*(4), 461–478.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.

Lynch, K., & Star, J. R. (2013). Views of struggling students on instruction incorporating multiple strategies in Algebra 1: An exploratory study. *Journal for Research in Mathematics Education, 45*(1), 1–21. Retrieved from http://nrs.harvard.edu/urn-3:HUL.InstRepos:10989382

Margolis, H., & McCabe, P. P. (2006). Improving self-efficacy and motivation: What to do, what to say. *Intervention in School and Clinic, 41*(4), 218–227.

Martin, D. B. (2012). Learning mathematics while Black. *Educational Foundations, 26*, 47–66.

Marzano, R. J. (2003). *Classroom management that works: Research-based strategies for every teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Waters, J. T., & McNulty, B. A. (2004). *School leadership that works: From research to results*. Alexandria, VA: Association for Supervision and Curriculum Development.

McKinley, J. (2007). *Leveling the playing field and raising African American students' achievement in twenty-nine urban classrooms.* Retrieved from http://www.newhorizons.org/strateges/differentiated/mckinley.htm

Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Metallidou, P., & Vlachou, A. (2007). Motivational beliefs, cognitive engagement, and achievement in language and mathematics in elementary school children. *International Journal of Psychology, 42*(1), 2–15.

Mickelson, R. A. (2001). Subverting Swann: First and second-generation segregation in the Charlotte-Mecklenburg Schools. *American Educational Research Journal, 38*(2), 215–252.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*: *An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Miller, J. G. (1997). African American males in the criminal justice system. *Phi Delta Kappan, 78*, K1–K12.

Morgan, P. L., Farkas, G., & Maczuga, S. (2014). Which instructional practices most help first-grade students with and without mathematics difficulties? *Educational Evaluation and Policy Analysis*. Retrieved from http://epa.sagepub.com/content /early/2014/06/20/0162373714536608

Morgan, P. L., Farkas, G., & Wu, Q. (2011). Kindergarten children's growth trajectories in reading and mathematics: Who falls increasingly behind? *Journal of Learning Disabilities, 44*(5), 472–488. doi:10.1177/0022219411414010

Murray, J. (2013). The factors that influence mathematics achievement at the Berbice campus. *International Journal of Business and Social Sciences, 4*(10), 150–164.

National Association of School Psychologists. (2003). *Recommendations for the Individuals with Disabilities Education Act reauthorization: Identification and eligibility determination for students with specific learning disabilities*. Retrieved from https://www.nasponline.org/x26823.xml

The National Center for Educational Achievement. (2009). *Core practices in math and science: An investigation of consistently higher performing school systems in five states*. Retrieved from http://www.act.org/research/policymakers/pdf/Core-Practices-in-Math-and-Science.pdf

National Center for Education Statistics. (2001). *The condition of education*. Retrieved from http://nces.ed.gov/pubs2001/2001072.pdf

National Center for Education Statistics. (2013). *The nation's report card: Trends in academic progress 2012* (NCES 2013 456). Washington, DC: Institute of Education Sciences, U.S. Department of Education.

National Center on Education and the Economy. (2013). *What does it really mean to be college and work ready?* Retrieved from http://www.ncee.org/college-and-work-ready/

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform: A report to the nation and the Secretary of Education*. Washington, DC: U.S. Department of Education.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2006). *Curriculum focal points for prekindergarten through grade 8 mathematics*. Reston, VA: Author.

National Education Association. (2011, February). *Race against time: Educating Black boys*. Retrieved from http://www.nea.org/assets/docs /educatingblackboys11rev.pdf

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for mathematics*. Retrieved from http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf

National Research Council. (2001). *Adding it up: Helping children learn mathematics*. Washington, DC: National Academy Press.

Nicolaidou, M., & Philippou, G. (2003). *Attitudes towards mathematics, self-efficacy and achievement in problem solving*. Pisa: University of Pisa.

Noble, R. (2011). Mathematics self-efficacy and African American male students: An examination of two models of success. *Journal of African American Males in Education, 2*(2), 188–213.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

Onwuegbuzie, A. J., & Leech, N. L. (2010). Guidelines for conducting and reporting mixed research in the field of counseling and beyond. *Journal of Counseling and Development, 88,* 61–69.

Osterholm, M. (2006). Characterizing reading comprehension of mathematical text. *Educational Studies in Mathematics, 63*(3), 325–346.

Pajares, F. (2002). *Overview of social cognitive theory and of self-efficacy*. Retrieved from http://www.emory.edu/EDUCATION/MFP/EFF.HTML

Pajares, F., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. In R. Riding, & S. Rayner (Eds.), *Self-* pp. 239–266). London, England: Ablex Publishing.

Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Payne, R. (2003). *A framework for understanding poverty* (3rd ed.). Highlands, TX: Aha! Process.

