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The Academic Achievement Gap: Learning From Schools That Bridge the Academic Achievement Gap Between African American Students and Caucasian American Students

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Dedication

This dissertation is dedicated to my husband, Greg. Throughout the long, arduous process of coursework, research, and writing, your support of me was unwavering. You allowed me the quiet space I needed to complete this life's dream. You provided meals for the long days of writing, a listening ear for the times of writer's block, and encouragement when I wanted to quit. Thank you, Greg, for your constancy. I love you so much. You are my rudder, and I could not have done this without you.

I would also like to dedicate this dissertation to my parents, Wayne and Ellen Hooks, who have supported me through two graduate programs. You are inspirational in your unchanging and resolute support of my dreams and goals. I love you and thank you for being my parents.

This dissertation is also dedicated to my children, Steven and Matthew. I am so proud of the kind, loving men you have grown to be. A mom could not be prouder of her sons than I am of both of you. It is an honor that you call me "mom."

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Abstract

The academic achievement gap has been observed in the United States since the late 1960s. Despite the best efforts of lawmakers and educators, African American students continue to achieve lower academically than their Caucasian American peers. The purpose of this mixed-methods study was to investigate three schools that were successful at reducing the achievement gap between the African American students and Caucasian American students at their school in the area of mathematics and provide suggestions for other schools. Mathematics teachers at the selected schools were asked about their awareness of the factors that contributed to the achievement gap between African American and Caucasian American students and the strategies used on their campus to address the disparity. The study participants were also asked to share specific techniques that they used in their class to provide greater equity for all their students. The findings indicated that teachers from the selected schools were aware of many of the factors that contribute to the achievement gap, and they actively utilized research-based measures to mitigate the difference in achievement between their student groups. Communicating high expectations to all students, setting and modifying goals with students, and making sure parents understood how to partner with the school are just a few of the strategies used by the schools in this study to mitigate the achievement gap between African American and Caucasian American students. Sharing the strategies proven to be successful in reducing the achievement gap could result in more equitable learning environments at other schools.

Keywords: achievement gap, African American students, socioeconomic status, teachers, teaching strategies, teacher-parent

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Chapter 1: Introduction

Despite years of effort from policymakers and educators, African American students in families from lower socioeconomic status (SES) continue to achieve 41% to 43% lower than Caucasian American students from similar socioeconomic levels in all academic achievement areas and graduation rates (Chambers et al., 2014; Kuhfeld et al., 2018; Nielsen, 2013; Plata et al., 2017; West-Olatunji et al., 2010). Gaps between African American and Caucasian American students are found when students first begin school and continue through elementary school (Kuhfeld et al., 2018). Whereas there is a gap in all academic areas, mathematics is an area where researchers have found significant cumulative effects in achievement (Chambers & Spikes, 2016; Kotok, 2017). Studies have found that African American students score lower on national tests of math and consistently achieve at lower levels than Caucasian American students in similar level mathematics (de Brey et al., 2019; West-Olatunji et al., 2010). Singh (2015) posited that students' math performance in the early grades could be a determining factor of their future academic success in mathematics. Furthermore, studies have suggested that African American students fall behind Caucasian American students in progressing through the sequence of math courses in high school (Byun et al., 2015; Schiller et al., 2010).

The academic achievement gap has been recognized as a severe problem in the United States for many years (Coleman, 1966). The next section will offer a historical overview of the multitude of factors that can contribute to the achievement gap between African American students and Caucasian American students.

History of the Achievement Gap

As early as 1966, there has been a recognition of the gap in Caucasian American students' academic achievement and African American students (Coleman, 1966). Despite

educators and governmental entities' efforts, African American students continue to lag behind Caucasian American students in all academic areas (de Brey et al., 2019; Plata et al., 2017). This disparity in achievement is observed throughout the K–12 schooling years.

In 1966, James Coleman researched the reasons for the difference in academic achievement between African American students and Caucasian American students. Since that time, researchers have studied the achievement gap from many different perspectives (Celeste et al., 2019; Henry et al., 2020; Mooney, 2018; Slopen et al., 2016; von Stumm, 2017; Wright et al., 2017). These studies have found a range of factors that contribute to the gap in achievement between African American students and Caucasian American students.

Deficit thinking is one factor that negatively influences the gap in students' academic achievement (Bottiani et al., 2016; Garcia-Olp et al., 2017; Peterson et al., 2016; Silva-Laya et al., 2019). Viewing students' academic ability through a deficit perspective holds the individual culpable for the inequality and creates unrealistic obstacles to overcome (Silva-Laya et al., 2019). This paradigm is difficult to change due to social and cultural resistance to address the uncomfortable topic of race (Hunt & Seiver, 2018). A subtle form of deficit thinking is implicit bias. A teacher's implicit bias can affect how they demonstrate achievement expectations to students, possibly resulting in a self-fulfilling reality (Anderson, 2018).

Family income has long been considered an influential aspect of the achievement gap between African American students and Caucasian American students. Cultural capital has been described as the skills, knowledge, and perspectives most accepted by schools that help students and parents experience all aspects of the educational system (Blandin, 2017; Tan, 2017). Parents with higher SES tend to possess more cultural capital, resulting in navigating social and educational resources to academically assist their children (Coley et al., 2019; Hanselman, 2019).

Reardon and Portilla (2016) argued that while the academic achievement between racial groups has narrowed slightly, the gap between students with a lower SES and students with a higher SES has widened. The reasons behind the increase in the achievement gap between income groups are unclear.

Another factor contributing to the achievement gap between African American students and Caucasian American students is access to advanced courses and gifted and talented programs. Enrollment in lower- or higher-level courses creates a trajectory from which it is difficult to change (Kitchen et al., 2016; Kotok, 2017; Legette, 2018). Research has shown that tracking has a uniquely compelling impact on the achievement gap in the area of mathematics (Kotok, 2017). Tracking in mathematics leads to a widening academic achievement gap between African American students and Caucasian American students and between students in families with low SES and students in families with high SES (Byun et al., 2015; Covay Minor, 2016). Furthermore, the gap widens significantly between African American students and Caucasian American students enrolled in advanced mathematics courses (Covay Minor, 2016).

Relationships between tracking and teachers' implicit bias have been noted by researchers (Anderson, 2018; Crabtree et al., 2019; Whitford & Emerson, 2019). Whitford and Emerson (2019) argued that teachers who understand and accept their students' cultures and beliefs provide a more equitable learning environment for all students. Crabtree et al. (2019) suggested that a lack of knowledge about the different ways giftedness is demonstrated contributes to the underrepresentation of African American students in gifted course tracks. Whitford and Emerson (2019) suggested that teachers receive training on empathy and understanding different cultures to mitigate the effects of implicit bias toward individual students.

The achievement gap between African American students and Caucasian American students has long been evident in Texas, most noticeably with the introduction of the Texas Assessment of Basic Skills (TABS) in 1980 (Paige & Witty, 2010; Texas Education Agency, 2009). Even though the state changed the standardized test used to measure schools' and districts' accountability over the past 40 years, the achievement gap remains. The school district included in this research is no different. Since the state began to use the Texas Academic Performance Report (TARP) to publish standardized testing results in 2012, the district in this study has seen a significant gap in achievement between African American students and Caucasian American students. Table 1 shows the regular disparity in mathematics scores between African American students and Caucasian American students for all grades in the district included in this study.

Table 1

District Achievement Data From 2012–2018

Year	African American	White	Gap
2012–2013			
Phase-in Level II	77%	93%	16%
Final Level II	28%	58%	18%
Advanced Level III	10%	31%	21%
2013–2014			
Phase-in Satisfactory	78%	93%	15%
Postsecondary Readiness	33%	64%	31%
Advanced	11%	34%	23%
2014–2015			
Satisfactory	83%	95%	12%
Postsecondary Readiness	45%	77%	32%
Advanced	17%	46%	29%
2015–2016			
Satisfactory	74%	92%	18%
Postsecondary Readiness	35%	69%	34%
Advanced	12%	38%	26%
2016–2017			
Approaches	79%	93%	14%
Meets	42%	73%	31%
Masters	16%	43%	27%
2017–2018			
Approaches	78%	93%	15%
Meets	43%	73%	30%
Masters	17%	44%	27%

Note. The word White is used in this table to represent Caucasian Americans to remain consistent with reporting on the TAPR.

As demonstrated in Table 1, the achievement gap between African American students and Caucasian American students in this district has stayed constant over the past six years, even though the testing format changed. For each test, the gap in achievement increased as the standard increased. At the highest standard for each test, the advanced level had at least a 21% achievement gap between Caucasian American students and African American students. The State of Texas Assessment of Academic Readiness (STAAR) Performance Standards (Texas Education Agency, 2019a) describes students achieving at the advanced level as prepared for the next grade level with little intervention. However, that data point could be skewed by Caucasian American students' lower achievement at that achievement level. The following section will explain the problem leading to this research study.

Statement of the Problem

The achievement gap between African American students and Caucasian American students has been observed since the Equality of Educational Opportunity Study (Coleman, 1966). Researchers have found several possible reasons for the pervasive gap in achievement between student groups (Chmielewski, 2017; Garcia & Economic Policy Institute, 2017; Ogg & Anthony, 2020). African American students and students from lower SES are oriented to a lower academic track more often than other students (Dockx et al., 2019). Peterson et al. (2016) argued that students' SES contributes to tracking and the subsequent achievement gap between Caucasian American students and students of color. Once tracked into ability groups, it is challenging for students to change tracks. This phenomenon is observed most often and is especially detrimental in the area of mathematics. Early entry into advanced math courses can significantly influence enrollment in upper-level math courses and even college enrollment (Byun et al., 2015; Chmielewski, 2017). Some of the reasons for this difficulty are the

pedagogical design of the lessons, which maintain or enlarge existing gaps in performance, relations between peers, student acceptance of lower academic track, and teacher beliefs about their students (Dockx et al., 2019; Liou et al., 2017). Covay Minor (2016) also argued that the level of teaching and "opportunity to learn" (p. 194) in lower-level math courses preclude students from successfully changing track to a higher-level math course. Moreover, teachers' implicit bias, perception of students' academic skills, and deficit thinking inherent in many school structures perpetuate the cycle of lower academic tracking and lower academic achievement (Barbarin & Aikens, 2015; Dockx et al., 2019; Liou et al., 2017; Mattison et al., 2018).

This study's school district also experienced an achievement gap between African American students and Caucasian American students. For this study, the reference to African American students includes those identified as African American and excludes students identified as Hispanic. There are 87 comprehensive campuses in the district, composed of 12 high schools, 19 middle schools, and 56 elementary schools. The district consists of 49.9% economically disadvantaged students. Schools with a higher percentage of students from low SES are more likely to have more students of color (de Brey et al., 2019; National Center for Education Statistics, 2015). Students of color from low socioeconomic backgrounds typically enter school with fewer academic readiness skills than their peers (Barbarin & Aikens, 2015). Additionally, studies have found that students' SES holds exceptional leverage over their academic achievement (National Center for Education Statistics, 2015). However, Byun et al. (2015) argued that many factors, including family background, teachers' expectations, and the school environment, influence students' educational success and enrollment in advanced math courses.

This study's impetus began when the superintendent of my school district set a goal for all student groups enrolled at the comprehensive schools to score within 10 percentage points of each other on the state standardized test or STAAR (State of Texas Assessment of Academic Readiness). As the assistant superintendent for school leadership in my district, part of my responsibility is to assist principals in leading their schools. Our district superintendent gave the charge to meet his goal of a 10% or less gap between all student groups to all district administrators who worked directly with the schools.

Twelve of the elementary schools in the district are greater than 80% economically disadvantaged. Economically disadvantaged percentages are determined by the number of students enrolled at the school who qualify for free or reduced lunch according to the Federal Income Eligibility Guidelines (United States Department of Agriculture, 2019). As demonstrated in Table 2, three schools in this district have reduced the achievement gap between African American students and White students in two reported areas, specifically the meets and masters levels for STAAR mathematics. However, the middle school in this study reported a less than 10 percentage point gap between African American students and White students enrolled at the school in all reported areas of STAAR mathematics, approaches, meets, and masters levels.

Table 2

Selected Schools Data, Mathematics STAAR, 2018–2019

School	Approaches	Meets	Masters
Middle School, 8th grade math			
African American			
2018	92	48	5
2019	93 (+1)	56 (+8)	11 (+6)
White			
2018	97	71	19
2019	92 (-5)	69 (-2)	7 (-12)
ES #1, 5th grade math			
African American			
2018	86	36	14
2019	77 (-9)	45 (+9)	26 (+12)
White			
2018	67	0	0
2019	94 (+27)	44 (+44)	19 (+19)
ES #2, 5th grade math			
African American			
2018	89	45	16
2019	78 (-11)	49 (+4)	22 (+6)
White			
2018	92	69	31
2019	93 (+1)	43 (-26)	29 (-2)

Note. The word White is used in this table to represent Caucasian Americans to remain consistent with the reporting on the TAPR. ES #1 represents Elementary School #1, and ES #2 represents Elementary School #2.

There are protective factors that have been found to mitigate the risk of failure for students of color and lower SES (Williams & Portman, 2014). Providing circumstances that establish a more equitable learning environment for all students is critical to addressing and overcoming the achievement gap between African American students and Caucasian American students (Davis et al., 2019; Ogg & Anthony, 2020; Paschall et al., 2018; Zhao, 2016). Since school structure and teacher expectations can contribute to students' academic achievement, it is

paramount that educators understand the measures taken by successful schools (Hanselman, 2019; Ho & Cherng, 2018; Mattison et al., 2018). Understanding the pedagogical framework, professional community expectations, and other protective factors present in schools that help African American students overcome the achievement gap could help other schools minimize the achievement gap (Diemer et al., 2016; Hanushek, 2016; Wickstrom & Gregson, 2017). Replicating these measures may help other schools in their efforts to provide a more equitable environment for educational attainment for all students (Byun et al., 2015).

This study was influenced by Adams' (1963) social equity theory. The theory of educational equity was used as a microscope to view equitable practices, such as allocating resources to schools in the form of finances, employees, and facilities. Other theories that influenced this research study are critical race theory (Delgado & Stefancic, 2017), an explanation for the inequitable treatment of individuals due to their race, and change theory (Dhillon & Vaca, 2018), a description of the strategies and steps used to enact change successfully. The impact of each of these theories on the academic achievement gap will be discussed in Chapter 2.

Purpose of the Study

Multiple factors could contribute to the academic achievement gap in mathematics between African American students and Caucasian American students. Some of the factors involved with the continuing achievement gap are teacher perceptions and expectations of students (Ho & Cherng, 2018; Mattison et al., 2018), parental involvement (Hanselman, 2019; Penner, 2018), the students' SES (Ho & Cherng, 2018; Paschall et al., 2018; Penner, 2018), and academic tracking into lower- or upper-level math curriculum (Byun et al., 2015; Covay Minor, 2016; Dockx et al., 2019). Research into the strategies and processes utilized by schools that

have successfully mitigated the aforementioned factors could suggest efficacious strategies for other educators facing this problem.

The purpose of this mixed-methods study was to understand the systems employed by schools in a large public school district in Southeast Texas, which brought about significant equity in the mathematics achievement of African American students. For this study, school systems refer to factors such as, but not limited to, master schedule considerations, staffing, and professional development opportunities.

The research goals were (a) to identify the specific design or approach used by schools that are closing the mathematics achievement gap between African American students and Caucasian American students, and (b) to provide suggestions to campuses in this district for closing the mathematics achievement gap between African American students and Caucasian American students.

This study's research design was a mixed-methods approach, using postmodern theories, such as change theory, critical race theory, and educational equity, to situate the study's context. The study focused on two elementary schools and one middle school from different socioeconomic advantages.

Research Questions

Q1. What level of knowledge do mathematics teachers have about the academic achievement gap between African American students and Caucasian American students?

Q2. What systemic school-based strategies explain the decreased academic achievement gap between African American students and Caucasian American students?

Definition of Key Terms

Achievement gap. The disparity in the academic performance of students (Ansell, 2011).

Colorblindness. The act of treating everyone the same, regardless of gender, ethnicity, or race (Ullucci & Battey, 2011).

Critical race theory. An explanation of the underachievement of African American students through the lens of race, class, and gender (Howard, 2008).

Deficit thinking. Deficit thinking places the fault of the lack of achievement on the individual or group (Fergus, 2017).

Implicit bias. The behavior or attitude toward something is based on an individual's social group (De Houwer, 2019).

Intersectionality. The interconnectedness of race and SES that creates interdependent systems of bias or discrimination (Lexico, 2019).

Meritocracy. The belief that achievement is based on ability (Ullucci & Battey, 2011).

Socioeconomic status (SES). Socioeconomic status is the social standing of a group or person based on education, income, and job.

State of Texas Assessment of Academic Readiness (STAAR). Standardized tests used in Texas to assess students' knowledge of a particular subject at a specific grade level (Texas Education Agency, 2019b).

Texas Academic Performance Report (TAPR). The TAPR is a disaggregated report on each school and district in Texas detailing student performance, staff, student demographics, and programs offered (Texas Education Agency, 2019c).

Tracking. The placement of students into a level of course based on their perceived academic ability (Chambers & Spikes, 2016).

Chapter Summary

The achievement gap between African American students and Caucasian American students remains a significant problem in schools. Many factors contribute to the discrepancy in achievement. Chapter 2 offers an extensive literature review on the studies and research surrounding the achievement gap. Theories that help frame this study are also explained in Chapter 2.

Chapter 2: Literature Review

African American students' academic achievement continues to trail that of Caucasian American students despite years of study and policymakers and educators' extensive efforts. The National Center for Education Statistics puts out a yearly report detailing racial and ethnic groups' statistical information. In 2019, notwithstanding that they make up 15% of the students enrolled in public schools, 6% of African American students earned advanced placement credits, whereas 17% of Caucasian American students earned advanced placement credits (de Brey et al., 2019). African American students scored the lowest out of all tested students in fourth grade, eighth grade, and twelfth grade on the National Assessment of Educational Progress (NAEP) mathematics test (de Brey et al., 2019). The purpose of this study was to understand the systems and strategies used by schools that successfully reduced the achievement gap between African American and Caucasian American students in the area of mathematics.

Much research has been conducted on the educational achievement gap between African American students and Caucasian American students (Henry et al., 2020; Mahari de Silva et al., 2018; Reardon et al., 2017). Some researchers contend that poverty or the family's SES serves as a significant contributor to the discrepancy in achievement between student groups (Coley et al., 2019; Henry et al., 2020; von Stumm, 2017). Other elements that contribute to the achievement gap are course tracking in schools, quality and experience level of teachers, and student motivation (Bottiani et al., 2016; Legette, 2018). Student achievement is also impacted by deficit thinking, such as implicit bias, colorblindness, or meritocracy (Garcia-Olp et al., 2017; Patton Davis & Museus, 2019). This chapter includes three theoretical perspectives on the achievement gap between African American students and Caucasian American students and a review of the

literature, which investigates the factors that have been found to contribute to the achievement gap.

Theoretical Framework Discussion

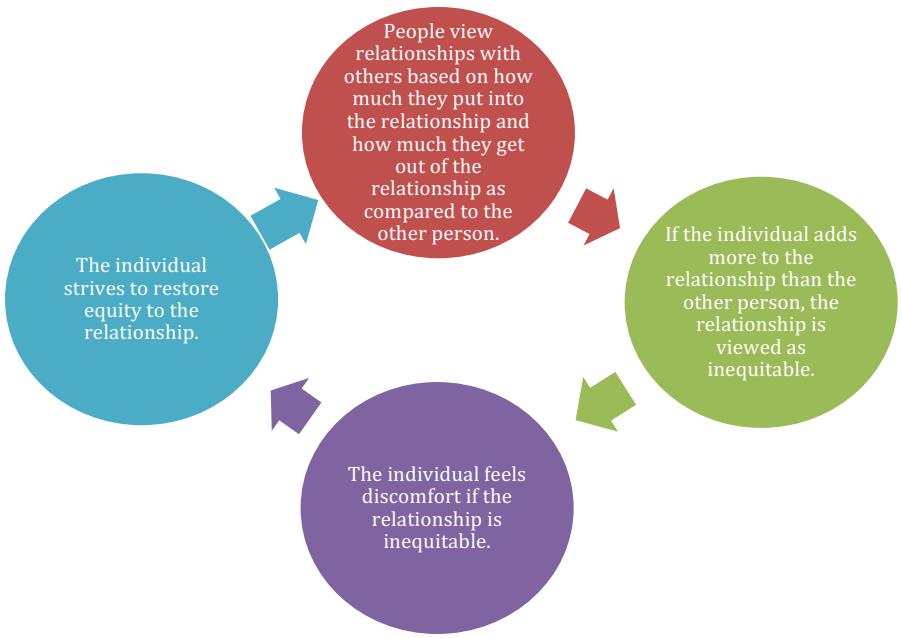
Three theoretical frameworks influenced this study: social equity theory, critical race theory, and change theory. Social equity theory and critical race theory provided a perspective on the disparity present in the academic achievement between African American students and Caucasian American students. Change theory influenced this study by explaining the backward thinking and design necessary for systemic change to occur. Each theory contributed to different aspects or factors to consider when studying the achievement gap.

Equity Theory

Fowler and Brown (2018) outlined equity theory in the context of business based on the theory postulated by J. Stacy Adams (1963) as containing four constructs explained in Figure 1.

Figure 1

Constructs of Equity Theory



Social equity theory has been described as a set of processes, such as verbal and nonverbal communication, that increase the racial achievement gap (McKown, 2013). Equity theory in education is a theoretical framework that helps individuals understand the achievement gap (Fowler & Brown, 2018). Positive or negative influences can characterize social equity theory. Fowler and Brown (2018) agreed with McKown (2013), arguing that many processes influence children's achievement. As determined by race, the achievement gap is increased when opportunities are not distributed equally among students of all races.

Equity influences are found in all aspects of a child's life. For example, parenting practices such as the amount and degree of conversation in the home, relationships between parents and children, and dominating or accommodating parenting styles could directly influence a child's academic achievement (Blandin, 2017; Kuhfeld et al., 2018; Ogg & Anthony, 2020; Sonnenschein & Sun, 2017). Likewise, teachers possess a direct influence on a student's achievement by presenting engaging lessons and building relationships with students (Davis et al., 2019; Diemer et al., 2016; Seo et al., 2019; St. Mary et al., 2018). The expectations of their teachers significantly impact students.

The Pygmalion effect is evident in teacher expectations and student performance (Anderson, 2018). Teachers have the potential to increase a student's agency by establishing equitable teaching practices. A teacher's expression of high or low expectations of a student can put in motion a cycle of hope which influences student behavior or academic performance (Anderson, 2018). The student's reaction to the teacher's expectations is met with a teacher response. This cyclical nature of teacher expectation and student behavior either promotes or negates educational equity (Anderson, 2018).

Frequently, the teacher expresses an inequitable position very subtly and unconsciously. Conversely, students can interpret an action or word in a particular manner due to its association with their race. Additionally, teachers can communicate acceptance or disapproval of a race through simple acts in the classroom, such as calling on individual students or teaching from a particular book (McKown, 2013). This racial climate, or students' perception that races are treated equally, can influence how students perceive the classroom (Diemer et al., 2016). These events can lead to less effort to achieve on the part of the disenfranchised student (Fowler & Brown, 2018). However, studies demonstrate that training teachers to develop a self-awareness of implicit bias and ways to integrate cultural responsiveness may help mitigate subtle influences that affect the achievement of underserved students (Fahey & Ippolito, 2014; Fowler & Brown, 2018).

Critical Race Theory

Another theoretical framework that helps explain the achievement gap between African American students and Caucasian American students is critical race theory. Critical race theory was introduced by legal scholars Derrick Bell and Alan Freeman to analyze race in society (Hiraldo, 2010). Critical race theory is a paradigm to view inequitable practices due to an individual's race (Gillborn et al., 2017). Advocates of this theory posit that racism has been normalized in the United States (Mahari de Silva et al., 2018). In education, this theory is used to analyze how practices contribute to inequitable actions or attitudes towards certain groups of people according to their race or ethnicity (Solorzano & Yosso, 2001).

Critical race theory offers several perspectives to view how race is observed, influenced, and actualized (Hiraldo, 2019). Delgado and Stefancic (2017) reported that critical race theory is composed of six tenets (see Figure 2).

Figure 2

Six Tenets of Critical Race Theory

1. Racism is a common, acceptable feature in our society.
2. Large sections of society benefit from facets of racism and therefore have no impetus to change it.
3. Race is constructed or manipulated by society.
4. Differential racialism is the racialization of different groups at different times.
5. Identities that overlap (i.e., race and gender) create intersectionality.
6. Each race has its unique voice of color.

Studies have suggested that critical race theory helps explain the misunderstanding of a colorblind perspective of race (Delgado & Stefancic, 2017). It has been argued that colorblindness regarding race is a form of discrimination because it advances the perception that all races are alike and should be treated the same (Celeste et al., 2019). A cultural deficit point of view sees individuals only as his or her race. Critical race theory confronts a deficit viewpoint by recognizing the individual's characteristics and aspects instead of amassing all of the same race as one (Delgado & Stefancic, 2017).

Ladson-Billings (Mahari de Silva et al., 2018) used a critical race lens when discussing how education is funded in the United States. Ladson-Billings (Mahari de Silva et al., 2018)

observed that schools in more affluent areas collected more property taxes and could spend more on schools. However, those affluent areas consisted of a majority of Caucasian American families (Mahari de Silva et al., 2018). This observation supports the supposition that African American students are more likely to come from families with lower SES and live in less affluent communities (de Brey et al., 2019; Henry et al., 2020).

Change Theory

There have been many theories about the facilitation of change in an organization. Each theory has its process of describing the steps or checkpoints along the way to the final change goal. Kurt Lewin (1947) provided the first robust explanation of how change happens in organizations or groups of people. Since that time, several studies have produced different theories on successfully implementing change in an organization (Bakari et al., 2017; Dhillon & Vaca, 2018). A theory of change is merely explaining the strategies used to set a goal and the steps taken to meet that goal (Dhillon & Vaca, 2018). Change efforts fail at alarming rates (Burnes, 2015). The most often cited reason for a change initiative's failure is resistance to change (Burnes, 2015).

Bakari et al. (2017) suggested a theory of change that included authentic leadership as the driving force. Authentic leadership maintains the importance of relationships between employer and employee, particularly in the form of trusting relationships (Fox et al., 2015; Greenier & Whitehead, 2016.) Leadership traits such as trustworthiness and credibility help others feel comfortable with new or different paradigms (Bakari et al., 2017). Therefore, a leadership framework of authenticity could create "readiness for change" (Bakari et al., 2017, p. 162) in the organization. Framing the achievement gap with change theory supports the premise that the behaviors or attitudes that may influence the disproportionality between African American

students and Caucasian American students' academic achievement can be changed to create a more equitable environment.

The next three sections will provide a literature review, which supports the multitude of factors that can influence students' academic achievement. The broad topics discussed are deficit thinking, the SES of the family, and the school environment.

Deficit Thinking

A deficit-oriented explanation has been used by many to explain the achievement gap between African American and Caucasian American students (Garcia-Olp et al., 2017; Patton Davis & Museus, 2019). Patton Davis and Museus (2019) suggested that "deficit thinking holds students from historically oppressed populations responsible for the challenges and inequalities that they face" (p. 119). Teachers' expectations toward African American students' ability and potential achievement can be influenced by deficit thinking (Blandin, 2017). Pervasive deficit thinking and labeling in schools can create hurdles for students of color (Davis et al., 2019; Garcia-Olp et al., 2017). For example, although African American students compose 15% of the student population enrolled in public schools in 2015, only 6% of African American students earned advanced placement credits in mathematics (de Brey et al., 2019).

In explaining the achievement gap, several different types of deficit perspectives permeate the educational system. Colorblindness is a deficit approach in which an individual assumes no difference in culture or racial characteristics (Celeste et al., 2019; Whitford & Emerson, 2019). Implicit bias, or the unconscious attitude or behavior toward a particular group, is another form of deficit thinking present in schools (De Houwer, 2019; Peterson et al., 2016). When found in schools, deficit thinking approaches, such as implicit bias and a colorblind

perspective, can significantly change the trajectory of a student's academic path (Gay, 2018; Peterson et al., 2016; Whitford & Emerson, 2019).

Colorblindness

A form of deficit thinking prevalent in the educational world is the paradigm of colorblindness. A colorblind perspective professes to see and treat all people the same and ignore any differences in race, gender, or SES status (Larnell et al., 2016). Ignoring any difference in race or gender allows individuals to avoid discussing inequality (Fergus, 2017; Rodriquez & Greer, 2017). Celeste et al. (2019) found a significant gap in schools' achievement that maintained a colorblind approach to teaching. This colorblind point of view in teachers creates the condition for instruction that does not consider any differences in students (Celeste et al., 2019; Patton Davis & Museus, 2019).

Studies suggested that a colorblind view of students by their teachers perpetuates an environment in which teaching is one-size-fits-all, diversity is ignored, and racial inequality is rationalized (Celeste et al., 2019; Fergus, 2017; Hurtado, 2019). Milner (2013) argued that teachers who posit that they do not see color unknowingly create an "opportunity gap" (p. 36) that perpetuates a divide between African American and Caucasian American students. The phrase opportunity gap focuses on the unstable conditions in which children find themselves, which provides barriers to academic achievement (Mooney, 2018). Tabron and Chambers (2019) suggested that the gaps in opportunities available to African American students reflect a systemic breakdown that schools might mitigate.

Conversely, acknowledging differences in individuals can create a sense of belonging and improve performance (Apfelbaum et al., 2016; Celeste et al., 2019). Fergus (2017) argued that less efficacious teachers express colorblindness in their teaching practices. A colorblind belief

system, while well-intentioned, perpetuates the deficit mindset of the classroom (Fergus, 2017). Hunt and Seiver (2018) argued that educators should gain a greater understanding of the role of race in educational society and the importance of considering race while teaching. Culturally responsive teaching considers the uniqueness of different cultures represented in the classroom and recognizes the cultural influences that permeate teaching and learning (Gay, 2018). Reducing colorblindness in teachers could create a more equitable learning environment for all students.

Implicit Bias

The existence of implicit bias in teachers can produce deleterious consequences by continuing the inequitable practices, which add to the achievement gap (Clark & Zygmunt, 2014; Peterson et al., 2016; Plata et al., 2017). One of the most concerning consequences is the effect of bias on teachers' expectations of certain students' achievement. Peterson et al. (2016) and Liou et al. (2017) suggested that teachers hold an unconscious bias toward students of color and students from lower SES exhibited through lower teacher expectations. On the other hand, de Boer et al. (2010) found that teacher expectations were impacted more by a student's SES than race. Implicit bias toward groups can lead to different instructional methods and expectations in the classroom (Whitford & Emerson, 2019). The discontinuity between the teacher and students' cultural identities can contribute to misinterpretations and confusion in the classroom (Whitford & Emerson, 2019; Whitford et al., 2016).

The realization of unconscious bias has been found to make people feel uncomfortable and defensive (De Houwer, 2019). Whitford and Emerson (2019) posited that schools should help teachers develop an awareness of implicit bias to influence teaching practices positively. Because purposeful, engaging teaching is such a vital component for student achievement,

schools need to provide an environment where teachers are compelled to work together and provide rigorous instruction for all students (Anderson, 2018; Ford et al., 2018; Hwang et al., 2018). Unintended consequences such as tracking in courses and instructional rigor differences can occur when teachers hold a predisposed position on students' potential (Peterson et al., 2016). Researchers recommended that teacher education programs provide training in teaching for diversity (Bottiani et al., 2016; Clark et al., 2016; Larnell et al., 2016).

Warren (2017) suggested that educators who practice empathy toward students from culturally diverse backgrounds employ a "culturally responsive pedagogy" (p. 169) and create an environment where students can achieve higher academically. Teachers who practice empathy are more able to view their instruction through the lens of their students (Warren, 2015). Although sometimes disconcerted by the knowledge that they hold biases, teachers who have an awareness of implicit bias can better mitigate those biases in the classroom (Clark & Zygmunt, 2014; Whitford & Emerson, 2019).

Conversely, Plata et al. (2017) and Allard and Santoro (2006) found no link between professional training on diverse cultures or races and teacher beliefs or attitudes. Alternately, Griffin et al. (2017) found that African American students work exceptionally hard in the classroom to overcome barriers created by teachers' implicit bias. The impact of implicit bias remains influential but challenging to mitigate.

Socioeconomic Status

The family's SES has long been viewed as a significant contributor to the continued inequity in achievement between African American students and Caucasian American students. Socioeconomic status (SES) is a combination of occupation, wealth, educational attainment, residence location, and social influence (Dictionary, 2020). The impact of SES is observed

through differences such as, but not limited to, parenting behaviors and access to resources (Henry et al., 2020; Penner, 2018). Moreover, studies have found a close relationship between a child's academic achievement, the parents' education, and the family (Cate & Glock, 2018). The family's SES can impact a child's academic achievement from very early in the schooling years (Georges & Pallas, 2010; Ogg & Anthony, 2020; Penner, 2018), but the gap can begin before a student even starts school.

Parenting Behaviors

The differences in parenting behaviors and the home environment between those with higher SES and lower SES have been studied extensively (Benner et al., 2016; Howard et al., 2019). Researchers have found a strong correlation between parents' education level and students' academic achievement (Henry et al., 2020; Nitardy et al., 2015). Penner (2018) found that parenting practices can contribute to the achievement gap of students. Parents' education level can influence where a family lives, the support available at home for school activities, other children with whom to interact, and access to quality schools and teachers (Henry et al., 2020). Parents from higher SES can provide their children with more educational experiences and are more likely to be involved in their children's education than parents from lower SES (Blandin, 2017; Georges & Pallas, 2010; Penner, 2018).

Cate and Glock (2018) found that teachers exhibited implicit bias toward students depending on the education level of the parents. They suggested that teachers' favorable behavior toward students with more highly educated parents could heighten the differences in educational outcomes between students (Cate & Glock, 2018). Tan (2015) argued that differences in parenting practices between racial-ethnic and socioeconomic groups could result in a wide variation in children's academic achievement. For example, Coley et al. (2019)

suggested that children in families from higher SES provide advantages not provided by families from lower SES that subsequently help the children from a higher SES achieve more academically. Furthermore, Benner et al. (2016) found that parental involvement holds as much long-term influence over children's academic achievement as family income and more impact than race or ethnicity.

Penner (2018) suggested a discrepancy in the types of cultural capital students from poverty bring to the school environment. Parents with very low SES typically possess little of the skills needed to maneuver through the school environment to gain access to the best teachers or best classes (Penner, 2018; Reardon et al., 2017). Conversely, Hanselman (2019) and Ho and Cherng (2018) argued that parents from higher SES backgrounds have a greater understanding of school structures and processes that enable them to intervene for their child in gaining access to specific teachers or advanced courses. Additionally, Blandin (2017), Nielsen (2013), and Penner (2018) agreed that parents from higher SES impart essential social and institutional knowledge to their children, which assists in navigating the school setting, such as socially acceptable behavior and communication methods. These strategies help students exhibit more acceptable behaviors to teachers in the classroom and the general school environment (Penner, 2018).

Studies have suggested that parents and students in poverty develop a dependence on the school, which increases the school's impact on their achievement (Ogg & Anthony, 2020). The lack of environmental and social experiences and parents' education levels creates families dependent on the school to provide many supports (Chmielewski, 2017; Reardon, 2018). School dependent families need much more assistance with acquiring the skills necessary to function and navigate the school environment (Benner et al., 2016; Chmielewski, 2017; Penner, 2018).

Additionally, there is a difference in schools' and teachers' parental expectations between those from higher SES and lower SES. Milner (2013) found that parents with lower SES place a high value on the school's responsibility to increase test scores, whereas parents with higher SES value their children's happiness more than test scores. There are also differences in parental involvement between students with parents who have attained a higher education level and those with less education (Henry et al., 2020). Parents with a higher degree of education tend to be more involved in all aspects of their children's education, whereas parents from lower SES are more likely to be involved for a particular school-related reason (Henry et al., 2020; Penner, 2018).

Access to Resources

The difference in the academic success of students with lower SES is most apparent with students living in poverty. Paschall et al. (2018) argued the importance of the continued study on the "intersection of race and poverty" (p. 1175). Carter (2018) found that 63% of African American children came from low-income families compared to 12% of Caucasian American children. Likewise, Kuhfeld et al. (2018) found that African American students are more likely to live in poverty than other races. Table 3 demonstrates the difference between African American children and Caucasian American children living in the United States compared to the number living in poverty. Although each study's findings present slightly different percentages, Table 3 demonstrates the reality that African American children live in poverty to a disproportionate degree to their overall representation.

Table 3

Percentage of African American and White Children in the U.S. Living in Poverty, 2018

Source	African American children		White children	
	% of U.S. population	% living in poverty	% of U.S. population	% living in poverty
de Brey et al. (2019)	15.0	31.0	62	10.0
Fontenot et al. (2018)	14.1	28.8	72	10.5

Note. The word White is used to represent Caucasian Americans in this table to remain consistent with reporting the data from the two sources.

There are many challenges for students living in poverty. In addition to inadequate educational and social skill acquisition from parents, African American students are also more likely not to have health insurance and be taught by an uncertified teacher or a teacher with less experience (Byun et al., 2015; Kuhfeld et al., 2018; Milner, 2013). More African American students living in low-income situations or poverty equates to less access to educational resources for this group. Besides a lack of basic needs such as health insurance and safe neighborhoods, African American students are more likely to attend a school with fewer resources for a rigorous education (Kuhfeld et al., 2018). Each of these conditions multiplies the hurdles for African American students to achieve academically.

Students living in poverty are more likely to be taught by teachers with less experience, less commitment to their job, and a higher teacher turnover rate than other students (Hanselman, 2019). Peterson et al. (2016) supported Hanselman's belief with their findings that students living in poverty experience more inferior educational instruction with less-qualified teachers and lower expectations of teachers. Since more African American students experience poverty,

African American students are more likely to feel the effects of the lack of access to educational opportunities (Hanselman, 2019; Paschall et al., 2018).

The issues addressed previously can impact the academic achievement of students if each one is present alone. Henry et al. (2020) and Slopen et al. (2016) posited that the intersectionality of race and income helps shape a child's experiences, further impacting their achievement. Poverty is the commonality that makes intersectionality so powerful. The addition of poverty to other SES elements is even more detrimental to children's educational attainment (Davenport & Slate, 2019; Paschall et al., 2018). Harris and Leonardo (2018) argued that intersectionality is the "solder in the alloy between speech and the social conditions that make it possible" (p. 7). "Cumulative adversity" (Henry et al., 2020, p. 1483), or the addition of extreme poverty with other factors, can have an increasing impact on students' academic achievement (Henry et al., 2020; Paschall et al., 2018). Mitigating these cumulative indicators can provide equitable educational advantages to all students, regardless of their SES.

School Environment

The school environment, including, but not limited to, the structure of the academic courses, such as tracking, access to gifted and talented programs, quality or experience of teachers, and student motivation, can significantly impact the achievement of students (Grissom & Redding, 2016; Hanushek, 2016; Legette, 2018; Soland, 2018). The school structure's impact can be experienced through tracking or assigning students to particular courses based on some form of academic ability and enrollment in classes for students perceived to have gifted characteristics (Chambers & Spikes, 2016). Student motivation can be influenced by external measures or inherent disposition (Anderson, 2018; Soland, 2018). Each of these factors can fundamentally affect the academic achievement of students. The next section will provide

research that demonstrates how the school's structure can contribute to the achievement gap between African American students and Caucasian American students.

Tracking

Educational tracking has long been a part of the structure of schools. Tracking is the placement of students into a course level based on their perceived academic ability (Chambers & Spikes, 2016). While some researchers promote tracking as one of the best ways to teach different ability levels, African American students are more likely to be tracked into lower-level courses than Caucasian American students (Dockx et al., 2019; Legette, 2018). While tracking students by ability may be more comfortable for the teacher, it creates and perpetuates inequality between African American and Caucasian American students, which increases over time (Dockx et al., 2019; Chambers & Spikes, 2016) and perpetuates the belief that placement in advanced courses is based on merit (Legette, 2018).

Schools often begin tracking with students in early elementary school (Syed et al., 2011; Young et al., 2017). Educational tracking that starts in elementary school becomes a normal state for students to become accustomed and familiar (Chmielewski, 2017; National Center for Education Statistics, 2015; Young et al., 2017). This familiarity with the lower rigor and type of instruction is difficult for students to overcome. Dockx et al. (2019) argued that the nature and pace of instruction, experience level of the teacher, and prerequisite requirements produce an environment in which it is easy for students to maintain a particular course track for their entire school path. Often, teachers with fewer years of experience are selected to teach the lower track courses, which create a tracking system for teachers (Grissom & Redding, 2016). The quality of teaching in lower track classes and the speed and depth at which the instruction focuses can

exacerbate the gap between the tracks, which keep students on the same track throughout their schooling (Chambers & Spikes, 2016).

Early tracking, particularly in mathematics, puts students at risk of remaining on a particular track throughout their school experience (Schiller et al., 2010; Young et al., 2017). Maintaining the path at which one starts mathematics instruction is pointedly apparent in Algebra I. Students who take Algebra I later in school are less likely to continue into higher-level mathematics courses or enter into a science, technology, engineering, and mathematics (STEM) career (Young et al., 2017).

Byun et al. (2015) and Covay Minor (2016) noted that African American students and students from lower SES are less likely to enroll in advanced math classes. De Brey et al. (2019), in the Status and Trends in the Education of Racial and Ethnic Groups, found that 6% of African American students earned advanced placement credits as compared to 17% of Caucasian American students. Byun et al. (2015) noted several factors that can affect advanced mathematics course taking, such as family background, school environment, and student experiences.

Teacher expectations of students' academic ability also have a significant impact on achievement and progression into upper-level courses (Barbarin & Aikens, 2015; Dockx et al., 2019; Griffin et al., 2017; Kotok, 2017; Milner, 2013; Plata et al., 2017; Wright et al., 2017). Additionally, Mattison et al. (2018) argued that students with less teacher-perceived academic skills tended to stay on a lower academic track throughout their schooling.

Tracking exacerbates the social inequality found in upper-level courses, such as advanced placement and higher-level math courses (Chambers & Spikes, 2016; Dockx et al., 2019; Wright et al., 2017; Young et al., 2017). This inequality has implications for eventual careers in a STEM

field (Young et al., 2017). However, not all studies found a negative influence on course tracking for students. Dockx et al. (2019) argued that courses that prepare students for college are more effective if the class is populated with like-ability students. However, the prevailing belief among researchers is that African American students are more likely to be tracked into a lower-level course early in elementary school, from which they never exit (Dockx et al., 2019; Wright et al., 2017; Young et al., 2017).

Access to Gifted Programs or Advanced Courses

Access to gifted programs, particularly in the early grades, is pivotal for students to be exposed to rigorous lessons to participate in advanced classes in high school and potential enrollment in college (Crabtree et al., 2019). Studies have found that African American students are disproportionately underrepresented in gifted and talented programs in schools (Covay Minor, 2016; Ford, 2014; Tabron & Chambers, 2019).

Although African American students constitute 14.9% of Texas's student population, they represent only 11.1% of students enrolled in gifted courses. However, even though 7.2% of the student population is Caucasian American, Caucasian American students make up 12.4% of the gifted enrollment (Yaluma & Tyner, 2018). The National Center for Education Statistics as cited in de Brey et al. (2019) reported that compared to 17% of Caucasian American students, only 6% of African American students earned advanced course credits in mathematics (de Brey et al., 2019). Yaluma and Tyner (2018) argued that "when high-achieving poor and minority students have less access to these special programs than do their peers, gifted education may exacerbate existing inequalities" (p. 7).

Implicit bias and "unintended discrimination" (Ford, 2014, p. 148) can create a school environment where certain students do not have access to gifted classes (Davis et al., 2019).

Implicit bias demonstrated by teachers continues the inequitable practices, which add to the achievement gap (Clark & Zygmunt, 2014; Peterson et al., 2016; Plata et al., 2017).

Crabtree et al. (2019) argued that family income could be as restricting as the child's race when it comes to gifted program access. Schools with lower poverty levels are more likely to have gifted and talented programs, yet fewer African American students participate in those programs (Crabtree et al., 2019; Yaluma & Tyner, 2018).

Teacher Experience

It is a common refrain that the teacher is the most influential school-based factor in a child's academic career. Whereas the student population is becoming more diverse, teachers' distribution remains static with more Caucasian American teachers (Reiter & Davis, 2011). De Brey et al. (2019) noted that 80% of the U.S. teachers were Caucasian American, and only 7% were African American. Schools can address this mismatch in cultures by offering teachers training on understanding cultural diversity (Celeste et al., 2019; Clark et al., 2016; Sleeter, 2017). Dr. Tyrone Howard (Clark et al., 2016) argued that the training for teachers should revolve around "cultural competence" (p. 269) or how an individual's culture influences their actions, reactions, and interactions with others. Some studies suggested that the typical multicultural training tends to reinforce inequities already present (Banks, 2016; Civitillo et al., 2017).

A study found that minority students from families with lower incomes were more likely to be taught by a less experienced teacher (Hanselman, 2019). Students in high poverty schools were more likely to be led by an inexperienced teacher (Crabtree et al., 2019). However, another study discovered that the experience level does not make a difference unless the teacher's experience involves a solid understanding of the diverse cultures present in their class (Williams

et al., 2018). Furthermore, Williams et al. (2018) suggested a better solution to training new teachers on understanding and empathizing with students from a different race or ethnic background is to pair them with a veteran teacher who models how to use inclusive practices in lessons and interactions with students.

One of the characteristics found to be most beneficial to inclusive teaching practices is empathy (Warren, 2017). Effective teachers allow their use of empathy to respond to students' needs in a culturally diverse classroom (Warren, 2017). Nonetheless, implicit bias can impact the empathy demonstrated by teachers (Whitford & Emerson, 2019). Whitford and Emerson (2019) argued that helping teachers establish a healthy self-awareness about their biases can mediate this effect.

Student Engagement and Motivation

Students are motivated toward educational advancement through teacher expectations as well as parents and socioeconomics (Griffin et al., 2017). Studies have found that African American students tend to be more influenced by teacher expectations and experience more connectedness in schools with more African American students and fewer socioeconomic resources (Bottiani et al., 2016; Voight et al., 2015). Furthermore, positive relationships with adults at school lead to increased engagement by students (Kotok, 2017). Engaged students are typically more motivated toward academic success than disengaged students (Bottiani et al., 2016; Mahari de Silva et al., 2018).

Meritocracy is the systemic belief that "everyone has an equal chance to succeed within existing sociopolitical structures" (Patton Davis & Museus, 2019, p. 123). Meritocracy is closely aligned with student engagement and motivation toward academic success (Patton Davis & Museus, 2019; Zhao, 2016). However, Larnell et al. (2016) argued that critical race theory

provides a lens to view the symbiotic relationship between socioeconomics and access to resources. These researchers warn against assuming that all students have an equal chance at opportunities and success without considering the adversity associated with systemic racism and lower SES (Larnell et al., 2016). The idea that all students have the same chance at success has led to an increase in high stakes testing, perpetuating the achievement gap (Patton Davis & Museus, 2019). The paradigm of meritocracy is incomplete without considering other factors that may influence the opportunities for success.

Studies have suggested that educators hold meritocracy to be true, despite the apparent differences in student SES (Zhao, 2016). Colorblindness and other implicit bias forms can contribute to a difference in students' opportunities based on race or SES (Larnell et al., 2016). Researchers have suggested that consideration be given to the implications of teachers' implicit bias since Caucasian American teachers make up 80% of the U.S. teaching population (de Brey et al., 2019). At some point in their education, African American students have more likely been taught by a Caucasian American teacher (de Brey et al., 2019).

Understanding the cultures of students in the class assists teachers in providing a more equitable classroom environment. Warren (2017) argued that empathy could help teachers understand the cultural diversity in the classroom. Teachers who demonstrate empathy express a "culturally responsive pedagogy" (Warren, 2017, p. 169). Most teachers are well-intentioned; however, implicit bias is an influential factor in relations (Whitford & Emerson, 2019). Whitford and Emerson (2019) found that training preservice teachers on empathy were significant in reducing bias.

Additionally, Warren (2017) suggested that teachers should be trained on empathy to recognize their own biases. Teachers who demonstrate understanding and encouragement toward

students can influence their academic achievement (Warren, 2017; Whitford & Emerson, 2019). The motivation of students to achieve academically can significantly impact their educational success.

Chapter Summary

The research demonstrates the plethora of factors contributing to a disparity between Caucasian American students' academic achievement and the academic achievement of African American students (de Brey et al., 2019). Many factors contribute to this achievement gap, individually or collectively. For example, the SES of a family can influence the achievement of a student in multiple ways, from limiting access to better schools and teachers and access to certain social and educational resources to differences in parenting behaviors (Henry et al., 2020; McKown, 2013; Reardon et al., 2017). In addition to the lack of experiences and opportunities provided by their parents, these students fall victim to the lack of teacher quality and expectations, deficit thinking and implicit bias, and tracking imposed on them in the school environment (Fergus, 2017, Silva-Laya et al., 2019; Singh, 2015; Welton & Williams, 2014).

Given the disparity in academic achievement between African American students and Caucasian American students in schools, educators need to study the practices that have proven to mitigate the inequity in performance. Understanding the systems and structures established by schools that have successfully closed the achievement gap could provide strategies and solutions to other schools.

Chapter 3 contains the proposed methodology for this study. The following sections are included in Chapter 3: the problem of the study, the purpose of the study, research questions for the study, the research design and method, the setting and context, sampling, materials, and instruments used in the study.

Chapter 3: Research Method

The problem addressed in this study was the perpetual academic achievement gap between African American students and Caucasian American students. The purpose of this mixed-methods study was to understand the systems and structures used by schools in a large public K–12 school district in Southeast Texas, which brings about significant equity in the mathematics achievement of African American students. The research's overarching goal was (a) to identify the specific design or approaches used by schools that are closing the mathematics achievement gap between African American students and Caucasian American students, and (b) to provide recommendations to other campuses for closing the academic achievement gap. Research of the processes used by schools successful in mitigating this gap could benefit other schools.

The research questions answered in this study are:

Q1. What level of knowledge do mathematics teachers have about the academic achievement gap between African American students and Caucasian American students?

Q2. What systemic school-based strategies explain the decreased academic achievement gap between African American students and Caucasian American students?

Research Design and Methodology

This research study used a mixed-methods approach. Collecting research using a mixed-methods approach required thorough quantitative and qualitative methods (Creswell & Plano Clark, 2018). A mixed-methods approach allowed me to integrate quantitative research strengths (i.e., detailed measurement of numerical data) and qualitative research (i.e., analysis of narrated data; Venkatesh et al., 2016). "Methodological pluralism" (Moss & Haertel, 2016, p. 129) has been described as a perspective that combines qualitative and quantitative approaches to allow

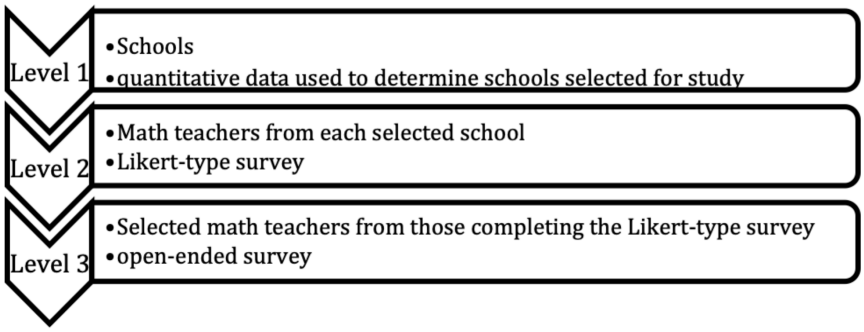
each method to complement and challenge the other. Moss and Haertel (2016) argued that social experiences are understood more completely when studied from multiple methodological views.

Venkatesh et al. (2016) suggested that in mixed-methods research, the questions, data collection, and data analysis are a combination of qualitative and quantitative measures. A study's combined methods allow the qualitative data to inform or clarify the quantitative data or the quantitative data to inform the qualitative data (Onwuegbuzie & Leech, 2019). In this study, I used a mixed-methods explanatory sequential design. I collected the Likert-type survey data first, then used an open-ended qualitative survey. The qualitative measure was used "to help explain and interpret quantitative findings" (Alavi et al., 2018).

Mixed-methods research is a flexible approach that allows researchers to use multiple methods and techniques through the research process (Venkatesh et al., 2016). A multilevel study was necessary to gather the deep and rich data needed to understand educators' behaviors and perceptions regarding teaching African American and Caucasian American students. Figure 3 demonstrates the multiple levels of data collection for this study.

Figure 3

A Flowchart Showing Multiple Levels of Data Collection



Initially, this study's qualitative method of data collection was to be conducted using a face-to-face model. However, in March of 2020, the COVID-19 virus swept the United States and the world, resulting in widespread, stay-at-home orders. Consequently, I conducted an open-ended survey via an online platform. I followed an emergent coding method for the open-ended survey.

Population

This study's population consisted of mathematics teachers at three campuses in a large public school district in Southeast Texas. The schools selected to participate in this study consisted of a high percentage of economically disadvantaged students based on the number of students receiving free or reduced lunch as designated by the Income Eligibility Guidelines set by the National School Lunch Program (United States Department of Agriculture, 2019), and their success in closing the academic achievement gap on the meets and master's level of the 2019 math STAAR between Caucasian American students and African American students. Each campus represented a different socioeconomic status level (i.e., higher SES, mid-range SES, and lower SES). Table 4 illustrates the breakdown of the three most prevalent races present in the school and the economically disadvantaged percentage for each school in the study.

Table 4

Student Demographic Information for the Schools Represented in the Study (2018–2019)

School	African American	Hispanic	White	Economically Disadvantaged
Middle School	19.0%	41.6%	27.8%	58.0%
Elementary School #1	38.6%	46.3%	6.0 %	83.4%
Elementary School #2	27.2%	62.9%	6.8%	90.0%

Note. The word White is used to represent Caucasian Americans to remain consistent with the way data is reported on the STAAR.

Samples

In a mixed-methods research study, the sample size ranges from small to large. Quantitative research endorses larger sample sizes, whereby qualitative research leans toward smaller sample sizes (Leavy, 2017). However, Hammersley (2015) argued that it is not so important how many samples the researcher uses but which samples are chosen for the qualitative research study. This study utilized a nested sampling method. One sample is a subset of another sample in the population (Headley & Plano Clark, 2019).

In this study, the Likert-type survey sample consisted of 66 mathematics teachers from the three selected schools. The open-ended survey sample consisted of 15 mathematics teachers from the selected schools who participated in the survey. While underrepresentation is a concern, the sample size was representative of the overall number of mathematics teachers on each campus (Sim et al., 2018). The sampling design provided an opportunity for justifiable generalization and "maximizes the interaction between the qualitative and quantitative research approaches" (Onwuegbuzie & Collins, 2017, p. 143).

Quantitative Sampling

Random sampling is most often associated with quantitative research studies (Terrell, 2016). However, to mitigate the possibility of a low response rate, all mathematics teachers at the three selected schools were invited to participate in the Likert-type survey. Including all the mathematics teachers from the chosen schools provided a broader understanding of teachers' perspectives regarding students and mathematics. The sample size was 31 mathematics teachers. The sample group of mathematics teachers was appropriate because this study focused on the academic achievement gap between African American students and Caucasian American students in mathematics.

Qualitative Sampling

Nonrandom sampling is often used in qualitative research studies (Kalu, 2019). However, this study utilized random sampling within the quantitative sample used for the Likert-type survey to select the individuals invited to participate in the open-ended survey. The sample drew from the mathematics teachers at the three schools who completed the Likert-type survey. To accomplish the randomized sample, the campus research sponsor at each school accessed the list of mathematics teachers from their school who completed the Likert-type survey. The campus sponsor assigned a number to each teacher in their school who completed the initial survey. Using a random number selector, each campus sponsor identified five teachers to invite to participate in the open-ended survey. The sample consisted of five math teachers from each elementary school and five math teachers from the middle school.

Materials and Instruments (Quantitative)

Surveys are a standard instrument for collecting data that will be analyzed quantitatively (Saldaña & Omasta, 2018). The quantitative tool used in this study was a Likert-type survey. The

survey consisted of 10 statements, measured using a 5-point Likert scale. The survey data was transformed into narrative form and analyzed qualitatively (Onwuegbuzie & Leech, 2019). This quantitative instrument was developed by the individual conducting the research (see Appendix A). The statements were prepared using the literature regarding factors that can contribute to the academic achievement gap between African American students and Caucasian American students.

Before providing the survey to the sample group, I pilot tested the survey with district administrators from the selected district. It is best practice to conduct pilot testing of an instrument before using it in the study (Leavy, 2017). The pilot group consisted of three assistant superintendents in the school district.

Materials and Instruments (Qualitative)

Grounded theory research uses multiple sources along with the study results to explain an event or experience (Terrell, 2016). This study sought to identify approaches to mitigate the academic achievement discrepancy between African American students and Caucasian American students. The qualitative material used in this study was an open-ended survey.

Morgan (2019) argued that the strength of focus groups is that the data obtained is explicitly concentrated on the focus of the individual conducting the research. Whereas a focus group was not used in this study, the open-ended survey was given to a focus group of teachers from the original sample.

Fifteen mathematics teachers were invited to participate in the open-ended survey for this study. Specifically, five math teachers from each of the elementary campuses and five math teachers from the middle school campus were invited to participate in the focus group. The open-ended survey aimed to explain or clarify the data collected from the Likert-type survey.

Participants of the open-ended survey began by answering two questions. After the initial two questions, participants watched a short video of an interview with Donna Ford, one of the primary researchers in gifted and talented education and author of many publications about the achievement gap. Following the video, participants answered six questions about their knowledge of the video's information and strategies to address the issues discussed in the video that may be present on their campuses. The questions for the open-ended survey can be found in Appendix B.

Quantitative Data Collection and Analysis Procedures

Likert-Type Survey

The quantitative data for this study was obtained using a Likert-scale measurement survey. The survey scale ranged from *strongly disagree*, *disagree*, *neutral*, *agree*, and *strongly agree*. The ordinal numbers one to five were assigned to the scale labels, with one reflecting *disagree strongly* and five appointed to *agree strongly*.

After receiving IRB approval (see Appendix C) to conduct the research, I began the recruitment process with the campus research sponsor at each school. Each campus research sponsor communicated with each mathematics teacher on their campus, requesting their participation in the 10-question survey. The consent form contained information about the research study and the role the teacher assumed upon participation. All participants were asked to sign a consent form before completing the survey and understood their right to revoke consent at any time. Participants received no compensation for completing the Likert-type survey.

I aggregated the survey data using the Software Package for Social Sciences (SPSS) to begin the data analysis. After establishing the mean, I extrapolated the range of answers provided

by the participants for each question. I used simple descriptive statistics to analyze the correlation between responses.

Qualitative Data Collection and Analysis Procedures

Each campus sponsor randomly selected five teachers from those who participated in the Likert-type survey to participate in an open-ended survey. Participants did not receive any compensation for their participation in the open-ended survey

Open-Ended Survey

Each campus sponsor emailed the five randomly selected math teachers from their school, inviting them to participate in the open-ended survey. The campus sponsor emailed the link to the open-ended survey to each of the selected teachers.

Saldaña and Omasta (2018) suggested that "coding is symbolizing – the condensation of a datum into a richer, more compact form of meaning" (para. 2). I utilized emergent codes or codes that came about during data collection (Creswell & Plano Clark, 2018) for the data analysis of the open-ended survey data. However, it was essential to maintain the participant's responses while staying focused on the research questions (Saldaña & Omasta, 2018). Initial in vivo coding and emergent coding was completed manually.

For the first round of coding, I began with in vivo codes. In vivo coding involves using the actual words from the participants in the analysis (Saldaña & Omasta, 2018, para. 1). I placed the words and phrases in quotation marks, as they were direct quotes from the participants. After reviewing the open-ended survey transcript, I highlighted words or phrases that stood out or seemed repetitive.

The second round of coding fine-tuned the phrases and themes from the initial coding round. During the second coding round, I considered the themes and patterns found in the initial coding to identify stronger connections between the participants' answers.

Complementarity

Complementarity is a way of clarifying the results of one method of data collection with another (Kansteiner & König, 2020). Studies are more valid if each of the data collection sources confirms the others (Lub, 2015). Using the open-ended survey data to clarify or enhance the understanding of the Likert-type survey is described as "qualitative content analysis" (Kansteiner & König, 2020, p. 228). Qualitative content analysis allows the researcher of a mixed-methods study to qualitize the quantitative data to fill in any gaps in understanding left after completing the quantitative data collection (Onwuegbuzie & Leech, 2019). Establishing validity in qualitative research methods requires the researcher to view the data from a different perspective than the quantitative data (Lub, 2015).

Methods for Establishing Trustworthiness

Confirming the research's integrity is the most effective way to develop the reader's confidence in the methods and findings' quality and rigor (Leavy, 2017). Demonstrating the study's credibility convinces the reader that the researcher's processes and techniques brought about sensible results (Saldaña & Omasta, 2018). One method of establishing the credibility of these data was member checking (Saldaña & Omasta, 2018). Member checking can occur during data collection or after data collection. This method helps gain a sense of balance and cohesion with the data (Saldaña & Omasta, 2018). Member checking for this study involved gathering feedback from assistant superintendent colleagues on the overall themes established during the Likert-type survey and open-ended survey data collection.

Triangulation uses multiple sources or study participants to establish themes or consistency among findings (Creswell & Plano Clark, 2018). Triangulation allows for corroboration or contradiction of quantitative results (Kansteiner & König, 2020). This study triangulated the data from the open-ended survey to confirm or refute the quantitative survey findings.

Leavy (2017) describes transferability as the "ability to transfer findings from one context to another based on … the similarity between the contexts made clear by a vividness in the data" (p. 154). Transferability was established by presenting precise details about the study's setting and the participants in each sample. By thoroughly explaining the district in which the study took place and the teachers who participated in the research, other researchers can deliberately choose to use it to compare their data to these findings. Furthermore, providing clear descriptions of each aspect of the study supported the results' extension in other contexts (Leavy, 2017).

Dependability was established in this study using multiple methods of data collection. The data collected from the quantitative survey informed the open-ended survey questions and vice versa. The methods of collecting and analyzing data were described in detail to increase the consistent interpretation of the data and enhance the replication of this study (Onwuegbuzie & Collins, 2017).

Cross-checking the data from multiple methods of data collection increased the confirmability of the study. Confirmability is the degree to which data from one approach can confirm the results from another form of data collection (Venkatesh et al., 2016). Data were recorded and coded as accurately as possible from the participants to ensure confirmability. To achieve confirmability in this study, I created codes for the data collected in the open-ended survey. The codes were compared to the Likert-type survey results.

Researcher's Role

In this study, I sought to maintain an unbiased approach toward the academic achievement gap between African American students and Caucasian American students. Additionally, I reflected on my experience as an elementary teacher and a middle school principal and considered how those experiences influenced my perspectives. Moreover, I conceded that I held beliefs and assumptions about the conditions that could affect the continuation of the academic achievement gap.

My relationship with the participants in this study was limited. There was no previous relationship, other than accidental, with the teachers involved in this study. As the researcher and transcriber, it was essential to collect and analyze the data retrieved from the Likert-type survey and open-ended survey in a fair and unbiased manner. I work in the same district as the individuals who participated in the study. While taking an active role in this study's setting, I maintained a peripheral view of the data collection and allowed the results to speak for themselves. As the researcher, personal perception did not influence the interpretation of the findings.

Ethical Considerations

Institutional review board (IRB) approval from Abilene Christian University was received before beginning any data collection. All data from human subjects were stored on encrypted computers and hard drives. No information from the data collected in this study was stored in the cloud. The participants were recruited from the selected schools. Participants were not identified in any way during the study. Methods of protecting their identity and confidentiality were clearly explained to the participants.

The district in this study had a rigorous process of obtaining permission to conduct research and collect data. I sought and obtained site permission for conducting the research using district data and collecting additional data from the three selected schools. Furthermore, I followed the guidelines established in the Belmont Report. The Belmont Report requires researchers to maintain respect for those involved in the study, minimize the harm and maximize the benefit of participation, and make sure the benefits and risks are fairly distributed (Office for Human Research Protections, 1978).

All participants completed a consent form acknowledging that they understood the study's purpose, their role in the research, and their willingness to participate in the study. Each participant was informed of their right to revoke their consent from participation in the study at any time (Saldaña & Omasta, 2018). No data was collected before Abilene Christian University had given IRB approval, the school district approving the research, and invited participants providing their consent.

Assumptions

I made a couple of assumptions during this study. First, I assumed that all participants would be honest and forthcoming with their answers. Dishonesty in participant answers would create diminished credibility of the study. A second assumption was that a mixed-method approach would produce the rich and vivid data necessary to conclude strategies that could help mitigate the academic achievement gap between African American students and Caucasian American students.

Limitations

Limitations are elements that are uncontrollable by the researcher (Terrell, 2016). One limitation of this study was the researcher's relationship with the participants. As a fellow

employee in the same district as the participants in this study, I conceded that personal bias could influence the findings. Additionally, all the participants in this study work in the same school district. Therefore, the results may not be generalizable to other school districts.

The small sample size was limiting because it decreased the generalizability of the study. Generalizability occurs when the researcher approaches saturation. Saturation occurs when the data results contain no new learning or findings (Onwuegbuzie & Collins, 2017; Saldaña & Omasta, 2018). The small sample size did not provide the saturation needed to produce results that could be generalizable to math teachers in other school districts.

Delimitations

Delimitations are constraints put on the study by the researcher (Terrell, 2016). The three schools selected to participate in this study achieved less than 10% discrepancy in the meets and master's criteria of the 2019 STAAR test between the African American students and Caucasian American students at their respective schools. Schools with higher than a 10% gap between African American and Caucasian American students were not included in this study.

Only mathematics teachers were selected to participate in this study since mathematics achievement was the research's focus. Teachers of subjects other than math were excluded from participation in this study to narrow the math achievement data results.

Chapter Summary

This chapter explained the methodology used in this study. This chapter includes the purpose and research questions, the setting of the research and participants invited to participate, the quantitative and qualitative methods of data collection and analysis, the researcher's role, ethical considerations, limitations, and delimitations. The participants for this study were selected due to their employment. Data collection and analysis methods were described: (a)

Likert-type survey consisting of 10 questions and (b) an open-ended survey. The findings of these data collection measures are presented in Chapter 4.

Chapter 4: Results

To understand the systems used by schools that have successfully produced significant equity in their African American students' mathematics achievement, I conducted a mixed-method explanatory sequential design study. The first phase of the study included a Likert-type survey, which sought answers to the research question (a) what level of knowledge mathematics teachers have about the academic achievement gap between African American students and Caucasian American students. The second phase of the study included an open-ended survey investigating the research question (b) what systemic school-based strategies explain the decreased academic achievement gap between African American students and Caucasian American students.

Chapter 4 is organized into three sections: participant information, quantitative results, and qualitative results. The first section describes the participants involved throughout the study. The second section provides data from the quantitative, Likert-type survey. The third section explains the data from the open-ended surveys and how those data support the quantitative results.

Participant Information

Participants were selected from the three schools involved in this study. Due to the possibility of a breach of confidentiality and maintaining the participants' anonymity, demographic information was not collected from any individual participating in the data collection process. Sixty-six individuals received the invitation to participate in the study. Thirty-one or 47% of eligible individuals completed the Likert-type survey. From the 31 teachers completing the Likert-type survey, 15 teachers received the open-ended survey. Ten or 67% of

the eligible individuals completed the open-ended survey. Table 5 shows the study participation for each data collection method.

Table 5

Number and Percentage of Study Participants From Sampling

Type of Survey	Likert-type survey	Open-ended survey
Invited to participate	66	15
Number of participants	31	10
Percentage of participants	46%	67%

Quantitative Results

The data collection process followed the mixed-methods approach by utilizing a quantitative survey and a qualitative survey. The quantitative data collection method consisted of a Likert-type, 10-question survey and was analyzed using the SPSS software (see Appendix A). The numbers in the scale in the Likert-type survey represented a range from *strongly disagree* to *disagree*, *neutral*, *agree*, and *strongly agree*. Purposive sampling was used for the Likert-type survey to select only mathematics teachers at three schools chosen in the district. The results from all the schools involved in this study are reported collectively. Each statement in the quantitative survey inquired about the teacher's awareness of indicators that could influence African American students' achievement gap and Caucasian American students.

Table 6 illustrates the participants' responses to the statements in the quantitative survey.

Table 6

Quantitative Survey Data Results

Survey Statement	*Strongly Disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1. I recognize that schools can influence the academic achievement gap between African American students and Caucasian American students using purposeful strategies.			2	18	11
2. I am aware of instructional strategies that minimize the mathematics achievement gap between African American and Caucasian American students.	1		6	19	5
3. I am aware of school-based measures that provide additional support for families with lower SES.			1	22	8
4. I am aware of school-based strategies that help parents with lower SES understand how they can partner with teachers in their child's education.	1	5	7	13	5
5. I am aware of school-based strategies that address the discrepancy in the number of African American students enrolled in gifted and talented (GT) courses related to Caucasian American students.	1	5	11	13	1
6. I believe that tracking students into higher- or lower-level math courses in the early grades puts students onto a permanent academic track.		6	9	11	5
7. I believe there are school-based strategies that minimize the occurrence of academic tracking in upper-level mathematics courses.	1	6	15	8	1
8. I am aware of the influence of implicit bias on teaching practices.			7	14	10
9. I utilize strategies to ensure that high expectations are communicated to all students.				5	26
10. I utilize strategies that teach students about the influence of intrinsic motivation on their academic achievement.			3	12	16

Participants' responses were skewed across all five possible answer choices on survey statements four, five, and seven. There was a wide range of awareness of measures to support parents in partnering with the school for their child's education, awareness of strategies to address the discrepancy in gifted and talented (GT) enrollment of African American students, and awareness of strategies that minimize tracking in upper-level math courses.

There was significant agreement among participants on four of the survey statements. Most participants answered with *agree* or *strongly agree* to survey statements number one, three, nine, and 10. Table 7 shows that 93.6% of participants selected either *agree* or *strongly agree* that purposeful strategies can influence the achievement gap.

Table 7

Quantitative Survey Question # 1

I recognize that schools can influence the academic achievement gap between African American students and Caucasian American students using purposeful strategies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Neutral*	2	6.5	6.5	6.5
	Agree	18	58.1	58.1	64.5
	Strongly agree	11	35.5	35.5	100.0
	Total	31	100.0	100.0	

Table 8 demonstrates that 96.8 % of participants responded either *agree* or *strongly agree* that they are aware of school-based measures that provide additional support for lower SES families.

Table 8

Quantitative Survey Question # 3

I am aware of school-based measures that provide additional support for families with lower SES.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Neutral*	1	3.2	3.2	3.2
	Agree	22	71.0	71.0	74.2
	Strongly agree	8	25.8	25.8	100.0
	Total	31	100.0	100.0	

Survey statement number nine elicited 100% of participant responses of either *agree* or *strongly agree*. No participant chose any of the other answer choices for statement number nine. Table 9 illustrates the results of survey statement number nine.

Table 9

Quantitative Survey Question # 9

I utilize strategies to ensure that high expectations are communicated to all students.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Agree*	5	16.1	16.1	16.1
	Strongly agree	26	83.9	83.9	100.0
	Total	31	100.0	100.0	

Ninety point three percent of participants responded *agree* or *strongly agree* that they teach their students about intrinsic motivation's influence on their academic achievement. The standard deviation for these data was .374, indicating minimal variance in the teaching about the impact of intrinsic motivation on students. Table 10 shows the results of survey statement number 10.

Table 10

Quantitative Survey Question # 10

I utilize strategies that teach students about the influence of intrinsic motivation on their academic achievement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Neutral*	3	9.7	9.7	9.7
	Agree	12	38.7	38.7	48.4
	Strongly agree	16	51.6	51.6	100.0
	Total	31	100.0	100.0	

Fifty-one point six percent of participants selected *agree* or *strongly agree* on the survey statement about early placement into a particular math course level, resulting in a consistent track along math courses throughout the school years. This data point's standard deviation was .996, indicating little disagreement among participants on the impact of early tracking into math courses. Table 11 shows the results from survey statement number six.

Table 11

Quantitative Survey Question # 6

I believe that tracking students into higher or lower math courses in the early grades puts students onto a permanent academic track.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Disagree*	6	19.4	19.4	19.4
	Neutral	9	29.0	29.0	48.4
	Agree	11	35.5	35.5	83.9
	Strongly agree	5	16.1	16.1	100.0
	Total	31	100.0	100.0	

All participants answered all statements on the quantitative survey. In analyzing each survey statement's mean using a histogram, I found that the mean trended toward *agree* and *strongly agree* on statement one, three, nine, and 10. This finding demonstrates strong alignment

among participants on the impact of purposeful teaching strategies, school-based strategies for providing additional support to families from lower SES, the communication of high expectations to all students, and teaching students about intrinsic motivation. Table 12 shows the data reflecting a mean above 4.2 for these survey statements.

Table 12

Statistics for Quantitative Survey

Question #		Q.1.	Q.2.	Q.3.	Q.4.	Q.5.	Q.6.	Q.7.	Q.8.	Q.9.	Q.10.
N	Valid	31	31	31	31	31	31	31	31	31	31
	Missing	0	0	0	0	0	0	0	0	0	0
M		4.29	3.87	4.23	3.52	3.26	3.48	3.06	4.10	4.84	4.42
Mdn		4.00	4.00	4.00	4.00	3.00	4.00	3.00	4.00	5.00	5.00
Mode		4	4	4	4	4	4	3	4	5	5
SD		.588	.806	.497	1.061	.893	.996	.854	.746	.374	.672

Qualitative Results

The qualitative data collection method included an open-ended survey containing a short video clip and eight short answer questions (see Appendix B). Random sampling was used for the open-ended survey to select only mathematics teachers who also participated in the Likert-type survey. Open, axial, and selective coding was used when analyzing the open-ended survey data to "enable a cyclical and evolving data loop in which the researcher interacts, is constantly comparing data and applying data reduction, and consolidation techniques" (Williams & Moser, 2019, p. 47).

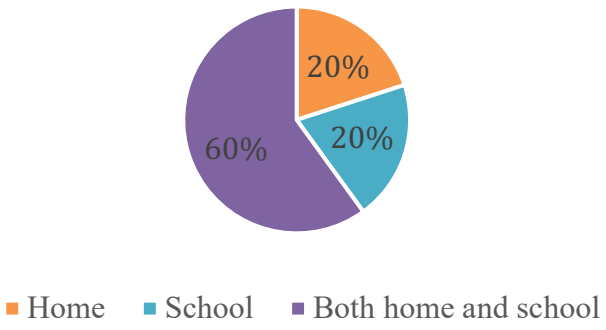
I used open coding for the first round of coding. Using expressions to classify meaning, such as words or phrases (Williams & Moser, 2019), I identified initial concepts present in the participants' responses. Using inductive reasoning, I analyzed the open codes to explain the results further using axial coding. The axial codes I identified were influential factors, school strategies, and school supports for the home.

Influential Factors

Study participants agreed that many factors could influence the academic achievement of a child. The participants listed factors present in the home and the school as affecting the academic achievement gap. Figure 4 demonstrates the factors that participants suggested influence the achievement gap between African American students and Caucasian American students.

Figure 4

Illustration Depicting the Home and School Influence on Academic Achievement



Participant A noted that the school holds the most influence over a child's academic achievement because school was "where the children spend the most of their awake hours," and the children eat "two out of their three meals in a day" at school. Participant H agreed that school

held the most influence over academic achievement because “we don’t have any control over what happens at home, but we have control over what goes on at school.”

Conversely, Participant B reported,

> It takes both parties in order for a child to reach full academic achievement. There is only so much material a teacher and child can practice in an hour and 30-minute period per subject. Parents have to be a reinforcement that supports … what the child is learning in class.

Likewise, Participant I stated that “communication and feedback” between the home and school are essential for a child’s academic success.

School Strategies

The open-ended survey allowed participants to share strategies used at their school to minimize the academic achievement gap between African American and Caucasian American students. The most common strategies implemented by the schools in this study are illustrated in Table 13.

Table 13

Common Strategies to Minimize the Achievement Gap Implemented by Schools in the Study

Strategy	# of Participants Listing the Strategy
Building positive relationships with students	8
Communicating high expectations to all students	8
Reflecting or modifying instruction based on data	7
Regular team planning	3

Eight survey participants reported the strategy of building positive relationships with students and communicating high expectations to all students. When describing how they go about building relationships with students, Participant C stated that students "love it when … teachers go to out of school activities." Participant G suggested that she "connect[s] the content to their everyday life."

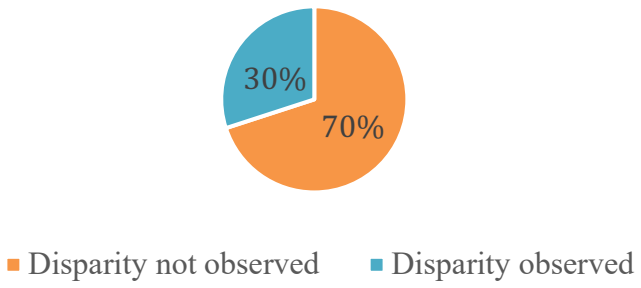
In describing the importance of communicating high expectations to all students, Participant A said, "letting them know that you are 100% on their side and want to see them succeed." Participant E suggested that goal setting with students is a way of communicating high expectations. She wrote that teachers should "draw a success path for them and celebrate every small or big success" and "communicate clearly to show your vision of success for them."

School Supports for the Home

Two of the open-ended survey questions allowed participants to share how their school provided support for parents. One of the questions specifically addressed the disparity in gifted and talented recommendations between African American and Caucasian American students. Figure 5 illustrates the degree to which the participants have observed a discrepancy in gifted and talented recommendations at their school.

Figure 5

Observed Disparity of GT Recommendations Between African American and Caucasian American Students



In describing the lack of disparity in GT recommendations between African American students and Caucasian American students, Participant A stated, “Honestly, it is harder to see this trend at our campus because we do have such a low number of white students.” Moreover, Participant E noted, “I think the planning to modify instructions and data tracking system for all sub pops [subpopulations] at my campus is playing a major role in closing the achievement gaps.”

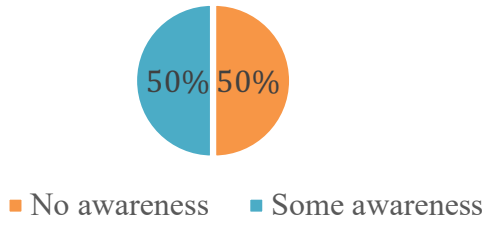
Conversely, Participant B noted no African American students in the fourth grade GT program at her school. Participant B speculated,

> Do parents know how to get their student tested for [the] program? Do parents know that being gifted is not only intellect? What type of relationship does the teacher have with the students in order to recommend them past just their academic capabilities? What biases are teachers imposing on their students when it comes to [the] program?

The other question that addressed the disparity in the GT recommendation process asked participants to share the steps their school implements to help parents with lower SES understand the GT qualification process. Figure 6 shows the participants’ knowledge of the actions taken by their school to ensure parental awareness of the GT recommendation and qualification process.

Figure 6

Participant Awareness of GT Qualification Process Communication with Parents



Participant E suggested that all meetings regarding the GT recommendation and qualification process be held in the parents' first language for comprehensive communication from the school to the home. The lack of understanding of the language of school in the United States has been found to create an arbitrary barrier to the gifted and talented programs for second language learners (Crabtree et al., 2019). In addition to communication in the parent's first language, Participant F recommended phone calls to the home, flyers regarding the process mailed to the family, and information placed on the campus website regarding GT recommendation and qualification.

Only two participants in the open-ended survey mentioned training teachers on deficit thinking and implicit bias. Participant A shared, "I feel like our school really works on deficit training. We are very trained on keeping high expectations for our students regardless of their backgrounds." On the other hand, Participant B stated, "Not enough work is being done to address cultural differences that can impact a teacher's delivery and ability to connect with students [such as] checking implicit biases that impact teaching whether intentional or unintentional."

Conclusion of Results

Using the qualitative measure to explain and inform the quantitative results is the strength of the mixed-methods approach to research (Alavi et al., 2018). The two methods of data collection were chosen to answer the research questions for this study: (a) what level of knowledge do mathematics teachers have about the academic achievement gap between African American students and Caucasian American students, and (b) what systemic school-based strategies explain the decreased academic achievement gap between African American students and Caucasian American students? Two themes that emerged as a result of the data analysis were

communication and systems. This section will explain the correlation between the quantitative and qualitative results related to communication and systems themes.

Communication

Communication between the school and the home and communication between individuals within the school were common themes throughout this study. Regular team planning was often mentioned by the participants as a strategy that is implemented at their school. Four participants explained in greater detail the backward and reflective planning, which takes place during the regular teacher planning sessions. These deep planning dives require a complicated degree of communication and collaboration between team members.

Other factors that support communication as a mitigating measure for the achievement gap are communicating with parents with lower SES regarding ways to help their child succeed academically. Communicating with parents often and in multiple ways builds a level of trust and relationship between the school and the home. Blandin (2017) argued that removing barriers to parental involvement in their child's education is critical for successful schools. The participant's responses endorsed this position.

Participants noted that positive relationships between the teacher and the parent provided rich dialogue regarding the availability of resources in the home, such as books, technology, and food. When there is a relationship involving honest communication between the teacher and the parent, the family and the school's needs can be effectively understood. There is a possibility of incorporating mitigating measures for deficits on either side.

In addition to positive relationships between the teacher and the parents, the participants acknowledged the significance of building relationships with students. The data supports the belief that expressing high expectations to students and involving students in goal setting creates

a trusting relationship between the teacher and the student (Allen et al., 2015). One participant recommended that teachers communicate to students the importance of progress and growth to discourage students from focusing so much on individual grades.

Systems

As stated previously, for this study, school systems refer to factors such as, but not limited to, master schedule considerations, staffing, and professional development opportunities. Using purposeful instructional strategies when teaching mathematics was noted by 93.6% of participants in this study as a factor influencing the achievement gap. The open-ended survey data supported this finding with teacher suggestions such as making the content relatable and fun for kids and providing them with tasks that encourage them to explain their thinking.

Other intentional instructional strategies that support the systems theme are using clean beginnings and endings for the lessons and other brain-based instructional methods. Providing a specific beginning and end to a lesson offers the brain a framework to place the learning. This and other brain-based teaching methods are part of a program utilized by the three schools in this study.

Another system's correlation between the quantitative results and the qualitative results is related to the discrepancy in the number of African American students and Caucasian American students enrolled in GT courses. In the Likert-type survey, the teachers were not aware of any distinction between the two groups and enrollment in GT courses. Likewise, in the open-ended survey, 70% of the participants responded that they were not aware of any disparity between the two groups in GT recommendations.

An area of systems that were not well understood by the participants was academic tracking in math courses. In the Likert-type survey, 48.4% of respondents selected the *neutral*

choice for the question about their awareness of academic tracking. The open-ended survey echoed the misunderstanding of the use of the word “tracking” in this study. The open-ended survey responses to tracking were related to measuring student growth, not an academic path of courses from which it is difficult to alter.

Chapter Summary

This chapter focused on explaining the data collection methods’ results and how the results answered the research questions. I used multiple measures to present quantitative and qualitative data. Furthermore, I compared the quantitative data with the qualitative data and identified themes in both data collection methods. Chapter 5 will discuss how the analyzed data will inform conclusions and recommendations to minimize the achievement gap in other schools.

Chapter 5: Discussion, Implications, and Recommendations

Despite years of research and mitigating efforts, African American students continue to trail Caucasian American students in academic achievement, particularly in mathematics (de Brey et al., 2019; Plata et al., 2017). This achievement gap is observed throughout the K–12 school years. The purpose of this study was to identify mitigating measures used by schools that have been successful in reducing the achievement gap between African American students and Caucasian American students in the area of mathematics to assist other schools in their efforts to minimize the achievement gap.

A mixed-methods approach was used to conduct this research to answer two research questions: (a) What level of knowledge do mathematics teachers have about the academic achievement gap between African American students and Caucasian American students?, and (b) What systemic school-based strategies explain the decreased academic achievement gap between African American students and Caucasian American students?

By using multiple methods and techniques throughout the research process, I used the qualitative data from the open-ended survey to inform the quantitative results from the Likert-type survey (Onwuegbuzie & Leech, 2019; Venkatesh et al., 2016). The research was limited by the inclusion of only three schools within one school district. The small number of participants from one population could limit the transferability of the results.

Chapter 5 is organized into four distinct sections. In the first section, I will explain the findings and limitations of the data results. The second section will explain the implications of the results in my district and education as an industry. In the third section, I will provide recommendations derived from the implications of the study. Chapter 5 will conclude with a

summary of the results concerning prior research on the achievement gap between African American students and Caucasian American students.

Interpretation of the Findings

Both phases of this research demonstrated the importance of continued study into the strategies and techniques found to mitigate the achievement gap between African American and Caucasian American students. The themes identified through this study's results, communication, and systems can be correlated to the research's theoretical frameworks. The theoretical frameworks influencing this research were equity theory, critical race theory, and change theory. The next section will explain the study results related to the first research question and the themes identified in the study through the lens of equity theory, critical race theory, and change theory.

Findings Related to Research Question Number One

This study's first research question focused on the level of knowledge possessed by mathematics teachers regarding the academic achievement gap between African American students and Caucasian American students. Each theoretical framework supported this research question. Equity theory was significantly influential to this question because it helped explain parents' and teachers' additional support and expectations. Blandin (2017), Kuhfeld et al. (2018), and Ogg and Anthony (2020) suggested that parenting practices can have an impact on the academic achievement of a child. Equity theory supported the theme of communication found in the results.

Communication between parents, teachers, and students was a common theme throughout the data collection process. For example, strong relationships were a key element to the appropriate communication level necessary to provide support for African American students

from lower SES. This study's results demonstrated teachers' awareness of the importance of establishing and maintaining a deep, meaningful relationship with students and their parents. Penner (2018) and Reardon et al. (2017) suggested that parents with low SES typically possess little of the skills needed to navigate the school environment. This study supported the belief that the academic achievement gap is addressed more significantly when there is effective communication between the school and the home regarding the child's academic progress.

Similarly, equity theory highlighted how effective communication promotes educational equity through the cyclical nature of teacher communication of high expectations and students' response to that expectation (Anderson, 2018). This study demonstrated the importance of expressing high expectations to all students, particularly African American students from lower SES. Eighty percent of teachers in this study reported that communicating high expectations to their students resulted in more positive relationships between teachers and students. Additionally, 40% of participants in this study noted the importance of helping students set goals and plans to reach their goals.

Critical race theory informed this study through the tenet of the intersection of race and SES. De Brey et al. (2019) and Henry et al. (2020) suggested that African American students are more likely to come from families with lower SES and live in less affluent communities. All the schools in this study had economically disadvantaged percentages over 50%. Elementary school number one had 83.4% of students reported as economically disadvantaged, while elementary school number two reported 90.4% economically disadvantaged students. The middle school in this study had 58% of students registered as economically disadvantaged. African American students made up 27% of elementary school number one, 27% of elementary school number two,

and 19% of the middle school. Caucasian American students consisted of 6% of the student body at both elementary schools.

A lack of resources found in very low SES areas is part of the systems related to the achievement gap and the intersectionality of race and SES. More African American students living in low-income situations or poverty equates to less access to educational resources for this group (Kuhfeld et al., 2018). The lack of resources available to families with less SES was echoed in the results of this study. The teachers participating in this study reported a lack of resources among students, such as Internet access, technological devices, and books. It is vital for schools located in lower SES neighborhoods to provide resources not found in their students' homes.

An element of the communication and systems themes found in this study is parental support of their children. Penner (2018) found that parental support and parenting practices contribute to the achievement gap of students. The differences in parenting practices between racial-ethnic and socioeconomic groups result in a wide variation in children's academic achievement (Tan, 2015). Fifty-eight percent of participants in this study reported that schools could help parents from lower SES understand how they can partner with teachers in their child's education. Assisting parents in understanding how to partner with schools is very important to increase the gifted and talented recommendations of African American students and increase support on homework and review activities.

Through the theory of change, Bakari et al. (2017) suggested that there must be a willingness to change before authentic change can occur. Sixty percent of the participants in this study reported an awareness of the achievement gap between African American and Caucasian American students and factors that can impact it. Framing the achievement gap with change

theory supports the premise that the disproportionality between African American students and Caucasian American students' academic achievement can be changed to create a more equitable environment related to behaviors or attitudes. One element related to the achievement gap for which participants noted a need for change was increased teachers' training.

Burnes (2015) suggested that the most common reason for a change initiative's failure is resistance to change. As found in this study of schools that have shown a reduction in the achievement gap between African American and Caucasian American students, an awareness of the factors contributing to the achievement gap can help teachers incorporate mitigating measures. Ford (2014) argued that "the nature, extent, and quality of educators' training to work effectively/equitably with students from both culturally different groups should be examined. Professional development on culture and cultural differences must be ongoing and substantive" (p. 152). Participants in this study recommended that teachers receive training in the areas of cultural differences and implicit bias.

Findings Related to Research Question Number Two

The second research question in this study focused on the systemic school-based strategies that explain the decreased academic achievement gap between African American students and Caucasian American students at the schools involved in the study. Schools' strategies that reduce the achievement gap between African American and Caucasian American students are directly related to the school's systems. Furthermore, how the teacher communicates strategies to students is crucial to the students' success within a school.

Equity theory was demonstrated in the schools in this study by how the teachers communicated and implemented instructional strategies. Hunt and Seiver (2018) argued that understanding the deficits in learning expressed by their students' academic performance allows

teachers to construct more effective instructional techniques. This study revealed that holding all students to the same rigorous standards can reduce the achievement gap between African American and Caucasian American students. Seventy-seven point four percent of the participants in this study were aware of instructional strategies that helped minimize the achievement gap. Equity theory supports the suggestion that teachers possess a direct influence on a student's achievement by presenting engaging lessons and building relationships with students (Davis et al., 2019; Diemer et al., 2016; Seo et al., 2019; St. Mary et al., 2018).

Participant's responses support Larnell et al.'s (2016) assertion that critical race theory provides a lens to view the symbiotic relationship between socioeconomics and access to resources. Seventy percent of participants in this study suggested using specific strategies to minimize the achievement gap between African American students and Caucasian American students. Three distinct strategies present in the schools in this study that helped combat systemic racism and established an equitable and balanced learning environment were backward planning for assessments, differentiating instruction based on student needs, and setting goals for students based on their previous year's achievement.

Participants reported that they consciously looked for ways to make the learning relevant for their students. Change theory asserts that there must be a readiness to change before actual change can occur (Bakari et al., 2017). The participants' overwhelming assertion in this study was modifying instruction based on students' academic progress and data. Another strategy used by study participants to make learning relevant to students was connecting the content to their lives. This strategy supports the literature that understanding the students' cultures in the class helps teachers provide a more equitable classroom environment (Warren, 2017).

The theme of communication was reflected in the second research question. Anderson (2018) argued that the teacher's expression of high expectations could influence the student's academic performance. Similarly, Kotok (2017) suggested that positive relationships with adults at school lead to increased engagement. Study participants reported that regularly communicating high expectations to their students and their belief that all students can achieve academic success positively influenced the achievement gap between the African American students and Caucasian American students on their campus.

Limitations

While this study provided some compelling information regarding factors that could reduce the achievement gap between African American and Caucasian American students, it was not without limitations. One of the initial limitations was the small population surveyed for the study. Three schools within one school district were selected for this study due to their success in minimizing the achievement between African American students and Caucasian American students on the 2019 mathematics STAAR. By studying three schools within one district, a small number of teachers were available for the sample. Although 66 teachers received the initial survey, only 31 teachers completed the survey. The small number of study participants could limit the transferability of the study results to other school districts.

Another limitation of this study is my involvement in the research and my position in the school district. Using reflexivity, I was always aware of and evaluating my influence on the study results. To achieve the study results' trustworthiness and confirmability, I needed to remove myself to the most extent possible during the data collection phase. This was accomplished by establishing a campus research sponsor at each participating school. The campus research sponsor served as the liaison between the study participants and me. The

campus research sponsor provided consent forms and the Likert-type survey to study participants. Campus research sponsors randomly selected five individuals from those completing the Likert-type survey to send the link to the open-ended survey. I had no interaction with any of the study participants throughout the entire study.

These measures taken to reduce the limitation created by my position in the district produced an additional restriction that could affect the results' interpretation. A sampling bias could impact the interpretation of results due to the small sample size and the demographic makeup of the teachers involved in the study. As the researcher with a position of authority in the school district, I removed myself entirely from the data collection process and any interaction with the study participants. This complete removal interfered with my knowledge of the demographics of the teachers who participated in the research. I was unaware of the years of experience, gender, race, or training level for any of the study participants. This lack of information prevented me from ensuring a representative sample that can be replicated. The generalizability of the results is limited because this study provides no information on the individuals involved.

Implications

The findings in this study have several implications for my school district and education as an industry. This study's implications reflect systems and communication themes and support the theories of equity, critical race, and change. The first implication of this study is the impact of the teacher on the academic achievement of students.

Warren (2017) and Whitford and Emerson's (2019) assertion that teachers who demonstrate understanding and encouragement toward students influence their academic achievement was supported in this study. Multiple teachers in this study's qualitative portion

reaffirmed the belief that positive, trusting relationships between the teacher and his or her students held significant influence over their students' academic achievement. Moreover, the qualitative results maintain teachers' belief that strong relationships between the home and the school provide a more supportive environment for students. Schools may need to create opportunities for these healthy, positive relationships to occur and flourish.

Another implication from this study is the regular expression of high expectations for all students from their teachers. Anderson (2018) proposed the importance of teachers articulating their belief that all students can achieve high academic achievement levels. The teachers in this study paralleled this assertion. Many study participants reiterated the importance of communicating high expectations to students in multiple ways. One method of communicating high expectations to students repeated by study participants was goal setting with students based on individual progress. Engaging students in goal setting, evaluating their progress, and modifying their goals could be strategies teachers use in other schools in this school district.

A third implication from the study results is the communication between the school and the home regarding how parents can support their children toward academic achievement. Study results align with the literature that argued that parenting behaviors and access to resources could impact children's academic achievement (Henry et al., 2020; Penner, 2018). The results suggested that parents with low SES benefit from symbiotic relationships with their children's school and teachers. Establishing systems that encourage regular communication with parents regarding how to support their children at home and gain access to resources to help their children achieve academic success is a strategy shown by study results to impact the achievement gap between African American and Caucasian American students.

This study demonstrated that the selected schools' mathematics teachers adopted commonly used strategies and techniques in place at many other schools to minimize the achievement gap between African American and Caucasian American students. Since the strategies used by the teachers were not different from other schools, the distinguishing factor for the success of these three schools points to the leadership present in the schools. Gülşen and Gülenay (2014) and Hollingworth et al. (2018) agreed that the principal's leadership determines the school culture and climate and directly influences its success.

School principals established collaboration among teachers and the use of research-supported techniques to provide effective, meaningful instruction. Hollingworth et al. (2018) argued that enacting change is easier when the school culture supports risk-taking and a willingness to fail in the process of learning a new skill. The principals at the schools involved in this study provided strong leadership and encouragement to think outside the accepted teaching methods. Leadership traits, such as trustworthiness, help teachers feel comfortable with new paradigms (Bakari et al., 2017). By providing a trusting environment in which to try and fail, then try again, these principals encouraged their teachers to change strategies based on the needs of their students. Moreover, the principals established a school culture of accountability among the staff, which allowed all staff members to hold each other to very high standards of teaching and supporting students and parents in their strive for academic success.

Just as important as relationships between students and teachers is the relationship between the principal and teachers. Learning environments with a high degree of trust between campus leaders and teachers celebrate student improvement and are more open to change (Hollingworth et al., 2018). The climate on each of the campuses involved in this study reflected common goals for student achievement and continuity of high expectations for all students,

regardless of SES, gender, or race. The principals demonstrated strong leadership by inspiring teachers to be creative in motivating and communicating with their students. The broad acceptance by the campus leadership of diverse teaching and communication methods could have contributed to a more significant reduction in the achievement gap on these campuses.

Recommendations

This study demonstrated the importance of teachers' awareness of strategies that influence the academic achievement of students. It also supported the literature that students respond to equitable practices in the classroom (Diemer et al., 2016). Recommendations were developed from combining the quantitative and qualitative data results and interpreting the results through the lens of equity theory and change theory.

Recommendations for Practical Applications

Based on the implications of this study, there are several recommendations for practical applications. This study confirms the research suggesting that providing the circumstances that establish a more equitable learning environment for all students assists in overcoming the achievement gap between African American students and Caucasian American students (Davis et al., 2019; Ogg & Anthony, 2020; Paschall et al., 2018; Zhao, 2016). The protective factors present in the schools involved in this study could help other schools minimize the achievement gap (Hanushek, 2016; Wickstrom & Gregson, 2017).

A recommendation from this study is for schools to establish a system of team planning for their teachers. Team planning is crucial to teachers by providing the collaboration needed to understand the data related to the student's academic achievement. Collaborative planning sessions allow teachers to establish students' goals based on prior performance and modify instruction based on data.

Whitford and Emerson (2019) argued that expectations could be expressed differently depending on implicit bias. Another recommendation for practical application is to provide teachers training on cultural differences and deficit thinking, such as implicit bias. Providing training and support for the teachers on implicit bias can create an awareness of potentially discriminatory practices present in the classroom. Prior research suggested that teachers hold an unconscious bias toward students of color and students from lower SES, exhibited through lower teacher expectations (Liou et al., 2017; Peterson et al., 2016). Study results suggested that participants understood the importance of expressing high expectations for all students, regardless of race or SES. Teachers need to understand the impact of their instructional choices and communication techniques in the classroom. Therefore, training teachers on communication methods and teaching without bias is critical for minimizing the achievement gap.

The third recommendation for practical application is increasing parents' awareness of the process for gifted and talented recommendation and qualification. Since family income can be as restricting as a child's race when it comes to gifted program access (Crabtree et al., 2019) and African American students are disproportionately underrepresented in gifted and talented programs in schools (Covay Minor, 2016; Ford, 2014; Tabron & Chambers, 2019), providing information to parents on what constitutes giftedness and steps to recommend their child to the gifted and talented program is essential to increasing the number of African American students on an upper-level track of courses. Reducing the impact created by a lack of understanding or awareness of parents about the gifted and talented program at their child's school could minimize the achievement gap by providing more African American students to be considered for the program.

Recommendations for Future Research

The recommendations for future research stem from the findings and limitations of this study. One area for future research is the impact of tracking in mathematics courses. While the literature pointed to a constancy of the track of math courses from early in the school years leading to an inability to move from a lower-level math course to a higher-level math course, this study did not produce that result. However, this study revealed a misunderstanding of the definition of tracking among teachers at different levels of school.

The misunderstanding of the impact of tracking speaks to another recommendation for future research. This study involved two elementary schools and one middle school. The lack of understanding about the significance of tracking on students' math achievement suggests that teachers in the lower grades of public school may not appreciate the long-term effects of tracking on a child's academic path, even into higher education. I recommend further study on creating awareness among teachers in early grades of course tracking and its effects on students' educational path.

Finally, I recommend future research on how change theory influences culturally responsive teaching practices. This study demonstrated that teachers who communicated high expectations to their students created a learning environment that minimized the achievement gap between African American and Caucasian American students. The willingness to recognize that the communication of high expectations, regardless of race, gender, or SES, influences academic achievement and reflects an acceptance of changes in education. Future research should focus on the change inherent in using culturally responsive teaching practices and teachers' willingness to accept those changes.

Chapter Summary

This research study sought to contribute to the literature on the awareness of mathematics teachers about the achievement gap between African American and Caucasian American students and the strategies used to mitigate the achievement gap. Using a mixed-methods explanatory sequential design, I used a Likert-type survey to study teachers' beliefs about the factors that influence the academic achievement gap between African American students and Caucasian American students and an open-ended survey to explore the strategies used by teachers that minimize the achievement gap at their school.

The quantitative findings demonstrated a strong agreement among study participants that teachers' purposeful strategies, the communication of high expectations to all students, and teaching students on the importance of intrinsic motivation can positively influence students' academic achievement. The study participants also resoundingly agreed that providing strong school support for parents with lower SES, who typically have a lack of environmental and social experiences and lower levels of education (Chmielewski, 2017; Reardon, 2018), contributed to minimizing the achievement gap between African American and Caucasian American students.

Qualitative findings explained the strategies prevalent in the study's schools, which teachers believed reduced the academic achievement gap among their students. For example, the communication of high expectations for all students, the impact of teacher collaborative planning and review of student data, and goal setting with students, including the modification of goals in response to student progress, were all reported as strategies used at the schools in this study. Kotok (2017) argued that positive relationships with adults at school lead to increased engagement by students. Study participants reflected this argument by reporting that strong

relationships between the teacher and the students create a learning environment in which all students benefit.

The significance of this study cannot be understated in today's environment of social unrest. The disparity in the academic achievement of African American students related to Caucasian American students' academic achievement should be viewed through a critical lens by educators in all areas of our country. Understanding the long-term impact of less African American students in upper-level mathematics courses in the early grades is crucial to providing equity among college students and access to high paying jobs. The wide-reaching effects of the decisions made by school leaders regarding school systems such as teacher hiring and training, scheduling students into classes, and support for students and parents from lower SES must be considered as we address the overwhelming and persistent gap in achievement between groups of students. This study seeks to add to the literature on measures that have minimized the achievement gap between African American and Caucasian American students.

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Appendix A: Likert-Type Survey

Please answer the following survey questions. Participants are cautioned to refrain from providing possible identifying information (e.g., school, grade taught, etc.) throughout the participation process.					
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. I recognize that schools can influence the academic achievement gap between African American and White students using purposeful strategies.	○	○	○	○	○
2. I am aware of instructional strategies that minimize the mathematics achievement gap between African American and White students.	○	○	○	○	○
3. I am aware of school-based measures that provide additional support for families with lower SES.	○	○	○	○	○
4. I am aware of school-based strategies that help parents with lower SES understand how they can partner with teachers in their child's education.	○	○	○	○	○
5. I am aware of school-based strategies that address the discrepancy in the number of African American students enrolled in GT courses related to White students.	○	○	○	○	○
6. I believe that tracking students into higher- or lower-level math courses in the early grades puts students onto a permanent academic track.	○	○	○	○	○
7. I believe there are school-based strategies that minimize the occurrence of academic tracking in upper-level mathematics courses.	○	○	○	○	○
8. I am aware of the influence of implicit bias on teaching practices.	○	○	○	○	○
9. I utilize strategies to ensure that high expectations are communicated to all students.	○	○	○	○	○
10. I utilize strategies that teach students about the influence of intrinsic motivation on their academic achievement.	○	○	○	○	○

Note. The word White represents Caucasian Americans in this table.

Appendix B: Open-Ended Survey Questions

Before video

1. Do you believe that the home or the school has the most influence over a child's academic achievement? Why?
2. Have you witnessed the achievement gap between African American students and White students on your campus? If yes, to what do you attribute that gap?

Link to video clip: https://youtu.be/adMFCNdbIsA?t=267

After video

3. Did you hear any new information in the video? If so, what was new information?
4. Does your school use any strategies like those mentioned in the video? If so, how does your school implement those strategies?
5. The person being interviewed discussed the disparity in gifted and talented recommendations between African American students and White students. Have you observed this disparity at your school? If yes, to what do you attribute the disparity at your school?
6. What steps, to your knowledge, does your school take to help parents from lower SES understand the GT recommendation and qualification process?
7. Tracking of math classes was also discussed in the video. What is your understanding of the impact of tracking on a student's progression through mathematics courses?
8. Other than strategies previously shared, what processes or techniques have you observed which help to minimize the achievement gap between African American and White students?

Note. The word White represents Caucasian Americans in this survey.

Appendix C: IRB Approval Document

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
325-674-2885

September 3, 2020

Sheri McCaig
Department of Organizational Leadership
Abilene Christian University

Dear Sheri,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled "The Academic Achievement Gap: Learning from Schools That Bridge the Academic Achievement Gap between African American students and White Students",

was approved by full board review on August 31, 2020 for a period of one year. (IRB # 20-092). The expiration date for this study is August 31, 202:. If you intend to continue the study beyond this date, please submit the Continuing Review Form at least 30 days, but no more than 45 days, prior to the expiration date. Upon completion of this study, please submit the Inactivation Request Form within 30 days of study completion.

If you wish to make any changes to this study, including but not limited to changes in study personnel, number of participants recruited, changes to the consent form or process, and/or changes in overall methodology, please complete the Study Amendment Request Form.

If any problems develop with the study, including any unanticipated events that may change the risk profile of your study or if there were any unapproved changes in your protocol, please inform the Office of Research and Sponsored Programs and the IRB promptly using the Unanticipated Events/Noncompliance Form.

I wish you well with your work.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs