MENTORING IN URBAN HIGH SCHOOLS: IMPACT ON 9th GRADE AFRICAN AMERICAN MALES' ALGEBRA I ACHIEVEMENT

A Record of Study

by

ALAN DALE ELLINGER

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Chair of Committee,	Patricia Larke
Co-Chair of Committee,	Carol Stuessy
Committee Members,	Trina Davis
	Gwendolyn Webb-Hasan
Head of Department,	Michael de Miranda

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ABSTRACT

In 2010, an urban high school in southeast Texas was considered academically unacceptable by the Texas Education Agency and had not met state standards for seven years. Data showed there were many issues in the school such as poor academics, high absentee rate, low graduation rate, and discipline issues. When the school focused on finding a solution to these problems they found that a specific population was showing the widest academic gaps: African American males.

Plans were developed to create a mentoring program for the African American males that were identified as being at-risk of dropping out of high school. Outside professionals that possessed strong academic backgrounds volunteered to support the interventions towards the students' academic gaps. To evaluate the impact of the mentoring program, five research questions guided the study. They were: 1) What are the differences between course grades of mentored African American males compared with those of non-mentored African American males in Algebra I?; 2) What are the differences between grades of mentored African American males compared with those of non-mentored African American males in Algebra I with the same teacher?; 3) What the differences are between scores of mentored African American males and non-mentored African American males on Algebra I assessment?; 4) What the differences are among scores by objectives of African American males on the State Algebra I assessment?; and 5) What are African American males' perceptions about the mentoring program?

Results of the study showed a difference of a passing average for mentored students in Algebra I of approximately six percentage points higher than non-mentored students in 2011-12 and approximately 4 percentage points higher for mentored students in 2012-13. Mentored students had a significantly higher passing percentage by teacher of record in both years of the study. Differences of passing averages for mentored students on the Algebra I EOC of approximately 44 percentage points higher than non-mentored students in 2011-12 and approximately 35 percentage points higher for mentored students in 2012-13 were found. Mentored students had a significantly higher passing percentage by EOC objectives in both years of the study. Mentored students recorded significantly positive responses on mentoring program surveys in both years of the study. Evidence gathered on the program recorded the correlation between the mentoring program and EOC assessment scores and showed that the mentoring program had a significant impact on the outcome of the STAAR Algebra I EOC Assessment for the African American male students who participated. The analysis of data demonstrates that the more time a mentor spends with a student, the greater the likelihood of a higher score on the assessment.

DEDICATION

I dedicate this work to my wife Sharon Ellinger who stood by me and encouraged me every day, without her support this would not have been possible. I also want to recognize my children Kyle, Ryan, Cody, Liam, and Molly for being my inspiration to want to complete this program.

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Finally, thanks to my wife and children for their patience and love.

NOMENCLATURE

TEA	Texas Education Agency
ISD	Independent School District
TAKS	Texas Assessment of Knowledge and Skills
STAAR	State of Texas Assessments of Academic Readiness
EOC	End of Course
PEIMS	Public Education Information Management System
AEIS	Academic Excellence Indicator System
AYP	Average Yearly Progress
AWARE	Data Disaggregation System
PHStat	Statistical Analysis Program
UTMB	University of Texas Medical Branch
NAACP	National Association for the Advancement of Colored People
NCTM	National Council of Teachers of Mathematics
NAEP	National Assessment of Educational Processes
SASS	Screening, Assessment, and Support Services
SAT	Scholastic Aptitude Test
ACT	American College Testing
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
AAUW	American Association of University Women
AHAA	Adolescent Health and Academic Achievement

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CHAPTER I

INTRODUCTION

Math performance gaps are recognized as a point of concern for public schools across the United States. In 2011, low math assessment scores were recognized as a major problem on the accountability report for an urban high school in southeast Texas (Texas Education Agency, 2015). Ball High School was labeled Academically Unacceptable by the Texas Education Agency and was conducting a needs assessment for a transformation grant. After further inspection of student data, the school administration identified the root causes of the academic problems.

Administrators found that issues were multi-faceted and should be addressed. Many discussions of student data occurred between the principal of the high school and the assistant superintendent for curriculum and instruction about low mathematics assessment scores, which finally led to a focus on the consistently low scores of African American males. While the problem of African American males' scores was complex, causes for the achievement gaps were undetermined and not evident. School records indicated potential causes, including high rates of discipline issues and absenteeism, extreme poverty, and living in one-parent households.

I proposed for my record of study to examine the effectiveness of mentoring programs in boosting performance of ninth-grade African American male students in Algebra I. In the next section, I will provide general information about the problem, my proposed solution, and the guiding questions and objectives.

Background of the Study

My search of the literature revealed that the most substantial academic problem for African American students in America's schools is a growing achievement gap in mathematics (Johnson & Kritsonis, 2006). A large segment of African American students are suffering from instructional practices that are not compliant with the recommendation set by the National Council of Teachers of Mathematics (NCTM: Vanneman, Hamilton, Anderson, & Rahman, 2009). In particular, African American males were shown to have the most severe educational gaps in mathematics. African American males score lower in Algebra I courses during their freshman year of high school compared to other groups, causing these students ultimately not to reach more advanced math courses (Reigle-Crumbs, 2006). These same grade disparities were not seen among African American female students, giving light to the idea that more attention should be focused on racial inequality in math among male students (Thomas & Stevenson, 2009).

An alternative view came from a report by the American Association of University Women, which suggested no significant disadvantage toward males in education (Corbett, Hill & St. Rose, 2008). Dee (2005) reviewed the literature and commented that gender may be too broad a category for analytically examining the deep-seated problems of equity in education. I chose to address the immediate issues connected with low-performing African American males, such as negative environmental and cultural influences, and other suggestions for educators to improve and support educational equity (Noguera, 2003).

My search of the literature led to my decision to implement a structured mentoring program, which has been reported to be successful in alleviating problems within the education sector. Furthermore, I found new studies in the literature that evaluated mentoring initiatives focused on African American males designed to help close the achievement gap in high school mathematics. Most research on mentoring programs focused on problems associated with drug use, early marriage and pregnancies, low self-esteem, and increases in juvenile crime (Terzian, Andrews, & Moore, 2011). Given that youths at risk are likely to be confronted with difficulties in education, school professionals and parents search for effective interventions for school-related problems. In this study, the support for the students came in the form of highly educated professionals mentoring young, struggling, African American male students. The overarching benefit of helping to close academic achievement gaps in mathematics is to help solve the social issues that surround these students.

In this study, I examined the effect of mentoring on the academic achievement of ninth-grade African American male students in Algebra I. To try to eliminate any differences in the data caused by the state changing testing standards, I made the decision to focus on participants in the 2011-12 and 2012-13 school years. Each year, approximately 100 African American male students in grades 9-12 participate in the program. Academic, attendance, and discipline data are collected on each student participating in the program.

To obtain a clear representation for comparison in this study, I also involved a comparison group. This comparison group consisted of African American male students with similar prior scores who declined to participate in the mentoring program. For the 2011-12 school year, I compared data between 27 ninth-grade Algebra I African American male students who participated in the mentoring program and 27 ninth-grade Algebra I African American male students who opted out of the program. My search for the comparison group found that there were 27 students who declined the program, allowing me to randomly select the 25 who were selected for the study. For the 2012-13 school year, I again compared 26 African American male students who participated in the mentoring program and the same number of students who declined the program. As in the previous year, there were slightly more students who did not participate, so I used a random selection to obtain a matching number for the study.

I selected these students because it was the first time they had taken the state assessment in Algebra I. I collected test scores from the state assessment for State of Texas Assessments of Academic Readiness (STAAR) math from the year prior to the students participating in the mentoring program and the Algebra I data at the end of the mentored year with the aim of comparing the outcome to see if the program had any significant impact on the youth. This data show overall raw score for the assessments as well as how each student scored on specific objectives covered by the test.

Along with state assessment scores, I collected data on Algebra I course grades, attendance records, frequencies of discipline infractions, and time each student spent with their mentor. It was believed that students who participated in the program and regularly met with the mentor would make significantly higher academic gains after the program. In addition, surveys were completed at the end of each year to gauge the perceptions of the participants and mentors towards the program.

The administration of the high school considered evaluating how a structured community mentoring/tutoring program could affect the performance of young African American male students on the state assessment for mathematics. The idea of a mentoring/tutoring program seemed a positive intervention because desperate mathematics scores immediately showcased as a major hurdle for transforming the high school and achieving Academically Acceptable status. At the beginning of the campus needs assessment process, the administration believed that low mathematics achievement could be eliminated by developing an intervention plan to have the students see a math teacher for extra time during the week, and this extra instruction time would close the performance gap.

While this teacher tutoring was put into place, the need for a more focused approach to reach these underperforming students at risk was paramount. Approximately 70% of the district meets the free and reduced lunch status, while 100% of the students who participated in this study meet those standards. Moreover, the city where the high school is located suffered a devastating natural disaster five years earlier that greatly disrupted the student's education during very important formative years for mathematics. The location of the school also establishes a sense of isolation, and many students, especially African American males, find themselves surrounded by negative influences that could lead to discipline incidents.

With these issues in mind, the administration decided that a mentoring program directed at African American males and facilitated by local educated, successful professionals with strong backgrounds in mathematics could lay a foundation of making right choices in the community and in school while closing the achievement gap in mathematics.

Knowing that an initiative such as this program would succeed or fail on the support of the community, the school called together different panels to discuss the issue. After interviewing community leaders, the feedback suggested that the problem of low mathematics achievement for African American males in this community was rooted in poverty and the lack of a culturally responsive environment. If left unchecked, these students would continue to fail, and their learning gaps would continue to worsen. The majority of students had several factors that caused them to be considered youths at risk, including poverty, failure to advance in grade levels, and failure to pass previous state assessments, which often leads to dropping out of school. I proposed that a mentoring program could enhance the education of African American male students in this community.

When the instructional planning team at the high school examined the problems that African American male students were facing that may have been detrimental to their success, several issues were found. In the minds of the instructional team, the problem space included different stakeholders that brought their own issues to the discussion. These stakeholders were the students, teachers, and administrators. By understanding and identifying the stakeholders and focusing on an instructional goal, the information from "Leading for Instructional Improvement" by Fink & Markholt (2011) led the school to see how many possible multi-dimensional issues may lie under the focus problem. The path to a solution was planted in class instruction and intervention strategies such as the mentoring program.

After the school identified problems and possible solutions, administrators created a youth mentoring program. The program focused on helping young African American male students in grades 9 through 12 become stronger mathematics students.

Tutor-A-Tor Mentoring Program

The Tutor-A-Tor Mentoring program has been in place for the past six years. The program was designed to identify the approximately 85-100 underachieving African American males that are recognized each year as needing targeted interventions. These students were identified as having the highest possibility of not completing high school and going on to struggle socially and economically after leaving. In the past six years, the program has supported the majority of the students who succeeded in graduating on time, and many of these students have gone on to college after recognizing their academic strengths or left high school with a vocational certification that allowed them to enter the workforce with a high-paying skill. This program has given students a chance to have a mentor who will provide academic support and social and emotional support to make good decisions that will yield success and be successful in the future. In this program, students that had never passed a state assessment or worked with a mentor on character and academics. It was important that by the end the year, students would have earned a successful score on the STAAR and gain knowledge that they can be successful. This program has been vital to this community, to the school, but most of all to the students.

This program has also had a tremendous impact on the perception of the community towards the students at Ball High School. Before the program, the pervasive view by the community was that Ball High School was a dangerous place where no learning was occurring and where students had no drive to be successful. The best publicity for this program has been from the mentors going back into the community and describing Ball High School as it is today. The community has a positive view of the students and not negative

The program has a very close partnership with University of Texas Medical Branch, a teaching hospital on the island. The president of the institution has partnered with our program and has offered all of his medical and teaching staff as mentors. He has strongly encouraged his department chairs to take significant roles in the program, and currently we have approximately 80 mentors from UTMB. We also work with Texas A&M University Galveston, Galveston College, and local churches and businesses. All of these establishments provide positive, professional role models to the mentoring program. To be part of the program, mentors are required to offer at least one hour per week to the students at Ball High School. The program director screens all mentors brought into the program for an expertise that will help the students (math, science, etc.) and personality that will match with a particular student. Mentors must pass a criminal background check.

The program director has over 15 years total educational experience and holds a BS in Science and M.Ed. in Educational Administration from the University of Houston–Clear Lake. She taught science for 12 years and directed a parent liaison initiative for three years. The director meets with and interviews every potential mentor. After developing a matrix for the students involved in the program according to their needs, the director matches the mentor to the protégé. The director, along with an assistant, develops schedules that meet the needs of the students as well as the mentors. The program is under the curriculum and instruction umbrella and is overseen by the dean of instruction.

Statement of the Problem

A trend of African American male students underachieving in mathematics spurred calls from the community for an immediate and lasting solution. As revealed by the accountability report for the high school, African American male students consistently perform poorly in school mathematics (Texas Education Agency, 2015). Varied arguments were put forward to explain this situation, including the idea of the students' home language. There is an argument that a reason for African American male students' low performance in mathematics is an instructional vocabulary gap between language which is used at home and that which is needed to understand mathematical concepts (Stevens, Schulte, Elliott, Nese & Tindal, 2015). Nationally there has been some discussion that the curriculum used in schools is so disconnected from the prior knowledge that underprivileged African American students have that they do not see a later need for the content (Holt, 1995). This suggests some direction for further study on the mathematics performance of African American students. In addition, many teachers are unprepared to teach African American students, and often blame the students for their underachievement (Gay, 2010).

The Problem Space

History of Ball High

Texas in the 1880s was one of the exciting frontiers in the United States. With a growing economy based on cotton and agriculture, the state offered endless opportunities for immigrants, Texans, and freed slaves. Many came to Texas through the state's richest and largest city at the time, Galveston, to claim land on the western border, find jobs, or even work the cattle farms throughout the state. Galveston itself was a modern city with a vibrant business and arts community. The citizens of Galveston during this time educated their children either through private or parochial schools or simply did without.

The Texas legislature authorized public education in 1840, which made possible public schools (TEA, 2016). Many business leaders discussed the growing trend sweeping across American cities to provide public, compulsory education. They saw that by educating the general population, they would have a better, more reliable work force as well as a better community.

George H. Ball, who had built a fortune with dry goods stores and banking, donated $50,000 to build Ball High School, a public high school for White children grades 8-12, as well as Central High School, an all African American high school

(Hefferman, 2014). Ball High School was built as a modern stone and brick building. It was not complete when Mr. Ball died of a stroke in 1884; however, Mrs. Ball completed the project. She also completed Central High School, which was a wooden structure and much smaller than Ball High School. The city established taxes, per state legislation, to pay teacher salaries and administrative costs. The first students graduated from both campuses and joined the work force in 1887 (Ball High School, 2016). Mrs. Ball spent an additional $47,000 in 1890 to add improvements to Ball High.

From the beginning, Ball High School was a progressive and wealthy campus. The students who attended included European immigrants, Texan Hispanics, and Americans whose families had resettled in Texas. The names and faces of graduates from Ball High during the early years of the institution reflect the diversity and wealth of the White community. Portraits of these early students hang in the hallways of Ball High today. The White community at the time was defined as non-Black and included Hispanics.

In contrast, Central High School's students, while hard working and ambitious, were not afforded the same opportunities as their White counterparts. Records show a series of shabby wooden buildings that housed a dedicated staff and student base (Cherry, 2004). While Central students contended with Jim Crow laws, open discrimination, and social barriers to economic advancement, the principal of the school and his staff maintained high educational standards and dedication to their student base. A brick high school was built for Central students in 1893. This structure was expanded and included an African American library under the leadership of J. R. Gibson (Jones, 2008).

Galveston waxed and waned in economic growth during the first part of the 20th century. The hurricanes of 1900, 1909, 1915, 1932, 1943, and 1947 debilitated the city (Handbook, 2010), and the economic infrastructure that created the two high schools shifted inland to Houston. Galveston’s economy changed from banking and shipping to tourism and gambling (Handbook, 2010). By 1950, many illegal businesses (prostitution and gambling) had been closed. This was the beginning of a long, economically stagnant period. The economic backbone of the city consisted of UTMB, American National Insurance, and Moody National Bank. The city settled into a pattern of little economic growth, which maintained stagnant social and economic boundaries for its citizens.

In 1959, the Supreme Court heard the case of *Brown v. Board of Education*, which made racial segregation in public schools illegal (Courts, 2016). On the island, however, racism and Jim Crow laws remained the status quo. While white students were given more opportunities for education and jobs, African American students floundered, held back by irrational and unfair laws and social systems.

In 1954, Galveston ISD built a new Central High School building. It was modern and sophisticated from an architectural and technical perspective. That same year, Ball High School also built a new building (Ball High School, 2016). The African American community felt that the new Central High School was a victory at the time for their children. However, critics saw this as a placation and catalyst to keep the status quo. In 1954, the African American unemployment rate at 9.9% was twice that of whites at 5%

(Desilver, 2013). In 1954, the average white family income was $4,173, while African Americans earned around $1,400 per year, about one-third of whites (Department of Commerce, 1961).

Desegregation of Texas schools started in the 1960s and was met with great resistance by non-Black communities. In 1957, Texas passed a law that declared segregation legal on the state level. The law started with the Mansfield school desegregation incident in 1956. In that incident, after a federal judge ordered Mansfield schools to desegregate, citizens of the community blocked three African American students from entering the high school to attend classes. The governor, Allan Shivers, along with the local sheriff, looked the other way while the African American community and the teens were terrorized and refused an education. Even the U.S. President Dwight Eisenhower looked the other way. It was not until President Lyndon Johnson declared that federal funding would be withheld from segregated schools in 1965 that Texas schools quietly desegregated (Green, 2010).

In Galveston, desegregation did not occur until 1969, when Central High School was converted to a middle school. The success of this shift in social policy is attributed to winning sports teams within Galveston ISD, which knitted the community together (Ball High School, 2016). A civil rights lawsuit filed in 1959 against Galveston by the NAACP for segregation was finally resolved in 2009 to the satisfaction of the NAACP (Boudreaux & Gatson, 2013). Over the years, the district played a shell game with bussing and zoning to effectively keep a segregated school district. The social policy on segregation has deep roots within the Galveston community. It is a complex problem that transcends culture, economic status, religious organizations, and education.

Decades after desegregation and the combining of Ball High School and Central High School legacies of the two institutions remain. Conversations with former students that attended Central High School brings out tremendous pride in the school that these individuals could call their own (C. Brooks, personal communication, July 28, 2016). A current assistant principal Ball High School and former graduate of Central High School illustrates a view of the separation as a sense of pride that Central was their school (C. Brooks, personal communication, July 28, 2016). Although a source of fond memories, Mr. Brooks does recall working with his younger brother on mathematics homework years later. His younger brother was a student at the newly integrated Ball High School and was enrolled in advanced mathematic courses. Mr. Brooks stated he realized the opportunities that were open to these students now that he did not have since Central had no advanced mathematic courses (C. Brooks, personal communication, July 28, 2016). Today, former students and their families still come back to Galveston for the "Central Gathering" to carry on the traditions and to illustrate the contributions that these African American students have had on the community (C. Brooks, personal communication, July 28, 2016).

In September 2008, three years before Ball High School instituted its mentoring program, the island was devastated by Hurricane Ike. Learning for students in schools all over the area was disrupted, but those living in Galveston were forced to leave and piece together a life elsewhere for an extended amount of time. When the schools did reopen in Galveston, the enrollment at the high school dropped from a pre-storm number of approximately 2,400 students to a re-opening enrollment of below 1,500. Over the next two years, families began returning to the island with students that had been jumping around among different school districts because of housing situations, which affected their education.

In the fall of 2010 Ball High School identified instructional needs for its approximately 1,850 students. At first glance, there were the typical problems of low-performing schools: minimal academic conversations among educators, a fractured curriculum with very little observation and follow through by administrators at the high school, low expectations for the general student population, and very low parent and community involvement. As Newell & Simon (1972) discuss, when a researcher or practitioner discovers a problem, a picture develops in their minds of the multi-dimensional state of the problem, known as the problem space. In their book titled, "School Leadership that Works", Marzano, Walters & McNulty (2005) examined the need to look at all sections of the school and show leadership to solve problem space issues in a transformational model. Wrapping this idea of problem space around mentoring, Dubois & Karcher (2013) discuss the need for a mentoring program to focus on multiple facets of the protégé's needs.

I identified the issue for this study by examining the student data. Low mathematic assessment scores were recognized as a major problem on the accountability report for the high school (Texas Education Agency, 2013). After disaggregating the data, it was concluded that the African American population was performing significantly lower as compared to other students of Algebra I. A decision to mentor students was already part of an overall plan to implement at the high school, so based on the data, administrators decided to focus on African American male Algebra I students as the initial target group for the mentorship program. Keeping in mind problem space, the staff only identified the first step of the problem, and many other dimensions still lurked in the background stalling the transformation progress until they were found and solutions applied (Newell & Simon, 1972).

As for the problem of practice, the mentoring program identifies each student's areas of academic strengths, weaknesses, and interests and then pairs the student with someone from the community having similar interests who will mentor the student a minimum of one hour per week. The program has allowed the school to measure the impact of the time spent with a mentor. The goal is to see changes in academic performance. The hope was that improvement in this area would indicate that the combination of a one-on-one relationship with an adult who valued education and the time spent in closing academic gaps would make the student more likely to be successful on state assessments.

Research Questions

The overall question that the author seeks to answer is what is the impact of the mentoring program on the academic achievement of ninth-grade African American male students in Algebra I? More specifically, the questions are:

1. What are the differences among course grades of mentored African American males when compared with non-mentored African American males in Algebra I?

2. What are the differences of mentored African American males when compared with non-mentored African American males in Algebra I with the same teacher?

3. What are the differences between mentored African American male participants and non-mentored African American male participants on Algebra I assessment?

4. What are the differences are among scores by objectives of African American males on the state Algebra I assessment?

5. What are African American males' perceptions about the mentoring program?

The idea of problem space would push for solutions to be found to issues beyond the obvious one that students were doing poorly on tests (Newell & Simon, 1972). A more expansive view of this was studied by Havnes, Christiansen, Bjork, & Hessevaagbakke (2016) when they discussed the idea of a dual-problem space. In this idea, the traditional problem space can be viewed in two parts: content space and relational space. The idea of working on the content space (the problem at hand) while simultaneously working of relational space (all related challenges and opportunities) is the needed vision for helping students close the achievement gap in urban schools (Havnes, Christiansen, Bjork, & Hessevaagbakke, 2016).

Five years before this program was implemented, the community was devastated by a natural disaster that has disrupted the education process to this day. Considering the entirety of factors that could play a part in widening the achievement gap of African American male students in mathematics, this study focused directly on the assistance given to students through the mentoring program to strengthen their knowledge in Algebra I and obtain a passing score on the state's Algebra I assessment given to ninth graders.

Significance of the Study

Mathematics education will play a key role in the life of many students regardless of their race or gender. In the United States, mathematics is seen as playing a leadership role in the country's school reform efforts (Darling-Hammond, 2015). Participating in additional tutoring or mentoring programs could not only be beneficial to African American male students by helping them strengthen their mathematic identities, but could also benefit a number of key stakeholders in education by creating a culturally responsive environment.

The immediate stakeholder was the student. These individuals have the most to gain or lose from their performance on these assessments. The next stakeholder was teachers. Teachers needed to take ownership of the status of the academic ability of the students in their classes. And administrators needed to retain good teachers to build consistency.

To solve the student problem, the school needed to solve the issues with the teachers and administrators (J. Pillar, personal communication, August 21, 2011).

Administrators were at risk for suffering public wrath and personal guilt for allowing these students to fail continuously. Administrators needed to carry their own weight of being part of the problem. When a spot evaluation was completed, the curriculum that they were responsible for monitoring for fidelity of implementation of instruction showed inefficiencies and bias toward allowing ineffective teachers to stay in the classroom instead of documenting the need for professional development or removal. It was clear that these administrators needed more professional development and follow-up on monitoring, observing, and evaluating instruction in the classroom (Fink & Markholt, 2011). To solve the problems with the teachers, the issue with the administrators had to be corrected (J. Pillar, personal communication, August 21, 2011).

Definition of Terms

1. "Black or African American" refers to a person having origins in any of the Black racial groups of Africa (Rastogi, Johnson, Hoeffel, & Drewery, 2010).

2. Mentoring relationship is where there is an emotional connection and in which the mentor offers guidance and other forms of support to the young person (Dubois & Karcher, 2015).

3. Academic cohort is typically applied to students who are educated at the same period of time—a grade level or class of students (Education Reform, 2013).

4. Tutor-A-Tor is the name of the mentoring program at Ball High School.

CHAPTER II

LITERATURE REVIEW

In this section, I will review literature to assemble a picture of what African American male students are confronted with in classrooms that may not have their best interests in mind. First, I will discuss literature that focuses on the mathematical achievement of African American males in school. Second, I will consider the role that urban schools play in the struggles that these students have in mathematics. I will look at how the relationships of teachers and students in this school affect success in mathematics. Third, once some of the underlying issues are identified, I will look at what approaches may be available to educators to address the achievement gap in mathematics of African American males. I will focus on what types of interventions are available and effective. Fourth, in this literature review, I will look at the role of mentoring. I will look at what type of mentoring may be appropriate to help African American male students struggling in mathematics. Lastly, I will discuss literature that describes a sample of mentoring models.

Mathematics Achievement of African American Males

Beginning the multifaceted examination of the achievement of African American male students in mathematics, I must give credit to the great success that many young African American students accomplish. Research conducted on mathematics self-efficacy by Richard Noble (2011) found that failures and struggles of African American students are exaggerated.

While there is no doubt that there are a vast number of success stories that can be identified, this does not take away the fact that an achievement gap that exists for many African American students that puts their futures at risk. Barnes & Slate (2014) conducted a comprehensive study to show the lingering achievement gap between White students and African American students. In a study done by the NAEP on high school and first-year college students nationwide between 1984 and 2004, the results showed that mathematic achievement among African American students was stagnate, and there was a significant achievement gap in mathematics between African American and White students (Barnes & Slate, 2014). In figure 2.1, an NAEP graph shows the mathematics gap between White and African American students closing, but it is still unacceptably wide in 2004.

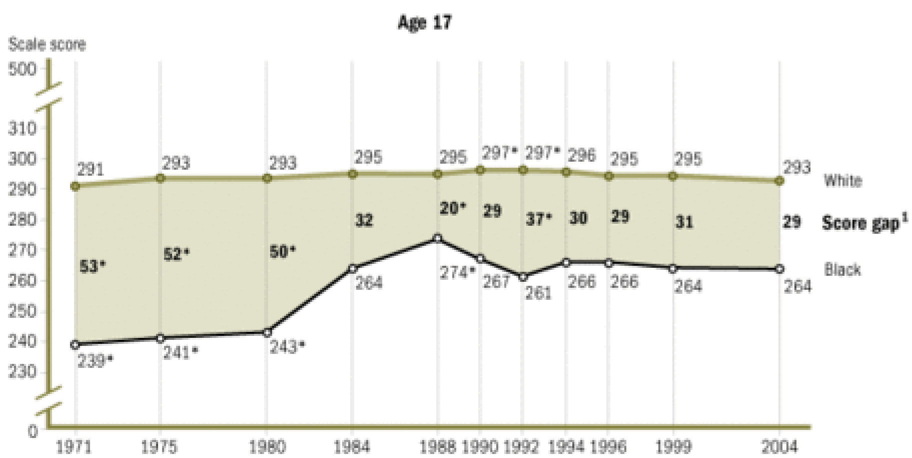

Figure 2.1. Mathematics education gap between White and African American students from 1971 to 2004.
(NAEP, 2016)

NAEP uses a statistic from 2004 where the National Center for Educational Statistics (NCES) showed that for all students entering college in the United States, over

50% had to enroll in developmental math courses, shedding light on the poor state of mathematics instruction in this country. Another study conducted between 2006 and 2009 in Texas using data from the Texas Education Agency to determine college readiness verified that these large and consistent mathematical achievement gaps still existed between African American and White students (Barnes & Slate, 2014). During these years, to be considered college ready in mathematics a student needed to score a 2200 or above on the Exit Level Texas Assessment of Knowledge and Skills or a 500 or above on the math portion of the SAT. In Table 2.1, the percentage of African American and White students who were considered college ready based on mathematics results are shown for each year of the Barnes and Slate research.

Table 2.1

Texas Mathematic College Readiness for African American and White Students

School Year	% African American Students	% White Students
2006-2007	29	59
2007-2008	32	59
2008-2009	38	63

(Barnes & Slate, 2014)

In the 2006-2007 school year, 29% of African American students and 59% of White students were college ready. Similarly, in the 2007-2008 school year, 32% of African American students and 59% of White students were college ready. Slight growth was seen in the 2008-2009 school year, but a large achievement gap remained, with just 38% of African American students deemed college ready, compared with 63% of White students. To compare to recent state accountability results, TEA released data in the

2012-13 school year which showed 60% of African American students and 83% of White students were college ready in mathematics. This report from TEA showed large gains among the African American population in mathematics, but a large gap remained. TEA released the next year that both groups dropped slightly, with 51% of African American students and 78% of White students being considered college ready.

In a study concerning African American students' performance in mathematics, Reigle-Crumbs (2006) researched whether ethnic backgrounds had any impact on the performances of students especially in mathematics. After thoroughly examining information presented by the Adolescent Health and Academic Achievements (AHAA), the researcher documented with concern that African American male students in inner-city schools scored disturbingly lower grades in Algebra I when compared with other ethnic groups. Using longitudinal studies, the researcher was able to establish that the performance trend existed and that this trend had a negative impact on achievement gaps in mathematics of the students. She pointed out that failure to succeed in early school years, especially in mathematics, presented a major challenge for the students to move on to advanced level courses in mathematics. Consequently, she argues that overall academic achievement of African American male students was significantly associated with their ethnic background and their experiences in the classroom.

Given that this large achievement gap exists for African American students, many educators feel that they must take on a "savior" role for these students in the area of mathematics. Many educators frame a picture of these students or their families as not caring about success in education (Battey & Frank, 2015). This view fuels the inappropriate expectation that youngest African American students are just not good at math, and they should expect less. Nasir & Shaw (2011) point out those racial narratives exist layering different ethnic groups with different levels of mathematics ability. They argue that many educators point to a “model minority” as proof that Asian American students are naturally good at mathematics while African American students are not. It is a real issue to not fully serve the needs of an African American student in the area of mathematics because of low expectations and then blame them later for not having more success (Battey & Frank, 2015).

Urban Schools

A working definition of urban schools is schools that are located in large populous cities where the level of poverty is significant. These urban schools are more likely than not to have the least qualified teachers to work with the students that need to most help (Lankford, Loeb, & Wyckoff, 2002). Grant, Crompton, & Ford (2015) express an eye-opening view that in urban schools around the United States there are a disproportionate number of African American male students and those that are labeled at-risk. These students find themselves in these schools for a number of different reasons ranging from economics to social situations, but the bottom line is they all attend these schools with a reasonable expectation that they will receive the best education possible.

The reality is that too many African American male students go to schools that receive failing grades from their state education agencies, and the goal of graduating is not the norm (Grant, Crompton, & Ford, 2015). Statistically through their educational experience, African American males will show disproportionately higher rates of suspension or expulsion from school, or just dropping out of high school all together (Jarjoura, 2013). Jarjoura (2013) also states that African American males will be more likely to go to prison that to go to college. The saving grace or the continuation of failure for these students is what type of teacher they encounter in the classroom.

As described in the study by Lankford, Loeb, & Wyckoff (2002), a large number of less qualified teachers are assigned to urban schools in poor areas, but some teachers look to these schools as a mission to do what is right for students. Castro (2014) describes two types of teachers in his research to better understand the solutions for urban schools. He states that these two types are visionaries/reformers and saviors/opportunists. Castro describes saviors and opportunists as seeing students in urban schools as victims who are not able to achieve, so low expectations are set. They see their opportunity of working in an urban school as a way to prove they should obtain better jobs later. They often care little about building strong relationships with urban students and, therefore, would not be suitable as a mentor (Castro, 2014).

To help young African American students become better mathematics students, they need to be motivated in the classroom, have instilled in them that they have the ability to be successful, and have a caring and dedicated teacher instructing them (Berry, Thunder, & McLain, 2011). Castro describes the other type of teachers, visionaries and reformers, as those who want to work in urban schools because they see the greatness in all students and want to guide them to meet their full potential. He states that these teachers want to change the educational system to be accepting of all groups and to take away the idea that a student must fit a particular mold to be considered college bound or a great asset to society. These teachers are much more likely to take on a mentoring role with their students that would be grounded in trust and respect (Castro, 2014).

The point of these two types of teachers may really come down to the idea of who is advocating for these African American male students in the classroom. Research on mentoring programs suggests that mentors have a more profound impact on their protégés, with more successful results, when they provide teaching as part of the relationship model (DuBois et al, 2011). Many programs that are focused strongly toward advocating for the student are available around the United States as possible interventions, such as 100 Black Men, REAL (Respect, Excellence, Attitude, and Leadership), Ten Point Coalition, Harlem's Children Zone's A Cut Above, and The Mentoring Center (Jarjoura, 2013). To bridge the gap between mathematic reforms and cultural approaches to instruction, teachers must be willing to restructure content and social constructs to build a culturally responsive environment (Leonard & Martin, 2013). In creating this learning environment, Matthews, Jones, and Parker suggest that the mathematic identity of an African American student has the ability to strengthen and expand (Leonard & Martin, 2013). In building this culturally responsive environment in an urban setting, it develops academic achievement, social awareness, cultural affirmation, and competency (Leonard & Evans, 2008).

Approaches to the Issues of an Achievement Gap

All the strategies and solutions found to help young African American male students achieve in mathematics, or school in general, in some part involve building better relationships, and building relationships is the foundation for mentoring. This is the idea that Battey & Franke (2015) discussed in their research about how the need to build strong relationships is just as important as solid instruction in helping engage students of color in algebra. In their research, they discuss the need for educators to set aside professional development time and begin to have conversations about the idea of introducing culture into instruction. Much like Castro's research about the types of teachers needed in urban schools, Battey & Franke's (2015) research found that having the right teachers who care enough to focus on the academic contributions of African American students instead of only what they are getting wrong can switch the students' entire mathematical thinking (Battey & Franke, 2015). They state that this switch in thinking can result in the students become more engaged and more successful in algebra.

Mathematics identity and race identity are not settled in isolation. The two are tied together due to the approach of the instruction (Berry, Thunder, & McLain, 2011). A project to address the mathematic gaps for African Americans was created in 1984 by Harvard graduate and civil rights leader Dr. Robert P. Moses (Algebra Project, 2016). The project that Moses started is aimed at changing the social constructs that enable the disenfranchisement of a large portion of the United States population. The Algebra Project (2016) supports quality public education by supporting culturally sensitive educational strategies in the classroom. The project accomplishes this task by supporting school reforms that build capacity to sustain student-centered strategies in the classroom. The model for this project is to develop partnerships with local stakeholders in historically underserved communities (Algebra Project, 2016).

Moses believes that the Algebra Project (2016) is an answer to the ever-accelerating expansion of technology and the global economy, which have placed algebra as a gatekeeper for higher learning, career, and economic opportunities. Students in the United States who are lacking in receiving appropriate education according to international academic performance reports are disproportionately represented by low-income rural and urban African American youth (Algebra Project, 2016). The Algebra Project (2016) states that according to statistics, approximately 50% of African American ninth graders do not graduate from high school with their academic cohort. The statistics also show that the dropout rates for African Americans are near 80% in some poor urban schools. Because these students are lacking in mathematic fundamentals that they should have received in middle school, when they reach high school they are more likely to be assigned to the least qualified math teacher, resulting in largely segregated classrooms (Algebra Project, 2016).

A strategy presented in a study by Grant, Crompton, & Ford (2015) that was directed at helping to change the mathematical identity of young African American male students through instruction was called The Algebra Project Cohort Model. The overarching question for this research was "How did the math identity of six African American male students participating in The Algebra Project Cohort Model initiative develop over their four years of high school?" (Grant, Crompton, & Ford, 2015). For this study, researchers put the six participating students together in a small cohort to work closely with them. This same strategy was used later to build a small learning community. While following solid researched-based instructional strategies for algebra, the researchers knew that these students would need instructors who were sound in pedagogy and able to build a culturally aware and responsive environment. These instructors would have to be able to build relationships with these students to change their mathematical identities (Grant, Crompton, & Ford, 2015). While this project is ongoing, it has become very successful help young African American males throughout the United States in over 200 locations (Algebra Project, 2016). Mario Eraso suggests that the Algebra Project's success is by following a rigorous structure of professional development and instruction, the process is noted for significant growth of mathematic achievement with African American students (Leonard & Martin, 2013).

While improving the instruction of mathematics for young African American males in a culturally responsible environment did show success according to Berry, Thunder, and McLain. Berry, Thunder, & McLain (2011) looked at outside instruction such as tutoring and mentoring as successful ways of changing the mathematics identity of these students.

Mentoring

Though many mentoring programs for the younger generations have taken place over the last two decades, the concept of mentoring extends much further. According to Feldman & Ouimette (2004), the traditional notion of mentoring involved experienced men helping boys to learn a trade or specific skill. Researcher Urie Bronfenbrenner argued that the idea referred to a one-on-one association between two distinct individuals, usually of different ages and nature of development, where "a mentor is an older, more experienced person who seeks to develop the character and competence of a younger person" (Freedman, Greenleaf, Sperling, & Parker, 1985). The current working definition of mentoring is an ongoing high quality relationship where the focus is building academic, professional, or social skills (Dubois & Karcher, 2015).

In actuality, two types of mentoring exist: natural mentoring and planned mentoring. A working definition of natural mentoring is a relationship where an adolescent feels that they have someone outside their immediate family who can give support or guidance on important decisions (Zimmerman, Bingenheimer, & Notaro, 2002). In this relationship, the mentor is familiar with the adolescent in a natural setting. Dubois & Silverthorn (2005) studied natural mentoring relationships to identify characteristics that might act as predictors for future outcomes. These characteristics are the role of the mentor, how often mentoring occurs, emotional attachment of the relationship, and how long the mentoring lasts (Dubois & Silverthorn, 2005). Dubois & Silverthorn (2005) state in their findings that a natural informal role of mentoring over a consistent and sustained period of time shows a link to higher completion rates in high school and higher attendance rate in college. This study found that a non-family mentor possibly has a greater impact in this relationship role (Dubois & Silverthorn, 2005). Adolescents who have natural mentors are 52% more likely not to get involved in drugs or violence and have a more positive view of school (Zimmerman, Bingenheimer, & Notaro, 2002).

On the other hand, adolescents can be involved in planned mentoring. A working definition of planned mentoring is a process that can be systematically implemented, existing in a structure in which an adult and an adolescent are matched through a formal process (Johannessen, 2016). While planned mentoring does not have the ingrained social connection that natural mentoring does, the mentor and protégé have the ability to connect on a deeper level due to common interests, desires, and needs (Hall, 2015). In schools where mathematic instructional gaps are firmly embedded for African American males, a planned mentoring plan can close the gaps quicker and with greater understanding by targeting specific needs (Whipps-Johnson, 2016). The purpose of these programs is to provide youths at risk with assistance and guidance to enable them to grow into responsible adults and fill the gap created by the diminished opportunity for natural mentoring (Freedman, Greenleaf, Sperling, & Parker, 1985). Mentoring has been found to be the most valuable resource for youths whether it's planned or informal (Dubois & Karcher, 2013).

Mentoring Models

Researchers and educators have developed several models to explain the structure and organization of mentoring. The need for a mentoring program is not only to put a willing adult with a young student that lacks a positive role model, but to connect two individuals together and foster a relationship that will assist the younger in transitioning into adulthood (Jarjoura, 2013).

When done with fidelity, a mentoring program for African American males can be a transformative process (Jarjoura, 2013). Being part of a group that builds and sustains strong relationships inspires those who participate in the program to go forward to motivate and guide others to work towards successful and productive futures (Jarjoura, 2013). It is imperative for mentoring programs that provide mentors for youth to design the process with appropriate models in mind and to structure the programs to make the most of the relationship between the mentor and mentee. In figure 2.2, Jarjoura (2013) offered a visual model of what considerations go into developing a mentoring program for you African America males.

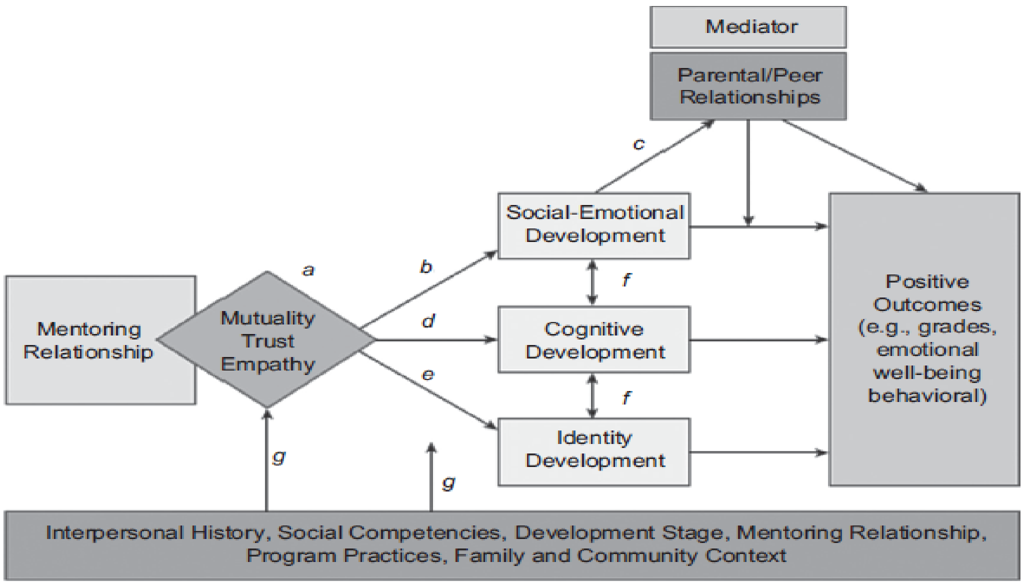

Figure 2.2. Conceptual framework for a Mentoring Model for Youths
(Jarjoura, 2013)

In this section, the study examines the Attachment Theory Model and the Action-Reflection Model. The importance of presenting these models is to establish a theoretical basis and conceptual framework for this record of study. According to Davis (2006), theories of ideas are the differences that determine a specific research design and are normally recognized as valid evidence of the events being studied.

Attachment Theory Model

This form of natural mentoring focuses on the relationships between immediate family members (Dubois & Karcher, 2015). This theory can be viewed in attachment parenting, which then can be mirrored in attachment mentoring. The strength of this theory is the building of a positive self-identity of the adolescent through experiences, which DuBois & Karcher (2015) suggest will affect all future relationships. They suggest that youths who have secure attachment relationships are better equipped with resources to adapt to later periods of difficulty. In figure 2.3 below, the conceptual framework shows the three different approached for the attachment theory and the outcomes that would be likely present from the child.

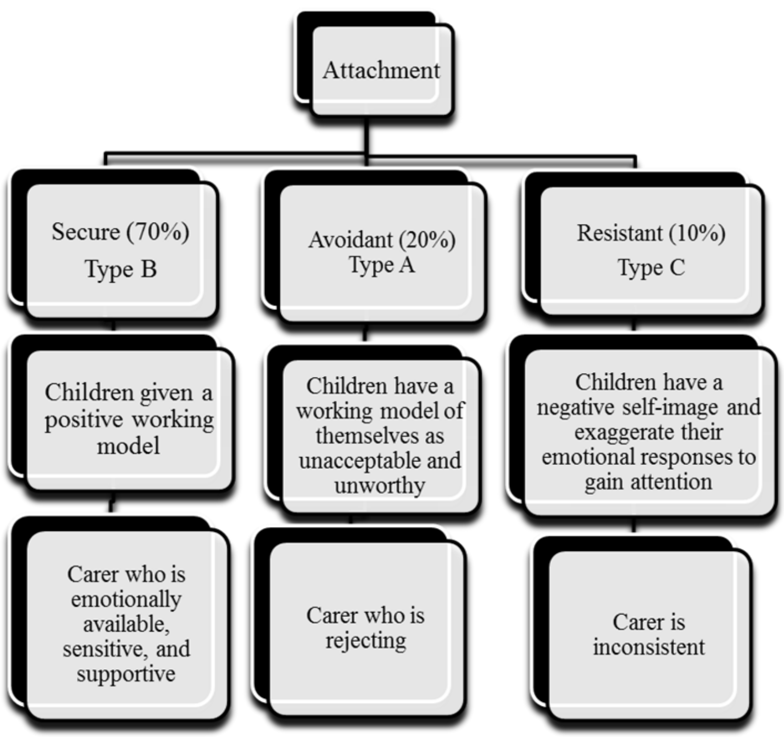

Figure 2.3. Conceptual framework for Attachment Theory.
(Child Development, 2016)

The Action – Reflection Model

In Norway, one of the most successful planned mentoring models is the Action-Reflection Model. This model was developed by Handal & Lauvas (1987) at a time when mentors faced criticism over excessive control of students. Experts were concerned that the use of excessive power over students would create an increased number of dependent students (Saleh, 2011). To decrease this use of superfluous control, Handal & Lauvas created the Action-Reflection Model as an alternative to the structured tradition of apprenticeship. One important concept in the model is the "Practice Theory," which refers to values, experiences, and knowledge that hugely influence an individual's plan of action. According to Handal & Lauvas (1987), each individual demonstrates personal cognitive planning strategy based on interactions and experiences with other individuals. Thus, the sole purpose of mentoring is to allow an individual to develop a better understanding of his or her practice theory. In figure 2.4 below, Ronnerman & Salo (2014) developed a conceptual framework diagram of the action-reflection model. They show the model working in three phases. The first was the formulation of an idea and action taking place. The second phase is the reflection of what had occurred, such as choices made during the action. The third phase is the justification for decisions moving forward, in the case of mentoring the idea of choosing the direction that best helps the protégé.

Figure 2.4. Conceptual framework of Action-Reflection Model.
(Ronnerman & Salo, 2014)

The literature reviewed in the section came in useful as the program developed and the study progressed. The ideas covered on the types of mentoring assisted in the selection and training of the mentors for the program. The focus on maintaining a culturally responsive environment drove the selection of training for both the teachers and the mentors. This literature laid the framework for the creation of a mentoring program to achieve successful results for our students in need.

CHAPTER III

METHODOLOGY

The author worked to answer the research question, “What is the impact of the mentoring program on the academic achievement of ninth-grade African American male students in Algebra I. To find the answer to this research question, other factors need to be identified to evaluate the effectiveness of the program.

1. What are the differences between course grades of mentored African American males compared with those of non-mentored African American males in Algebra I?
2. What are the differences between grades of mentored African American males compared with those of non-mentored African American males in Algebra I with the same teacher?
3. What are the differences between scores of mentored African American males and non-mentored African American males on Algebra I assessment?
4. What are the differences among scores by objectives of African American males on the State Algebra I assessment?
5. What are African American males’ perceptions about the mentoring program?

The approach was to collect data for quantitative analysis through assessment and attendance in mentoring sessions and qualitative analysis by student perceptions. I collected quantitative data through students’ course grades, state assessment results, and time spent with mentors. I collected data for the qualitative analysis by students completing surveys at the end of the mentoring year. I used a mixed quantitative/ qualitative research design for the purpose of this study. The individuals identified for the sample were enrolled in a mentoring program for an entire school year. The participants entered into the program based on previous low state assessment math scores or course results that acted as predictors for future state assessments. I compared the results on the following state assessments or end-of-course results with the results before they were enrolled into the mentoring program. I used a mixed quantitative/ qualitative research design because it offers credible answers as to whether the outcome of an event can be attributed to the program. By using this mixed method, the data could be used for corroboration between the two analysis styles (Bryman, 2006). This corroboration of the mixed research design allowed for enhancement and illustration of the connection between the raw quantitative numbers and the perceptions of the students (Bryman, 2006).

Study Context

The location of the study was an urban high school located on the on the Gulf coast of Texas that has been struggling with its accountability ratings from the Texas Education Agency. The school was granted the Texas Title I Priority Schools Grant in 2010, allowing administrators to gather people and resources to identify and solve deeply ingrained problems that had hampered students' success. After detailed disaggregation of dozens of data sets, administrators developed a plan to focus on two areas academically: African American mathematics and whole campus writing. The school implemented intervention strategies for whole class instruction and plans that targeted individual students. While developing these plans, the curriculum team discovered that the educational gaps of African Americans in mathematics could be narrowed to a more specific group, African American males.

At this high school in school years before 2010, African American males were unsuccessful on the state assessments almost 75% more often than African American females (Texas Education Agency, 2015). The focus for intervention shifted to the causes for the lack of success by such a high percentage of this particular group. The answers were all around in the high-risk categories such as: low accumulation of course credits, low attendance, discipline issues, poverty, too often a fractured family structure, and failure on state assessments. With this realization, administrators decided to develop a program to assist African American male students, the “Tutor-A-Tor” (named for the school’s mascot, a tornado) mentoring program.

Administrators developed the mentoring program to identify approximately 100 African American males who had failed the previous year’s state assessment and matched other at-risk markers such as course failures, poor attendance, or discipline problems. Once a student was identified, they were encouraged to participate in the program during a conference with the student, parent, and school official. Students had the opportunity to decide not to participate. The program director met with each student who agreed to be in the program one-on-one and developed a profile for that student on his likes, dislikes, hobbies, and other characteristics. She also met with each potential mentor to create a profile to be matched with a student. The director used the district’s data disaggregation program to identify specific academic gaps. The mission of the "Tutor-A-Tor" mentoring program was to help close the academic gaps in mathematics and other areas for this group of young males by pairing them with positive role models.

Selection and Training of Volunteers

The recruitment of mentors for the program was accomplished in a variety of ways. The district put advertisements in all media outlets available such was television, radio, newspaper, and district website. These advertisements were directed at the general population who would like to give back to the schools. The director of the program visited community businesses and ministries to focus on specific traits that some students would need to help them be successful. The major push was a collaborative effort between the mentoring director and school administration to recruit mentors from University of Texas Medical Brach – Galveston and Texas A&M University – Galveston. The addition of mentors from these latter institutions gave the program the expertise in needed areas to mentor students.

Individuals who volunteered for the mentoring program had a selective process to complete to become mentors. They filled out an application and underwent a criminal background check. Once an applicant had cleared a background check, they then completed a questionnaire that gathered information such as their academic backgrounds, academic strengths, hobbies and other personality traits. The students entering the program completed a similar questionnaire. A copy questionnaire is located in appendices 4. The director would interview each mentor as well as each student before matching a student with a mentor.

Once a mentor was selected for the program and matched with a student, they would meet with instructional leaders on campus to discuss the needs of the students and the framework of instruction on campus. The mentors always had access to instructional coaches and teachers to assist them in specific areas. The mentors had access to all instructional materials as well as notes from the teacher about how concepts were being taught in the classroom. A copy of both the mentor and mentee questionnaire are included in the appendices as appendix 4 and 5.

Selection of Participants and Data

Each year approximately 100 African American male students are identified for the mentoring program based on at-risk indicators dealing with mathematics. The mentoring program identifies each student's areas of academic strengths, weaknesses, and interests and then pairs the student with local professional from the community who has a strong educational background and similar interests. Mentors agree to mentor a student a minimum of one hour per week focusing on Algebra I tutoring. To measure the impact of the amount of time a student spends with a mentor, the program looks for changes in academic performance, attendance, and discipline. Improvement in these areas indicates that the combination of a formal mentoring relationship with an adult who emphasizes a focus on mathematics to help close instructional gaps and the time spent in strengthening his study skills makes a student more likely to be successful on state assessments.

The study collected and recorded data on the performance of each individual student before and after the program, as well as the duration of time that each student participated in the program. For the usefulness of this study, I identified 27 African American male students out of the approximately 100 students who participated in the mentoring program during the 2011-12 and 26 African American male students during the 2012-13 school years. I selected these 27/ 26 students because they were first time ninth-grade students during the identified school year, taking the state Algebra I End-Of-Course (EOC) assessment for the first time. The study collected data on these 27/ 26 mentored students and compared their scores with those of 27/ 26 African American male students with similar course and assessment scores who did not participate in the program. This compared group was randomly selected from a group of African American male students who met the criteria to participate in the mentoring program but personally chose not to be involved.

Intervention

Using mentoring as an intervention for achievement gaps in algebra I for African American males meant building relationships. The entire process that occurred from application, to questionnaire, to interviews was about matching a specific student with a specific mentor with the best chance to promote a successful relationship. The need to place the student and mentor in a probable relationship was due to a time restraint. A solid mentoring relationship requires trust to move forward, and normally that type of trust takes time (Dubois & Karcher, 2015). The questionnaires and interviews were meant to match two individuals together that already had multiple interests in common to help foster a budding relationship.

Instrumentation

State assessment scores were collected as well as course grades on all students involved in the study. I obtained assessment data through the state's AEIS reports and the school district's AWARE system and I collected course grades for Algebra I for participating students through the school's Skyward students' management system. In addition, I used tables and graphs to present the results in a clear and easily understandable way.

The STAAR test for Algebra I is divided into five reporting categories. The categories cover all the concepts that high school students should be able to master on the Algebra I assessment. Each category is divided into two different types of standards: readiness and supporting. Readiness standards have the following characteristics:

- They are essential for success in the current grade or course.
- They are important for preparedness for the next grade or course.
- They support college and career readiness.
- They necessitate in-depth instruction.
- They address broad and deep ideas.

Supporting standards have the following characteristics:

- Although introduced in the current grade or course, they may be emphasized in a subsequent year.
- Although reinforced in the current grade or course, they may be emphasized in a previous year.

• They play a role in preparing students for the next grade or course but not a central role.

• They address more narrowly defined ideas (TEA, 2016).

After a student completes the STAAR EOC assessment, TEA gives them a score indicating their performance. TEA has established a system of three performance standard categories listed below in Table 3.2.

Table 3.1

STAAR Performance Standards

Level I	**Level II**	**Level III**
Unsatisfactory Academic Performance	Satisfactory Academic Performance Students who meet this standard are sufficiently prepared for the next course. These students are on track to be sufficiently prepared for college courses.	Advanced Academic Performance Students who meet this standard are well prepared for the next course. These students are on track to be well prepared for college courses.

(TEA, 2016)

In the STAAR Algebra I Blueprint shown in Table 3.1 below, all reporting categories are listed as well as how many readiness and supporting standards are in each category. Also included in the blueprint is how many questions are on the EOC assessment for each category. The bottom of the blueprint shows a range of how many questions are asked for each type of standard, exactly how many total questions are on the EOC assessment, and in what form they are asked.

Table 3.2

STAAR Algebra I Blueprint

STAAR Algebra I Blueprint Reporting Categories	**Number of Standards**		**Number of Questions**	
Reporting Category 1: Number and Algebraic Methods	Readiness Standards	2	**11**	
	Supporting Standards	11		
	Total	13		
Reporting Category 2: Describing and Graphing Linear Functions, Equations, and Inequalities	Readiness Standards	3	**12**	
	Supporting Standards	8		
	Total	11		
Reporting Category 3: Writing and Solving Linear Functions, Equations, and Inequalities	Readiness Standards	5	**14**	
	Supporting Standards	7		
	Total	12		
Reporting Category 4: Quadratic Functions and Equations	Readiness Standards	4	**11**	
	Supporting Standards	4		
	Total	8		
Reporting Category 5: Exponential Functions and Equations	Readiness Standards	2	**6**	
	Supporting Standards	3		
	Total	5		
Readiness Standards	**Total Number of Standards**	**16**	**60% – 65%**	**32–35**
Supporting Standards	**Total Number of Standards**	**33**	**35%– 40%**	**19–22**
Total Number of Questions on Test	**49 Multiple Choice** **5 Griddable** **54 Total**			

(TEA, 2016)

Every year TEA assigns performance standards to each STAAR assessment given. At the moment, TEA has a phase-in plan for a schedule of performance standards that continue to rise until the 2021-2022 school year, when the recommended final Phase II score of 4000 is implemented (see Table 3.3). The performance standard for Phase II was 3500 from the first STAAR assessment in the 2011-12 school year until the 2014-2015 school year. Phase II passing standard rose to 3550 this past year, 2015-2016. Level III performance standard score has always been at its current level. Focusing in on Algebra I, students will need to score a 3625 to meet level II and a 4333 to meet level III in the 2016-2017 school year.

Table 3.3

State of Texas Assessments of Academic Readiness End-of-Course Assessments Performance Standards

Assessment	**2015-2016 Standard**	**2016-2017 Standard**	**2017-2018 Standard**	**2018-2019 Standard**	**2019-2020 Standard**	**2020-2021 Standard**	**2021-2022 Recommended Level II**	**Recommended Level III**
Algebra I	3550	3625	3700	3775	3850	3925	4000	4333
Algebra II	3550	3625	3700	3775	3850	3925	4000	4411
Biology	3550	3625	3700	3775	3850	3925	4000	4576
English I	3775	3813	3850	3888	3925	3963	4000	4691
English II	3775	3813	3850	3888	3925	3963	4000	4831
English III	3775	3813	3850	3888	3925	3963	4000	4546
U.S. History	3550	3625	3700	3775	3850	3925	4000	4440

* The standard in place when a student first takes an EOC assessment is the standard that will be maintained throughout the student's school career. Standards apply beginning with students first enrolled in Grade 9 or below in 2011-2012.

(TEA, 2016)

When it developed the STAAR assessments, the State of Texas wanted to ensure the validity of the tests to corresponding courses. TEA (2016) compiled The STAAR EOC Linking Studies to correlate student performance on STAAR EOC assessments in similar content areas. The results of the STAAR EOC linking studies drive the placement of performance standards for all assessments. TEA (2016) hoped that this alignment of the performance standards would be a predictor of how students would perform on later EOC assessment. Table 3.4 shows the transition courses, the sample size used in the STAAR EOC linking studies, and the correlations of scores from subsequent EOC assessments (TEA, 2016). For the Algebra I EOC, according to TEA (2016), the study is derived from a single population of students from the 2009 testing administration. TEA (2016) expects the correlation between STAAR assessments will improve in the following years due to demanding testing conditions.

Table 3.4

STAAR EOC Linking Studies

From	**To**	**Sample Size**	**Correlation***
English I reading	English II reading	17,159	0.67
English I writing	English II writing	16,641	0.71
English II reading	English III reading	68,054	0.61
English II writing	English III writing	68,691	0.68
Algebra I	Algebra II	22,075	0.68

(TEA, 2016)

Another validity test done by TEA (2016) was a correlation study between the score on the STAAR EOC assessments and the grade of the high school courses they were enrolled in when the assessment was taken. These tests measured the comparable results of how well the high school course prepared the students for the assessment. TEA (2016) used scores that were gathered in a single population sample from a real test administration in 2011 for the study. Table 3.5 below shows the EOC assessment/high school course, the sample size for each assessment, and the correlation score between the EOC assessment score and the likelihood that the student obtained at least a B average in the course (TEA, 2016).

Table 3.5

STAAR EOC Test to High School Course Performance

Test/Course	**Sample Size**	**Correlation***	**Likelihood of Earning a B or Better in Corresponding Course**	
			Satisfactory	**Advanced**
English I reading	59,903	0.47	80%	94%
English I writing	62,175	0.48	88%	98%
English II reading	23,332	0.42	81%	93%
English II writing	23,598	0.44	87%	97%
Algebra I	93,848	0.60	87%	97%
Biology	69,089	0.51	83%	95%
U.S. history	41,803	0.37	88%	94%

(TEA, 2016)

To gauge the feelings and perceptions of the African American male students who participated in the mentoring program, a questionnaire was administered to them at the end of each school year. The instrument used is located in the appendices as appendix 1. The questionnaire was developed and administered by an outside evaluator, Wexford. The instrument had 13 questions, the first 7 questions covered demographic topics. The next 5 questions covered perceptual questions about the experience of participating in the mentoring program with a yes or no answer. The last question was an open ended response for students to discuss the matter further.

Data Collection

I collected quantitative data through students' course grades and state assessment results. Test data from the End of Course (EOC) assessment or low previous mathematics grades was the basis for selecting which students were permitted into the mentoring program. I obtained attendance and grade data were from the campus' Public Education Information Management System (PEIMS) data. The mentoring program director recorded the number of hours each student was mentored, and I reviewed data to gauge the effectiveness of the program.

The following is a list of data that I pulled for each of the data sets to respond to each of the research questions:

Baseline Student Data

- A table was created of Algebra I student data and STAAR Algebra I EOC results (with time spent with mentor) that included a student identifier code, course title, teacher identifier code, 6-week Algebra I course grade by student, end of year Algebra I course grade by student, STAAR Algebra I EOC scores, and the amount of time each student spent with their mentor for the year of the study. All data were organized in a Excel spreadsheet to assist in further data disaggregation, and then data were extracted from both mentored and non-mentored students for the 2011-12 and 2012-13 school years.

Research Question 1

- A table was created including a summary of statistics for African American male students in Algebra I participating in the study in a table format identifying the number of students in each group per year, the course mean for participating group, and the course standard deviation for each group. The summary displayed the data as all, mentored students, and non-mentored students. Data sets were made for both the 2011-12 and 2012-13 school years.

Research Question 2

- A table was created including a summary of Algebra I averages for students by the teacher of record by collecting data in a table format. The table consisted of categories for both mentored and non-mentored students for each teacher of record for Algebra I. The data sets included the number of students in each group per teacher and end of year Algebra I course averages for each student group per teacher. Data sets were made for both the 2011-12 and 2012-13 school years.

Research Question 3

- A table showing Algebra I EOC summary data for students participating in the study by collecting data divided into categories of all students, mentored students, and non-mentored students was created. Included in the data set was the number of students in each group, the number of students who met standards for the STAAR Algebra I EOC assessment in each group, the percentage of students that met standards in each group, the mean Algebra I EOC assessment score for each group, and the standard deviation for each group. I made data sets for both the 2011-12 and 2012-13 school years.
- A table was created for frequency of raw scores of Algebra I EOC for African American male students involved in the study for both the 2011-12 and 2012-13 school years. The data sets were divided into categories of all, mentored, and non-mentored students. The data was arranged in a table format with the

performance standard scores for the Algebra I EOC assessment divided into four ranges. The other data included in the table was the number of students that scored in each score range in each group, the percentage for each frequency group, a count for the cumulative frequency of scores, and the percentage of cumulative frequency.

- A stem-and-leaf display was developed for the STAAR Algebra I EOC score distribution for students that participated in the mentoring program for both the 2011-12 and 2012-13 school years. This statistical analysis was developed using the PhStat Statistics Program. Data that was entered to build the analysis was the sample size for each group and all Algebra I EOC scores for students who participated in the mentoring program.

Research Question 4

- A table was created of STAAR Algebra I EOC passing percentages by reporting categories for students involved in the study for both the 2011-12 and 2012-13 school years. The data was divided for each category by students in the mentoring program and non-mentored students. The table included the five reporting categories for the Algebra I EOC and the number of questions each student group answered correct.

Research Question 5

- A table was created of mentored students' responses to the survey given after the first year of participating in the mentoring program. This data set only included the students that participated in the mentoring program for the 2011-12 and the

2012-13 school years. The five questions relating the study was added to the table. The data was collected and counted for affirmative responses for all questions related to the mentoring program. The table reflects the total number of affirmative answers and the percentage for each question. The mentoring survey can be found in Appendix 1.

Overall Research Question

- A table was created showing the comparison of STAAR Algebra I EOC scores and time spent with mentors for African American male students involved in the study to compare the STAAR EOC score range with the amount of time each student spent with their mentor. The scores were divided into five different ranges. The data included the number of students whose scores fall into each individual range, including the overall percentage of the range, and the average amount of time that each student spent with their mentor for each score range was included in the table. Data sets were created for both the 2011-12 and the 2012-13 school years.
- A scatter plot and linear trend line was developed for the STAAR Algebra I EOC scores and time spent with mentors for African American male students by using PhStat Statistical Program. This figure was created to correlate the individual Albebra I EOC scores with the time that the same students spent with their mentors. The data inputed into the program was all Algebra I EOC scores and total time mentored, paired with specific students. A progression line was

included in the scatter plot to illustrate a cluster of scores. Scatter plots were developed for both the 2011-12 and the 2012-13 school years.

- Individual confidence interval estimates were created for the mean of STAAR Algebra I EOC scores of African American male students who participated in the mentoring program in PhStat Statistical Program for each student group for each of the school years included in the study. The data inputted into the program was the sample size for each student group, the mean of the sample Algebra I EOC scores, the sample standard deviation, and the intended confidence level.
- Separate variance t test was developed comparing the mentoring group and the non-mentoring group using the PhStat Statistical Program for both the 2011-12 and 2012-13 school years. The data inputted into the program was the sample size for each student group, the mean of the Algebra I EOC and the standard deviation for each group, and the level of significance.

Data Analysis

I conducted an analysis and used the information to break down each procedure of the mentoring program and evaluate its effectiveness. The study sought to establish the effectiveness of prolonged mentoring on the success of African American male Algebra I students in mathematics. I compiled quantitative data on each individual student's performance on the Algebra I state assessment scores and course grades from the students' ninth-grade year, the year that they participated in the mentoring program. I collected the state assessment scores to compare to time spent with the student's mentor. I conducted an analysis of variance to look for a correlation between participating in the mentoring program and success on the Algebra I End of Course test. Along with the raw scores from the state assessments, I collected scores from individual objectives on the assessment to check for growth and closing of achievement gaps. I collected each student's course grades for Algebra and separated by teacher of record for the class. I used the data to view the students' mastery of the curriculum through the school year and compare with similar students in those classes who did not participate in the mentoring program.

The use of a content analysis on the mentoring program afforded me the opportunity to review work that may have gone unnoticed. This review gave me the chance to organize information and focus on every detail in which the mentoring program engaged. In addition, I conducted descriptive analysis by using range, mean, and standard deviation scores. Huck (2008) describes descriptive analysis as summarizing data on a single dependent variable. All data focused on gauging the success of African American male students in mathematics who participated in a mentoring program.

Validity, Credibility, and Reliability

In order to ensure credibility of the results, I assessed the control group to determine their performance in their Algebra I class as well as on the STAAR Algebra I EOC assessment. The control group was not enrolled in the mentoring program and, therefore, I expected there would not be any significant variation of their grades at the beginning and at the end of the grading period. This ensured that the variation in the results of the experimental group could be attributed significantly to the mentoring program.

Limitations

One limitation is having a small data set to work with. While viewed as a positive for the mentoring program, it must be understood that there are outside variables not measured in the current data. The mentoring program is seen as a success. Mentors tutored the students in math and provided positive role models. But the program most likely is not the sole factor causing the success seen in the data sets.

Author’s Role

As the Dean of Instruction of this urban high school, I oversee the mentoring program as well as all academic initiatives on campus. I have access rights to all data used in this study as part of my normal position with the school district. For full disclosure, this mentoring program was started as an initiative under my authority in 2011. This was one of many issues the administration at Ball High School was confronted with at the beginning of the transformation project, but like all initiatives we implemented, we did so because we wanted to find a solution that didn’t just give us a quick fix but truly reached to address root causes and put into place long-term processes to help all students.

I have 20 years of experience in education and have worked in four different school districts. I taught for eight years and have been a campus and district level administrator for 12 years. I hold a BS in History from the University of Mary Hardin

Baylor, a M.Ed. in Educational Administration from Tarleton State University, and am currently working towards an Ed.D. in Curriculum and Instruction at Texas A&M University.

I started my education working in small rural school district that was not racially diverse. As a White, male administrator, there may be some question as to my ability to relate to the problems of African American students. I think my early experience in the small districts I worked for prepared me well for later challenges. I have always held every student to high standards with the belief they can be successful. I brought that train of thought to the larger school districts I've worked in and have always pushed back when the underlying thoughts were that "they" couldn't be successful. My thought is that we hold every student to the highest of standards until we have a legitimate reason to believe he or she will not be able to attain that standard, and then we find interventions to help them be successful at the highest level possible.

CHAPTER IV

FINDINGS

In this chapter, I will present statistical results to answer each of the research questions stated earlier in the study. At this stage of the study, I obtained data for each of the students who participated in the study of the mentoring program. The data for the students is divided into categories based on whether the student agreed or declined to participate in the mentoring program.

Demographic Analysis

I conducted this study to measure the effectiveness of the mentoring program at the designated urban high school in helping ninth-grade African American male students in Algebra I perform better on state mathematics assessments. I used descriptive, correlational, and graphical analysis to help answer the research questions. Categorical variables in the study consisted of 54 students who were freshmen during the 2011-12 school year and 52 students who were freshmen during the 2012-13 school year. The state measuring assessment tool during this study was the Algebra I End of Course (EOC) STAAR tests.

The students selected each school year for the study consisted of freshmen African American male students who participated in the mentoring program the same year they were enrolled in an Algebra I course. The comparison group students also were freshmen African American male students enrolled in an Algebra I course, but they did not take part in the mentoring program.

As seen in tables 4.1 and 4.2, I tracked Algebra I scores for each grading period and the overall Algebra I grade for the school year for each student. The table also indicates the teacher of record with whom each student took Algebra I. I documented STAAR Algebra I EOC scores for both the mentored and non-mentored students, as well as the amount of time each mentored student spent with their mentor.

Table 4.1 shows data for 27 African American ninth-grade male students who took Algebra I for the first time in the 2011-12 school year and participated in the mentoring program. I created the comparison group for this study by randomly selecting 27 African American ninth-grade male students taking Algebra I for the first time who qualified to be in the mentoring program but declined to participate.

Table 4.2 shows data for the second study group in the 2012-13 school year. This group consisted of 26 African American ninth-grade male students taking Algebra I for the first time who participated in the mentoring program. I created the comparison group for this study by randomly selecting 26 African American ninth-grade male students taking Algebra I for the first time who qualified to be in the mentoring program but declined to participate.

Table 4.1

2011-12 Algebra I Student Data and STAAR Algebra I EOC Results (with Time Spent with Mentor)

2011-2012 Mentored & Non-Mentored Students Compared by Teacher											
Student	Course	Teacher	11-12 Alg I 1st 6 weeks	11-12 Alg I 2nd 6 weeks	11-12 Alg I 3rd 6 weeks	11-12 Alg I 4th 6 weeks	11-12 Alg I 5th 6 weeks	11-12 Alg I 6th 6 weeks	11-12 Alg I Average	2012 Alg I EOC	Time w/ Mentor
M1	ALGEBRA 1	K	80	71	72	77	82	80	77	3214	0
M2	ALGEBRA 1	P	60	71	64	62	73	72	67	2437	0
M3	ALGEBRA 1	K	77	74	70	72	74	75	74	3615	0
M4	ALGEBRA 1	K	76	82	82	78	83	81	80	3388	0
M5	ALGEBRA 1	K	88	78	74	91	88	71	82	3579	0
M6	ALGEBRA 1	P	50	71	84	78	82	81	74	3058	0
M7	ALGEBRA 1	B	54	66	62	55	50	65	59	3347	0
M8	ALGEBRA 1	K	72	70	75	76	73	79	74	3721	0
M9	ALGEBRA 1	K	82	84	76	71	72	80	78	3542	0
M10	ALGEBRA 1	K	72	71	79	75	57	61	69	3058	0
M11	ALGEBRA 1	D	60	42	70	64	55	56	58	3428	0
M12	ALGEBRA 1	P	50	55	64	62	59	66	59	3058	0
M13	ALGEBRA 1	N	80	60	70	70	54	50	64	3260	0
M14	ALGEBRA 1	D	68	71	90	90	76	81	79	3615	0
M15	ALGEBRA 1	N	43	75	27	57	0	20	37	3113	0
M16	ALGEBRA 1	D	76	60	78	62	70	70	69	3388	0
M17	ALGEBRA 1	N	72	77	75	81	84	83	79	3791	0
M18	ALGEBRA 1	D	65	77	90	75	55	50	69	3428	0
M19	ALGEBRA 1	D	81	77	85	84	82	84	82	3686	0
M20	ALGEBRA 1	D	63	57	50	60	53	50	56	3260	0
M21	ALGEBRA 1	P	65	73	71	65	75	74	71	3347	0
M22	ALGEBRA 1	P	71	62	73	62	60	72	67	3304	0
M23	ALGEBRA 1	D	54	62	66	50	80	82	66	3165	0
M24	ALGEBRA 1	B	52	57	66	65	59	67	61	2577	0
M25	ALGEBRA 1	D	70	70	84	71	71	70	73	3542	0
M26	ALGEBRA 1	K	76	71	71	74	72	77	74	3214	0
M27	ALGEBRA 1	D	91	84	87	85	88	90	88	3721	0
M28	ALGEBRA 1	N	66	70	62	50	54	52	59	3113	742
M29	ALGEBRA 1	D	88	70	89	85	88	91	85	3721	1283
M30	ALGEBRA 1	N	75	77	72	75	81	78	76	3969	1456
M31	ALGEBRA 1	N	56	51	67	50	62	67	59	3347	451
M32	ALGEBRA 1	K	74	78	88	71	62	64	73	3686	1086
M33	ALGEBRA 1	B	76	77	78	80	78	79	78	3933	1324
M34	ALGEBRA 1	D	91	90	99	96	94	96	94	3750	1279
M35	ALGEBRA 1	K	75	74	70	81	62	83	74	3897	1366
M36	ALGEBRA 1	K	89	75	82	72	76	83	80	3651	1243
M37	ALGEBRA 1	N	78	85	83	87	91	90	86	3579	1015
M38	ALGEBRA 1	D	83	81	84	77	81	84	82	3861	1411
M39	ALGEBRA 1	N	55	67	73	72	50	57	62	3058	652
M40	ALGEBRA 1	K	75	78	75	81	86	83	80	3304	947
M41	ALGEBRA 1	D	66	74	88	74	77	81	77	3897	1379
M42	ALGEBRA 1	P	71	79	81	85	82	88	81	3721	1280
M43	ALGEBRA 1	P	73	75	71	76	82	78	76	3579	835
M44	ALGEBRA 1	N	74	80	81	50	63	55	67	3542	631
M45	ALGEBRA 1	K	79	72	78	79	76	80	77	4000	1488
M46	ALGEBRA 1	K	95	65	71	57	70	82	73	4162	1389
M47	ALGEBRA 1	N	81	84	80	79	85	84	82	3861	1477
M48	ALGEBRA 1	P	71	74	72	71	72	70	72	3826	1282
M49	ALGEBRA 1	N	93	79	53	57	50	55	65	3260	912
M50	ALGEBRA 1	D	85	84	82	85	90	85	85	3826	1295
M51	ALGEBRA 1	D	65	64	71	63	66	58	65	3388	856
M52	ALGEBRA 1	P	73	82	83	87	91	95	85	4333	1323
M53	ALGEBRA 1	K	75	76	74	71	61	72	72	4000	1288
M54	ALGEBRA 1	K	78	78	83	72	70	77	76	3651	1178

Table 4.2

2012-13 Algebra I Student Data and STAAR Algebra I EOC Results (with Time Spent with Mentor)

2012-2013 Mentored & Non-Mentored Students Compared by Teacher											
Student	Course	Teacher	12-13 Alg I 1st 6 weeks	12-13 Alg I 2nd 6 weeks	12-13 Alg I 3rd 6 weeks	12-13 Alg I 4th 6 weeks	12-13 Alg I 5th 6 weeks	12-13 Alg I 6th 6 weeks	AVG	2013 Alg I EOC	Time w/ Mentor
M1	ALGEBRA I	K	86	90	88	86	89	94	89	3750	1354
M2	ALGEBRA I	K	75	60	70	73	52	88	70	4262	1479
M3	ALGEBRA I	K	87	88	88	90	87	94	89	3500	1222
M4	ALGEBRA I	S	82	75	81	77	89	77	80	3577	1361
M5	ALGEBRA I	D	78	60	70	50	62	55	63	3203	384
M6	ALGEBRA I	S	89	79	81	73	72	79	79	3614	1283
M7	ALGEBRA I	K	81	90	90	82	78	71	82	3500	1044
M8	ALGEBRA I	N	75	81	80	85	88	83	82	3577	1075
M9	ALGEBRA I	K	77	74	71	74	75	79	75	3650	1187
M10	ALGEBRA I	P	82	81	78	83	85	82	82	3687	1328
M11	ALGEBRA I	S	88	82	80	86	91	88	86	3940	1389
M12	ALGEBRA I	P	72	67	75	76	70	78	73	3423	824
M13	ALGEBRA I	S	82	86	84	87	93	99	89	3903	1431
M14	ALGEBRA I	K	89	79	80	91	81	94	86	3687	1408
M15	ALGEBRA I	S	77	80	79	74	75	76	77	4174	1366
M16	ALGEBRA I	K	77	73	72	85	87	90	81	3794	1378
M17	ALGEBRA I	D	94	82	76	83	85	90	85	3831	1257
M18	ALGEBRA I	D	78	78	65	73	76	81	75	3650	1108
M19	ALGEBRA I	S	90	81	75	73	84	89	82	3577	1191
M20	ALGEBRA I	K	85	90	94	92	94	95	92	3723	1261
M21	ALGEBRA I	D	95	97	85	91	92	96	93	3614	1248
M22	ALGEBRA I	K	37	53	62	66	63	67	58	3650	1267
M23	ALGEBRA I	S	72	72	81	53	65	65	68	2984	346
M24	ALGEBRA I	D	99	91	82	73	84	87	86	3539	1439
M25	ALGEBRA I	S	71	71	74	73	74	72	73	2918	273
M26	ALGEBRA I	D	80	88	84	77	81	75	81	3614	1314
M27	ALGEBRA I	S	65	72	57	50	61	74	63	2846	0
M28	ALGEBRA I	K	95	94	90	100	93	92	94	3614	0
M29	ALGEBRA I	D	90	85	72	76	82	81	81	3462	0
M30	ALGEBRA I	D	71	51	58	65	73	77	66	3251	0
M31	ALGEBRA I	S	86	82	63	70	72	72	74	3539	0
M32	ALGEBRA I	K	83	97	84	78	92	90	87	3423	0
M33	ALGEBRA I	D	75	77	77	86	87	80	80	3251	0
M34	ALGEBRA I	D	88	82	84	73	73	80	80	3340	0
M35	ALGEBRA I	K	91	96	84	79	77	82	85	3500	0
M36	ALGEBRA I	N	62	71	67	73	65	72	68	3101	0
M37	ALGEBRA I	K	84	92	99	94	98	98	94	3650	0
M38	ALGEBRA I	P	50	53	70	72	75	77	66	3154	0
M39	ALGEBRA I	K	80	70	79	77	81	82	78	3577	0
M40	ALGEBRA I	P	50	70	63	70	50	55	60	3296	0
M41	ALGEBRA I	N	58	54	62	66	72	64	63	3462	0
M42	ALGEBRA I	N	70	66	74	73	72	76	72	3614	0
M43	ALGEBRA I	K	91	76	97	89	95	87	89	3687	0
M44	ALGEBRA I	D	71	60	79	63	52	50	63	3101	0
M45	ALGEBRA I	K	87	82	93	91	88	80	87	3750	0
M46	ALGEBRA I	D	80	77	79	71	50	75	72	3539	0
M47	ALGEBRA I	K	70	60	73	76	74	78	72	3203	0
M48	ALGEBRA I	D	71	71	84	88	95	88	83	3539	0
M49	ALGEBRA I	N	80	85	84	85	73	81	81	3614	0
M50	ALGEBRA I	K	80	70	83	83	81	82	80	3650	0
M51	ALGEBRA I	D	72	75	77	81	44	54	67	3577	0
M52	ALGEBRA I	K	71	54	52	50	51	50	55	3340	0

Findings for Research Questions

Research Question #1

I conducted descriptive analysis by using the range, mean, and standard deviation scores. Huck (2008) describes descriptive analysis as summarizing data on a single dependent variable. The range of average scores on the Algebra I course end of the year assessments for the students who took Algebra I during the 2011-12 school year and participated in the study was 37 to 94. For the 2012-13 school year, the range was 55 to 94. Observing these scores separated by participation status, the scores for the students who participated in the mentoring program in 2011-12 ranged from 59 to 94, while the non-participating students' scores ranged from 37 to 88.

These scores seem to be very similar until observing the mean of these scores. Table 4.3 shows the mean of the Algebra I scores for the 2011-12 school year as well as the standard deviation. The mean score for the mentored students in 2011-12 was 75.55, while the mean score for the non-mentored students was 69.73.

Table 4.3

2011-12 Summary Statistics for African American Male Students in Algebra I Who Participated in the Study

Variable	**N**	**Mean**	**Std Dev**
Algebra I Course Average All	54	72.64	10.01
Mentored	27	75.55	8.72
Not Mentored	27	69.73	10.53

This difference is even greater when looking at the pass/fail numbers for these two groups from tables 4.1 and 4.2. In the 2011-12 school year, of the 27 African American males who took Algebra I for the first time and participated in the mentoring program, 21 passed the course and 6 failed. An even more dramatic difference is found looking at the pass/fail rates of the 27 African American male students who took Algebra I and participated in the study but were not mentored. Only 14 of those students passed the course and 13 failed.

Huck (2008) discusses that the standard deviation is a measurement of variability. The smaller the standard deviation, the closer the data points are in a grouping. The standard deviation for the Algebra I course grade for mentored students in the 2011-12 school year was 8.72. The standard deviation for the non-mentored students' Algebra I course grades was 10.53, indicating a wider spread of scores.

Table 4.4 shows the mean of the Algebra I scores and the standard deviation for the 2012-13 school year. The mean score for the mentored students in 2012-13 was 79.70, while the mean score for the non-mentored students was 75.38.

Table 4.4

2012-13 Summary Statistics for African American Male Students in Algebra I Who Participated in the Study

Variable	**N**	**Mean**	**Std Dev**
Algebra I Course Average All	52	77.54	9.95
Mentored	26	79.70	9.07
Not Mentored	26	75.38	10.83

As in the previous table, this difference is shown to be even greater when looking at the pass/fail numbers for these two groups. In the 2012-13 school year, of the 26 African American males who took Algebra I for the first time and participated in the mentoring program, 23 passed the course and 3 failed. When compared with the 26 African American male students who took Algebra I and participated in the study but did not get mentored, only 17 passed the course and 9 failed. The standard deviation for the Algebra I course grade for mentored students in the 2012-13 school year was 9.07. The standard deviation for the non-mentored students Algebra I course grades was 10.83, indicating a wider spread of scores as seen in the prior school year.

Research Question #2

Table 4.5 shows the data for the students who participated in the study in the 2011-12 school year divided by whether they were mentored or not, and by which Algebra I teacher they were scheduled with for the year.

Table 4.5

2011-12 Summative Algebra I Averages for Students by Teacher of Record

Teacher of Record	# of Mentored Students # of Non-Mentored Students	End of Year Course Average
Teacher K	8	75.58
	8	75.88
Teacher P	4	78.42
	5	67.57
Teacher B	1	78.00
	2	59.83
Teacher N	8	69.50
	3	59.89
Teacher D	6	81.25
	9	70.961

The research question asked how the two groups differed when compared with the same teacher of record for Algebra I. For the majority, students who participated in the mentoring program had a higher end of the year course average. Four of the teacher groups had an average spread of nine points or more favoring the mentoring group. Only one teacher group had a near equal average.

The non-mentored students in Teacher K's group had an advantage of 0.30 on average over the mentored students. The similarities between the number of students who passed Algebra I for the year by teacher and the number of students who passed the Algebra I EOC by teacher with data from Table 4.1 were almost exact. The results indicated that for the students who participated in the mentoring program, three teachers had a difference in four student group data sets between the number of students who passed the course and who passed the Algebra I EOC. For Teacher K, all eight students in [his/her] class who participated in the mentoring program passed the course, but one of these students did not pass the EOC. For Teacher N, three of the eight students in [his/her] class who participated in the mentoring program passed the Algebra I course for the year, but four passed the EOC.

Observing the students in the study who did not participate in the mentoring program, only two teacher groups had a different number of students who passed the Algebra I course for the year than passed the EOC. In teacher K, seven of the eight students not participating in the mentoring program passed the course for the year, and only four passed the EOC. For Teacher P, two of the five students who were not participating in the mentoring program passed the Algebra I course for the year, but none passed the EOC. For all of the other teachers, the number of students who passed the Algebra I course for the year, in both the mentoring and non-mentoring groups, was the same as the number of students who passed the Algebra I EOC.

When I analyzed the data for the students who participated in the study in the 2012-13 school year, I found higher course averages than in 2011-12 by teacher group. However, I also found more volatility regarding how many students passed the Algebra I EOC. Table 4.6 shows the 2012-13 results.

Table 4.6

2012-13 Summative Algebra I Averages for Students by Teacher of Record

Teacher of Record	# of Mentored Students # of Non-Mentored Students	End of Year Course Average
Teacher K	7	78.31
	7	81.00
Teacher P	5	83.97
	4	72.13
Teacher S	5	78.83
	4	72.25
Teacher N	4	80.13
	6	72.47
Teacher D	5	77.90
	5	76.10

Table 4.6 divides students by whether or not they were mentored and by which Algebra I teacher they were scheduled with for the year. Different from the prior year, all teacher groups for both mentored and non-mentored students had passing course averages for Algebra I. Again, the majority of students who participated in the mentoring program had a higher end of the year course average. Three of the teacher groups had an average spread of 6 points or more favoring the mentoring group. Teacher K had a 2.69-point advantage on the course average for the non-mentored group.

When I compared the data in Table 4.6 with the data in Table 4.2, I found there were more differences in 2012-13 than in 2011-12 regarding the number of students who passed Algebra I for the year by teacher and the number of students who passed the Algebra I EOC by teacher . The results indicated that for the students that participated in the mentoring program, four teachers had a difference in half the student group data sets between the number of students who passed the course and the number who passed the Algebra I EOC.

For Teacher K, six of the seven students in his/her class who participated in the program passed the course, but all seven of these students passed the EOC. For Teacher P, all five students in his/her class who were participating in the mentoring program passed the Algebra I course for the year, but only four passed the EOC. For Teacher N, all four students in his/her class who were participating in the mentoring program passed the Algebra I course for the year, but only three passed the EOC.

Observing the students in the study who did not participate in the mentoring program, again only two teacher groups had different results between the number of students who passed the Algebra I course for the year and the number who passed the EOC. For Teacher K, six out of seven of the students who did not participate in the mentoring program passed the course for the year, and only four of the seven passed the EOC. In teacher group D, two of the five students who did not participate in the mentoring program passed the Algebra I course for the year, but none of these students passed the EOC. All of the other teacher groups had results that showed the number of students who passed the Algebra I course for the year, in both the mentoring and non-mentoring groups, was identical to the number of students who passed the Algebra I EOC for both groups.

Research Question #3

Moving from Algebra I course grades to Algebra I EOC success, by observing the assessment data you can begin to form a clearer picture of what possible impact the mentoring program may have on students' ability to pass the EOC. The breakdown of data regarding student success on the EOC in the 2011-12 school year is shown in Table 4.7.

Table 4.7

2011-12 Algebra I EOC Summary Data for Students Who Participated in the Study

	# of Students in Study who Tested	# of Students Met Standards	% of Students in Study Who Met Standards	Mean	Std DEV
All Students in Study	54	30	55.56	3514.28	364.24
Mentored Students	27	21	77.78	3700.56	308.45
Non-Mentored Students	27	9	33.33	3328.00	321.29

The passing raw score for the 2011-12 Algebra I EOC was 3500. The average score for the 54 students participating in the study was 3514.28. Of the 54 students participating in the study, 30 of these students met the standard and scored a 3500 or higher. Students in the study who were in the mentoring program scored significantly higher than the average. Nearly 78% of mentored students, 21 out of 27 students, met standards for the assessment. The average score for students participating in the mentoring program was 3700.56.

Turning to the students in the study who were not participating in the mentoring program, we saw much lower scores. The percentage of non-mentored students who met standards was 33.33%, only 9 out of 27 students. The average of the raw scores in this group was 3328. The EOC success rate data for the students in the study in the 2012-13 school year is shown in Table 4.8.

Table 4.8

2012-13 Algebra I EOC Summary Data for Students Who Participated in the Study

	# of Students in Study who Tested	# of Students Met Standards	% of Students in Study Who Met Standards	Mean	Std DEV
All Students in Study	52	35	67.31	3527.33	277.69
Mentored Students	26	22	84.62	3628.50	294.26
Non-Mentored Students	26	13	50.00	3426.15	222.33

The mean score for the 52 students who participated in the study was 3514.28. Of the 52 students who participated in the study, 35 met the standard and scored a 3500 or higher. Students in the study who were in the mentoring program scored significantly higher than the average. Nearly 85% of mentored students, 22 out of 26 students, met standards for the assessment. The average score for students participating in the mentoring program was 3628.50.

Turning to the students in the study who did not participate in the mentoring program, we saw higher scores than the previous year. The met standards percentage for the non-mentoring students was 50%, 13 out of 26 students. The average of the raw scores in this group was 3426.15.

With a passing EOC raw score of 3500, it may be difficult to determine how each group did within the wide range of scores. Table 4.9 shows the 2011-12 frequency of scores, indicating the number of students who excelled, the number who scored at the passing rate or slightly above, the number who were close to passing and the number who were farther away from success.

Table 4.9

2011-12 Frequencies of Raw Scores of Algebra I EOC for African American Male Students Who Participated in the Study

Group	Score	Frequency	Percent (%)	Cum. Freq.	Cum. %
All	<3600	24	44.44	30	55.56
	3500-3599	6	11.11	6	11.11
	3400-3499	2	3.70	24	44.44
	>3400	22	40.74	22	40.74
Mentored	<3600	18	66.67	21	77.78
	3500-3599	3	11.11	3	11.11
	3400-3499	0	0.00	6	22.22
	>3400	6	22.22	6	22.22
Non-Mentored	<3600	6	22.22	9	33.33
	3500-3599	3	11.11	3	11.11
	3400-3499	2	7.40	18	66.67
	>3400	16	59.26	16	59.26

The data show that for the whole group of students who participated in the study, 11.11% scored within 100 points of the minimum passing score, and 44.44% of the students excelled past the 100-point spread. In this same whole group, 3.7% of the students scored within 100 points below the minimum passing score, while 40.74% of the students scored 100 points or more below the minimum passing score.

Looking at the data for the students who participated in the mentoring program from the 2011-12 school year, 11.11% of these students scored within 100 points of the minimum passing score and 66.67% scored beyond the 100-point threshold. In this student group, only six students failed the EOC, and they scored more than 100 points below the minimum passing score.

The non-mentored students in the study for this school year scored much lower. Only 33.33% passed the Algebra I EOC, 11.11% scored within 100 points of the minimum passing score, and 22.22% scored beyond that point. The troubling sign was that 7.4% of the non-mentored students scored within 100 points below the minimum passing score, and 59.26% scored below the 100-point threshold below the passing rate.

While the data for the 2012-13 school year was slanted in the same direction as the prior year, in favor of students who participated in the mentoring program, the percentage of scores were better for both groups. Table 4.10 shows the 2012-13 frequency of scores, indicating the number of students who excelled, the number who scored at the passing rate or slightly above, the number who scored closer to a passing rate, and the number who were farther away from success.

The data show that for the whole group of students who participated in the study, 23.08% scored within 100 points of the minimum passing score, and 44.23% of the students excelled past the 100-point spread. In this same group, 7.69% of the students scored within 100 points below the minimum passing score, while 25% of the students scored 100 points or more below the minimum passing score.

Table 4.10

2012-13 Frequencies of Raw Scores of Algebra I EOC for African American Male Students Who Participated in the Study

Group	Score	Frequency	Percent (%)	Cum. Freq.	Cum. %
All	<3600	23	44.23	35	67.31
	3500-3599	12	23.08	12	23.08
	3400-3499	4	7.69	17	32.69
	>3400	13	25.00	13	25.00
Mentored	<3600	16	61.54	22	84.62
	3500-3599	6	23.08	6	23.08
	3400-3499	1	3.85	4	15.38
	>3400	3	11.54	3	11.54
Non-Mentored	<3600	7	26.92	13	50.00
	3500-3599	6	23.08	6	23.08
	3400-3499	3	11.54	13	50.00
	>3400	10	38.46	10	38.46

The data for the students who participated in the mentoring program from the 2012-13 school year show 23.08% of these students scored within 100 points of the minimum passing score, and 61.54% scored beyond the 100-point threshold. In this student group, only four students failed the EOC, one scored within the 100 points below the minimum passing score, and three scored below that point.

The data for the students in the study who did not participate in the mentoring program shows23.08% scored within 100 points of the minimum passing score, and 26.92% scored beyond that point. Of these students, 11.54% scored within 100 points below the minimum passing score, and 38.46% scored below the 100-point threshold below the passing rate.

Another way of viewing data for the test administration of the STAAR Algebra I EOC assessment to graph it determining dispersion. A stem-and-leaf graph illustrates score location, dispersion, and shape of the data set (Thompson, 2006). In Figure 4.1, the data is set in a stem-and-leaf plot with statistical details. The statistics program used the option to use the stem unit as 100 and round the leaf number again so not to use large numbers. The sample size for this graph was 27 students who participated in the mentoring program during the 2011-12 school year, and the mean for their scores was 3700.56. The standard deviation of this group was 308.45. The distributions of the scores are clustered around the raw score range from 3500 to 4000.

		Stem-and-Leaf Display	
		Stem unit:	100
Statistics		30	6
Sample Size	27	31	1
Mean	3700.556	32	6
Median	3721	33	0 5 9
Std. Deviation	308.4524	34	
Minimum	3058	35	4 8 8
Maximum	4333	36	5 5 9
		37	2 2 5
		38	3 3 6 6
		39	0 0 3 7
		40	0 0
		41	6
		42	
		43	3

Figure 4.1. Stem-and-leaf display of 2011-12 STAAR Algebra I EOC score distribution for students who participated in the mentoring program.

The data shown in figure 4.2 is for 27 students from the 2011-12 school year that did not participate in the mentoring program, and the mean for their scores was 3328. The standard deviation for this group was 321.29. The distributions of the scores are clustered around the raw score of 3300.

		Stem-and-Leaf Display	
		Stem unit:	100
Statistics		24	4
Sample Size	27	25	8
Mean	3328	26	
Median	3347	27	
Std. Deviation	321.288	28	
Minimum	2437	29	
Maximum	3791	30	6 6 6
		31	1 6
		32	1 1 6 6
		33	0 5 5 9 9
		34	3 3
		35	4 4 8
		36	1 1 9
		37	2 2 9

Figure 4.2. Stem-and-leaf display of 2011-12 STAAR Algebra I EOC score distribution for students who did not participate in the mentoring program.

In Figure 4.3, same as above, the data is set in a stem-and-leaf plot with statistical details. The sample size for this graph was 26 with a mean of 3628.5. The standard deviation for this group was 294.26. The distributions of the scores are primarily clustered around the raw score 3500 with the majority of other scores being higher.

		Stem-and-Leaf Display	
		Stem unit:	**100**
Statistics		**29**	**2 8**
Sample Size	**26**	**30**	
Mean	**3628.5**	**31**	
Median	**3632**	**32**	**0**
Std. Deviation	**294.2576**	**33**	
Minimum	**2918**	**34**	**2**
Maximum	**4262**	**35**	**0 0 4 8 8 8**
		36	**1 1 1 5 5 5 9 9**
		37	**2 5 9**
		38	**3**
		39	**0 4**
		40	
		41	**7**
		42	**6**

Figure 4.3. Stem-and-leaf display of 2012-13 STAAR Algebra I EOC score distribution for students who participated in the mentoring program.

The data shown in figure 4.4 is for 26 students from the 2012-13 school year who did not participate in the mentoring program, and the mean for their scores was 3426.15. The standard deviation for this group was 222.33. The distributions of the scores are clustered in a range of raw scores from 3100 to 3600.

		Stem-and-Leaf Display	
		Stem unit:	**100**
Statistics		**28**	**5**
Sample Size	**26**	**29**	
Mean	**3426.154**	**30**	
Median	**3481**	**31**	**0 0 5**
Std. Deviation	**222.3305**	**32**	**0 5 5**
Minimum	**2846**	**33**	**0 4 4**
Maximum	**3750**	**34**	**2 6 6**
		35	**0 4 4 4 8 8**
		36	**1 1 1 5 5 9**
		37	**5**

Figure 4.4. Stem-and-leaf display of 2012-13 STAAR Algebra I EOC score distribution for students who did not participate in the mentoring program.

Research Question #4

The fourth research question seeks to determine if there are any differences in the success rate for the individual objectives for the STAAR EOC Algebra I assessment between the students in the study that participated in the mentoring program and those who did not participate. The percentages of items correct in the following tables indicate how each student group correctly scored on each objective. The passing rate for the Algebra I EOC was 37% in both the 2011-12 and the 2012-13 school years.

In the 2011-12 school year, table 4.11 shows that the mentored students scored above the overall passing of 3500 in four of the reporting objectives.

Table 4.11

2011-12 STAAR Algebra I EOC Passing Percentages by Objectives for Students Who Participated in the Study

STAAR Algebra I EOC Objectives	Mentored % Items Correct	Non-Mentored % Items Correct
1. The students will describe functional relationships in a variety of ways.	46.86	28.13
2. The student will demonstrate an understanding of the properties and attributes of functions.	36.08	35.83
3. The student will demonstrate an understanding of linear functions.	47.67	34.67
4. The student will formulate and use linear equations and inequalities.	30.50	21.50
5. The students will demonstrate an understanding of quadratic and other nonlinear functions.	41.67	35.00

The average number of mentored students who met standards for objective 1 was 46.86%, objective 3 was 47.67%, and objective 5 was 41.67%. The same students scored lower on objective 2 and 4. The average number of mentored students who met standards for objective 2 was 36.08% and for objective 4 was 30.50%.

As for the non-mentored students in the study, no average for students who met standards for any individual objective was above 37%. The average number of non-mentored students who met standards for objective 1 was 28.13%, objective 2 was 35.83%, objective 3 was 34.67%, objective 4 was 21.50%, and objective 5 was 35%. The non-mentored students did not perform better as an average score on any objectives than the mentored students.

In the 2012-13 school year, table 4.12 shows that the mentored students scored above the overall passing rate in three of the reporting objectives.

Table 4.12

2012-13 STAAR Algebra I EOC Passing Percentages by Objectives for Students Who Participated in the Study

STAAR Algebra I EOC Objectives	Mentored % Items Correct	Non-Mentored % Items Correct
1. The students will describe functional relationships in a variety of ways.	58.38	38.75
2. The student will demonstrate an understanding of the properties and attributes of functions.	29.58	25.42
3. The student will demonstrate an understanding of linear functions.	40.33	34.33
4. The student will formulate and use linear equations and inequalities.	38.50	29.50
5. The students will demonstrate an understanding of quadratic and other nonlinear functions.	30.56	22.78

The average number of mentored students who met standards for objective 1 was 58.38%, objective 3 was 40.33%, and objective 4 was 38.50%. These students scored lower on objective 2 and 5. The average number of mentored students who met standards for objective 2 was 29.58% and for objective 5 was 30.56%.

Unlike the non-mentored students in the study from the previous year, non-mentored students in 2012-13 did meet standards for one of the objectives. The average number of mentored students who met standards for objective 1 was 38.75%. The average number of non-mentored students who met standards for objective 2 was 25.42%, objective 3 was 34.33%, objective 4 was 29.50%, and objective 5 was 22.78%.

As in the previous year, the non-mentored students did not perform better as an average score on any objectives than the mentored students. Following a trend from previous data, average rates for met standards for both student groups were higher in the 2012-13 school year than they were in the 2011-12 school year.

Research Question #5

When looking at research question 5, the focus was on the students who participated in the mentoring program. The question asked what perceptions did the students who were mentored have about the program at the end of their ninth-grade year. From the survey located in Appendix 1, there were five questions that focused on the student's feelings about the mentoring program. The five questions were:

1. Did the mentoring program help me improve my attendance in school?
2. Did the mentoring program help improve my grades?
3. Did the mentoring program help improve my attitude toward school?
4. Will the mentoring program help prepare me to graduate?
5. Will the mentoring program help prepare me for the future?

Table 4.13 shows the percentage of mentored students in the 2011-12 school year that answered in the affirmative to each of the five questions.

Table 4.13

2011-12 Mentored Students' Responses to Survey after 1st year Participating in the Mentoring Program

Targeted Question on Reflection of Mentoring Program	# of Students Who Responded Positively	% of Students Who Responded Positively
Mentoring Program helped me improve my attendance.	25	92.59
Mentoring Program helped improve my grades.	23	85.19
Mentoring Program helped improve my attitude toward school.	25	92.59
Mentoring Program helped prepare me to graduate (in the future).	20	74.07
Mentoring Program helped prepare me for the future.	22	81.48

The percentage of students who felt that the mentoring program helped them improve their attendance was 92.59%. The percentage that felt the mentoring program helped improve their overall grades was 85.19%. When gauging attitude, 92.59% of the students felt that the mentoring program helped improve their attitude towards school. Maybe because these were ninth-graders being asked to see three years into the future, only 74.07% felt that the mentoring program was helpful to them for getting prepared to graduate. With the same idea about the future, 81.48% of the students felt that the mentoring program was helpful in preparing them for their future after high school.

Table 4.14 shows the percentage of mentored students in the 2012-13 school year that answered in the affirmative to each of the five questions.

Table 4.14

2012-13 Mentored Students' Responses to Survey after 1st year Participating in the Mentoring Program

Targeted Question on Reflection of Mentoring Program	# of Students Who Responded Positively	% of Students Who Responded Positively
Mentoring Program helped me improve my attendance.	23	88.46
Mentoring Program helped improve my grades.	24	92.31
Mentoring Program helped improve my attitude toward school.	25	96.15
Mentoring Program helped prepare me to graduate (in the future).	19	73.08
Mentoring Program helped prepare me for the future.	23	88.46

The percentage of students who felt that the mentoring program helped them improve their attendance was 88.46%. The percentage that felt the mentoring program helped improve their overall grades was 92.31%. When gauging attitude, 96.15% of the students felt that the mentoring program helped improve their attitude towards school. Again, maybe because these were ninth-graders being asked to see three years into the future, only 73.08% felt that the mentoring program was helpful to them for getting prepared to graduate. And again, with the same idea about the future, 88.46% of the students felt that the mentoring program was helpful in preparing them for their future after high school.

Overarching Research Question

The overall question for the study is what kind of impact the mentoring program in place at Ball High School had on ninth-grade African American male students on their STAAR Algebra I EOC assessment.

Correlation studies look at the size and direction in which the data flows (Shadish, Cook, & Campbell, 2002). Records for the 2011-12 school years indicate that the maximum amount of time a mentor could spend with a student was approximately 1,200 minutes, and the actual mentoring time ranged from 385 minutes to 1,181 minutes. Table 4.15 shows the breakdown of STAAR scores by the number of mentored students in a particular score range for 2011-12. The table indicates the percentage of the number of students who scored in a specific range and the average amount of time that those students spent with their mentor during the 2011-12 school year.

Table 4.15

2011-12 Comparison of STAAR Algebra I EOC Scores and Time Spent with Mentors for African American Male Students Who Participated in the Study

Score	**N**	**Percent (%)**	**Avg Time w/ Mentor (min)**
4000-4500	4	14.81	1372.00
3700-3999	11	40.74	1348.36
3500-3699	6	22.22	998.00
3300-3499	2	7.41	653.50
2900-3299	4	14.81	813.25

Of the 27 students in the study who participated in the mentoring program during the school year, 22.22% scored between 3500 and 3699 and spent an average of 998 minutes during the school year with their mentor. The next highest scoring group was

40.74% of the students ranging from 3700 to 3999 and averaging 1348.36 minutes during the year with their mentor. 14.81% of the mentored students scored in the highest category between 4000 and 4500 and spent an average time of 1372 minutes that year with their mentor.

On the other side of this scale were the students who did not pass the Algebra I EOC assessment. Students scoring between 3300 and 3499 made up 7.41% of this student group and spent an average of 653.5 minutes with their mentor during the school year. The lowest scoring group was between 2900 and 3299. 14.81% of the students in this group scored in this range and spent an average of 813.25 minutes during the year with their mentor.

Table 4.16 shows the breakdown of STAAR scores by the number of mentored students in a particular score range for 2012-13. The table indicates the percentage of students who scored in a specific range and the average amount of time that those students spent with their mentor during the 2012-13 school year.

Table 4.16

2012-13 Comparison of STAAR Algebra I EOC Scores and Time Spent with Mentors for African American Male Students Who Participated in the Study

Score	**N**	**Percent (%)**	**Avg Time w/ Mentor (min)**
4000-4500	2	7.69	1422.50
3700-3999	6	23.08	1345.00
3500-3699	14	53.85	1248.21
3300-3499	1	3.85	824.00
2900-3299	3	11.54	334.33

Of the 26 students in the study who participated in the mentoring program during the school year, 53.85% scored between 3500 and 3699 and spent an average of 1248.21 minutes during the school year with their mentor. The next highest scoring group was 23.08% of the students ranging from 3700 to 3999 and averaging 1345 minutes during the year with their mentor. 7.69% of the mentored students scored in the highest category between 4000 and 4500 and spent an average time of 1422.5 minutes that year with their mentor.

On the other side of this scale were the students who did not pass the Algebra I EOC assessment. Students scoring between 3300 and 3499 made up 3.85% of this student group and spent an average of 824 minutes with their mentor during the school year. The lowest scoring group was between 2900 and 3299. 11.54% of the students in this group scored in this range and spent an average of 334.33 minutes during the year with their mentor.

In figure 4.5, a scatter plot shows the correlation between student attendance to mentoring and Algebra I STAAR scores for the 2011-12 school year. By looking at the scores and time spent with a mentor in Table 4.1, I placed these two data sets into a scatter plot to correlate the information. A progression line is placed in the scatter plot to show that all data points fall tightly grouped along the line, with the exception for a couple outliers. Pearson's r was calculated as 0.6855.

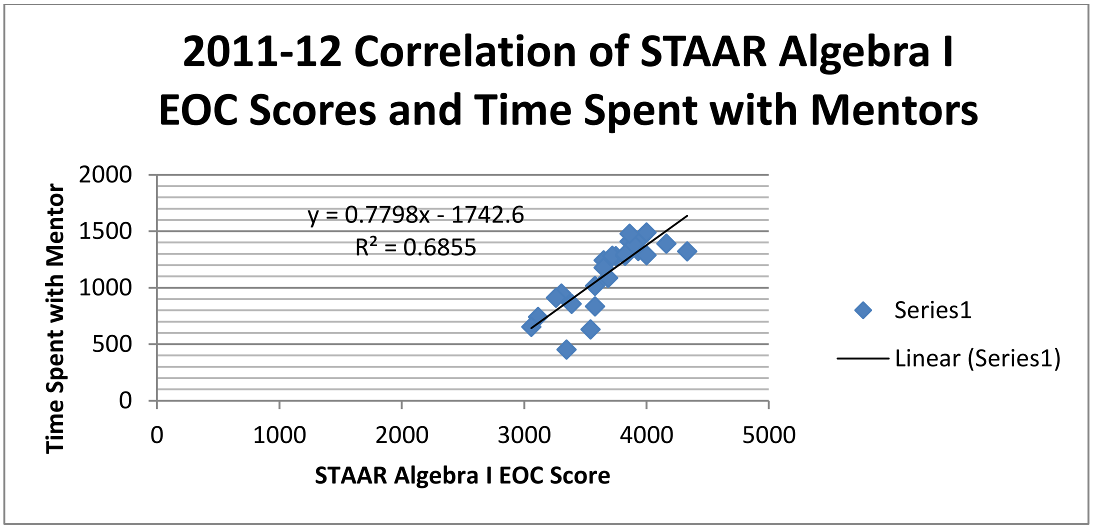

Figure 4.5. 2011-12 scatter plot and linear trend line of STAAR Algebra I EOC scores and time spent with mentors for African American male students.

In figure 4.6, a scatter plot shows the correlation between student attendance to mentoring and Algebra I STAAR scores for the 2012-13 school year. By looking at the scores and time spent with a mentor in table 4.2, I placed these two data sets into a scatter plot to correlate the information. A progression line is placed in the scatter plot to show that all data points fall tightly grouped along the line, with the exception for a couple outliers. Pearson's r was calculated as 0.7177.

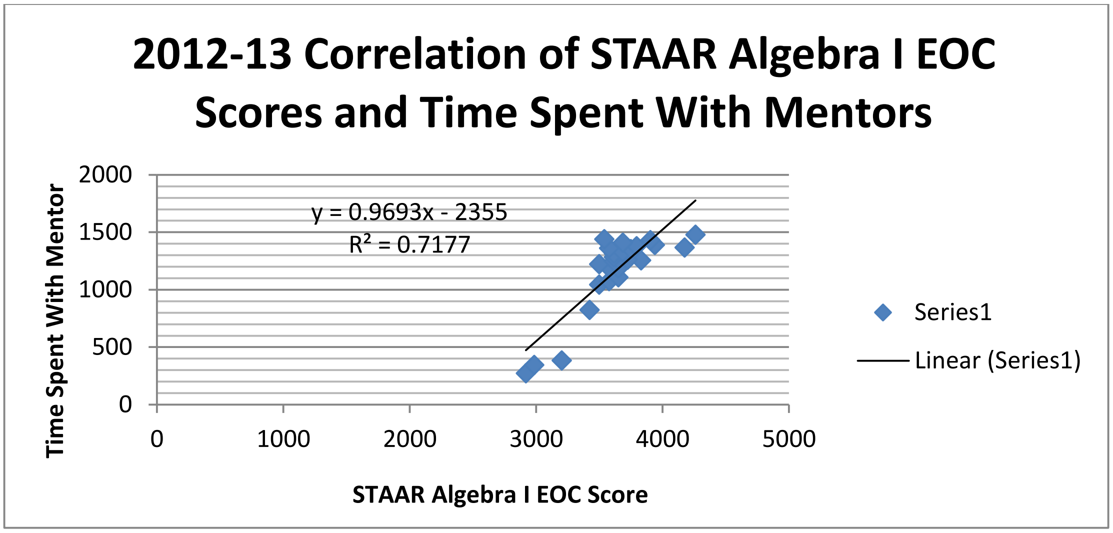

Figure 4.6. 2012-13 scatter plot and linear trend line of STAAR Algebra I EOC scores and time spent with mentor for African American male students.

Confidence intervals are stated by Thompson (2006) to be the best strategies for statistics. Confidence intervals reveal explicit intervals of scores of the dependent variables (Huck, 2008). The confidence interval for the data of the mentored students in the 2011-12 school year is measured with a z score of -1.96 meaning that the data set has a confidence level of 95% that it has a normal distribution, and limits of 3584.21 (lower) and 3816.91 (upper) as seen in Figure 4.7.

Confidence Interval Estimate for the Mean

Data	
Population Standard Deviation	**308.45**
Sample Mean	**3700.56**
Sample Size	**27**
Confidence Level	**95%**

Intermediate Calculations	
Standard Error of the Mean	59.36123018
Z Value	-1.9600
Interval Half Width	116.3459

Confidence Interval	
Interval Lower Limit	**3584.21**
Interval Upper Limit	**3816.91**

Figure 4.7. Confidence interval estimates for the mean of 2011-12 STAAR Algebra I EOC scores of African American male students who participated in the mentoring program.

The confidence interval for the data of the mentored students in the 2012-13 school year is measured with a z score of -1.96 meaning that the data set has a confidence level of 95% that it has a normal distribution, and limits of 3515.39 (lower) and 3741.61 (upper) as seen in Figure 4.8.

Confidence Interval Estimate for the Mean

Data	
Population Standard Deviation	**294.26**
Sample Mean	**3628.5**
Sample Size	**26**
Confidence Level	**95%**

Intermediate Calculations	
Standard Error of the Mean	57.70913393
Z Value	-1.9600
Interval Half Width	113.1078

Confidence Interval	
Interval Lower Limit	**3515.39**
Interval Upper Limit	**3741.61**

Figure 4.8. Confidence interval estimates for the mean of 2012-13 STAAR Algebra I EOC scores of African American male students who participated in the mentoring program.

An analysis of variance was completed with a Separate Variance t Test comparing the 2011-12 mentoring group and the non-mentoring group in figure 4.9.

Separate-Variances *t* Test for the Difference Between Two Means			
Data			
Hypothesized Difference	**0**		
Level of Significance	**0.05**		
Population 1 Sample			
Sample Size	**27**		
Sample Mean	**3700.56**		
Sample Standard Deviation	**308.4500**		
Population 2 Sample			
Sample Size	**27**		
Sample Mean	**3328**		
Sample Standard Deviation	**321.2900**		
Intermediate Calculations			
Numerator of Degrees of Freedom	53978227.5565	Calculations Area	
Denominator of Degrees of Freedom	1039767.5701	Pop. 1 Sample Variance	95141.40
Total Degrees of Freedom	51.9137	Pop. 2 Sample Variance	103227.26
Degrees of Freedom	51	Pop. 1 Sample Var./Sample Size	3523.75
Standard Error	85.7146	Pop. 2 Sample Var./Sample Size	3823.23
Difference in Sample Means	372.56	For one-tailed tests:	
Separate-Variance *t* Test Statistic	**4.3465**	TDIST value	0.0000
		1-TDIST value	1.0000
Two-Tail Test			
Lower Critical Value	**-2.0076**		
Upper Critical Value	**2.0076**		
***p*-Value**	**0.0001**		

Figure 4.9. Separate Variance t Test comparing the 2011-12 mentored group with the non-mentored group.

With the data from the two student groups in the calculations, a degree of freedom of 51 exists. It was determined using the PHStat Program that the critical value of the t table was 2.008 +/- for the upper and lower tail areas. The Separate-Variance t Test statistic is 4.35 and the p-Value for this data is 0.0001 < 0.05 level of significance.

The sample variance for the students in the study that participated in the mentoring program was 95141.4. For the students who did not participate in the mentoring program, it was 103227.26.

In figure 4.10, the data from the two student groups in the calculations showed a degree of freedom of 46.53 exists. As in the statistic above using the PHStat Program, the critical value of the t table was 2.013 +/- for the upper and lower tail areas. The Separate-Variance t Test statistic is 2.80 and the p-Value for this data is 0.0075 < 0.05 level of significance. The sample variance for the students in the study who participated in the mentoring program was 86588.95, and for the students who did not participate in the mentoring program it were 49430.63.

Separate-Variances *t* Test for the Difference Between Two Means			
Data			
Hypothesized Difference	**0**		
Level of Significance	**0.05**		
Population 1 Sample			
Sample Size	**26**		
Sample Mean	**3628.5**		
Sample Standard Deviation	**294.2600**		
Population 2 Sample			
Sample Size	**26**		
Sample Mean	**3426.15**		
Sample Standard Deviation	**222.3300**		
Intermediate Calculations			
Numerator of Degrees of Freedom	27368824.24 74	Calculations Area	
Denominator of Degrees of Freedom	588226.8000	Pop. 1 Sample Variance	86588.94
Total Degrees of Freedom	46.5277	Pop. 2 Sample Variance	49430.62
Degrees of Freedom	46	Pop. 1 Sample Var./Sample Size	3330.34
Standard Error	72.3293	Pop. 2 Sample Var./Sample Size	1901.17
Difference in Sample Means	202.35	For one-tailed tests:	
Separate-Variance *t* Test Statistic	**2.7976**	TDIST value	0.0037
		1-TDIST value	0.9963
Two-Tail Test			
Lower Critical Value	**-2.0129**		
Upper Critical Value	**2.0129**		
***p*-Value**	**0.0075**		

Figure 4.10. Separate Variance t Test comparing the 2011-12 mentored group with the non-mentored group.

CHAPTER V

CONCLUSION

Results

This study was conducted to test if the Tutor-A-Tor mentoring program at Ball High School could be considered to have a positive effect on mathematical success for ninth-grade African American males on the STAAR Algebra I EOC Assessment. The idea of developing a mentoring program for African American males arose from the need to address severe gaps in the area of mathematics for these students. Administrators at Ball High School wanted to know if providing intense math tutoring within a mentoring setting was working. Success in developing a culturally responsive environment in an urban setting is the basis for strengthening the mathematical identity of the African American male students participating in this mentoring program (Leonard & Evans, 2008).

Using descriptive, correlational, and graphical analysis to help answer several guiding questions, Studies with strong theoretical frameworks test data to base the conclusions for the study. Categorical variables in the study consist of the 54 ninth-grade African American male students in the 2011-2012 school year and 52 ninth-grade African American male students in the 2012-2013 school year. I used Algebra I course grades and STAAR Algebra I EOC assessment scores to measure any possible impact.

To determine where the achievement gaps were in the students participating in the study, I collected data and disaggregated it to answer five research questions. The answers to the questions revealed a picture of the mathematical identity of ninth-grade African American male Algebra I students in this urban school. The following is the discussion of the five research questions.

Research Question #1

The argument for significant evidence of impact by the mentoring program starts with research question 1 observing the important difference in Algebra I passing rates between mentored and non-mentored African American male students. The overall passing percentage for all students taking Algebra I in the 2011-12 school year was 87%. The African American male students who participated in the mentoring program in 2011-12 had an end of year Algebra I average that ranged from 59 to 94 and had a passing average of 77.78%. The comparison group for the 2011-12 school year who did not participate in the mentoring program had scores in Algebra I that ranged from 37 to 88. This group's overall end of year passing average in Algebra I was 51.85%. The individual students' Algebra I year-end average illustrates the number of students who showed mastery in Algebra I and helped the students in the mentoring group close the gap between them and the whole group average.

As in the previous study year, the data for 2012-13 showed the mean of the Algebra I scores for those African American male students who were being mentored as being slightly better than the mean for those students not in the mentoring program. The mean score for the mentored students was 79.70, while the mean score for the non-mentored students was 75.38. The difference in these averages reveals a greater significance when considering the passing averages for these two groups.

In the 2012-13 school year, 88.46% of the African American males who took Algebra I for the first time and participated in the mentoring program passed the course. This percentage compares with 65.38% of the African American male students who took Algebra I and participated in the study but were not mentored who passed the course. This indicates a smaller achievement gap between the overall passing rate of White students on the STAAR Algebra I EOC Assessment and the African American male students who participated in the mentoring program. The closure of this achievement gap illustrates the significance that the Tutor-A-Tor mentoring program played in the algebra I instruction of these African American males. Like the results of the Algebra Project discussed in chapter two, this study showed that the mentoring program had a strong academic impact on these students.

Research Question #2

Once the difference in Algebra I passing averages were highlighted, I needed to observe the impact of the teacher of record to determine if they had the key ingredient to the students' success. To answer the second research question, I created a table to divide mentored students from non-mentored students and grouped them by their Algebra I teacher of record for the 2011-12 school year. The reason for this table was to demonstrate how the students in each group did in their algebra class while also comparing the effects of different teachers.

There were four ways of perceiving this data. First, if the gaps among mentored students and non-mentored students inside the teacher groups were similar to the overall averages, this would indicate that the instruction in the Algebra I classes was consistent.

Second, if the gaps inside teacher groups were opposite from the overall averages, that would indicate there was no connection between mentoring and student success. Third, if the gaps inside the teacher groups were very small and both student groups had successful averages, it would indicate that the teacher was successful with their instructional engagement of the students. Last, if the gaps inside the teacher groups were very small and both student groups had unsuccessful averages, it would indicate that the teacher was weak in their instructional methods with the students.

The teacher groups that included the students who participated in the study in the 2011-12 school year almost all showed similar gaps between passing averages as they had in the overall splits of passing averages between mentored students and non-mentored students. Four of the teacher groups had an average spread of nine points or more favoring the mentoring group. The Teacher K group had a near equal average, with the non-mentored students in this group having an advantage of 0.30 on average over the mentored students.

When I observed the analyzed data for the students participating in the study in the 2012-13 school years, again I saw higher course averages among mentored students by teacher group. As in the data sets for the previous year, I divided groups first by whether they were mentored or not and second by which Algebra I teacher they were scheduled with for the year. I observed from this data set that all student groups among all teachers had a passing Algebra I average. Following my same belief about teacher instruction in the classroom, evidence would point that all teachers improved their teaching methods from the previous year as gaps in all groups were narrower.

Research Question #3

Viewing the data from Table 4.1, the study shows similar results between the number of students who passed Algebra I for the year by teacher and the number of students who were successful on the STAAR Algebra I EOC Assessment by teacher. For the next research question, the focus moved from Algebra I course grades to Algebra I EOC success. Findings show assessment data that indicated evidence of the impact that the mentoring program had on student success.

The student data for the STAAR Algebra I EOC Assessment in the 2011-2012 school year indicated that the average score for the 54 students participating in the study was 3514.28, the passing average of the mentored group was 3700.56, and the average for the non-mentored group was 3328. With all other courses and interventions being equal for the two groups, students in the study who participated in the mentoring program scored significantly higher than the average, with almost 78% passing the assessment. The drop in success was apparent with the group who did not participate in mentoring, with just 33.33% of these students achieving a successful score on the EOC.

The comparison of course grades and STAAR results in Table 4.2 showed more differences for the student groups who participated in the 2012-2013 school year. Like the previous year's data, data for 2012-2013 indicated a possible impact that the mentoring program may have had on student success. The student data for the STAAR Algebra I EOC Assessment in the 2012-2013 school year indicated that the average score for the 52 students who participated in the study was 3527.33, the passing average of the mentored group was 3628.5, and the average for the non-mentored group was

3426.15. As before, the study shows that mentoring had a significant impact on the students considering 85% of the mentored students passed the STAAR Algebra I EOC Assessment while only 53.85% of the non-mentored students in the study were successful on the same assessment.

Looking at the passing rates for the STAAR Algebra I EOC Assessment, which requires a raw score of 3500 to pass, in the 2011-2012 school year study group, 18 of the 27 of the African American male students who participated in the mentoring program scored above 3600. On the other hand, 16 of the 27 African American male students who did not participate in the mentoring program scored below 3400. This shows that a majority of students in the two groups, 66.67% of the mentored students and 59.26% of the non-mentored group, scored well above or below the minimum passing score for STAAR.

In the student groups for the 2012-2013 school year evidence shows that the scores revealed better results than the year before. 84.62% of the African American males that participated in the mentoring program scored over 3600 on the STAAR EOC, and 38.46% of the non-mentored group scored below 3400. The study shows through the data that these scores indicate a significant impact by the mentoring program to help such a large percentage of the participating students to score so well on the STAAR EOC. Such a wide split between the majorities seems to point toward a correlation between the time spent in mentoring and the STAAR Algebra I EOC Assessment scores.

Research Question #4

In the fourth research question, I was trying to find evidence of significant impact from the mentoring program on African American male students on the success rate for the individual objectives of the STAAR Algebra I EOC Assessment. For both years of the study, mentored students outperformed non-mentored students in every reporting category. By tying the course grades differences together with the STAAR EOC raw scores, it is evident that mentoring had an impact on the performance of the reporting categories.

The African American male students who participated in the mentoring program excelled in reporting category 1 in both study years with an 18-20 point difference over the non-mentored students. This data identified a significant gap left unbridged without the assistance of mentoring. The average passing rate between African American male students participating in the mentoring program versus African American males who did not participate mirrored differences seen in overall course grades and EOC assessment scores. Mentored students in 2011-12 averaged 48.86 in category I, 36.08 in category II, 47.67 in category III, 30.5 in category IV, and 41.67 in category V. Non-mentored students in 2011-12 averaged a passing rate of 28.13 in category I, 35.83 in category II, 34.67 in category III, 21.5 in category IV, and 35.0 in category V. Mentored students in 2012-13 averaged 58.38 in category I, 29.58 in category II, 40.33 in category III, 38.5 in category IV, and 30.56 in category V. Non-mentored students in 2012-13 averaged a passing rate of 38.75 in category I, 25.42 in category II, 34.33 in category III, 29.5 in category IV, and 22.78 in category V.

The African American males in the mentoring program in the 2012-2013 school year posted an average higher than the state average for all African American students. While scores were still low compared the overall state and district averages, the point spread between the mentored students and the non-mentored student's points towards a correlation that time with mentors helped the African American male students in both study years. To confirm this correlation statistical, I need to conduct analyses.

Research Question #5

Leonard & Evans (2008) suggest that too often that the perceptions on education by African American students are based on a lack of experiences. The mentoring program for the students in this study afforded them engaging experiences that allowed them to develop action plans to strengthen their mathematic identities. The study shows that the measures followed from the Action-Reflection model allowed students to gain new experiences in mathematics and make plans for their own learning. In this study, research question 5 begins to wrap up the argument that mentoring had a positive impact on the scores of African American male students on the STAAR Algebra I EOC Assessment. The evidence I was searching for in question 5 was of the students' perceptions, namely did the mentoring program help them? Only the students who participated in the mentoring program were surveyed.

The first question asked if the students felt that the mentoring program helped improve their attendance. Mentoring participants in both study years believed that the program encouraged them to have better attendance. The underlying belief in this question was that as the students became more confident and engaged in their math classes, they were more eager to attend.

The second question asked the students if the mentoring program helped them perform better in class and make better grades. Again, the overwhelming belief was that the program did help. The evidence indicated that the students in the mentoring program as a group had higher grades in Algebra I, but the study shows the students perceived that the mentoring helped them perform better in all their courses.

The third question asked the students if they believed the mentoring program helped improve their attitude about school in general. Over 90% in both of the study years answered in the affirmative that the mentoring program did improve their attitude towards school. This meant even the students that didn't pass their Algebra I class or their STAAR assessment still felt that the mentoring program positively changed their perceptions of school. This affirmation of the mentoring program is a strong indication that the students were able to grow strong attachments to their mentors with a basis of trust and consideration (Dubois & Karcher, 2015). The findings show that the theory in the Attachment Theory Model hold true in this study by the building of strong relationships and attachments.

We know from the literature covered in this study that the key to any mentoring program is building relationships and changing negative behaviors (DuBois & Karcher, 2015). I would suggest that at this point we could declare that this mentoring program had a significant impact on natural relationships as well as the development actions plans based on real-world experiences for these African American male students, but we still need to confirm a correlation between the time spent participating in the mentoring program and EOC assessment scores.

An interesting finding that arose during the study was the strength of the correlation between the time that each student spent with his mentor and the score that student obtained on the STAAR Algebra I EOC Assessment. The correlation is the more time a student spends with his mentor, the higher the score he obtained on the STAAR Algebra I EOC assessment. While this was the plan and hope for the program all along, it was exciting to see the positive outcome in the data.

When the 2011-2012 students' STAAR scores and the amount of minutes each student spent with the mentor were graphed on a scatter plot with regression line, the data in Figure 4.5 revealed that the scores positively correlate with the amount of time spent with the mentor. Pearson's r correlational coefficient is calculated for this scatter plot as 0.6855. As +1 and -1 is considered the perfect relationship, $r = -0.6855$ signifies a strong correlational relationship (Thompson, 2006). The 2012-2013 scatter plot data of students' scores and time spent with the mentor calculated a Pearson's r of 0.7177. Correlational analysis of data demonstrates that the more time a mentor spends with a student, the greater the likelihood of a higher score on the STAAR Algebra I EOC Assessment.

Recommendations

The data has shown that this mentoring program has helped to improve the community of Galveston through the lives that it has touched. In many cases, this program brought together individuals from different races, economic and social groups, ages, and educational backgrounds. On both sides of the mentoring relationship, mistrust has been replaced with friendships. The business community of Galveston sees a younger generation they can pass the torch to, and the students see a path towards hope. All that has been built up to this point now can be strengthened through teacher and mentor support.

While the classroom teacher was a valuable part of the mentoring program in the program's early development, this relationship needs to strengthen going forward. Before, teachers were much more of a support for the mentors. But a recommendation would be to develop plans to better support the teachers in the organization and philosophy of the mentoring program. Teachers should receive professional development regarding the approach that youth mentoring takes to help teachers better work with the participating students in their classes as well as all of their students. The training that teachers could receive concerning mentoring young students, especially African American males, could help them engage these students in a positive and meaningful manner that encourages these students to strive for success in the classroom. Data collected in the classroom and in the mentoring room should be shared with all stakeholders to plan and implement strong interventions for students in need.

Program Evaluation

What has been missing from the mentoring program throughout its development has been a systematic formal evaluation process. The goal for the mentoring program moving forward should be to increase capacity—to help more students—while maintaining the successful aspects of student/mentor relationships. To ensure that the program is continuing to be effective, an evaluation process must be in place.

The program evaluation is to provide project personnel with solid information for managing program activities to ensure accomplishment of the stated goals and objectives. The evaluation plan developed for this project should be based on the project's 1) desired outcomes and performance measures, 2) formative and summative evaluation components, and 3) analysis of all assessment data using the required student groups from our state accountability process. As a guide for the program evaluation process, an outside evaluator such as Wexford Inc. of California can evaluate the efficiencies procedures and the effectiveness of policies to ensure the most positive impact.

The program evaluation standards should identify the following necessary components to be addressed in an evaluation process: 1) deciding whether to evaluate; 2) defining the evaluation problem; 3) designing the evaluation; 4) collecting information; 5) analyzing information; 6) reporting the evaluation; 7) budgeting the evaluation; 8) contracting for evaluation; 9) managing the evaluation; and 10) staffing the evaluation. The evaluation plan should also use quality management to assess for continuous improvement that will provide an ongoing review system, instituted with the campus team. The evaluation team should institute quality management practices throughout the project organization and provide training to ensure the organization consistently meets or exceeds project goals and objectives. This study has shown that this method would place a focus on process measurement and controls as a means of insuring continuous improvement.

In addition to standardized tests, benchmarking tests and other identified assessments that will be collected from students' classes, we should continue to develop surveys and instruments to systematically collect information specific to the mentoring program. All data should be disaggregated to include key elements of the objectives to be reported out which might include: economic status, mobility, race and ethnicity, special education, ESL, gender, enrollment patterns, and successful completion of specific course. This will include information STAAR and benchmarking assessments. In addition, disaggregated information should be provided on mentoring participants' professional development and the use of targeted incentives for all participants.

The methods used to assess the indicators will focus on objectives and will yield quantitative as well as qualitative data that will feed into programmatic efforts to analyze and adjust program work. Qualitative data (site visits, mentor and student interviews) will be summarized and will include major trends and patterns.

The administrative team and program director should encourage outside evaluators to conduct site visits to gather observational data. A formative evaluation processes will allow the evaluation team to answer such questions as "To what extent did the program accomplish the goals?" and "How effective were the development and implementation processes?"

The purpose of the process evaluation should be to determine the extent to which the program is being implemented according to the plan. The evaluation will provide information on what components of the program are responsible for outcomes, understand the relationship between program context and program processes, provide program staff with feedback on the quality of implementation, and use the feedback data to refine program components.

All feedback from formative assessments should be provided to the leadership team in quarterly reports, conference calls, and in face-to-face presentations. Following each formative evaluation visit, the administrative team will complete evaluation reports that will be given to the program staff. Data in these reports will provide information that indicates whether or not expected progress is being made by the program.

Recommendations for Future Studies

Opportunities for future studies exist in many different areas that the current study I think next I would like to complete a follow up study of these African American male students to track their paths after high school. The study would focus on the students chosen academic or career path after high school and what influence the mentoring program may have had on those choices. I would like the study to focus on the success of the student in their future endeavors and understand their perceptions of their journey to that point.

Another future study I would like to be part of would be a more intense qualitative analysis of the relationships involved in a mentoring program. What does the relationship look like between the mentor and their protégé, and between the mentor and the teachers and administration of the school? The study would contain an in-depth analysis of the characteristics of the mentor and parameters of the mentoring relationship.

The last follow up study I would like to be involved with would be to look at the effects of this mentoring program on all ethnic groups to compare growth. I understand that this study showed growth among the African American male students in mathematics, but would we see the same growth in other student groups? Would the style of mentoring need to take different approaches to get the same results? My findings show that this study would have a greater impact on not just mentoring, but how we as educators instruct students in the classrooms.

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APPENDICES

Appendix 1: Annual Student Survey for Mentoring Program

Galveston ISD APEX 2 - Student Survey about Magnet Student Support Services

* 1. My school:

- Scott Collegiate Academy
- Ball HS - STEM
- Ball HS - I&E
- Weis Media Arts & Technology Prep Academy
- Ball HS - BioMed
- Ball HS - Media

* 2. My grade level:

- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

* 3. I am:

- Female
- Male

4. I am:

- Black/African-American
- Asian
- White
- Latino/Hispanic
- Pacific Islander/Native Hawaiian
- Native American/Alaska Native
- Two or more races

* 5. My language background is:

- English is my first language.
- English is my second language. I spoke another language before learning English.

* 6. I have an IEP. (I am in a Special Education Program.)

- Yes
- No

* 7. This school year, I attended the following support programs:

- [ ] Tutoring
- [ ] Academic Mentoring
- [ ] Career Mentoring

* 8. This school year, have the tutoring and/or mentoring services helped you improve your school attendance?

◯ Yes

◯ No

* 9. This school year, have the tutoring and/or mentoring services helped you improve your grades?

◯ Yes

◯ No

* 10. This school year, have the tutoring and/or mentoring services helped you improve your attitude toward school?

◯ Yes

◯ No

* 11. This school year, have the tutoring and/or mentoring services helped prepare you to graduate?

◯ Yes

◯ No

* 12. This school year, have the tutoring and/or mentoring services helped prepare you for your future?

◯ Yes

◯ No

13. What was most helpful about these services?

Appendix 2: Resume of Study Author

Alan D. Ellinger

3130 Autumnjoy Dr.

Pearland, TX 77584

713-582-4609

alanellinger@gmail.com

I am a student focused professional who can bring discipline, team work, and organization to a school campus. My objective is to provide students with a safe and creative learning environment through competent and enthusiastic teachers.

Experience

2013-Present Galveston ISD/ Ball High School

Dean of Curriculum & Instruction (Associate Principal)

- Oversee all details of the curriculum & instruction on the high school campus.
- Oversee and direct the hiring, management, and appraisal of all instructional staff.
- Coordinate with district on all policies and initiatives.
- Evaluate all instructional programs, initiate interventions when needed.
- Manage all collaboration between Ball HS and all local college programs our students are involved with.
- Plan, develop, and oversee professional development for all instructional staff.
- Manage instructional technology staff to ensure students access to updated systems.
- Southern Region Education Board Technical Assistance Visit audit member.

2010-2013 Galveston ISD/ Department of Curriculum and Instruction

Curriculum Project Director

- Oversee and direct all activities associated curriculum and instruction on the high school campus.
- Hire and manage administrative and teaching personnel
- Manage $6 million budget
- Work within guidelines for Title I
- Assist in directing high school curriculum and instruction

2007-2010 Angleton ISD/ Angleton High School/ Middle School

Assistant Principal

- Directly responsible for 475 students grades 9-12
- Supervised and managed Social Studies Department (21 teachers)
- Assisted campus Principal with management of curriculum and instruction
- Served as Campus Textbook Coordinator
- Served as administrator at U.I.L. academic and athletic events
- Maintained positive public relations when police when involved with campus violence
- Supervised the administration of SAT/ ACT on campus
- Oversee the implementation of curriculum
- Led grade level teams in the instruction of students
- Manage facilities, including during Hurricane Ike

2003 – 2007 West ISD / West High School

Assistant Principal

- Directly responsible for 500 students grades 9–12
- Supervised and managed teaching staff (20 teachers)
- Organized transportation needs for High School campus
- Assisted campus principal with management of curriculum and instruction
- Assisted with the master schedule
- Oversaw facilities and custodial staff
- Served as District Textbook Coordinator
- Served as administrator at UIL academic and athletic events

- Maintained positive public relations and assisted the police presence on campus
- Planned, implemented, and managed campus safety and crisis plans

1996 - 2003 Troy Middle School / Troy ISD

Teacher & Football & Track Coach

- 6th grade social studies and reading
- Served on the Social Studies K-12 vertical alignment team
- Served on the Textbook committee
- Served as the UIL Maps, Charts, and Graphs coach – 6th, 7th, and 8th grades

1988 – 2014 United States Army/ Texas National Guard

- Earned Parachutist Badge
- Earned Combat Infantryman's Badge and Combat Medical Badge
- Served in the Panamanian conflict and Operation Iraqi Freedom
- Excelled in problem solving in stressful situations

Education

1992 – 1996 University of Mary Hardin-Baylor, Belton, TX
Bachelor of Science
Major – History

2002 – 2004 Tarleton State University, Killeen, TX
Masters of Education
Educational Administration
Certification for Principal EC – 12

2012-Present Texas A&M University, College Station, TX
Doctor of Education
Curriculum and Instruction
Expected Graduation December 2016

Algebra I Assessment

Eligible Texas Essential Knowledge and Skills

Texas Education Agency Student Assessment Division January 2014

STAAR Algebra I Assessment Mathematical Process Standards

These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.

(A.1) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Reporting Category 1: Number and Algebraic Methods The student will demonstrate an understanding of how to use algebraic methods to manipulate numbers, expressions, and equations.

(A.10) **Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions. The student is expected to

(A) add and subtract polynomials of degree one and degree two; ***Supporting Standard***

(B) multiply polynomials of degree one and degree two; ***Supporting Standard***

(C) determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend; ***Supporting Standard***

(D) rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property; ***Supporting Standard***

(E) factor, if possible, trinomials with real factors in the form $ax2 + bx + c$, including perfect square t trinomials of degree two; and ***Readiness Standard***

(F) decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial. ***Supporting Standard***

(A.11) **Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms. The student is expected to

(A) simplify numerical radical expressions involving square roots; and

Supporting Standard

(B) simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents. ***Readiness Standard***

(A.12) **Number and algebraic methods.** The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions. The student is expected to

(A) decide whether relations represented verbally, tabularly, graphically, and symbolically define a function; ***Supporting Standard***

(B) evaluate functions, expressed in function notation, given one or more elements in their domains; ***Supporting Standard***

(C) identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes; ***Supporting Standard***

(D) write a formula for the n^{th} term of arithmetic and geometric sequences, given the value of several of their terms; and ***Supporting Standard***

(E) solve mathematic and scientific formulas, and other literal equations, for a specified variable. ***Supporting Standard***

Reporting Category 2:

Describing and Graphing Linear Functions, Equations, and Inequalities

The student will demonstrate an understanding of how to describe and graph linear functions, equations, and inequalities.

(A.3) **Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to

(A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y – y1 = m(x – x1)$; ***Supporting Standard***

(B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems; ***Readiness Standard***

(C) graph linear f unctions on the coordinate plane and identify key features, including *x*-intercept, *y*-intercept, zeros, and slope, in mathematical and real-world problems; ***Readiness Standard***

(D) graph the solution set of linear inequalities in two variables on the coordinate plane; ***Readiness Standard***

(E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values o f a, b, c, and d; ***Supporting Standard***

(F) graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist; ***Supporting Standard***

(G) estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and ***Supporting Standard***

(H) graph the solution set of systems of two linear inequalities in two variables on the coordinate plane. ***Supporting Standard***

(A.4) **Linear functions, equations, and inequalities.** The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to

(A) calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association; ***Supporting Standard***

(B) compare and contrast association and causation in real-world problems; and ***Supporting Standard***

(C) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems. ***Supporting Standard***

Reporting Category 3: Writing and Solving Linear Functions, Equations, and Inequalities The student will demonstrate an understanding of how to write and solve linear functions, equations, and inequalities.

(A.2) **Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to

> (A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities; ***Readiness Standard***
>
> (B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y – y1 = m(x – x1)$, given one point and the slope and given two points; ***Supporting Standard***
>
> (C) write linear equations in two variables given a table of values, a graph, and a verbal description; ***Readiness Standard***
>
> (D) write and solve equations involving direct variation; ***Supporting Standard***
>
> (E) write the equation of a line that contains a given point and is parallel to a given line; ***Supporting Standard***

(F) write the equation of a line that contains a given point and is perpendicular t o a given line; ***Supporting Standard***

(G) write an equation of a line that is parallel or perpendicular to the *x*- or *y*-axis and determine whether the slope of the line is zero or undefined; ***Supporting Standard***

(H) write linear inequalities in two variables given a table of values, a graph, and a verbal description; and ***Supporting Standard***

(I) write systems of two linear equations given a table of values, a graph, and a verbal description. ***Readiness Standard***

(A.5) **Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to

(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; ***Readiness Standard***

(B) solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides; and ***Supporting Standard***

(C) solve systems of two linear equations with two variables for mathematical and real-world problems. ***Readiness Standard***

Reporting Category 4: Quadratic Functions and Equations The student will demonstrate an understanding of how to describe, write, and solve quadratic functions and equations.

(A.6) **Quadratic functions and equations.** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations. The student is expected to

(A) determine the domain and range of quadratic functions and represent the domain and range using inequalities; ***Readiness Standard***

(B) write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax2 + bx + c$); and

Supporting Standard

(C) write quadratic functions when given real solutions and graphs of their related equations. ***Supporting Standard***

(A.7) **Quadratic functions and equations.** The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations. The student is expected to

(A) graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including *x*-intercept, *y*-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry; ***Readiness Standard***

(B) describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and ***Supporting Standard***

(C) determine the effects on the graph of the parent function $f(x) = x2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x – c)$, $f(bx)$ for specific values o f *a*, *b*, *c*, and *d*.

Readiness Standard

(A.8) **Quadratic functions and equations.** The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to

(A) solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and

Readiness Standard

(B) write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems. ***Supporting Standard***

Reporting Category 5: Exponential Functions and Equations The student will demonstrate an understanding of how to describe and write exponential functions and equations.

(A.9) **Exponential functions and equations.** The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to

(A) determine the domain and range of exponential functions of the form $f(x) = abx$ and represent the domain and range using inequalities; ***Supporting Standard***

(B) interpret the meaning of the values of *a* and *b* in exponential functions of the form $f(x) = abx$ in real-world problems; ***Supporting Standard***

(C) write exponential functions in the form $f(x) = abx$ (where *b* is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay; ***Readiness Standard***

(D) graph exponential functions that model growth and decay and identify key features, including *y*-intercept and asymptote, in mathematical and real-world problems; and ***Readiness Standard***

(E) write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems. ***Supporting Standard***

Appendix 4: Mentor Questionnaire

MENTOR QUESTIONNAIRE
Tutor-a-Tor Mentoring Program

Contact Information:

Name: ____________________

Home Address: ____________________

City/State/Zip: ____________________

Business/Employer: ____________________

Title: ____________________

Education: ____________________

College attended: ____________________

Preferred contact number: ____________________

Email: ____________________

Do you volunteer/work experience with students or children? YES____NO ___

Are you able to volunteer 1 hour per week? YES___30 minutes?

Day(s) of the week and preferred time:

TUESDAY__WEDNESDAY__THURSDAY__AM__PM

Preferred Subject (s): ____________________

Favorite Sport (s): ____________________

Referral (s) (that may want to mentor as well): ____________________

Would your organization be willing to host a presentation overviewing the mentoring program?

( ) YES *if so, what day and time?* ____________________

( ) NO

Please return along with a copy of a state id or driver's license to:

Vivian Hernandez
% Ball High School
4115 Avenue O, Room 1071, or email to vivianhernandez@gisd.org

Appendix 5: Mentee Questionnaire

BALL HIGH SCHOOL

Mentee Questionnaire

Contact Information:

Name______________________________

Home Address: ______________________________

City State Zip ______________________________

Age: ____________ **Grade:**______________

Parent or Guardian: ______________________________

Email: ______________________________

Phone:______________________________

Favorite Sport: ______________________________

Favorite Food: ______________________________

Best Subject:______________________________

Pastime Activity:______________________________

Where do you feel you need help?______________________________

What is your life long dream____________?______________

Do you plan to go to college? ______________________________

Where do you see yourself in 5 years?

____

____

____

Office Info:

Day of the week:

T__W__T__AM____PM______________________________

Mentor:

Mentee Questionnaire 1
Revised 9-9-16
VII
BHS