Programme for International Student Assessment. (2012). *What 15-year-olds know and what they can do with what they know*. Retrieved from http://www.oecd.org/pwasa/keyfindings/pwasa-2012-results-overview.pdf

Rabe, B. (2006). Race to the Top: The expanding role of US state renewable portfolio standards. *Sustainable Developmental Law & Policy, 7*, 10.

Rakes, C. R., Valentine, J. C., McGatha, M. B., & Ronau, R. N. (2010). Methods of instructional improvement in algebra: A systematic review and meta-analysis. *Review of Educational Research, 80*(3), 372–400.

Redmond, G. (2010). Children's agency and the welfare state: Policy priorities and contradictions in Australia and the UK. *Childhood, 17*(4), 470–484.

Ringstaff, M. E. (2008). *Obtaining success with freshman transition plans: A study of programs in four high schools in Virginia* (Unpublished doctoral dissertation). Liberty University, Lynchburg, VA. Retrieved from http://digitalcommons.liberty.edu/doctoral/115/

Rowling, J. K. (2000). *Harry Potter and the goblet of fire*. New York, NY: Arthur A. Levine Books.

Rothman, T., & Henderson, M. (2011). Do school-based tutoring programs significantly improve student performance on standardized tests? *Research in Middle Level Education Online, 34*(6). Retrieved from http://files.eric.ed.gov /fulltext/EJ925246.pdf

Russo, M. (2006). Teacher professional development: How do we establish it and know that it's working? *The Evaluation Exchange*, *14*(4), 6.

Rutherford-Becker, K. J., & Vanderwood, M. L. (2009). Evaluation of the relationship between literacy and mathematics skills as assessed by curriculum-based measures. *The California School Psychologist, 14*, 23–34.

Scafidi, T., & Bui, K. (2010). Gender similarities in math performance from middle school through high school. *Journal of Instructional Psychology*, *37*(3), 252–255.

Schiefele, U., Krapp, A., & Winteler, A. (1992). Interest as a predictor of academic achievement: A meta-analysis of research. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 183–212). Hillsdale, NJ: Erlbaum.

Shatzer, R. H., Caldarella, P., Hallam, P. R., & Brown, B. L. (2013). Comparing the effects of instructional and transformational leadership on student achievement: Implications for practice. *Educational Management Administration & Leadership*. doi:10.1177/1741143213502192

Silver, E. A., & Stein, M. K. (1996). The QUASAR project: The "revolution of the possible" in mathematics instructional reform in urban middle schools. *Urban Education, 30*(4), 476–521.

Simon, B. S. (2001). Family involvement in high school: Predictors and effects. *NASSP Bulletin, 85*(627), 8–19.

Southwest Educational Development Laboratory. (2005). *The newsletter for the reading first program. What Is Instructional Leadership and Why Is It So Important?* Retrieved from http://www.sedl.org/pubs/reading100/RF-NB-2005-Spring.pdf

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Stake, R. E. (2006). *Multiple case study analysis*. New York, NY: The Guilford Press.

Star, J. R., & Rittle-Johnson, B. (2008). Flexibility in problem solving: The case of equation solving. *Learning and Instruction, 18*, 565–579.

Stein, M. K., Kaufman, J. H., Sherman, M., & Hillen, A. F. (2011). Algebra a challenge at the crossroads of policy and practice. *Review of Educational Research, 81*(4), 453–492.

Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. *Management Decision, 39*(7), 551–555.

Symonds, K. W. (2004). *After the test: Closing the achievement gaps with data* (Learning Point Associates Rep. No. ED-01-CO-0011). Naperville, IL: North Central Regional Educational Laboratory, Institute of Education Sciences, U.S. Department of Education.

Ten Bruggencate, G., Luyten, H., Scheerens, J., & Sleegers, P. (2012). Modeling the influence of school leaders on student achievement: How can school leaders make a difference? *Educational Administration Quarterly, 48*(4), 699–732.

Thompson, J. (1998). *Discipline survival kit for the secondary teacher*. West Nyack, NY: The Center for Applied Research in Education.

Thompson, L. R., & Lewis, B. F. (2005). Shooting for the stars: A case study of the mathematics achievement and career attainment of an African American male high school student. *The High School Journal*, *88*(4), 6–18.

Thompson, R. A., & Zamboanga, B. L. (2004). Academic aptitude and prior knowledge as predictors of student achievement in introduction to psychology. *Journal of Educational Psychology, 96*(4), 778–784.

U.S. Government Accountability Office, Program Evaluation and Methodology Division. (1990). *Case study evaluations*. Washington, DC: U.S. Government Printing Office.

Usher, E. L., & Pajares, F. (2009). Sources of self-efficacy in mathematics: A validation study. *Contemporary Educational Psychology, 34*(1), 89–101.

Villa, S. M. (2008). *Correlation between reading skills and mathematics performance: An analysis of Stanford Achievement Test scores from Grades 6 to 11* (Unpublished doctoral dissertation). University of Texas, El Paso, TX. Retrieved from http://digitalcommons.utep.edu/dissertations/AAI1453851/

Virginia Department of Education. (2015). *State report cards*. Retrieved from https://p1pe.doe.virginia.gov/reportcard/

Vogel, C. (2008). Algebra: Changing the equation. *District Administration, 44*, 34–40. Available at http://eric.ed.gov/?id=EJ807617

Wang, J., & Goldschmidt, P. (2003). Importance of middle school mathematics on high school students' mathematics achievement. *The Journal of Educational Research, 97*(1), 3–19.

Wei, X., Lenz, K. B., & Blackorby, J. (2012). Math growth trajectories of students with disabilities: Disability category, gender, racial, and socioeconomic status difference from ages 7 to 17. *Remedial and Special Education, 34*(3), 154–165.

Welner, K. G. (2001). *Legal rights, local wrongs: When community control collides with educational equity*. Albany, NY: SUNY Press.

White, L. J. (1998). National PTA standards for parent/family involvement programs. *High School Magazine, 5*, 8–12.

White, H. E. (2009). *Increasing the achievement of African American males*. Retrieved from http://www.vbschools.com/accountability /research_briefs/aamalebrieffinalamarch.pdf

Wilson-Jones, L. C., & Caston, M. (2004). Cooperative learning on academic achievement in elementary African American males. *Journal of Instructional Psychology, 31*(4), 280–283.

Xin, Y. P. (2008). The effect of schema-based instruction in solving word problems: An emphasis on pre-algebraic conceptualization of multiplicative relations. *Journal for Research in Mathematics Education, 39*, 526–551.

Xin, Y. P., Zhang, D., Park, J. Y., Tom, K., Whipple, A., & Si, L. (2011). A comparison of two mathematics problem-solving strategies: Facilitate algebra-readiness. *The Journal of Educational Research, 104*(6), 381–395.

Yin, R. K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Corwin Press/Sage Publications.

APPENDICES

APPENDIX A:VIRGINIA POLYTECHNIC INSTITUTE AND STATE

UNIVERSITY CONSENT FORM-IRB

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Informed Consent for Participants in Research Projects Involving Human Subjects

Title of Project: Math Achievement: What Can School Administrators Do to Improve Black Male Math Achievement?

Investigator(s): Felix A. Addo **felix71@vt.edu** **540-288-8965**
Dr. William Glenn **wglenn@vt.edu** **703-538-8481**

I. Purpose of this Research Project
The purpose of this qualitative study will be to examine and identify various protocols, and programs implemented by school leaders to improve Black male math achievement. The study will focus on how school leaders influence Algebra 1 teachers' instructional practices and what issues school leaders see as relevant to Black male students' performance in Algebra 1. Finally, how school leaders approach strategies the literature identifies as relevant to black males and Algebra 1 achievement (quality instruction, supportive learning environment, culture of equitable outcome, understanding of social classes, parent empowerment, community partnerships, etc.)? Information gained from this research will be shared with the school district and schools to implement protocols and programs to improve black male students' Algebra 1 performance.

II. Procedures
A letter of permission to conduct the study will be obtained from each identified school and each participant. The letter will explain the purpose of the study and how the study will benefit schools, participants, education in general and most importantly black male students.
I use the Virginia Standards of Learning (SOL) assessments in Algebra 1 to identify the cases and sites. An open-ended semi-structured interview will be given to school leaders. The interview questions will consist of 6 to 8 questions. The interviews are expected to take forty-five minutes to an hour. All interviews will be audio recorded then transcribed. A copy of their transcribed interview will be shared with each interviewee. I will interview principals, lead math teachers and school counselors in all two schools and review documents utilized by each school.

III. Risks
The risks associated with this study are considered minimal. School leaders who do not wish to participate in the study may opt-out without any prejudice.

IV. Benefits
While there was no guarantee of benefits, any benefits of this study are to inform the body of research regarding protocols, instructional strategies and leadership role to

improve teaching and learning Algebra 1 for black male students. In addition, the data obtained from this study and the results presented will provide school leaders with a track record of success of protocols and that improve black male students' Algebra 1 performance. No promise or guarantee of benefits has been made to encourage you to participate.

V. Extent of Anonymity and Confidentiality

The data in this study will be collected anonymously. Pseudonyms will be used to protect the confidentiality of the participants in the study. All interviews will be digitally recorded in order to have accurate transcriptions. Observation notes will be kept confidentially. All recordings and observation notes will be stored at the residence of the researcher throughout the process in password protected laptop, password protected flash-drive and locked file cabinet. Interview notes, transcripts note and document review analysis will be shared with all participants for accuracy. Upon completing the study, all recordings and notes will be provided to the chairperson of the doctoral candidate for storage. The Virginia Tech (VT) Institutional Review Board (IRB) may view the study's data for auditing purposes. The IRB was responsible for the oversight of the protection of human subjects involved in research.

VI. Compensation

There will be no compensation associated with participation in this study.

VII. Subject's Consent

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date_____

Subject signature

_____

Subject printed name

VIII. Freedom to Withdraw

The principal, assistant principal, Counselor, Lead Math Teacher are free to withdraw from this study at any time without penalty.

IX. Questions or Concerns

Should you have any questions about this study, you may contact one of the research investigators whose contact information was included at the beginning of this document. Should you have any questions or concerns about the study's conduct or your rights as a research subject, or need to report a research-related injury or event, you may contact the VT IRB Chair, Dr. David M. Moore at moored@vt.edu or (540) 231-4991.

(Note: each subject must be provided a copy of this form. In addition, the IRB office may stamp its approval on the consent document(s) you submit and return the stamped version to you for use in consenting subjects; therefore, ensure each consent document you submit was ready to be read and signed by subject.

APPENDIX B: INTERVIEW PROTOCOL, PRINCIPAL

Adapted from Creswell, 2013 Figure 7.4

Project: What can school administrators do to improve the math performance of black males?

Time of interview:
Date:
Place:

The purpose of this study was to identify specific school leadership practices that influence and improve the math achievement of black males in Algebra 1.

Questions:

1. Your school's 2013 thru 2015 Algebra 1 SOL performance by black male students has consistently increased each year. To what factors would you attribute the increased achievement?
2. What was your role in the success of black male students in Algebra 1?
3. What specific instructional practices within your building have a track record of success for black male students in Algebra 1?
4. What role do other school leaders (other than the classroom teachers) play in the success of black male students in Algebra 1?
5. What types of non-academic strategies have you employed to support black male students in Algebra 1?
6. What other factors do you believe might contribute to the success of black male students in Algebra 1 in your school?
7. What recommendations or suggestions would you give school leaders as they work to improve the Algebra 1 performance of black male students?

(Thank individual for participating in this interview. Assure him or her of confidentiality of responses and potential future interviews.)

APPENDIX C: INTERVIEW PROTOCOL, COUNSELOR

Adapted from Creswell, 2013 Figure 7.4

Project: What can school administrators do to improve the math performance of black males?

Time of interview:
Date:
Place:

The purpose of this study was to identify specific school leadership practices that influence and improve the math achievement of black male students in Algebra 1.

Questions:

1. What was the role counselor's play in the success of black male students and Algebra 1?
2. How do counselors support the instructional practices of Algebra 1 teachers?
3. What strategies have you employed to empower parents to be part of their child's educational life?
4. What two or three things are most important when it comes to Algebra 1 success for black male students?
5. What role do your school administration play in the success of black male students and Algebra 1?
6. What recommendations or suggestions would you give school leaders as they work to improve the Algebra 1 performance of black male students?

(Thank individual for participating in this interview. Assure him or her of confidentiality of responses and potential future interviews.)

APPENDIX D: INTERVIEW PROTOCOL, LEAD MATH TEACHER

Adapted from Creswell, 2013 Figure 7.4

Project: What can school administrators do to improve the math performance of black males?

Time of interview:
Date:
Place:

The purpose of this study was to identify specific school leadership practices that influence and improve the math achievement of black male students in Algebra 1.

Questions:

1. Your school's 2013 thru 2015 Algebra 1 SOL performance by black male students has consistently increased each year. To what factors would you attribute the increased achievement?
2. What was your role in the success of black male students in Algebra 1?
3. What specific instructional practices within your building have a track record of success for black male students in Algebra 1?
4. What strategies have Algebra 1 teachers employed to empower parents to be part of their child's educational life?
5. What role do other school leaders (other than the classroom teachers) play in the success of black male students in Algebra 1?
6. What other factors do you believe might contribute to the success of black male students and Algebra 1 in your school?
7. What recommendations or suggestions would you give school leaders as they work to improve the Algebra 1 performance of black male students?

(Thank individual for participating in this interview. Assure him or her of confidentiality of responses and potential future interviews.)

APPENDIX E: LESSON PLAN ANALYSIS PROTOCOL

Adapted from www.cpam.teachersdg.org
Class _Algebra 1 Part 1_____

Student Learning Goal(s):
SOL A.1:
The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to evaluate algebraic expressions for a given replacement set to include rational numbers.

Beginning: Bell ringers- Warm-up - Spiral

During: Use algebra tiles to help students make connections between abstract and concrete

After: Use activity worksheet for students to set up expressions with tiles and replace, or substitute, each rectangle with its tile value.

Formative Assessment(s):
Students to draw a model of the expression 3X + 6, assign a value to X, and replace X with your selected value. What is the simplified answer?
Journal/Writing Prompts
Exit tickets

Lesson Notes (instructional strategies utilized):

Manipulative: using algebra tiles to model simplifying expressions.
Direct instruction in simplifying expressions
Scaffold notes
Songs
Compare and contrast

Groups: Students will work independently, in pairs and share.

Emphasis on Vocabulary: algebraic expression, associative, commutative, inverse, reflexive, replacement set, substitution variable, symmetric, transitive.

Lesson Plan Analysis Protocol

What to look for when analyzing an Algebra 1 lesson plan

- The richness and meaningfulness of the **tasks, problems and examples**
  - meaningful tasks are selected
  - mundane tasks are adjusted
  - tasks effectively capture the relevant mathematics

Notes: **The use of algebra tiles to make connections. The lesson plan contains good examples.**

- The effectiveness and appropriateness of **representations**
  - multiple representations are used
  - different representations are connected
  - representations are chosen for their appropriateness

Notes: The representations chosen for the mastery of this objective is appropriate.

- The maintenance of a focus on the **big mathematical ideas**
  - connections to how concepts are related
  - explanations for procedures are grounded in concepts

Notes: Encouraged students to use the language of the properties while simplifying expressions.

Class _Algebra 1A_____

Student Learning Goal(s):
SOL A.1:
The student will solve multistep linear and quadratic equations in two variables, including solving literal equations (formulas) for a given variable

Beginning: Bell ringers- Warm-up - Spiral

During: Use shapes that represent variables to help students make connect the abstract to concrete.

After: Provide students with construction paper, scissors and large white paper and markers to students. Use equations activity worksheet for students to solve using the shapes.

Formative Assessment(s):
Students to draw a pictorial representation of the equation $5x - 3y = 15$. Show how to solve it by using your drawing.
Ask students to create an equation given pictorial representation. Explain how to solve for b.
Journal/Writing Prompts

Lesson Notes (instructional strategies utilized):

Have students highlight the variable and/or shape for which they are solving.
Venn Diagram
Equations vs. Inequalities
Think-Alouds

Groups: Students will work independently and in pairs.

Emphasis on Vocabulary: Literal equations, properties of equation

Lesson Plan Analysis Protocol

What to look for when analyzing an Algebra 1 lesson plan

- The richness and meaningfulness of the **tasks, problems and examples**
  - meaningful tasks are selected
  - mundane tasks are adjusted
  - tasks effectively capture the relevant mathematics

Notes: **The use of shapes to make connections is very good. The lesson plan contains good examples with meaningful tasks using the activity.**

- The effectiveness and appropriateness of **representations**
  - multiple representations are used
  - different representations are connected
  - representations are chosen for their appropriateness

Notes: The representations (shapes) chosen for the mastery of this objective is appropriate.

- The maintenance of a focus on the **big mathematical ideas**
  - connections to how concepts are related
  - explanations for procedures are grounded in concepts

Notes: Encouraged students to use the language of the properties and vocabulary while solving multi-step equations including solving literal equations.

APPENDIX F: DOCUMENT ANALYSIS AUTHENTICITY PROTOCOL

Date:
Document Analyzed:

Questions for determining authenticity

- √ What was the history of the document?
- √ How did I get it?
- √ What guarantee was there that it was what it pretends to be?
  Was the document complete, as originally constructed?
- √ Has it been tampered with or edited?
  If the document was genuine, under what circumstances and for what purposes was it produced?
- √ Who was/was the author?
- √ What was he trying to accomplish? For whom was the document intended?
  What were the maker's sources of information? Does the document represent an eyewitness account, a secondhand account, reconstruction of an event long prior to the writing, an interpretation?
- √ What was or was the maker's bias?
  To what extent was the writer likely to want to tell the truth?

Do other documents exist that might shed additional light on the same story, event, project, program, context? If so, are they available, accessible? Who holds them? (Merriam, 1998, p. 122) citing (Lincoln & Guba, 1981) citing Clark (1967, pp. 238-239)

APPENDIX G: THEMES TEMPLATE

Adapted from Stake, 2006 Worksheet 2

Research Question 1: What role did school leaders play in improving Black male students' Algebra 1 performance?

Themes from Research Question 1

Interviews	Principals	Counselors	Lead Math Teachers
Theme 1:	Instructional issues that affect student achievement.	Scheduling of students into appropriate courses and with the right teacher.	Making sure that teachers implement the curriculum.
Theme 2:	Resources and funds for programs	Advise students struggling academically to attend after school tutorial and remediation.	Attend and participate in all collaborative sessions
Theme 3:	Implementation and monitoring of the curriculum	Facilitate meetings with parents and teachers.	Tutor students before, during and after school
Theme 4:	Provide opportunity for teachers to communicate	Communicate with parents about staying involved in their child's education.	
Theme 4:	The expectation that all students will be successful		

Research Question 1a: What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?

Themes from Research Question 1a

Interviews	Principals	Counselors	Lead Math Teachers
Theme 1:	Hire dynamic staff.	Schedule parent and teacher conferences	Teachers collaborate about student academic performance
Theme 2:	Create opportunities for teachers to collaborate.	Advice struggling students of support services available	Frequent communication about instruction
Theme 3:	Provide instructional technology for all classrooms.	Communicate with parents and encourage them to stay engaged in their child's education	Teacher training regarding instructional strategies

Theme 4:	Provide teacher training.		Ensure that teachers keep up with the curriculum pacing guide.

Research Question 1b: What strategies did school leaders undertake to help Black male students' Algebra 1 performance?

Themes from Research Question 1b

Interviews	
Theme 1:	Summer enrichment program for rising 9th graders
Theme 2:	Adults taking an interest in kids through mentoring.
Theme 3:	Communicate with parents to stay involved in their child's education.
Theme 4:	Provide meaningful information to parents/families through different modes of communication.

Research Question 1c: What strategies did school leaders employ to influence Algebra 1 teachers' instructional practices to improve Black male students' performance?

Themes from Research Question 1c

Interviews	Principals
Theme 1:	Students receiving additional academic support outside of the classroom.
Theme 2:	Communicate to parents/families to get involved for the success of Black male students' in Algebra 1.
Theme 3:	Having a relationship between school leaders and students is crucial to the success of Black males.
Theme 4:	Hire strong math teachers that are knowledgeable of the content and know how to work with different learning styles
Theme 5:	Secure funds to compensate teachers for tutoring and remediation programs

Themes of Algebra 1 Lessons and Unit Plans

Document Review	Lesson Plans	Unit Plans
Theme 1:	The use of different instructional strategies	A calendar of daily activities and skills students will be able to learn
Theme 2:	There is a focus of the big mathematical ideas	Questions and activities that can be integrated into instruction
Theme 3:	Frequent checking for understanding of objective	Accommodations for differentiated instruction
Theme 4:	Emphasis placed on mathematics vocabulary	A focus on vocabulary that students must know to be successful

APPENDIX H: ANALYSIS OF THEMES TEMPLATE

Adapted from Stake, 2006 Worksheet 3

Research Question 1: Themes of School Leaders

Synopsis of the Case: (brief descriptive stats and description of leadership role)

Research question 1 ascertained the role of the principal, counselor and lead math teacher in improving the Algebra 1 performance of Black male students.

Overview Information from School Leaders: (brief descriptive stats, overall approach of leadership activities in improving Algebra 1 performance of Black male students)

School leaders defined their role differently with respect to their job position in the school. Each leader did what was in the best interest of Black male students to ensure their success.

Specific information from each participant; Principal, Counselor and Lead Teacher: (specific information about leadership activities to improve Algebra 1 performance of Black male students)

School leaders scheduled students appropriately with the right teacher, set high expectations that all students will be successful, facilitate meetings with parents, communicate with parents/families, tutor students, attend and participate in collaborative sessions and find resources to support instruction and after school remediation.

Information from Artifact Review: (summary of data about school leadership role and activities in improving Algebra 1 performance of Black male students)

The school's website contained information about the scheduling process, after school tutoring pamphlet, activities calendar to include parent and teacher meeting dates and ParentVue and StudentVue portal. A robo call that goes out to parents about school events is another way school leaders communicate with parents/families

Prominence of Principal Themes: Guiding the school for all to be successful
Prominence of Counselor Themes: Appropriate course placement and support
Prominence of Lead Math Teacher Themes: Collaborate and ensure teachers teach the of the standards.

Analysis of worksheet 2, worksheet 3 and response to interview questions as it relates to research questions generated the following:

Findings:

Principals : Instructional leader and manager

Counselors: Scheduling students into the appropriate course and providing support.

Lead Math Teachers: Working alongside other math teachers to improve instruction and the representative of the department within the school.

APPENDIX I: REFLEXIVE JOURNAL PROTOCOL

Date:
Location:

1. “The pensive” (Gerstl Pepin & Patrizio, 2009; Rowling, 2000):

2. Thick, rich description (including context):

3. Notable Quotes:

4. Self-Reflexivity: *Prompts:”* What do I know? How do I know what I know? What shapes and has shaped my perspective? How have my perceptions and my background affected the data I have collected and my analysis of those data? How do I perceive those I have studied? With what voice do I share my perspective? What do I do with what I have found?” (Patton, 2002, p. 495)

5. Reflexivity about Participants:
Prompts: “How do those studied know what they know? What shapes and has shaped their world view? How do the perceive me, the inquirer? Why? How do I know?” (Patton, 2002, p. 495)

6.Reflexivity about Audience:
Prompts: “How do those who receive my findings make sense of what I give them? What perspectives do they bring to the findings I offer? How do they perceive me? How do I perceive them? How do these perceptions affect what I report and how I report it?” (Patton, 2002, p. 495)

APPENDIX J: VIRGINIA TECH IRB APPROVAL LETTER

VirginiaTech

Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
email irb@vt.edu
website http://www.irb.vt.edu

MEMORANDUM

DATE:	May 25, 2016
TO:	William Joseph Glenn, Felix Akwei Addo
FROM:	Virginia Tech Institutional Review Board (FWA00000572, expires January 29, 2021)
PROTOCOL TITLE:	What Can School Administrators Do to Improve the Math Performance of Black Males
IRB NUMBER:	**16-486**

Effective May 25, 2016, the Virginia Tech Institution Review Board (IRB) Chair, David M Moore, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

http://www.irb.vt.edu/pages/responsibilities.htm

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As:	**Expedited, under 45 CFR 46.110 category(ies) 5,6,7**
Protocol Approval Date:	**May 25, 2016**
Protocol Expiration Date:	**May 24, 2017**
Continuing Review Due Date*:	**May 10, 2017**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

APPENDIX K: VIRGINIA TECH IRB APPROVAL LETTER 2

VirginiaTech

Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
email irb@vt.edu
website http://www.irb.vt.edu

MEMORANDUM

DATE: June 8, 2016

TO: William Joseph Glenn, Felix Akwei Addo

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires January 29, 2021)

PROTOCOL TITLE: What Can School Administrators Do to Improve the Math Performance of Black Males

IRB NUMBER: **16-486**

Effective June 8, 2016, the Virginia Tech Institution Review Board (IRB) Chair, David M Moore, approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

http://www.irb.vt.edu/pages/responsibilities.htm

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As:	**Expedited, under 45 CFR 46.110 category(ies) 5,6,7**
Protocol Approval Date:	**May 25, 2016**
Protocol Expiration Date:	**May 24, 2017**
Continuing Review Due Date*:	**May 10, 2017**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

APPENDIX L: PARTICIPANT REQUEST EMAIL

Email

Dear XXX,

My name is Felix Addo and I am a doctorate student at Virginia Tech. For my dissertation, I am examining how school leadership improves the Algebra I performance of Black males. XXX High School was selected for my research as one of the top two high schools in Virginia to have demonstrated three consecutive years of increased achievement by Black males on the Algebra 1 SOL and surpassed state average by at least 5%. As the XXX of XXX High School, you are an integral part of the success of Black males in mathematics to provide valuable first-hand information from your own perspective. I would like to interview you about leadership practices, protocols, programs, instructional practices and support systems that help improve the Algebra I performance of Black males in your school.

The interview will be audio recorded. In addition, I will be taking written notes during the interview. The interview will require approximately forty-five minutes to one hour to complete. You will be asked to answer seven questions. There is no compensation for the interview or responding, nor is there any known risk. I plan to interview other school leaders in your school that contribute to the success of Black males in Algebra I.

Participation is strictly voluntary and confidential. If you are willing to participate, please suggest a day and time that suits you, and I'll do my best to be available. If you have any questions, please do not hesitate to ask either by phone, email or in person. Please see attached documents for information about the study.

Thank you in advance for taking the time to assist me in my educational endeavors. I would be honored if you would accept this invitation to participate.

Sincerely,

Felix Addo
XXX-XXX-XXXX (personal cell phone)
XXXXXX@vt.edu

APPENDIX M: WEBSITE ANALYSIS AUTHENTICITY PROTOCOL

Judge The Quality of Internet Resources

1. Authority: Authority exists if the webpage lists the author and his or her credentials and the address has a preferred domain such as: .edu, .org, or. gov. Therefore, to assess the site's authority, you should do the following:
    a. Find the source of the document. A URL ending in .edu is a form an institution of higher education, .gov is from some branch of the U.S. federal government, .org is from some nonprofit organization such as the American Psychological Association, .com is from a commercial vendor, and .net is from anyone who can afford to pay for space on a server.
    b. Identify the qualifications of the publisher of the web document. You can get some of the information from the website itself by reading the "about us", "mission", or "who we are" sections.

2. Accuracy: Accuracy is the highest when the webpage lists the author and institution that publishes the page and provides a way of contacting the author. To assess the accuracy, you should do the following:
    a. Look at the credentials of the person who write the webpage and check for a link or an e-mail address that will permit you to contact this person.
    b. Identify the purpose of the information. Is it public services announcement, advertisements, sales pitch, news release, or a published research study? The purpose may suggest that a certain bias exists in the information.
    c. Determine if there is acknowledgement of the limitations of the information, particularly if the information is the report of some study.
3. Objectivity: Objectivity is highest when the webpage has little or no advertising and provides accurate and objective information. Therefore, you should do the following:

a. Identify if there is any evidence of some sort of bias in the information presented.
    i. Is the information traceable to factual information presented in some bibliographic or Internet reference? Such information may be less biased.

ii. Do the authors express their own opinion? Authors' opinions suggest bias.

4. Currency: Currency exists when the webpage and any links it provides are updated regularly. This means that you should determine the following information.

a. When the webpage was produced

b. When the webpage was updated and how up-to-date the link (if any) are.

5. Coverage: Coverage is good when you can view the information on the webpage without paying fees of having additional software requirements. (Johnson & Christensen (2012).

APPENDIX N: COMPLETED WEBSITE ANALYSIS AUTHENTICITY PROTOCOL

Evaluating Web Sites: Criteria and Tools

1. **Authority:** Ebenezer High School and Knoxboro High School has a webmaster that maintains the site at the district level and at the school level. Both websites are public as it contains information for the public. For issues with the website, there is an email address of the website master. The majority of the information is free to the public. Students, parents and staff have access to confidential information through a secure log in process. Documents posted on the websites are from school faculty and staff.

2. **Accuracy**: The documents found on the website are of the highest quality as they appear to have been published by district level personnel or school level faculty and staff. There are documents on the website that offer opinions through experiences. The majority of the documents are for information purpose.

3. **Currency**: Both webpages are updated regularly. They both state that "copyright © 2017. All rights reserved".

4. **Coverage**: There are no fees to view the webpages or any documents (Johnson & Christensen (2012).

APPENDIX O: PARTICIPANTS' RESPONSES TO RESEARCH QUESTIONS

Alignment of Responses in Relation to Research Questions

Research Question 1	Response to Interview Question (RQ)
Principals	RQ1, RQ2, RQ4, RQ5, RQ6, RQ7
Counselors	RQ1, RQ2, RQ3, RQ4, RQ5, RQ6
Lead Math Teachers	RQ2, RQ3, RQ4, RQ5, RQ6, RQ7

Research Question 1a	Response to Interview Question (RQ)
Principals	RQ1, RQ2, RQ3, RQ4, RQ6, RQ7
Counselors	RQ6, RQ7
Lead Math Teachers	RQ1, RQ2, RQ6, RQ7

Research Question 1b	Response to Interview Question (RQ)
Principals	RQ3, RQ4, RQ5, RQ7
Counselors	RQ3, RQ4, RQ6
Lead Math Teachers	RQ3, RQ4, RQ7

Research Question 1c	Response to Interview Question (RQ)
Principals	RQ1, RQ2, RQ3, RQ4, RQ5, RQ6, RQ7
Counselors	RQ1, RQ2, RQ3, RQ4, RQ5, RQ6
Lead Math Teachers	RQ1, RQ2, RQ3, RQ4, RQ5, RQ6, RQ7

APPENDIX P: COLLABORATIVE PLANNING TEMPLATE

Collaborative Planning Template

<table>
<tr><td colspan="3">Subject(s): Math Location of the Meeting: Room</td></tr>
<tr><td>Date of Meeting:</td><td>Start Time:</td><td>End Time:</td></tr>
<tr><td colspan="3">Team Members Present:

Team Members Absent:</td></tr>
<tr><td colspan="3">Celebrations to Share:</td></tr>
<tr><td colspan="3">Major Objectives/SOLs being covered during this time period:</td></tr>
<tr><td colspan="2">Assessments / Evidence

☐ Projects ☐ Quizzes ☐ Tests

☐ Academic Prompts ☐ Anecdotal Records

☐ Lab ☐ Other ( )</td><td>Pacing Guide Status

☐ On Target

☐ Behind Target

↳ How far behind? _____</td></tr>
</table>

APPENDIX Q: A PROFESSIONAL LEARNING COMMUNITY TEMPLATE

Collaborative Learning Team Members: Subject:
Date:

SMART GOAL:

What Do We Want Students to Learn? (Upack the SOL. Create the essential questions that students should be able to answer) The Essential Questions are: 1. 2. 3. 4. 5.	CRISS	**How Will We Know They Are Learning?** (Administer the essential questions as a formative assessment and analyze the results as a team) Results:
How Will We Respond When They Don't Learn? (List your intervention strategies) **Interventions:**	Think Aloud	**How Will We Respond When They Do Learn?** (How will you acknowledge individual success?) **Enrichment:** **Celebrations:**

Feedback: