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Junior High School Teachers' Perceptions of Math Instruction for African American Students

Sandra Denise Richardson
Walden University

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Sandra Richardson

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Dr. Michael Jazzar, Committee Member, Education Faculty

Dr. Tammy Hoffman, University Reviewer, Education Faculty

Chief Academic Officer

Eric Riedel, Ph.D.

Walden University
2016

Abstract

Junior High School Teachers' Perceptions of Math Instruction for African American
Students

by

Sandra Richardson

MA, Albany State University, 2004

BS, Albany State University, 2001

Doctoral Study Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education

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October 2016

Abstract

A mathematics achievement gap exists between 8th grade African American students and other ethnic groups. Guided by the conceptual framework of constructivism, the purpose of this case study was to examine 8, Grade 8 math teachers' perceptions of factors contributing to mathematical performance gap in their African American students and what instructional strategies can be used to help reduce the achievement gap in southwest Georgia. Data were obtained through interviews and classroom observations and were coded and analyzed using typological analysis, followed by inductive analysis. The results of the data revealed teachers perceived recruiting and retaining African American teachers and providing professional development on the various co-teaching strategies, could help lower the achievement gap between African American students and other ethnic groups in the area of mathematics. Based on the findings, a professional development plan was created which addressed co-teaching, aligning instruction to the needs of African American students' culture, and implementing different instructional strategies in the math classroom. The implementation of this project may contribute toward positive social change by helping teachers support 8th grade African American students' performance in mathematics thus improving math achievement.

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Dedication

This doctoral study is dedicated to my son, Quen. I am so proud of you. You are my pride and joy. You are the reason why I work so hard to be successful. I hope watching my dedication and hard work throughout this journey encourages you to never give up. I love you with everything in me. My greatest accomplishment is being your mom. No matter how old you get you will always be my baby. Always remember to put God first and everything else will fall into place.

I also dedicate this doctoral study to my mom, Bobbie. I would not be here if it were not for you. Thanks for always loving me unconditionally. You are not only my mom, but you are also my best friend. Thanks for your continued encouragement and support. I love you more than you will ever know. Thanks for listening to me vent about this tedious journey. You are truly the wind beneath my wings.

During this journey, I suffered a significant loss. My dad, Willie Lee Richardson, passed away from stomach cancer. My dad meant the world to me. I loved him more than words can say. During his battle with cancer, I found myself in a very dark place. I became unfocused and unmotivated. When I finally realized he would never want me to give up, I pulled myself together. I know he may not physically be there when I receive my diploma, but I know he will be shining and smiling down on me from Heaven. Although your time on earth has expired, you will live in my heart forever. I love you dad.

Acknowledgments

First I would like to give honor to God, who is the head of my life. None of this would be possible without the guidance of my committee members, Dr. Marcia Griffiths-Prince and Dr. Susan Whitaker, Dr. David Bail, the URR representative, and the love and support of my family, friends, and coworkers. I would like to thank every one of you sincerely for helping make my dream a reality.

I would like to begin by thanking my committee chair, Dr. Marcia Griffiths-Prince. I would not have completed this journey without your guidance, patience, and support. Thanks for always being so supportive and only a phone call away. Your encouragement helped me more than you will ever know. There were several times I felt like giving up, but you encouraged me to keep pushing forward. Thanks for the laughs. I truly believe laughter is good for the soul. Because of you I am finally achieving one of my life's dream.

My sister and best friend, Alicia, thanks for being my cheerleader and number one fan. You believed in me even when I did not believe in myself. I would not have made it through this journey without you. I love you. To my brothers, Patrick, Willie, and Anthony, thanks for the encouragement, love, and support. I love you all dearly.

I would also like to thank my best friends, Eva and Mirander. We are not only best friends, but we are sisters. No matter what goes on in my life, good or bad, you ladies are always there to support me. We may not see or talk to each other everyday, but I know that you are only a phone call away if I need you. People say best friends are hard to find. That is because the best is already mine. I am truly blessed to have best friends like you. I love my best friends.

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Section 1: The Problem

Introduction

Performance in mathematics by African American students in junior high school has always been low compared to the performance of other ethnic groups in the United States. A number of reasons have been presented for this disparity in performance. Among the many reasons cited for the performance disparity were that factors associated with poverty and social orientation forced African American students to operate with different learning styles (Beecher & Sweeny, 2008; Darling-Hammond & Sykes, 2003), the use of the ‘*one-size-fits-all*’ curriculum for teaching (Alonso, Anderson, Su, & Theoharis, 2009; McBride, 2004), and more recently, that many teachers continue to use the same education approaches and styles with all ethnic groups (Johnson & Kritsonis, 2010; Weber, Johnson, & Tripp, 2013; Wynn, Fite, & Pardini, 2011). Other researchers have attributed reduced performance in mathematics achievement among African American students to disinterest in the regimen of mathematics education and lack of motivation (Flores, 2007; Lawrence-Brown, 2004; Thomas & Stevenson, 2009; Wilson & Rodkin, 2011).

Many researchers acknowledged the existence of some of the social and economic deficits of African American students (Cole, 1995; Ro & Choi, 2009; Williams, 2011). However, some suggested that not every African American student facing such challenges will perform poorly if instructors were aware of, and responsive to, the factors that are affecting mathematics achievement of African American students. Therefore, the purpose of this qualitative case study was to examine the attitude and perceptions of

mathematics teachers' regarding the achievement gap in mathematics between African American students and students of other ethnicities, the perceived causes of the achievement gap, their instructional practices as they influence the mathematics performances of 8th grade African American students, and their suggestions for reducing the achievement gap.

Definition of the Problem

The United States is becoming multicultural in every aspect (Banks, 2007; Cole, 1995; Demerath, 2012) and the wide achievement gap in mathematics among ethnic populations has become a problem nationwide. Public schools across the nation continue to struggle with persistent achievement gaps and this challenge becomes even greater for schools with high-poverty and high-minority populations, according to Li and Hasan (2010).

Many reasons have been advanced as causes for the variations. While some factors that contribute to lower achievement of African American students in mathematics have been identified in the literature as well as some possible solutions, the factors causing the lower achievement in the target district and appropriate solutions have not been identified.

In 2009-2010, 2010-2011, and 2011-2012 a higher percentage of African American students scored *not met* compared to the percentage of Hispanic and White students who scored *not met* in the target school district. The percentage of African American students who failed to meet the criteria in mathematics during the 2009-2010 academic year was 27%, which was higher when compared to other ethnic groups, such

as Hispanics at 19% and Whites at 11%. In 2010-2011, the percentage of African American students who failed to meet the criteria in mathematics was 27% which was higher than 21% Hispanics and 12% Whites. During the 2011-2012 academic year, the percentage of African American students who failed to meet the criteria in mathematics was 24%. That percentage was also higher when compared to other ethnic groups (Hispanics 14% and Whites 12%).

Rationale

Evidence of the Problem at the Local Level

Data has shown that achievement gaps continue to exist in rural school districts nationwide (Johnson & Kritsonis, 2010). A mathematical achievement gap has been shown to exist between African American students and other ethnic groups (Li & Hasan, 2010). Because employers seek individuals with basic mathematics skills, it is necessary that African American students receive relevant instruction (Ballard & Cintrón, 2010). This can be achieved, only if teachers are equipped and adopt math instructional strategies that help African American students overcome sociocultural and economic impediments to learning mathematics. This research, therefore, created awareness about the inequality in the achievement scores of 8th grade students in mathematics across the nation.

At this rural south Georgia school, there is a significant gap in mathematics achievement among African American students and other ethnic groups according to testing data (Georgia Department of Education, 2013). The school has an enrollment of 1,272 students in Grades 8-9; the grade of focus will be Grade 8. In order to document

the gap in mathematics achievement among African American students and other ethnic groups, testing data from the 2008-2009, 2009-2010, 2010-2011, and 2012-2013 report cards were examined. The report cards showed the percentage of students at each performance level for African American, Hispanic, and White students. The Criterion Referenced Competency Test (CRCT) categorizes students into three performance groups: does not meet, meets, and exceeds the established standard.

Figure 1 illustrates that for the academic year 2008-2009, the percentage of African American students who failed to meet the criteria in mathematics was 28%. This percentage is lower when compared to Hispanics at 30%, but higher when compared to Whites at 13%. The percentage of those who met the criteria among African Americans was 68% while the percentage of Hispanics who met criteria was 64%, and for Whites the percentage was 70%. The percentage of African Americans who exceeded the criteria was 4%, for Hispanics was 6%, and for Whites was 17%.

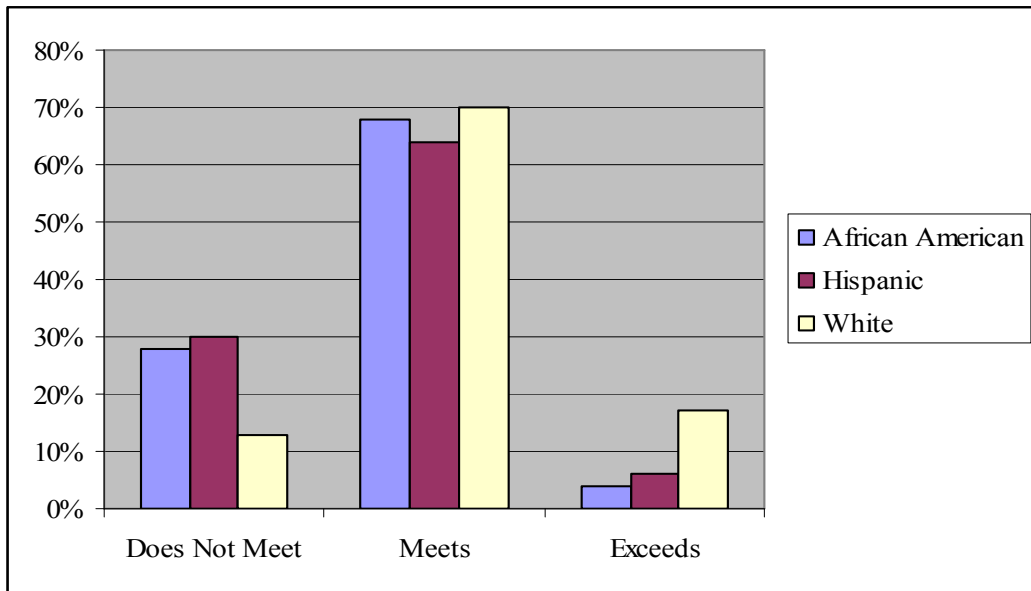


Figure 1. Bar graph showing the percentage of African American, White, and Hispanic students who do not meet, meet, and exceed the math criteria for the academic year 2008-2009. Source: Georgia Department of Education School Report Card, 2013.

Figure 2 also illustrates that the percentage of African American students who failed to meet the criteria in mathematics was 27%, which was higher when compared to other ethnic groups, such as Hispanics at 19% and Whites at 11%. The percentage of those who met the criteria among African Americans was 66% while the percentage of Hispanics was 74% and Whites 71%. While 8% of African American students during the 2009-2010 academic year exceeded the criteria, 7% Hispanics compared to 18% Whites exceeded the criteria, respectively.

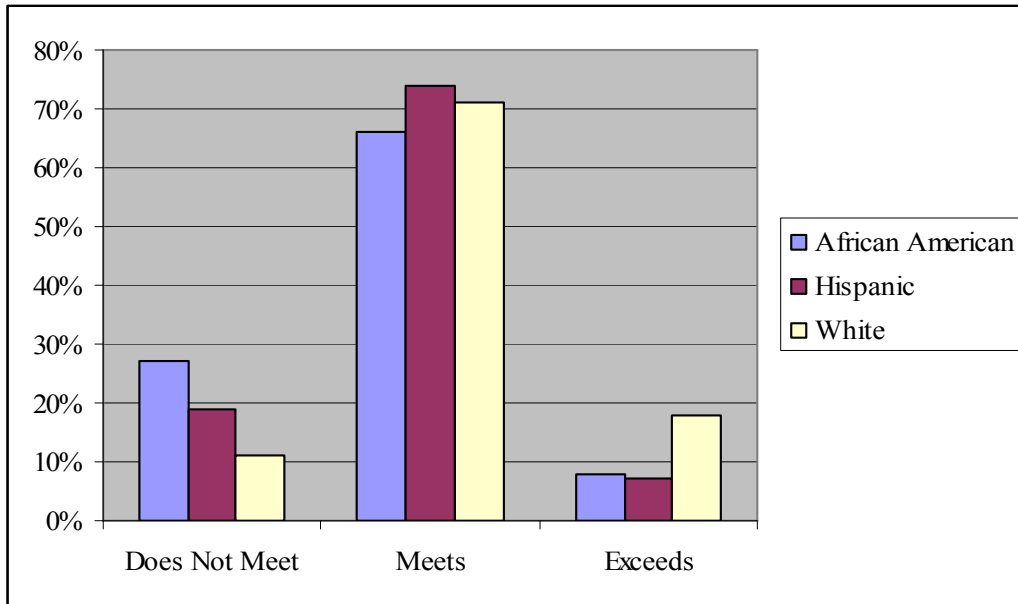


Figure 2: Bar graph showing the percentage of African American, White, and Hispanic students who do not meet, meet, and exceed the math criteria for the academic year 2009-2010. Source: Georgia Department of Education School Report Card, 2013.

Figure 3 illustrates that the percentage of African American students who failed to meet the criteria in mathematics during the 2010-2011 academic year was 27% which was higher than 21% Hispanics and 12% Whites. Among African American students the percentage which met the criteria was 65%, while 63% of Hispanics, and 66%, of Whites met the criteria. The percentage distribution of students who exceed the criteria that year was different. Only 8% of African Americans, 16% Hispanics, and 22% of Whites exceeded the criteria.

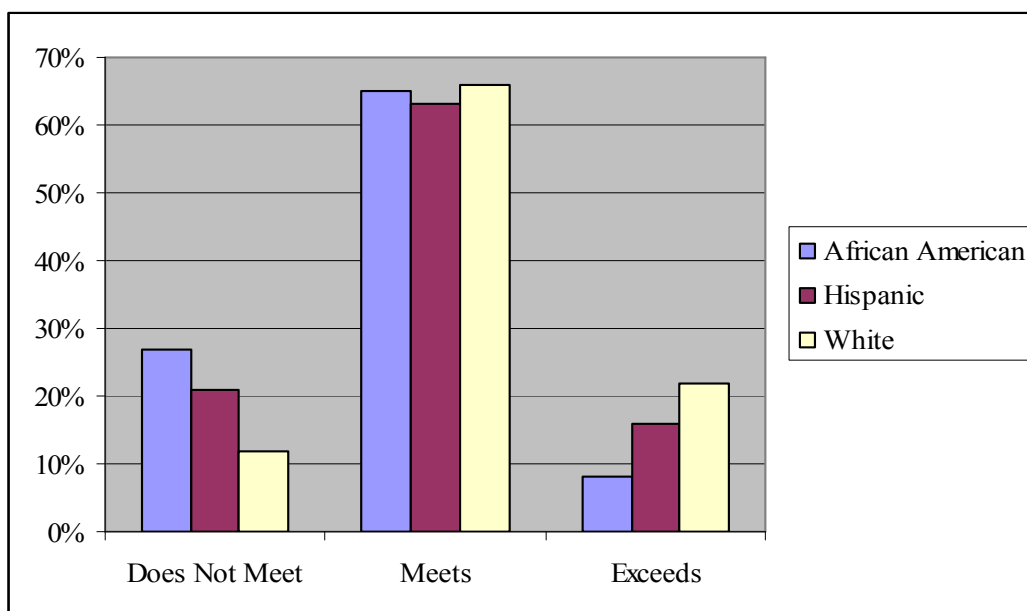


Figure 3. Bar graph showing the percentage of African American, White, and Hispanic students who do not meet, meet, and exceed the math criteria for the academic year 2010-2011. Source: Georgia Department of Education School Report Card, 2013.

Figure 4 illustrates that for the 2011-2012 academic year, the percentage of African American students who failed to meet the criteria in mathematics was 24%. That percentage was also higher when compared to other ethnic groups (Hispanics 14% and Whites 12%). Although a higher percentage (67%) of African American students met the criteria compared to 63% for both Hispanics and Whites respectively, only 9% of African American students exceeded the criteria while the percentages for Hispanics was 23% and 25% for Whites.

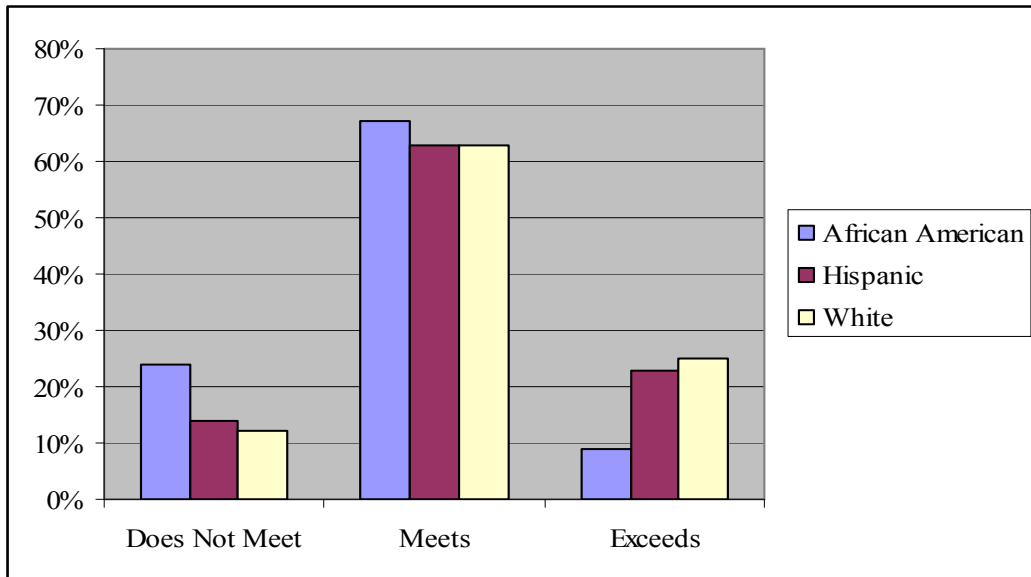


Figure 4. Bar graph showing the percentage of African American, White, and Hispanic students who do not meet, meet, and exceed the math criteria for the academic year 2011-2012. Source: Georgia Department of Education School Report Card, 2013.

Evidence of the Problem from the Professional Literature

The plight of the African American students in the classroom in general and regarding achievement in mathematics in particular had attracted both the attention and suggestions for remediation from many studies in the country. Banks (2007), Haberman (2009), Hyland (2009), and Matrevec (2011) all concluded that in order to effectively interact with African American students, teachers need training in multiculturalism, as well as experience working in multicultural settings. Flores (2007) noted that by the 8th grade, 91% of African American students across the United States are not proficient in mathematics. The Report Card prepared by the National Assessment of Educational Progress (NAEP) for 2013 confirmed that the percentage of African American students at or above proficiency in the 8th grade NAEP mathematics exam was the lowest (14%)

when compared with 21% of Hispanics and 45% of Whites (National Assessment of Educational Progress, 2013).

Among the many reasons presented for the low mathematics achievement of African American students in the country were (a) most teachers in multiracial schools have limited knowledge of African American students' learning styles because, in many cases, the teachers do not complete their in-service training programs (Watson, Park, & Lee, 2011), (b) use of ineffective curriculum and instructions for teaching African American students (Bronfenbrenner, 1979), and (c) lack of understanding by school administrators and district leaders on best practices that will provide enabling assistance to teachers in preparing African American students to succeed in mathematics (Brown, Benkovitz, Muttillio, & Urban, 2011; Davis & Jordan, 1994; Morris & Morris, 2013).

For remedial solutions, Haberman (2009) and Koutrouba, Baxevanou, and Koutroumpas (2012) argued that within any classroom, the instructor exerts positive or negative impacts on an African American student, and that classroom climate, motivational strategies used, and the teaching strategies adopted play major roles in influencing those reactions. They advised that, irrespective of students' past performances, by using positive approaches instructors can generate positive achievements in scores and behavior from their students.

Hines and Kritsonis (2010), Kennedy (2009), Cogburn, Chavous, and Griffin (2011), Hughes (2011), and Van den Bergh, Denessen, Hornstra, Voeten, & Holland (2010) surmised that instructors who do not succumb to the stereotyping of African American students as created by the media normally encourage and foster higher order

thinking skills, avoid low self-esteem, and boost performances among African American students. Brown, Bigler, and Chu (2011) advised that in order to elevate the African American students from environmental and social pressures, teachers must have and demonstrate a sense of confidence in the mathematics ability of the student to succeed.

The purpose of this case study, therefore, was to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics.

As a result of the evidence observed at the local level and supported in the professional literature, an 18-point questionnaire was developed to guide and record in-depth interviews from eight non-randomized samples of 8th grade mathematics instructors with classroom teaching experiences of African American students in rural south Georgia. Field observations were also conducted in the respective classrooms of the teachers to collect evidence regarding teaching styles and student interactions.

Definition of Terms

The following terms were essential to the study and are defined as follows:

Achievement gap: An achievement gap occurs when a subgroup of students' scores significantly lower on a standardized test than their counterparts (NCLB, 2001).

African American: A person having origins in any of the Black racial groups of Africa (Prewitt, 2013).

Co-teaching: A process by which two or more trained teachers work together in a teaching and learning context (Milme, Scantlebury, Blonstein, & Gleason, 2011).

Criterion Referenced Competency Test (CRCT): The test used in the state of Georgia designed to measure how well students acquire the skills and knowledge described in the standards set forth by the state (Georgia Department of Education, 2013).

Differentiated instruction: Differentiated instruction presents an effective method to address learner variance (Tomlinson, Brimijoin, & Narvaez, 2008), avoids the pitfalls of the ‘one-size-fits-all’ curriculum (McBride, 2004), and incorporates current research into the workings of the human brain (Tomlinson & Kalbfleisch, 1998; Tuttle, 2000), while supporting the multiple intelligences and varying learning styles (Lawrence-Brown, 2004; Tuttle, 2000) within contemporary classrooms.

Hispanic: A person of Cuban, Mexican, Puerto Rican, South or Central American or other Spanish culture or origin (Prewitt, 2013).

Instructional strategies: Strategies that determine the approach a teacher may take to achieve learning objectives (Edmonds, 1999).

Learning strategies: Methods utilized by students to learn or to take tests (Rothkopf, 1970).

Learning styles: Characteristic cognitive, effective, and psychosocial behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment (Curry, 1981).

Mathematics: The word ‘Mathematics’ is used interchangeably with the word “mathematics”, “math”, or “Math”.

Professional Learning Community: A process in which teachers and administrators continuously seek and share learning, and act on their learning (Stroll, Bolam, McMahon, Wallace, & Thomas, 2006).

White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa (Prewitt, 2013).

Significance of the Study

This study is significant for three primary reasons. First, by identifying the causes of the achievement gap in mathematics among African American students, teachers and administrators will be able to focus on areas that need to be addressed in order to close the achievement gap. Second, this study adds to the body of literature demonstrating the state of Georgia's cognizance of the various negative stories generated in the media from the prosecution of some teachers in the state who were accused of overzealousness in assisting their students to meet the state and federal passing standards. And finally, the creation of a project developed from the findings of this study could become a replicable blueprint for use by other institutions with similar problems.

Research Questions

This study focused on mathematics teachers and the achievement gap among African American students in mathematics. The purpose of this case study was to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics. Based on the evidence collected at the local level and supported in the

professional literature, the following four questions were developed to guide the study inquiry:

- RQ1. What are the attitudes and perceptions of junior high school mathematics teachers about the instructional strategies they use to teach 8th grade African American students math?
- RQ2. To what extent is the academic achievement of African American students in mathematics disproportionately lower compared to other ethnic groups?
- RQ3. How can educators determine the causes for the achievement gap and what can they do to help reduce it?
- RQ4. What instructional strategies could be implemented to close the mathematics achievement gap among African American students in mathematics?

Conceptual/Theoretical Framework

The foundation supporting the conceptual and theoretical framework for this study was the philosophy of constructivist theory which postulated that all children without organic retardation can learn (Bruner, 1996). Slavin, Madden, Karweit, Dolan, and Wasik (1992) asserted that, although some children may need more help and different approaches in order to learn, all children, however, can become successful learners.

Gordon (2009) noted, “teaching should promote experiences that require students to become active, scholarly participators in the learning process” (p. 39). It is the role of teachers to promote students’ experience and competence by inviting a student to be

active both in academic work and in other critical class activities (Brooks & Sanders, 2012).

Researchers have supported applying the theory of constructivism to the learning and teaching of mathematics. Livermore (2010) and Marrow (2011) observed that teaching instructions had largely shifted from a learner-centered to a problem solving approach in teaching and learning mathematics. Bock (2013) asserted that for learners to understand various mathematical concepts, they should be able to visualize the implication of mathematical ideas.

Given the constructivists perspectives, I revealed that knowledge acquisition for African American mathematic students is not merely a teacher-to-student relationship as dictated in the curriculum, but also a construct of the attitude and perception of the teacher. The constructivism theory also emphasized the importance of learning mathematics in the context of real-world situations, and aligning mathematic concepts with real world situations to give students a chance to have a true learning experience through developing conceptual understanding in the real world (Ballard & Cintrón, 2010).

Review of the Literature

Various methods were used to search and review the literature for pertinent issues relating to the subject of this study. Among the data base visited were the Education Research Complete, ERIC, EBSCOhost, as well as ProQuest Dissertations and Theses. Online search engines included Google, Yahoo, and Ask. Websites visited included the American Federation of Teachers, the Georgia Department of Education, Project Grad,

the National Research Council, and the web site hosted by the U.S. Department of Education. The process also included physical visits to the libraries of Albany State University, Darton State College, Thomas University, and Valdosta State University. For this literature review, information was taken from empirical research, peer-reviewed articles, books, and education peer-reviewed journals.

Foundations of the Problem

The mathematical performance of African Americans in junior high schools has been low when compared to other American students (Hanushek & Lindseth, 2009; Hodges & Tippins, 2009). The low performance may be due to the use of a '*one size fits all*' styles of teaching, while teaching African American students (Alonso, Anderson, Su, & Theoharis, 2009). Researchers have shown that African Americans have different learning styles influenced by various factors including cultural orientation and poverty (Hollis, 2010; Hughes, 2011). To determine how the mathematics performance of 8th grade African American students in junior high school is influenced by the attitudes and perceptions of mathematics teachers, with regards to the instructional strategies that they use, the proposed study examined the literature on differentiated instruction, multicultural education, parental involvement, prejudice attitudes of teachers, and single parent homes. A knowledge of some of the critical factors that influences students' performance was useful in understanding the implication of cultural orientation on the performance of African American students (Frye & Vogt, 2010; Killion & Roy, 2009). The teacher's attitude toward students and the strategies used in teaching mathematics students, determines the students' mathematics performance (Denton, 2013). Therefore, the

students' mathematics performance depends on the teacher's attitude and the strategies used by the teacher.

Even the dynamics of legislation, typified by the Brown vs. The Board of Education decision, did not change attitudes of those instructing African American learners (Rowley & Wright, 2011). Rowley and Wright (2011) used data from the Educational Longitudinal Study to examine the difference of reading and math test scores between Black and White 10th graders. They found that discrimination based on the ability of a student to perform the roles associated with their position within the school setting as well as family factors outside the school setting contribute to the academic achievement gap between Blacks and Whites. Currently there are still inequities in both instruction and relevant curriculum (Bock, 2013; Frye & Vogt, 2010; Hanushek & Lindseth, 2009; Hodges & Tippins, 2009; Marrow, 2011; Paige & Witty, 2010). As long as teachers continue to stereotype African American students, change will not occur.

The historical political effects of mathematical instructional strategies on African American students' achievement, continues much the same as before the 1950s desegregation of American public schools. The inequities continue with instruction and curriculum. Having high expectations as part of an instructional perspective enables and sustains learning. Accomplishing this with every student requires that teachers be able to generate as well as maintain essential connections with students (Alonso et al., 2009; Chase, 2010). Therefore, the teacher's connection and interaction with the students can exert a negative or positive impact on the student's performance in mathematics.

However, following the desegregation of American schools by the Supreme Court, there has been a significant change in the academic curriculum in some American states (Cogburn, Chavous, & Griffin, 2011; Loertscher, 2010). Cogburn et al. (2011) examined school-based racial and gender discrimination experiences among 8th grade African American students and found that it is important to consider gender and race related experiences in order to understand the academic and psychological adjustment among African American students. Studies further confirm that, although some states that witnessed considerable changes in teaching strategies, a good number of teachers in American states, including Georgia, have not changed their beliefs about African American students' attitudes, academic abilities, or instructional needs (Brown, Bigler, & Chu, 2011). Brown et al. (2011) used an experimental methodology to test hypotheses concerning the effects of various factors on children's views of gender discrimination and found that some children believe they have been the target of gender discrimination. Although the issue of reduced performance among African American students has been one of concern for many years, little effort to address the problem has been made in most American states. Even though some advances have been made toward changing the academic curriculum and teaching strategies, more work is needed.

In addition, student feedback on instructional attitudes and perceptions of teachers tells that there exists a misrepresentation in the public debate about why African Americans and other marginalized students fail math (Alonso et al., 2009; Sandy & Duncan, 2010). Sandy and Duncan (2010) utilized data from the National Longitudinal Survey of Labor Market Experience for Youth, to examine the urban school achievement

gap, and found that a large percentage of this achievement gap is due to the high concentration of disadvantaged students in urban schools. Rather than examining teachers' attitudes, much research looks at the pay disparities compared to wealthier school districts, poor facilities, and resources as a continuing factor of the low scores for math among African American junior high school students. These details rationalize the gap in outcomes for math preparedness among African American students (Theoharis, 2009).

In reality, both the instructional delivery and the curriculum content determine student success in all subjects, including mathematics (Beecher & Sweeney, 2008). Cultural intelligence that is reflected in curriculum and instruction underpins ongoing effective learning. Without a cultural focus, the statistics continue to reflect student failure in the core subjects, particularly among African American students (Livermore, 2010; Tiedt & Tiedt, 2009). Therefore, until teachers accept that African American students have different learning styles than other ethnic groups, and differentiate their teaching strategies accordingly, African American students will struggle in mathematics and other subjects.

Effective curriculum design that meets the diversity of the student population includes differentiation of instruction as gauged by student evaluation of the instruction. Differentiation of instruction remains the best practice of teaching (Joseph, Thomas, Simonette, and Ramsook, 2013; Levy, 2008). Joseph et al. (2013) examined the impact of using a differentiated instructional approach on college students and found that students responded favorably to the differentiated instructional approach. According to

Logan (2011), without this instructional strategy, African American students will continue to fail in learning math. Differentiation, as part of the curriculum design and teaching practices, provides effective guidance when used as an educational tool for all students (Logan, 2011; Weber, Johnson, & Tripp, 2013). Recognizing the fact that all humans learn differently, teachers should differentiate teaching strategies for all subjects, including mathematics (Chamberlin, 2011; Killion & Roy, 2009; Mizel, Hord, Killion, & Hirsh, 2011; Wormeli, 2011). Chamberlin (2011) examined the experiences of elementary teachers in a mathematics course and qualitative and quantitative analyses revealed that the prospective elementary teachers found differentiated instruction supportive of their diverse needs and they plan on implementing similar features in their future instruction.

The literature on applying multiple intelligence theories as an instructional approach supports the validity of such best practices in teaching. Multiple intelligences instructional techniques particularly address the diversity of the student population with different learning styles that include, visual, kinetic, hearing, observing, and engaging in learning tasks (Gardner, 2006). Special needs students also benefit from these types of instructional strategies (Ghamrawi, 2014; Laughlin & Foley, 2012). Ghamrawi (2014) examined teachers' use of the Multiple Intelligences Theory on vocabulary acquisition by kindergartners during English as a second language (ESL) classes and found that even though students acquired new vocabulary faster using traditional methods of teaching, their retention of such vocabulary words was significantly weaker when compared with the vocabulary acquired in Multiple Intelligence classes. Whether or not a student is a

special needs student, teachers should design and implement lessons that address all students' academic needs, learning styles, and multiple intelligences. Indeed, the benefits of such instructional strategies, along with the incorporation of parent participation, shows that children succeed better in school (Denton, 2013). Further, Lampman (2009) reviewed the successes of innovative tutoring programs. This literature review sets the momentum for the proposed study bringing understanding about teachers' attitudes and perceptions of math instructional strategies on student achievement of African American students.

Factors Contributing to the Lower Academic Performance of African American Students

This section of the literature review focuses on five main factors that contribute to the lower academic performance of African American students in math: differentiated instruction, multicultural education, parental involvement, prejudice attitudes of teachers, and single parent homes. These factors have a cumulative negative effect on the performance of African American students.

Differentiated instruction. Bush (2010) defined differentiated instruction as the learner centered model. Additionally, Bush noted that differentiated instruction acknowledges the fact that students are motivated and have individual learning styles and abilities. As such, students are generally ready to learn new things. Therefore, it is imperative to appreciate the diverse nature of the learners in the classroom.

According to Logan (2011), modern classrooms are more diverse than ever. In fact, as suggested by Logan, there will be a steady increase in students from the Hispanic,

Asian American, and African American communities. Therefore, it is essential to change the learning approach to acknowledge the diversity. The differentiated instruction method seeks to enhance the understanding of every student by applying a model that best serves the student's interest. Bush (2010) suggested that in the learning environment, educators often balance the three critical components, content, process, and outcome. It is important that educators learn to balance these three critical components because of the diversity of students in today's classrooms.

However, it is important to ensure that, although instruction is differentiated, mathematics teachers hold all students to standards that require substantial growth and achievement (De Jesus, 2012). Bush (2010) further outlined the three essential elements of the curriculum in the differentiated learning approach. These are the learning content and its appropriateness, how is the instruction best delivered, and the evidence that demonstrates the learning product. According to Bush, mathematics teachers should address all these elements to achieve the full effect. This requires the teachers to be flexible in their teaching approach and adjust the curriculum to fit every student's need.

Tomlinson, Brimijoin, & Narvaez (2008) also suggested three critical components in a diverse class; the content, the process, and the products. While similar to Bush's (2010) list, it differs in the final characteristics, product (as opposed to outcome). Tomlinson et al. referred to the materials used in the delivery of the learning goals and objectives. Ideally, these materials should differentiate with the tradition of the students taken into consideration. On the other hand, the process refers to the manner in which the content would be taught (Lakshmi, 2009). Tomlinson et al. fell short of recommending

the group approach to teaching. However, Bush (2010) observed that a teacher might employ a mixture of the whole class approach and individual assignment to small groups. Ideally, fulfillment of the learning objective is the goal. In some situations, certain students would be more receptive to the small group approach while others may be more comfortable with the whole class approach (Tomlinson et al., 2008). It is critical that the teacher shows sensitivity to the diversity in the classroom. It is the apparent insensitivity that could help to explain away the reduced performance for the African American students, especially in mathematics.

Rock, Gregg, Ellis, and Gable (2008) designed a blueprint for the application of differentiated instruction, which they call Reach. Teachers should reflect on the effort required to switch to differentiated instructions. Teachers need to evaluate the curriculum objectively, indicating what students should know, and the standards students would be held accountable for knowing (Beecher & Sweeny, 2008). A critical component in the blueprint relates to the analysis of the group and individual students' readiness, interests, preferences, strengths and weaknesses (Rock et al., 2008). This studied approach would inform the differentiated instruction required to ensure all students' concerns are addressed.

Multicultural education. General literature suggests that American teachers approach the teaching of mathematics from a mono-cultural perspective (Ferrera, Larke, & Lea, 2011). However, Chao (2013) perceived that students in the United States come from different backgrounds, races, languages, ethnicities, and social groups. Chao argued that this diversity should inform the approach the teacher assumes in the classroom.

According to Valimaa and Ylijoki (2010), the cultural background influences the intellectual grasp of the student. Ideally, the singular approach assumed by most of the teachers in America tends to favor the majority; the White population. This approach places the African American students alongside other minority ethnicities at a disadvantage.

The National Council of Mathematics Teachers appreciates the multicultural learning context that students in America experience (Ivers, 2012). To that extent, the Council has put in place measures deliberately intended to ensure that students think mathematically within their diverse cultural origins. Similar, it has been the practice of teachers to approach the teaching of mathematics from a more universal view. However, according to Banks and McGee (2009), mathematics teachers face immense challenges in teaching. Ivers discovered that many minority students face the limitation of having to learn mathematics in English, which is often not their first language (Cummins, 2000). This creates another learning barrier for many minority students.

As stated by Ivers (2012), the language barrier creates a double challenge, where students must learn the language while also learning mathematics. Ivers criticized the attitude of most American teachers who assume that these students are mathematically challenged. He explains that the students are not mathematically challenged, but rather the language barrier is the cause of the reduced performance. In fact, Ivers suggested that, in many cases, minority students also have a problem understanding mathematical symbols. Ivers also showed that the students could solve the problem by utilizing

mathematical approaches from their own cultures. In this way, the student could think mathematically without the language affecting his or her comprehension (Wong, 2010).

Irvine (2012) also assessed the results from students of teachers with multicultural knowledge, and observed that multiculturalism equips the teacher with an understanding that is a cross sectional rather than limited to one cultural context. In addition, he recognized that such teachers who show multicultural understanding tended to take their students through a varied approach that produced better results. Accordingly, as noted by Iwai (2013), teachers need to embrace the multicultural base of their students' population. This agrees with the approach set forth by the National Council of Mathematics Teachers, who recommend that the classroom multicultural context to be embraced and inculcated in the approach (Ivers, 2012).

In addition, Legaspi and Rickard (2011) noted that the multicultural context does not affect all minorities. In fact, according to Watson, Park, and Lee (2011), students from minority groups such as Japanese, Chinese, and Korean communities had an advantage in mathematics because of the inherent base ten systems in their native languages. Wang and Olson (2009) observed, in the case of African Americans, this advantage does not exist, perhaps explaining why the failure rates in mathematics are higher for African Americans than in other minorities. However, the reasons for reduced performance are not necessarily related to lower intelligence; factors such as multicultural contexts found throughout the American education system could be the reason (Valimaa & Ylijoki, 2010). Although a multicultural context does not affect all minorities, teachers should use multiple techniques to make education effective.

Parental involvement. Parental involvement in the education of their children also has a positive impact in the overall performance (Epstein, 1995; Radzi, Razak, & Sukor, 2010). Arnold, Zeljo, Doctoroff, and Ortiz (2008) observed that those students whose parents contributed to their education and engaged actively in the learning process tended to have positive results. Naturally, the student gets motivated and feels supported by the parental participation. A study by the United States Department of Education (2009) concluded that children whose parents were highly involved in their education had better academic outcomes than children whose parents were not highly involved in their education. Therefore, the earlier parental involvement begins in a child's educational process, the more powerful the effects.

Harrell and Banerjee (2011) noted that parental involvement could assume various forms. Parents could show their enthusiasm in their children's progress through facilitative and assistance services. Harrell and Banerjee observed that those parents who applied themselves deeply in the education of their children were appreciative of their children's results, pleased when their children performed well, academically. Bartel (2010) noted some of the ways in which parents could help their children learn well. They included strategies such as enriching the home environment to be facilitative of learning, checking homework assignments to ensure the children did the assignment correctly, and offering children emotional and psychological support, especially in subjects in which the parents noted their children performed poorly. Parents can also model the value of hard work, learning, and self-discipline, and express high, but realistic expectations for achievement.

Harrell and Banerjee (2011) classified the involvement of the parents into two broad categories; direct and indirect involvement. The indirect methods mostly occur at home, where the parent offers peripheral help and advice towards the child's learning objectives. In contrast, the direct parental involvement entails school contact, where the parent liaises with the school to ensure the student receives any necessary assistance (Jeynes, 2010). The latter is manifest by activities such as the attendance of school functions and parent teacher conferences. Epstein (1995) drew a parallel between students whose parents actively engaged in their children's learning process and those whose parents were either passive or were not involved at all. Results showed that, for students whose parental involvement was high, the academic performance was equally high.

Harrell and Banerjee (2011) also extended to the input of ethnic and racial socialization towards parental involvement in education of the children. They observed that those children whose parents made them conscious of the racial divisions and conclave tended to perform better academically as compared to children whose parents did not. On that premise, Harrell and Banerjee concluded that ethnic socialization and parental involvement positively impacts a student's academic performance. Researchers deduced that children whose parents displayed enthusiasm and interest in their studies were better performers and were motivated to do their best (Epstein, 1995; Juhudi, 2012). Furthermore, these students have better school attendance, decreased use of drugs and alcohol, fewer instances of violent behaviors, and lower rates of suspension.

On the other hand, the children whose parents showed little to no interest in their education had lower performance scores. In the latter category, the ones who performed better academically, in many cases drew their motivation from other factors. Coleman and McNeese (2009) confirmed the arguments by Harrell and Banerjee (2011) and asserted that parental involvement is linked to the grades received in the schools. Consequently, it is essential to examine the parental involvement of students.

Prejudice attitudes of teachers. Brown (2011) defined gender prejudice as the attitude that a group deserves lower social status based on gender related categorization. This definition has been slightly amended to fit the description of African American students. In that context, prejudice would be the attitude that one group (African American students) deserves a lower social status, based on racial categorization than other ethnic groups. Robinson and Theule (2011) observed that African American children join kindergarten with fewer reading skills than their White counterparts. This occurs in all African American children, irrespective of their parents' years of schooling and level of education at large. This gap widens or narrows depending on the manner in which students and teachers interact (Koutrouba, Baxevanou, & Koutroumpas, 2012). Brown asserted that the perceptions and expectations of both teachers and students, determine the outcome. However, it is the teacher's job to keep the classroom as prejudice-free as possible, and lead by example.

Sadly, in many cases, the poor performance of African American students often worsens as the gap widens (Coleman, & McNeese, 2009). The prejudice attitude that teachers have about some students also widens this gap. The attitude determines the

extent of interaction and effectiveness of the learning process. Hubbard and Stage (2009) argued that teachers, just like other human beings, make use of the dimensions of sex, class, ethnicity, and race to bring order to their perception of the classroom environment. Teacher perceptions toward students have become increasingly stereotyped rather than more in-depth and holistic, therefore, this gap will continue to widen.

Ahmed, Andrist, Davis, and Fuller (2013) confirmed the seeming prejudice that teachers bring to the teaching of African American students. This prejudice leads to discrimination; the low status attributed to the students, and affected their overall input in the classroom. Additionally, the contemptuous approach that teachers take with students can affect their self-esteem and personal confidence (Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010). Lucas (2008) further captured this, as he argued that the race or class of a student may prompt a teacher to apply generalized expectations. This makes it difficult for a teacher to cultivate relationships with individual students and perpetuates race or class distinctions among students. These familiar stereotypes make it difficult for disadvantaged or the minority students to distinguish themselves from the perceived ideas of the population (Van den Bergh et al., 2010). Such students will often exhibit negative behaviors when they lack confidence and have a negative self-esteem.

Whitley and Kite (2010) pointed to the fact that the affected groups are the minorities. African American students are stereotyped as weak, less intelligent and less committed (Braun, Chapman, & Vezzu, 2010). This negatively influences the input the student places on his/her academic pursuits with the overall effect being a decline in performance. It is consequently imperative for teachers to approach their students with

an open mind, allowing them equal learning opportunities devoid of perceptions and prejudice attitudes (Whitley & Kite, 2010).

Single parent homes/disappearing fathers. Single parenthood inevitably presents challenges to the overall upbringing of the child (Lehman, 2011). Education is one area that is immensely affected by the absence of either one or both parents or neglect by the parent of the child. Predictably, the effects point towards reduced academic performance, including performance in mathematics. According to Jeynes (2011), parental involvement has a positive effect on a student's education. When the student receives positive contributions from the parents, they are more likely to be motivated and encouraged to study. However, in single parent homes, the children often lack such support.

Sclafani (2004) examined parental involvement in four main ways, basic obligations, school to home communication, parent involvement at school, and in learning activities at home. Jeynes (2010) reported that, for the single parent students, the parental involvement was significantly lower, leading to a negative output. In the end, the parental input is necessary, but not always present in single parent homes. Research describes cases where the children, without the attention of their parents, rebel and in extreme cases could opt out of school (Jeynes, 2010; Kassin, Fein, & Markus, 2011). Obviously, if a student opts out of school, that will have a negative impact on the achievement gap in mathematics.

According to Jeynes (2010), parental involvement factors have a longitudinal effect on the student's academic growth. Additionally, Jeynes observed that parental

assessment of the child's educational attainment and communication had a positive effect on the academic performance of the child. Further, Radzi, Razak, and Sukor (2010) confirmed that parental participation had effects that were long lasting and had a foundational effect on the future success of the children. Incidentally, while these results were observed in cases of families with both parents, in cases where children were being raised by single parents, the situation was different. Those children tended to show reduced academic performance and displayed less enthusiasm for the learning process (Radzi et al., 2010). Therefore, when both parents are present in the home and active in their children's lives, children perform better academically.

Researchers also showed that the minority groups, led by Latinos and followed by African Americans, were more likely to have fragmented family structures (Whitley & Kite, 2010). In that context, it is students from such communities that would suffer the most from a lack of parental involvement and/or single parenthood (Bartel, 2010). These factors could account for the relatively reduced academic performance seen in the minority groups such as African American students (Sclafani, 2004). Likewise, it is critical to appreciate the strain created by the low economic power of the single parents. As explicated by Kassin et al (2011), the reduced performance could be a function of the economic conditions among other factors. However, until parents also get actively involved in their child's education, the achievement gap will continue to widen. Furthermore, those students traditionally left behind will continue to be left behind.

Implications

A review of the literature resulted in the analysis of the implications about the need for positive attitudes and perspectives of instructional strategies aimed at mathematics success for African American junior high school students in a rural Georgia school district. As African American students (in rural Georgia, and elsewhere in the US) reach the 8th grade without having learned to read, write, or do math, the dropout rate begins to climb and rapidly increases as students move through high school. According to Van den Bergh et al (2010), various biases can affect teachers' value system, leading to an inability to develop quality relationships with all their students, which in turn leads to low student performance (Livermore, 2010; Tiedt & Tiedt, 2009). Openness, as part of instructional strategy for teaching African American students remains a best practices perspective (Hanushek & Lindseth, 2009). The implication of such practices also looks at teachers using research-based strategies aligned with the diversity of the learning group.

Based on the findings of this study, a professional development plan was developed. Chambers, Lam, and Mahitivanichcha (2008) defined "professional development as activities that help education professionals develop the skills and knowledge required to achieve their school's education goals and meet the needs of students" (p. 4). While designing, implementing, and evaluating professional development can be difficult and complex work, the reward (improved student learning), is well worth the effort (Hirsh & Killion, 2009).

I could have developed and presented a white paper on the findings, but I rejected that as a project because I did not want to present my findings in a report or guide. I could have developed a unit of instruction based on the results, but I rejected that because I did not create or evaluate a curriculum. However, I decided to develop a project to provide staff development because I felt like that was the best genre or project type to use to present my findings and impact the achievement gap between African American students and other ethnic groups in mathematics.

Summary

In this section, I have defined the problem, presented the rationale for researching the problem and the significance of the problem, presented the research questions, and discussed the implications of the study. In addition, I have presented the conceptual framework for the study and reviewed the literature. In the next section, a description of the study design, the participants and setting, ethical considerations and protections for participants, data collection, data analysis procedures, and the results of the study will be presented.

Section 3 will present the components of a professional development program which after implementation and evaluation could provide an evidence-based redress for the low performances of African American and other minority cultural students not only in rural Georgia but across the nation. In Section 4 the experiences gained in the process of conducting the study and developing the project will be addressed.

Section 2: The Methodology

Introduction

The purpose of this qualitative study was to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics. An 18-point questionnaire was developed to guide and record in-depth interviews from a non-randomized sample of eight 8th grade mathematics instructors with classroom teaching experience with African American students in rural south Georgia. Field observations were also conducted in the respective classrooms of the teachers to collect evidence regarding teaching styles and student interactions. The following section includes a description of the qualitative research design and approach, criteria for selecting the participants, data collection strategies, and data analysis.

Research Design and Approach

The research design used in this study was qualitative case study. Other types of qualitative research include ethnography, grounded theory, historical research, and phenomenology (Creswell, 2012; Merriam, 2009). This research did not focus on describing the culture of a group of people; therefore, ethnography was not appropriate. Grounded theory was not a good choice because this research did not focus on finding a new theory. Historical research was not appropriate because events that occurred in the past were not the focus of this study. I did not study individuals and their experiences; therefore, phenomenology was not appropriate.

According to Merriam (2009), “qualitative case studies share with other forms of qualitative research the search for meaning and understanding, the researcher as the primary instrument of data collection and analysis, an inductive investigative strategy, and the end product being richly descriptive” (p. 39). The qualitative case study was the best method because it allows the researcher to focus on providing a detailed account of one or more cases. Using a qualitative case study was effective and informative to determine teachers’ perceptions regarding the mathematics achievements of African American students and to identify strategies that could be used to lower the achievement gap for this population.

Participants

The sampling strategy in this study was homogenous. In homogeneous sampling, the researcher purposefully samples individuals or sites based on membership in a subgroup that has defining characteristics (Creswell, 2012). This is a type of purposeful sampling. According to Patton (1990), “The logic and power of purposeful sampling lies in selecting information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research” (p. 169).

Participants are those individuals you will use in your study (Lodico, Spaulding, & Voegtler, 2010). The inclusion criteria was that the teachers had to be teaching 8th grade mathematics in one of two local school districts. The exclusion criteria included not currently teaching 8th grade mathematics or not teaching in one of the two selected school districts. The participants in this study consisted of eight 8th grade mathematics

teachers. Some of the participants were from the researcher's school system and some of the participants were from another school system. According to Creswell (2012), the number of people or sites sampled varies from one qualitative study to the next. It is typical in qualitative research to study a few individuals or a few cases. However, in some cases, the number may be several, ranging from one or two to 30 or 40 (Creswell, 2012).

In qualitative studies, numerous factors can determine sample sizes. Samples for qualitative studies are generally much smaller than those used in quantitative studies (Creswell, 2012). Samples in qualitative studies should be large enough to assure that most or all the perceptions that might be important are covered. However, if a sample is too large data usually becomes repetitive. Therefore, qualitative studies should follow the concept of saturation (Creswell, 2012; Merriam, 2009). I continued to collect data until I no longer heard or saw new information.

Procedures for Gaining Access to Participants

Permission is often necessary before you can enter a site and collect data (Creswell, 2012). Before I began collecting data, I received approval from the University's Institutional Review Board (12-10-14-0296775). Once I received approval, I sent a letter to the superintendents stating the purpose and intent of the project study and secure approval from the district to conduct the study (See Appendix B). Next, I met with the principals of the junior high schools to receive permission to conduct the project study. After meeting with the principals, I sent all the participants an invitation to participant in the study via e-mail using my Walden email account (See Appendix C).

Once the participants agreed to be in the study, I sent a letter of informed consent. In the letter, I informed them of the procedures, risks and benefits involved in the study, and that their participation in the study is voluntary and they may withdraw at any time and that any information provided to me will be kept confidential (Creswell, 2012).

Researcher-Participant Relationship

In order to establish trust throughout the study, I attempted to develop collaborative relationships with the participants. Hatch (2002) revealed that participants invest a significant amount of time and reveal information about their daily lives when participating in qualitative studies. Participants are asked to trust us to the point that they are comfortable sharing the intimate details of their worlds (Hatch, 2002). Since I am the principal investigator, it is imperative for me to establish an ongoing working relationship and create a positive rapport with the participants. If the researcher has a positive rapport with the participants, it creates a sense of trust and allows the participants to see the researcher's willingness to learn about them (Lodico et al., 2010). I do not work at neither of the schools in this study, but I know some of the participants. An open line of communication was established between the researcher and the participants by providing the participant's with the researcher's email and phone number. I encouraged the participants to communicate any questions or concerns throughout the data collection period. In order to establish trust, I used a neutral site for the interviews, used neutral body language, and immersed myself in the professional lives of the participants.

Ethical Considerations

Whether a researcher is conducting qualitative or quantitative research, research ethics is an important consideration (Lodico et al., 2010). Merriam (2009) suggested the following checklist to ensure ethical protection of the participants: “Explaining the purpose of the inquiry and methods to be used, promises and reciprocity, risk assessment, confidentiality, informed consent, data access and ownership, interviewer mental health, advice, data collection boundaries, and ethical versus legal conduct” (pp. 233-234). I reviewed this checklist throughout the course of this study. As the researcher, I addressed each of these concerns by being trustworthy and carrying out the study in as ethical a manner as possible.

According to Yin (2009), all participants should be protected from deception or harm. In order to protect the confidentiality of the participants, pseudonyms were used. The participants signed a consent form before they become involved in this study. The consent form included the purpose of the study, a description of the study, and risks involved in the study. I also informed the participants that their participation in the study is strictly voluntary and that they can withdraw from the study at any time.

All interviews were recorded and saved with the use of password protection on the researcher’s home computer. Observation data was locked in a filing cabinet in the researcher’s home office. Keeping collected data confidential provides protection of human subjects (Creswell, 2012; Lodico et al., 2010; Merriam, 2009; Yin, 2009).

Data Collection

Data were collected by using interviews and observations. According to Creswell (2012), interviewing is equally popular to observation in qualitative research and occurs when researchers ask one or more participants general, open-ended questions and record their answers. Interviews are advantageous in that they allow one-on-one interaction with a research participant, who can be asked follow-up questions to further explain his or her views. Although observation is a large part of how we learn, observation as a tool of research requires systematic and careful examination of the phenomena being studied (Lodico et al., 2010).

The observation took place in the participant's classroom during mathematics instruction. The observation protocol can be found in Appendix D. The duration of the observation was the length of the mathematics period and lasted approximately 45 minutes to one hour. The focus of the observations were mathematics instruction, the teaching strategies used, and the assignments given to students, what the teacher is doing to ensure student engagement, the teacher's interactions with African American students, and the classroom environment during mathematics instruction. I took field notes, during the observations, in order to record my observations. According to Bogdan and Biklen (2007), field notes are the written account of what the researcher hears, sees, experiences, and thinks in the course of collecting and reflecting on the data in a qualitative study. "The observations or 'raw data' produced by the researcher's observations will form the basis for the results and conclusions you draw in the study as such, the researcher's recording of this information must be detailed, precise, and accurate" (Lodico et al.,

2010, p. 119). I do not work at either of the schools in this study, but I had access to the participants because I work in the school system. The observations were conducted during the school day; therefore, I took a personal day and observed the participants' in their classrooms during the mathematics instructional block.

The interviews did not occur on the same day, but were conducted following the observations. The interviews were held in the participant's classroom. Each formal interview lasted approximately 45 minutes to one hour. The interviews were recorded with an audio recording device and were transcribed using Microsoft Word. This collection method ensures clarity of work done and accuracy when recording the data. The interview protocol can be found in Appendix E. I pilot test the interview protocol with a math teacher at another school who did not participate in the study to ensure that the questions are clear and will generate the data that was needed. This teacher received a letter of informed consent.

In order to validate the credibility of the study, I utilized member checking during the interview process and at the conclusion of the study. This is important because it increases the credibility of the study. I developed some of the interview questions and some were used in a doctoral study similar to mine (Bickford, 2013). That particular doctoral study focused on closing the achievement gap in mathematics for elementary school students with disabilities. In order to keep track of data and emerging understanding, I used reflective journals and field notes. After I transcribed the interviews, I gave each interviewee the transcriptions as part of the member checking process (Merriam, 2009). This is important because it helps ensure credibility.

Similarities were documented through coding in order to find themes. As recommended by Creswell (2012), I utilized a codebook in order to ensure that the coding is accurate.

Role of the Researcher

My role as the researcher is an educator in one of the school systems. I have worked in the educational field for the past 13 years in one of the school systems where the study took place. I am an elementary school guidance counselor. As the primary data collector, I do not hold any position of authority or supervision over any of the participants. I worked at one of the schools, of study, more than nine years ago. I worked with some of the participants in this study, but that did not affect data collection. According to Lodico et al (2010), it is almost impossible to remove all researcher biases from a study. However, in order to avoid having biases in this study, I was objective and engaged with the research. Therefore, I used neutral body language and not add in my opinions.

Data Analysis

While analyzing the data, it is necessary that the data be organized and for that preparation of data and its collection is the first step. Creswell (2007) also suggested that after preparing or collecting data the most important thing is to organize the data effectively. After that, the data should be reduced into themes by using the coding and condensing process which helps to represent the data in figures and tables. Moreover, the description becomes easy to understand as the coding and condensing process assess important information and convert the information into data such as information collected

from interviews or questionnaires which can be analyzed and converted into the data form (Creswell, 2007; Glesne, 2011).

The data analysis procedures were supported by the constructivist theory which I used as my conceptual framework. The conceptual framework was used to organize and identify results from documentary data which included scholarly researched information with the help of the coding process (Creswell, 2012). For example, in this study, the constructivism theory was focusing on the importance of learning mathematics and its concepts in the context of real-world situations to give students a chance to have a true learning experience. Furthermore, according to Bruner (1996), learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge.

After the data were collected, I analyzed the data collected from the observations and interviews to enhance the integrity of this qualitative case study through triangulation. The final step in qualitative data analysis is the actual writing of the research report, including the researcher's interpretations of what the data means (Lodico et al., 2010). Merriam (2009) stated, "As you collect and analyze more data, you begin to check whether categories derived from earlier data hold up as you analyze subsequent data" (p. 183). The transcribed data collected through interview method were analyzed. This implies successive interviews from eight participants. Each participant received a copy of his or her transcribed interview. This was part of the member checking process. As I read the transcriptions, ideas that appear multiple times throughout the documents were highlighted. After manually coding the themes, I used an Excel spreadsheet to

organize participant responses using the interview transcript as a guide in order to get a general idea of the data.

Data collected through observations were analyzed. Using codes allowed me to turn speech into meaningful categories. In order to detect patterns in a form of words and observed characteristics from the participants, codes were used. Initial coding was crucial in determining the commonly used words or symbols from the participants, and then a subdivision of the coded categories was done in search of repetitive words, themes, or ideas (Creswell, 2009). One of the easiest ways to identify themes and subthemes is repetition. After I transcribed the data, I used different colored pens to highlight key phrases and topics that occur and reoccur. In order to ensure that the coding was correct, I utilized a codebook as recommended by Creswell.

Data triangulation and member checks were used in this study to ensure the quality and credibility of this case study. Triangulation is the process of corroborating evidence from different individuals, types of data, or methods of data collection in descriptions and themes in qualitative research (Creswell, 2012). According to Merriam (2009), member checks are a process in which the researcher asks one or more of the participants in the study to check the accuracy of the account. In order to ensure accuracy, transcripts and audiotapes were reviewed throughout the entire process.

In the event of a discrepant case, the data were studied closely to determine if it might have skewed the overall analysis of the study. The experience of the participant and the environment in which the discrepancy occurred were taken into consideration. The cases were compared and examined to determine if they differed from the theory

base that the other data conformed. Through the observation data, I was able to observe what strategies were already in place and how effectively they were being used.

Qualitative Results

The purpose of this doctoral study was to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics. The forms of data collection implemented for this qualitative research study were interviews and observations. All data collection were completed by interviewing and observing the eight 8th grade mathematics teachers. The collection of data helped me determine teachers' attitudes and perceptions of math instructional strategies on African American students in junior high school.

Interviews

Interviews were carried out over eight days. The interviews lasted 45 minutes to one hour. The participants and I were the only one present during the interviews. Interviews were audio recorded where I could repeat the responses immediately. Eight participants were interviewed with varying years of teaching experiences. Transcripts were used with the interviews as well. There were variations of transcripts that were transcribed from the interviews by audio recording and put into Microsoft Word. Codes were used to analyze the data. This was done with each question by identifying the similarities and the differences from the responses. The information from the interviews were transcribed from the frequencies of data. Themes were used as well with

identifying and organizing the findings of the study. Each question was analyzed by using themes with data from the participants. Furthermore, this data was used as a narrative representing the findings of the study.

The responses were analyzed with each research question. This was done from the responses from each individual question. Categories were then created for the answers where the responses were coded by frequency. The responses were added to the notes that were generated into a Microsoft Word document. There were colors that were used for the themes. There were comparisons from the interview questions to the themes that were established from the research questions. Furthermore, the color-coded themes were used with the data collection, which helped to reach a conclusion pertaining to the perceptions of teachers. I used a descriptive approach with revealing the data from the findings.

Table 1 below illustrates the sources of the triangulated data used to answer the research questions of the study.

Table 1

Sources of Triangulated Response Data to the Research Questions

Research Questions (Paraphrased)	Corresponding Sources of Questions from the Transcribed Interview Protocol and Field Visit Observations
1. Attitude and perceptions about instructional strategies used to teach mathematics	1. Instructional strategies currently in place 2. Instructional strategies being utilized at the individual levels 3. Perceptions of effectiveness of strategies 13. Strategies currently being implemented to help African American students 14. Level of success for current strategies
2. Extent of academic achievement in mathematics disproportionately lower to other ethnic groups?	4. Thoughts on causes of lower achievements 6. Challenges influencing lower achievements 17. Ratings of African American students' mathematics achievements
3. Determination of causes for achievement gaps and what can be done to help?	5. Strengths influencing lower achievements 11. Greatest classroom strengths 12. Greatest weaknesses and plans to conquer them 16. Possible new strategies for improvement of African American math achievements
4. What new instructional strategies could be implemented to close present achievement gaps?	7. What can teachers do at the individual level to help 8. Need for training in multiculturalism 9. Level of confidence in mathematics Skills and its effects on ability to teach mathematics 10. Level of confidence in mathematics skills and its effects on ability to teach mathematics to African American students 15. What could be done differently for improvement

Study Findings

To protect the identity of the participants, all the teachers were assigned numbers and given pseudonyms for transcripts and write-ups. Responses to the question: “How long have you been a mathematics teacher?” revealed variation in the number of years participants had been in the teaching profession. Two participants had five years of teaching experience each, while the other six participants stated a range between one and 18 years.

Table 2 below is a profile of study participants displaying the number assigned to each teacher; their given pseudonyms, the level of their education, years of teaching experiences, as well as race, gender, and the number of students in their respective classes during the field visit observation. There were no male teachers included in this study because there were no 8th grade male mathematics teachers at the participating schools in this study.

Table 2

Profile of Study Participants

Teacher Number	Pseudonym	Level of Education	Years of Teaching Experiences	Race	Gender	# of Students in Class
1	Gineva Iverson	Bachelor's	3	Caucasian	Female	26
2	Vera Wang	Master's	1	Caucasian	Female	24
3	Bobbie Brown	Master's	2	African American	Female	18
4	Alicia Keys	Bachelor's	7	Caucasian	Female	24
5	Mirander Hobbs	Bachelor's	5	Caucasian	Female	20
6	Quen James	Master's & Specialist	18	African American	Female	23
7	Angie Braxton	Bachelor's	5	African American	Female	16
8	Brooklyn Smith	Master's & Specialist	11	Caucasian	Female	24

Teacher 1, Gineva Iverson is a White female who started teaching some three years ago. Gineva has a Bachelor's degree in Early Child Education and most of her teaching career had been in mathematics with her students being 8th grade multicultural. Her class consists of 10 African Americans, eight Whites, seven Hispanics, and one multiracial student.

Teacher 2, Vera Wang is a White female, who originally went to school to study finance. She has a BBA in Finance and a MAT in Middle Grades Math and Social Studies. She has always loved math and had plans to be a high school math teacher, but changed her mind after enjoying an accounting class. Even though this is her first year teaching mathematics, she feels confident in her mathematical ability. Her class consisted of 10 African Americans, 10 Whites, and four Hispanic students.

Teacher 3, Bobbie Brown is an African American female. She has a Master's degree in Middle Grades Math. This is her second year teaching mathematics. "As a new educator, I struggle with classroom management." Bobbie's class consists of 14 African Americans and four Hispanic students.

Teacher 4, Alicia Keys is a White female who has been teaching Mathematics for seven years. She is currently pursuing her Master's degree in Mathematics. Her favorite content is Algebra and Geometry. "I love math, but I have a hard time using data for instruction." Alicia's class consists of nine African Americans, nine Whites, and six Hispanic students.

Teacher 5, Mirander Hobbs is a White female who has always been either a Special Education teacher or a regular education teacher in a Special Education co-teaching classroom. She has been teaching Mathematics for five years. Mirander has a Bachelor's degree in Middle Grades Math. She feels like every year she teaches math she becomes more confident. Mirander's class consists of nine African Americans, seven Whites, three Hispanics, and one multiracial student.

Teacher 6, Quen James is an African American female who has been teaching for 18 years. She has a Master's degree in Middle Grades Education and an Educational Specialist degree in Curriculum and Instruction. Quen originally went to school to study biology. She majored in biology for two years and education for two years. She also taught Reading for one year. Quen's class consists of eight African Americans, six Whites, eight Hispanics, and one multiracial student.

Teacher 7, Angie Braxton is an African American female who started teaching some five years ago. She has a Bachelor's degree in Middle Grades Education. Angie stated she struggles with her confidence in her mathematical ability because she feels like if her students do not succeed then it is her fault. "I feel confident in teaching mathematics to African American students because I see myself in them." "I am a product of their environment and I let them know if I can do it then they can do it." Angie's class consists of 12 African Americans, three Whites, and one Hispanic student.

Teacher 8, Brooklyn Smith is a White female who has always wanted to be a teacher. She has been teaching for 11 years. She taught Social Studies for one year and mathematics for 10 years. Brooklyn has a Bachelor's degree in Middle Grades Mathematics and Science, a Master's degree in Middle Grades Mathematics and Science, and an Educational Specialist in Instructional Technology. She teaches honor/advanced classes. "I am very confident in my mathematical ability and the curriculum." Brooklyn said, "I feel as though confidence comes with time and

experience.” Her class consists of six African Americans, 12 Whites, and two Hispanic students.

Participants’ Responses to Research Questions through Interviews and Class Visit Observations

Research Question 1: What are the attitudes and perceptions of junior high school mathematics teachers about the instructional strategies they use to teach 8th grade African American students math?

I examined analyzed responses from the eight teachers through interviews with the researcher and the observational notes made during the classroom field visits. I wanted to know from the participants the attitudes and perceptions of junior high school mathematics teachers about the instructional strategies being used to teach 8th grade African American students math. Interview Protocol Item 2: “What instructional strategies do you use to teach mathematics to African American students?”; Item 3: “What are your perceptions regarding the effectiveness of each strategy you mentioned?”; Item 13: “What strategies are currently being implemented to help ensure the success of African American student in the area of mathematics?”; and Item 14: “How successfully do you feel these strategies are being implemented?” provided answers to Research Question 1.

Despite stated lack of consistencies in the instructional strategies being utilized, the majority of the teachers still rated their strategies as effective. In terms of African American students’ mathematics performance, however, the majority of the teachers, as shown in Table 3, admitted that the achievement of African American students was disproportionately lower than that of other ethnic groups.

Table 3

Teaching Strategies and Level of Success Ratings

Constructs	Themes	Frequencies
Instructional Strategies Used at Individual Teachers' Level	Practice	3 teachers said they use lots of practice
	Real Life Applications	3 said real life applications
	Whole Group Instructions	2 said they use whole group instructions
Level of Success With Current Strategies in General	Effective	7 of 8 participants rated the strategies as effective
	Not Effective	1 participate rated the strategies as ineffective
Ratings of African American Mathematics Achievements	Below Average	5 said mathematics achievement was below average
	Disproportionally Lower	1 said disproportionately lower
	Better Than Before	2 said achievements were better than they used to be

Three participants stated the use of lots of practice as instructional strategies with students. Another three participants stated whole group instruction and the remaining two identified other types of strategies. Examples of strategies cited by the participants

included: “trying to relate to the interest of the students,” “examining the attitude of the students,” “trying to reach the individual student,” “calling the parents if students are not prepared,” “using real-life situations,” “building relationships with the students,” “using scaffolding,” “examining assessments,” and “grouping the students.”

On the question regarding present strategies being utilized to help ensure the success of African American students in the area of mathematics, all the participants recognized and stated that there were no instructional strategies or program specifically designed or in place to help African American students to improve their performances in mathematics. Most of the participants expressed the feelings that teachers and curriculum coordinators needed some form of training that would create awareness about the issue of the mathematics achievement gap between African American students and other ethnic groups. Teacher 6 expressed the opinion that school authorities appear to be “veering away from African American kids and providing more support for Hispanics students.” Another participant stated that it appeared curriculum directors do not want to focus on African American students. “They want to sweep it under the rug and pretend like the achievement gap does not exist.” Teacher 8 advocated for the motivation of African American students to learn mathematics, saying “they do not think that they are going to need or use math in the future.”

The use of real world experiences, practice with students, and whole group instructions were evident during the classroom observation visits. As seen in Appendix D, the observations were designed to address all research questions. However, perceptions cannot be observed, therefore, the first research question, “What are the

attitudes and perceptions of junior high school mathematics teachers about the instructional strategies they use to teach 8th grade African American students math?" was not addressed in the observations. There was also evidence that most of the teachers were aware of, and participated in such remediation activities as "before and after school tutoring," "tutoring on Saturdays," "re-testing," and "re-teaching" being implemented for all students. Teacher 2 said, "These strategies are successful for the students that take advantage of them."

Other participants rated those strategies as being successful if "success" is viewed only as improvement from where the student started rather than in passing some examination. Teacher 6 observed that most African American students, especially males, are focused more on sports and sports practice after school, instead of math. "Math teachers cannot compete with sports," she said. The "success" ratings accorded to the remedial programs being implemented for every student by the school system, appeared not to be positively reflected in the achievements of African American students by the teachers.

Research Question 2: To what extent is the academic achievement of African American students in mathematics disproportionately lower compared to the achievement of other ethnic groups?

When teachers were asked through data collection protocol Items 4, 6, and 17, to share their perspectives on the extent to which academic achievements of African American students in mathematics were disproportionately lower compared to those of other ethnic groups, their responses were narrow and almost unanimous. Four of the

eight participants stated students do not receive the parental support they need at home. Teacher 3 said, “Parents do not stress the importance of why they are at school and how important it is for them to get a good education.” Two participants felt that the students are lacking basic math skills. Teacher 5 noted, “I think there are skills that they are lacking. Just basic reasoning skills are lacking.” Furthermore, two participants felt that students simply do not care.

Table 4, below, showed perceptions of the teachers regarding the effectiveness of their instructional strategies and causes of low mathematics achievement scores among African American students.

Table 4

Perceptions of Effectiveness of Strategies and Perceived Causes of Low Mathematics Achievement Scores Among African American Students

Themes	Subthemes	Description of Themes
Perceptions of Effectiveness of Strategies	Present Strategy Perceived as Being Effective	7 teachers said their classroom strategies were effective
		1 participate said their strategies were not effective
Perceived Causes of Low Mathematics Achievements Among African American Students	Lack of Parental Support	4 of the 8 participants cited lack of parental support
	Lack of Basic Math Skills	2 participants said students lack basic reasoning skills
	Inadequate Understanding of Purpose of Math in Their Future	2 participants said some African American students do not think they will need or use math in their future

When asked about the challenges perceived as influencing the mathematics achievement of African American students in math, (Interview Question 6), five participants stated parental involvement as a major challenge. Two participants stated that the behaviors of students also created challenge. There were other negative responses that the participants gave the researcher about the students such as students not knowing basic math skills, giving teachers a hard time, and not being realistic. Teacher 7 said, “Most African American students struggle with basic math skills.” It was noted during field visit observations of classes, however, that some teaches worked math

problems on the board for students and others allowed students to continue talking until they decided to stop talking.

In six of the classroom observations, the teacher worked the problems on the board, walked around the room, looked at student papers, and gave assistance as needed. In the other two observations, the teacher spent the majority of the class time demonstrating how to solve the math problems by working them on the board for the students. In five of the observations, the teacher divided the students into groups and had them work together to figure out how to solve the given math problem themselves. In the other three classes, the students began by working in groups, but when the teacher gave them an assignment, they worked by themselves. After the students completed the assignment, they worked with another student to check their work. Seven of the eight teachers reported that they found these instructional strategies effective while one teacher reported that “the strategies seem effective the first day or two and then it is not that effective. The students get comfortable where they are and they learn how to get away with doing the least.”

Table 5 below demonstrates the challenges perceived by teachers as influencers of mathematics achievement scores of African American students.

Table 5

Challenges Perceived by Teachers as Influencers of Mathematics Achievement Scores of African American Students

Challenges	Descriptions
Parents	Lack of parental involvement
Student Behaviors	Students giving teachers' hard time Non-realistic attitude of students
Teacher Interaction	Absence of interactions between teachers and students Teachers working math problems on the board instead of testing students' ability to problem solve the issue
Prejudice	Teachers' demonstrated prejudices against students

Research Question 3: How can educators determine the causes for the achievement gap and what can they do to help reduce it?

Research Question 3 attempted to seek participants' insight on the determinants of achievement gaps in mathematics among African American students, and what the teachers can do to reduce those gaps. For this question, participants were asked to respond to Items 5, 11, 12, and 16 of the data collection protocol which asked for strengths and weakness of what determinants influencing low achievement, and general activities that can be implemented to foster improvement of African American math achievement.

Table 6 illustrates responses identifying African American student strengths and teachers' suggested methods to identify determinants of achievement gaps and strategies to reduce gap margins. The eight participants whom I interviewed offered various responses to Item 5. Four participants felt that African American students are persistent. Teacher 1 said, "I think that most African American students are verbal and persistent. Some of them are not afraid to ask questions. If they do not understand a problem, most of them will keep trying until they get it." There were other positive remarks that the participants stated about African American students which included the students being smarter than some teachers give them credit for, they persevere, being verbal, will ask for help, worth more than they give themselves credit, and use common sense when solving math problems. One participant stated that when students pay attention in class they can apply real world applications very well. "When African American students behave in class, they can apply real world applications very well. They will take real world applications and work with that. They can work with it if they can relate to it."

Table 6

Teachers' Suggested Methods to Identify Determinants of Achievement Gaps and Strategies to Reduce Gap Margins

Teachers' Suggested Methods to Identify Determinants of Achievement Gaps	Descriptions of Determinants
At the Individual Teacher's Level	Teachers' lack of enabling knowledge and skills that could assist in recognizing early activities and behaviors among African American students leading to potential low achievements in math.
At the Administrator's Level	Administrators' insensitivities to prejudiced attitudes of some teachers Teaching strategies adopted and being utilized by some teachers
At the Students' Level	Unsocial behaviors in classrooms Unwillingness to participate in mathematics activities Tardiness Incomplete homework assignments
At the Parents' Level	Student' exhibition of disinterest in attending schools Failure of their students to share home work with parents Exhibition of unsocial behaviors by their student

Interview Question 11 asked participants to describe their greatest strengths in the classroom and how those strengths were being used in teaching? The answers to this question varied among the participants. Two participants stated that they had strengths

with asking the students questions. Other participants felt that their strengths were with teaching the content. Teacher 8 expressed, “I have a pretty good understanding of not just 8th grade math, but middle grades math in general. My bachelor degree is in middle grades math and my masters is in middle grades math. I love teaching math.” Ironically, one participant felt that her strengths are not identified because she is a beginning teacher. “I have not identified my greatest strength yet. I am still trying to find my way.” Other positive responses from the participants included having strengths with using resources, working hard with students, understanding grade level math, and genuinely caring about the students.

Greatest weaknesses of teachers (Interview Question 12) included course planning, course delivery, classroom organization and management, breaking down information, relating information to real life situations, understanding the culture, data, and paperwork. None of the mentioned weaknesses were the same. Teacher 2 noted, “My greatest weakness is putting out the information in bite size pieces. Breaking it down to the fundamental concept and not going too fast.” As stated by Teacher 4,

“I have a hard time using data for instruction because a lot of times you will get your data like after a big test and you feel like you do not have enough time to really go back and reteach something that needs to be retaught.”

Teacher 6 said, “My delivery is not always perfect for every child. I am really tweaking that. In the past three years, I have been really working on my delivery.” Table 7 below illustrates teachers’ perceived strengths of African American students and classroom strengths and weaknesses impacting African American performances in math.

Table 7

Perceived Classroom Strengths and Weaknesses Impacting African American Performances in Math

Themes	Subthemes	Description of Themes
Students' Strengths	Persistency Smartness Strong Verbal Language Resilience	Participants indicated that students are smart, that they can persevere, and have the ability to use their common sense.
Student' Challenges	Parental Involvement Behavior Lack of Basic Math Skills Background and Practice	Majority of the participants cited low parental involvement in the education of their children leading to unsocial behaviors and lack of math skills.
	Prejudice Attitude of Teachers	Some participants also said the prejudice attitude of some teachers also create challenges for the children.
Greatest Classroom Strengths	Flexibility of Content and Classroom Management	Three participants said flexibility of content and classroom management techniques are greatest strengths for them.
	Humor, Compassion, and Dedication	The use of humor, their compassions, and dedication were cited by many study participants.
Greatest Classroom Challenges	Planning, Delivery, Organization, and Classroom Management	Course planning, delivery methods, course organization, and classroom management were cited by some participants.
	Cultures	Understanding of other cultures was also cited.

Table 8, below is a list of activities suggested by participants to reduce low math achievement of African American students, in response to data collection protocol, Item 16.

Table 8

Suggested Activities to Reduce Low Math Achievement Gaps of African American Students

Themes	Subthemes	Description of Themes
Program Focus Activities	Relatable Math Assignments and Instructions	Two of the eight participants advocated for making math assignments or instruction more relatable.
	After School Tutoring	Three suggested stronger after school tutoring programs.
	Parental Contact Build Relationships and More Differentiated Instructions	Programs focusing on more frequent parental contacts, build relationships, and expansion of differentiated instructional method of teaching were also advocated.
Professional Development Training	Multicultural Approaches Enhanced Ability and Confidence in Training Mathematics	All eight of the participants supported the idea of professional development trainings which encompasses multicultural approaches, enhanced ability, and confidence in the teaching of math.

There was a wide array of responses to Interview Question 16. Two participants felt there should be a focus on the instructional strategies starting at the elementary level. Teacher 1 said, “Make sure every student at the elementary level get the foundation they need before they leave. When they get in junior high school we are trying to teach functions and systems and they do not even know their multiplication facts.” Two participants felt that students should receive more one-on-one instruction. Four participants stated that all mathematics classrooms needed co-teachers, small group instruction, and after school tutoring. Teacher 6 stated, “It would be nice if all math teachers had a co-teacher. However, the teacher and the co-teacher have to have the right chemistry.” In addition, six participants noted that there should be more African American male math teachers. Teacher 2 cited, “African American students, especially boys, need to see African American male teachers in the classroom. They need to see someone that looks like them and somebody they think they can relate to.” All eight of the participants expressed the idea of multicultural professional development training. Other responses from the participants included more differentiated instruction, classrooms need structure, students should be exposed to certain things, determine the causes of the achievement gap, target weaknesses, discipline should be handled differently, and homework practices should be prevalent for these students.

Research Question 4: What instructional strategies could be implemented to close the mathematics achievement gap among African American students in mathematics?

Teachers suggested a plethora of strategic approaches that they believed could contribute to the reduction of achievement gaps of African American students in mathematics. Three participants advocated the need for training in multiculturalism. Teacher 1 said, “I think it is good to know the different cultures, the different practices of different cultures, and the different processes of the different cultures. It helps teachers relate to the different students.” Two participants felt that math support classes should be expanded and target African American students specifically. All eight of the participants said new strategies of professional development specifically targeting the African American students’ low performances should be developed. There were other strategies suggested for teachers which included the recruitment and retention of African American male teachers, co-teachers, small groups, and smaller class sizes, as illustrated in Table 9.

When asked is there anything you would like to add, five of the participants had a few suggestions, two participants had one suggestion, and two participants did not give any suggestions. Teacher 6 stated that all her students have her cell phone number so that they can call at any time, if they have some challenges in math. Others gave such answers as being aware of their students’ needs, identification of strengths and weaknesses of their students, and continuing teaching math at the standard and level they want all students to achieve.

Teacher 7 noted they do intersession after the 1st, 2nd, 3rd, and 4th nine weeks. Intersession is a week of re-teaching for students who are failing at the end of nine weeks. It is for remediation purposes to help improve scores and to get students passing for the nine weeks.

Intersession is five hours a day. Teachers re-teach students who have a 67, 68, or 69 average so that they can get a 70 for the nine weeks. Students that are really struggling are also invited because the teacher can spend more one-on-one time with them. Unlike the other school system, which has 55 minutes instructional blocks, this school system has 100 minutes instructional blocks. “We do not feel as rushed and it gives the student more time in class to get the support they need.” African American students’ math scores on the CRCT are better in this school system than the other school system.

Table 9

Teachers' Suggested New Approaches to Closing Achievement Gaps

Themes	Subthemes	Description of Themes
Discipline	Multiculturalism	Broadening the teaching profession preparations to include training in multiculturalism
Math Support Classes	Expand Math Support Classes Targeting African American Students Specifically	Creation of a system of differentiated instruction that focuses more on the cultures of the students for math teaching
New Dialogues	New Strategies of Professional Development	All eight of the participants said new strategies of professional development specifically targeting the African American students' low performances should be developed.
	Establishment of Real Dialogue on Issue	Two of the participants called for additional real dialogue about the issue.
Policy Changes	Increment in African American Male Teachers Presence	Five of the eight participants indicated that there should be more African American male teachers.
	Implementation of Effective Co-teaching Program	Four said effective co-teaching activities should be encouraged
	Small Group Smaller Class Sizes	Three of the participants said small groups and smaller class sizes should be initiated at the policy level.

When asked about the teachers' impression and need to receive training in multiculturalism (Data Collection Protocol, Item 8), all the participants stated that such training will be both important and necessary. Four of the participants indicated that they had taken multiculturalism classes during their professional preparations, and that the knowledge was very beneficial. "There is a difference in the way Black, White, and Hispanic kids are brought up. There is also a difference in their culture, upbringing, and environment," said one of the four experienced multicultural participants. Other teachers expressed various positive connotations such as "the cultures bring different insights into the classroom," "teachers will have a better understanding of the students," and "such trainings will give teachers an understanding of the different skills, color and ethnicities which the different student brings into the classrooms" in support of multicultural professional training programs.

When asked about the confidence levels of teachers in their ability to teach mathematics (Data Gathering Protocol, Item 9), the responses were similar. Except for one teacher who said she struggles with teaching the subject, all the other participants stated that they feel very confident with their mathematical teaching abilities. One participant emphasized her level of comfort thus: "Even though I am confident in my mathematical abilities, when my students do not succeed I feel like it is my fault." Another teacher, however, modified the level of comfort by saying that she is confident in the curriculum, but not confident in the way the state wants her to teach it and how they want her to teach it.

The teachers' level of confidence in teaching mathematics to African American students (Item 10 on the Data Gathering Protocol) also generated similar responses among all the eight participants. They all stated that they were very confident with teaching this subject area to African American students. One participant stated that she feels confident because she sees herself in some of her students. Another stated that she feels confident in the curriculum, but does not feel 100 percent of the time that she knows the strategies that she needed to use or the approaches she needed to take. "I try things and if it does not work I try something different."

When asked what could be done differently to improve the success of their various strategies (Item 15 on the Data Gathering Protocol), all the participants wanted resources with a variety of strategies specifically designed to assist African American students in mathematics. They also wanted to see more professional development programs for teachers. Other strategies suggested included serious consideration given to addressing the needs of students, examining the issues of closing the achievement gap in mathematics, and having co-teachers in all mathematics taught by newly graduated math teachers in classes where African American students are present.

The data gathering protocol also afforded participants the opportunity to state, if there were other issues or points which they considered pertinent to the purpose of this study (Item 18). The participants expressed a wide range of responses to this question. Responses included such statements as "we cannot save all of these students," "hard for them to get excited about math," "need to be proactive," "they do not come with the foundation they need in order to be successful in mathematics," and "teachers' work

ethics should be increased.” One participant stated that it seems like there are so many things fighting against education. “It is hard to get students excited about math, but when I do it is good.” In addition to these, participants also offered such comments as “teachers need to establish relationships with students,” “teachers should learn how to examine personal needs of students,” teachers should demonstrate to the students that they genuinely care about them, providing tutoring, and volunteering for extra helps.”

Observations

As previously stated, observations were designed to address all research questions. Themes were used with observations according to the questions. It is impossible to observe perceptions and the extent of the academic achievement of African American students, therefore, the first research question, “What are the attitudes and perceptions of junior high school mathematics teachers about the instructional strategies they use to teach 8th grade African American students math?” and the second research question, “To what extent is the academic achievement of African American students in Mathematics disproportionately lower compared to other ethnic groups?” was not addressed in the observations. All observations were conducted prior to the interviews.

Classroom field visits were carried out for four days to observe teacher/pupil activities within the following nine areas: (a) instructional strategies, (b) teacher proximity, (c) questioning strategies, (d) scaffolding, (e) assigned activities, ((f) student engagement, (g) interactions with students, especially African American students, (h) addressing off task behavior, and (i) classroom management. I was looking for specific data in order to address the research questions. The third and fourth research questions,

“How can educators determine the causes for the achievement gap and what can they do to help reduce it?” and “What instructional strategies could be implemented to close the mathematics achievement gap among African American students in mathematics?” were primarily addressed by observing the questioning strategies used, scaffolding, assigned activities, and classroom management. By using these components of the observation, the researcher was able to observe what strategies were already in place and how effectively they were being used.

I observed several different questioning strategies. Some of the questioning strategies included “do you have any questions,” “how did you get that answer,” “what do you need to know in order to solve this problem,” and “can you justify that.” Teacher 6 asked her students, “Does anyone have the same answer, but a different way to explain it?” Using these strategies allowed the teachers to determine if students were on task and paying attention in the classroom.

Scaffolding and assigned activities were the next areas observed. During observations, all the participants assisted students when they needed help. I observed the participants assigning activities to the students. For example, there were different tasks that were assigned to the students which consisted of graphing slopes, using scatter plots, using two way tables, grading test, identifying correlations, checking own work, and reviewing for a test. However, there were other tasks which were observed in two of the classrooms with findings slopes, using line graphs, and line equations.

The last area observed was classroom management. Five of the participants allowed students to work in whole group the entire class period. The students in Teacher

4 class started as whole group, but when the assignment was given the students had to work by themselves. However, when the students completed the assignment they were allowed to work with a partner to check their work. In Teacher 5 class, the students started as whole group, but when the assignment was given they worked with a partner.

Conclusion

Section 2 of this research study examined the methodology, described the qualitative tradition, and justified the chosen research design. The participants, measures that were taken for protection of their rights, data collection, and data analysis were also discussed in this section. In this qualitative case study, I explored teachers' attitudes and perceptions about the instructional strategies they use to teach 8th grade African American students math. In Section 3, the literature will be reviewed primarily to search for a suitable evidence-based project that can be utilized or amended for use in the implementation of the recommendations of this study, and the project that was developed as an outgrowth of this study will be described.

Section 3: The Project

Introduction

The purpose of this case study was to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the math performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics. An 18-point questionnaire was designed to guide and record in-depth interviews from a non-randomized purposeful sample of 8th grade mathematics instructors who have experience teaching of African American students in rural south Georgia. Field observations were also conducted in the respective classrooms of the teachers to collect evidence regarding instructional strategies and student interactions.

According to Pabou, Anderson, and Kbarem (2011) and Villegas, Strom, and Lucas (2012), the need to close the racial gap between African American students and African American teachers came to national attention during the middle of the eighties era. It was in the year of 1972 that the U.S. Department of Education first collected demographic data for schools that were recently desegregated. The data verified the fact that African American students comprised 22% of total enrollments and African American teachers comprised 12% of the teaching force (Villegas et al., 2012). This percentage means that there was a 10% gap between African American students and African American teachers. Ten years after this data was collected, this gap has increased by 17%. Therefore, this percentage means that African American students

comprise 27% of enrollments and African American teachers of make up a mere 10% of the workforce.

This situation seems worse when one considers the situation in the rural south (and other areas of America) and the availability of high quality African American math teachers, as verified by the interviews conducted with both African American and Caucasian teachers and the literature that was reviewed. Williams (2011) explained that the gap of achievement between Caucasian and African American students continues to be a problem in the United States after more than two hundred years. Furthermore, existing literature supports the view that the achievement gap, not only exists between Caucasian and African American students, but also between Caucasian and students from most other minority ethnic groups (Burchinal et al., 2011; Cowan Pitre, 2014; Hines & Kritsonis, 2010; Moller, Mickelson, Stearns, Banerjee, & Bottia, 2013; Morris & Morris, 2013; Ottar, Konoid, Berry, Grissmer, & Cameron, 2013; Rowley & Wright, 2011; Williams, 2011). It is for this reason that educators are beginning to formulate various strategies to help reduce the achievement gap between Caucasian students and African American students. Ottmar et al. (2013) recognized the fact that students (especially those who are in junior high school) will benefit from teachers applying mathematical concepts and ideas to the world outside of the mathematics classroom as a way to improve African American students (especially Black males) attitudes and perceptions towards mathematics.

I conducted a qualitative project study at the local junior high school and a neighboring school system to access the attitude toward and perceptions of mathematics

teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that will improve the students' future performances in mathematics. To gather data for this study, I used observations and interviews as the data collection tools. The results of the data collected for this project study revealed that teachers believe recruiting and retaining African American teachers, professional development, and co-teaching could help lower the achievement gap between African American students and other ethnic groups in the area of mathematics. The final project discussion and review of the literature addressing this study are included in the third section. Section 3 also includes a description of the plan, goals, content, resources, and social change implications.

Description and Goals

In the data obtained, it was discovered that 8th grade African American students lagged behind other ethnic groups in performance in mathematics. However, it should be noted that American students as a whole lag behind their counterparts in other industrialized nations (Rowley & Wright 2011; Williams, 2011). It should also be noted that this situation is not any better in the case of the African American student when one does an assessment of his sociocultural context compared to his peers who are Asian and Caucasian (Cowan Pitre, 2014; Williams, 2011). The African American culture celebrates individuality and unique expressions, such as depicted in music, sports, and their spiritual and religious expressions. Therefore, it can be argued that when a mathematics teacher integrates elements of African American students' backgrounds into their teaching of critical mathematical concepts, these students will be able to more easily

grasp these concepts (Bryan & Ford, 2014; Griffin, 2013). Consequently, when mathematics teachers use this approach, the African American student's background can be helpful in understanding mathematical concepts rather than be a hindrance. The interviews conducted revealed that teachers believe that the socialization of African American students, most of which come from single parent background (with most of these parents parenting at a young age) is a challenge. One teacher admitted that the surroundings of the African Americans students in their neighborhoods could be problematic when doing academic work.

Cowan Pitre (2014) argued that access to high-quality curriculum programs, resources, and certified teachers play a major role in reducing the achievement gap rather than their sociocultural background. Cowan Pitre noted that the existing literature now rejects the argument that African American students' economic background, the involvement of parents in African American student's academic life, or the number of guardians or parents in the home as having an impact on the child's performance. Darenbourg and Blake (2013) contended that although an African American student might be academically at risk due to certain sociocultural and economic factors unique to their experience, in the fourth and fifth year of elementary school, it was observed that if these students were behavioral engaged, then they would be able to perform well academically.

Furthermore, as suggested by one of the teachers who was interviewed, it could be beneficial if African American teachers teach African American students who have trouble with mathematics because clearly, they would be more exposed to the cultural context of these students. Several teachers expressed the need for more African

American males to teach mathematics, as that would allow African American male students to have a visual picture of using mathematics, as an African American male will look like. As a result, African American students would be able to relate mathematical concepts to everyday experiences that can be linked to the African American culture. In light of the above observations, it appears plausible that the proposed project, which is to be outlined in this section, includes a focus on the necessity of recruiting and retaining African American teachers, co-teaching, and professional development to close the gap between African American students and other ethnic groups in the area of mathematics.

The goal set for the professional development program, therefore was to organize an educational development program for teachers of African American 8th grade students which will expose the participants to the intricacies and understanding of effective multicultural and co-teaching format and processes of instructions, provide them with trainings in classroom managements, and equip the participants with the necessary skills and knowledge of how best to support students in the classrooms and enhance students' achievement scores in mathematics.

Rationale

This project was chosen to address the mathematics achievement gap between African American students, especially within rural south Georgia. The findings from my project study showed that effective professional development would be helpful for 8th grade math teachers in ensuring they would have strategies to meet the academic needs of their students. As stated by Guskey (2002), professional development is the key to changing student achievement.

While conducting research, I found many articles on co-teaching, culturally relevant pedagogy, and differentiating learning (Guskey, 2007; Sleeter, 2001; Zimmerman & Dibenedetto, 2008). After reading and continued research on co-teaching, culturally pedagogy, and differentiating learning, a determination to develop a professional development program which addressed co-teaching, aligning instruction to the needs of African American students' culture, and implementing different pedagogy strategies in the math classrooms was created. This program would provide 8th grade math teachers with the strategies needed to create lessons which benefit African American students, while still implementing the current mathematical objectives in the classroom. The professional development program will also focus on learning as an active process of constructing knowledge based on the constructivist theory I used as my conceptual framework.

Review of the Literature

This literature review focuses on co-teaching, culturally relevant pedagogy, and professional development. Based on the findings of this project study, math teachers would benefit from professional development on mathematical strategies to help close the achievement gap in mathematics between African American students and other ethnic groups. A professional development plan which focuses on co-teaching, culturally relevant pedagogy and differentiating learning were a practical solution to these factors.

I used various methods for the review of literature. Specific databases such as Education Research Complete, ERIC, and Sage were used. To locate appropriate materials, the following terms were useful: achievement gap, African American students,

African American teachers, co-teaching, culturally relevant pedagogy, differentiating learning, mathematics achievement gap, and professional development.

Co-teaching

One of the potential strategies to improve the mathematics achievement gap among African American junior high school students and another student of different ethnicity is to integrate co-teaching strategies between a general and special educator. Co-teaching is typically practiced in inclusive education where students with disabilities require a special and general educator to optimize the learning outcome (Fennick, 2001). According to Yopp, Ellis, Duarte, Bonsangue, & Meza (2014), the co-teaching approach can be as effective in other instructional settings including mathematics. It is not common to see two teachers sharing a single physical space within the junior high school classroom, but the involvement of each teacher in the co-teaching team provides a condition that allows them to meet the diverse needs of the students regarding individualized support and attention. Furthermore, Yopp et al. asserted that the use of co-teaching can potentially advance student learning because the co-teaching model fosters shared responsibility and professional collaboration.

Similarly, Jackson and Wilson (2012) suggested that supporting the African American students' learning of mathematics encompasses a need to adopt specific forms of practice considering that the conventional approaches are potentially problematic. In this regard, co-teaching is part of the alternatives that will serve as the key to responding to the problem of practice. James (2015) argued that the co-teaching model adopted from the inclusive education environment could be applied in the general classroom setting

using collaborative efforts where one teacher delivers the instructions and facilitates activities. On the other hand, the co-teacher can observe the class and take notes about how the African American students react to the instructions, their behavior, and which students are getting it and who are not. The practice was implemented in other states such as New York where the common core state standards adopted the co-teaching model to close the gap in the mathematics learning outcome (Adams, 2015).

In a study by Adams (2015), the general and special education teacher both agreed that for co-teaching to be successful, both teachers have to work together as a team. The perceived positive implication of the co-teaching model in the classroom was attributed to the effectiveness of the approach in delegating the needs of the students among the teacher team and regarding enhancing the learning experience of the students because of the sharing of expertise in the process of planning, teaching, and assessing lessons. In a general classroom setting, it is assumed that not all students can grasp mathematical instructions, which demonstrates the need for extra attention.

The concept of co-teaching is identified as a collaborative effort between two teaching professionals, which is defined by Leafstedt, Richards, LaMonte, & Cassidy (2014) as the viable method of increasing the academic achievement of students and was designed for those with disability and special needs. Parker (2014) also looked at co-teaching with a general and special education teacher but looked at the impact on general education students. Parker conducted a study on the impact of co-teaching on the general education environment. The findings suggested that there was a significant difference for general education students in co-taught mathematics classes as compared to their peers,

not in co-taught classes (Parker, 2014). The result is an indication that the co-teaching model is likely to induce the same positive expectations on students' performance in mathematics. Furthermore, the findings also reinforce the assumption that the co-teaching model also works in the general education environment.

Regarding ascertaining the positive impact of co-teaching in increasing the performance of African American students in mathematics, Davis, Pitts Bannister, and Mutegi (2014) suggested that other forms of co-teaching approaches can be designed to accommodate the needs of African American students. The author articulated the work of Hill and Petchauer (2013) where a new concept in improving mathematics education for African American students through hip-hop music. The idea is to use hip-hop music in teaching math using rapping practice activities for the African American students to correlate with the instructions. Coaching through culturally familiar habits encompasses an opportunity for the teachers to capture the attention of the students during the lessons. However, one of the problems identified in this approach is the limited number of educators who can integrate the concept into teaching practice considering that not all teachers can make rap music (Davis et al., 2014). On the other hand, co-teaching can potentially enable the teachers to incorporate the concept by exchanging ideas.

From another perspective, Ploessl and Rock (2014) examined the co-teaching model regarding planning and instruction from the context of eCoaching. This is another form of co-teaching where one teacher assumes the responsibilities in the physical classroom while the other teacher provides coaching communicated electronically. The result suggests that eCoaching approach in the co-teaching model can greatly improve

student-specific accommodation and participation (Ploessl & Rock, 2014). The findings coincide with the result of the study by Johnson (2012) where the influence of co-teaching in learning and teaching practice was examined. It was found that co-teaching would work effectively with sufficient administrative support, training, co-planning opportunities, and training. Furthermore, Johnson asserted that learning and teaching are influenced by co-teaching model regarding expanding the opportunities for improvement and developing other classroom approaches because of the combined expertise in planning and instruction.

On the other hand, Delkammer and Leader-Jahnsen (2014) articulated the importance of co-teaching practices in secondary schools not only in the special education settings but also in general education as a whole. The authors argued their position on the concept of co-teaching as a result of examining the perception of general education teachers and secondary special education teachers about its importance. The researchers suggested that the teachers' perception of the importance of co-teaching is to successfully initiate lesson planning, communication, assessment, and differentiation of instruction. When the concept of co-teaching is applied in general education, the co-teaching approach enables the educators to be masters of specific content areas and learning subjects (Delkammer & Leader-Jahnsen, 2014). In this sense, the co-teaching approach can significantly improve the quality of teaching and learning experience regarding providing opportunities to differentiate instruction.

Co-teaching encompasses several structures to implement in the mathematics classroom. While other researchers suggested that the co-teaching model may not be

appropriate for mathematics, Pappamiheil (2012) contradicted this assumption by pointing out that the disadvantage of the co-teaching model within the general education setting is existent in ESL because the student is not only facing difficulty with numeracy, but also in fully understanding the instructions in English. Also, the difficulty in integrating the co-teaching model is attributed to parity, caseload size, high-stake testing, departmentalization, and differences in teaching style. However, the study conducted by Pappamiheil showed that co-teaching has a positive effect on mathematics regarding enhancing instruction. Furthermore, the approach was also found to support several academic and social aspects of classroom learning (Pappamiheil, 2012). The finding coincides with the result of the study by Cleaveland (2015) in which the teaming method in high school mathematics co-teaching enhances the students' capability to see alternative math solutions because of the individualized assistance provided by the co-teaching model.

Culturally Relevant Pedagogy

The term "culturally relevant pedagogy" describes an effective teaching approach that cuts across a multicultural classroom. Several assumptions arise when interpreting the meaning of culturally relevant pedagogy such as acknowledging ethnic culture, observance of holidays, and other culturally inherent practices. However, the context of culturally relevant pedagogy is not limited to perceptions that only teachers of colors can be culturally relevant because the concept does not only entail willingness of the teacher to adapt to the classroom diversity, but also to ensure that the learning opportunities apply to all students of various cultural backgrounds. According to Paris (2012), learning

and teaching in hip hop cultures, which is a dominant popular culture among African American students encompasses an ideological distinction between classroom practices that are culturally appropriate, relevant and responsive and practices that are based on the students' cultural and linguistic realities. Paris also supported the assumption that sustaining culturally relevant pedagogies entails a more effective approach in establishing connectedness between the educator and the student.

The assumption is supported by the findings in the study by North (2014) where the concept of culturally relevant pedagogies was observed in practice in a secondary mathematics class. The results of the Algebra test administered to a culturally diverse mathematics class showed that when teachers adopt culturally relevant pedagogy in the classroom, the culturally diverse students will have a greater opportunity to learn and retain mathematical content (North, 2014). Arguments surrounding the culturally relevant mathematics pedagogies assert that it is just good teaching. On the contrary, Stinson (2014) argued that it is not just about good teaching, but a matter of putting the concept into teaching practices. The argument was based on the perception that little good teaching is occurring in African American populated classrooms particularly in mathematics. Furthermore, the lack of good teaching practices in African American populated classrooms was found to be the motivating factor that enabled the development and the theory of culturally relevant pedagogy (Stinson, 2014).

In this regard, if culturally relevant pedagogy is not just about good teaching, the emerging question revolves around asking how mathematics teacher should teach in a culturally responsive way. The study by Ukpokodu (2011) addressed this question by

examining teachers' perception of culturally relevant pedagogy where it was found that teachers view mathematics as culturally neutral. Also, several issues were identified regarding associating mathematics instructions to culturally relevant teaching practices such as lack of culturally responsive teaching model in mathematics to emulate, the dominance of the existing text-based mathematics instructions, and standardization of curriculums that encompasses high-stakes testing. On the contrary, the study conducted by Flores (2014) asserted that culturally responsive teaching enable the teachers to attend to the cultural diversity of the classroom, which benefits students' regarding advancing mathematics learning.

Students benefit from culturally responsive teaching because when the teacher considers cultural differences as a differentiating factor in learning advancement of each student, it allows them to create new classroom practices that will work effectively across a multi-cultural class of students (Harding-DeKam and Ben-Peretz, 2014). According to Hamza and Hernandez de Hahn (2012), it is important that teachers align their teaching practices with their beliefs in discovering cross-cultural competencies when deciding to create pedagogies that entail action for change. Similarly, Harding-DeKam and Ben-Peretz (2014) asserted the same perception of the importance of culturally responsive teaching in mathematics learning because it allows students to establish a personal connection to the subject contents and instructions.

Putting the theory into practice requires the teachers to replace their deficient and pathological perception of communities and students of color with more positive ones (Gay, 2013). It is critical for teachers to replace these perceptions because the pluralistic

society is often susceptible to negativism, which prevents the educational innovations from generating sustainable and constructive classroom transformations that will benefit the culturally and ethnically diverse students. Gay (2013) examined the major issues related to culturally responsive teaching influenced by misconceptions, negative attitude, and beliefs about ethnicity, racial, and cultural diversity. Gay found that cultural differences and beliefs between the teacher and students create the resistance to cultural diversity, which impedes effective implementation of classroom instructions (Gay, 2013).

On the other hand, McLeman and Vomvoridi-Ivanovic (2012) pointed out that the real challenge in developing culturally responsive teaching practice particularly in mathematics is the insinuation of clear understanding and knowledge of the practice of equitable mathematics pedagogy. The researchers suggested that in expanding the dissemination of practice that integrates cultural equity in mathematics classrooms, it is necessary that the development of the understanding of culturally responsive teaching among math teachers begin in their education (McLeman & Vomvoridi-Ivanovic, 2012). This view of reinforcing cultural responsive teaching assimilates the findings of the study conducted by Joseph (2013) who argued that pre-service math teachers should develop cultural orientation through self-study narratives to be more aware of culturally responsive teaching. This means that putting cultural responsive teaching in practice begins with becoming self-oriented about cultural diversity in the classroom through self-learning and awareness of teaching for equity and social justice (Joseph, 2013).

Given the objective of finding the effective culturally responsive teaching practices for African American learners, the study by Hill (2012) showed that culturally

responsive teaching practices could significantly motivate African American students regarding actively engaging in the learning process. Hill examined the characteristics, practices, and frequency of use of 52 strategies employed by two teachers in a predominately African American urban public school to determine their impact on student learning and engagement. Further, Hill also suggested that when the teachers establish relationships with their African American students, it entails a positive influence towards a greater academic achievement of the students, provided that the teaching approach was done within the premises of the African American experiential and cultural filters (Hill, 2012). About teaching mathematics, the teachers are expected to confront issues regarding culture and race in the process of developing mathematical instructions and methods (Tawfeeq & Yu, 2012). Furthermore, the culturally neutral subjects such as mathematics should be addressed in the classroom by acknowledging the need to align the pedagogical content with cultural diversity.

To help close the achievement gap, mathematics teachers should use culturally responsive teaching. Culturally responsive teaching enables mathematics teachers to expand their options in developing instruction that promotes equity despite the cultural neutrality of mathematics as a subject (Bonner & Adams, 2011). In the study above, it was found that culturally responsive mathematics teaching (CRMT) directly influences classroom practices that conform to the needs of culturally diverse students. The grounded theory on CRMT as articulated by Bonner and Adams (2011) was also found to have resulted from the interaction between knowledge, communication, constant reflection/revision, and trust/relationship. More importantly, Bonner and Adams

supported the prior claims of the positive implication of culturally responsive teaching in advancing mathematics learning, particularly for African Americans.

Professional Development

Several studies have been conducted to determine the impact of professional development towards the secondary student's math proficiency. In a study by McMeeking, Orsi, and Cobb (2012), intensive math content courses followed by a follow-up workshop were conducted as a refresher for algebra, geometry, and math modeling intended for high school students. The development program lasted for 2-3 weeks and was composed of two courses conducted during the summer. Measuring the teaching improvement was done through analysis of the math achievement assessments, and it was found that the students of the teachers who attended two refresher courses had significantly higher test scores as compared to students of teachers who did not participate in the course (McMeking et al., 2012). This finding supports the results of the study by Perry and Lewis (2011) where a professional development initiative for math teachers was conducted to improve the students' proficiency in solving and understanding fractions. It was found from the intervention program that helping the students to easily learn fractions should begin by reinforcing the skills and knowledge of the source of the instructions, which are the mathematics teachers (Perry & Lewis, 2011).

On the contrary, Garet et al (2011) tested the effectiveness of the America's Choice professional development (PD) model and showed that there was no significant impact towards increasing the student's math proficiency. Similarly, the results of testing the effectiveness of the Pearson Achievement Solutions model also showed no significant

impact towards improving math proficiency. One of the factors pointed out by the authors regarding the ineffectiveness of the tested PD models is the lack of cohesiveness in retooling the scope and sequence of the approach in executing the professional development models. The biggest concern about the failure of America's Choice and Pearson Achievement Solution as Professional Development models was the lack of focus on an essential learning area in secondary mathematics (Garet et al., 2011).

According to Sztajn, Campbell, and Yoon (2011), conceptualizing a professional development model for mathematics teachers should take utmost consideration of the focal learning areas that need improvement in the classroom. Furthermore, Sztajn et al. suggested that no single PD model will work on the general population of teachers because the teachers have varying subject expertise and content mastery. The failure of a Professional Development model in enhancing the quality of teaching can be attributed to factors such as lack of administrative support, leadership, and conceptual framework that will meet the demands for learning improvements particularly on neutral subjects such as mathematics where a disparity in learning achievement was observed among African Americans (Caswell, 2011).

Given the government's initiative in making the educational system available to all Americans on equal footing, national reforms were initiated that involve enhancing classroom and teaching practices. On the other hand, perceptions about professional development among educators vary because of the attitudes that encompass resistance to change (Gokmenoglu & Clark, 2015). Perceptions about change as a result of professional development are one of the factors that contribute to the failure or success of

improvement initiatives. According to Gokmenoglu and Clark (2015) despite the immense amount of resources needed to facilitate a system-wide professional development program, its result regarding improving the students' academic performance justifies its necessity for implementation. The importance of professional development does not only involve increasing student proficiency, but also regarding innovating classroom cultures, organizational leadership, transforming curriculum, and teaching practices (Bedbarz, Fiorentini, & Huang, 2011).

Implementing professional development models also carefully examines the level of training quality (DeMonte, 2013). The report published by the Center for American Progress highlights the guidelines in ensuring that the quality of professional development programs initiated by schools and district administration are within the global parameters (Maaß et al., 2014). According to the work of DeMonte (2013), professional learning provided the link between the implementation and design of educational reforms. On the contrary, the proceedings of the Conference in Mathematics Education suggested that the success of the professional development program relies on the quality and central focus of the PD model employed in school-based programs (Maaß et al., 2014). This means that acting to facilitate professional development does not only involve aligning with the conditions of the educational reform, but should also consider the quality of the PD programs.

According to Stewart (2014), a professional learning community (PLC) is developed in academic institutions to compensate for the inadequate mentoring opportunities provided for teachers. Stewart suggested that these professional learning

communities should be based on the following six partnership principles: equality, choice, voice, reflection, praxis, and reciprocity. The professional learning activities of PLC should include the following learning activities: content focus, active learning, coherence, duration, and collective participation (Stewart, 2014). These professional learning activities will create a framework where structure and order can play an integral role in allowing a cycle of continuous improvement to occur while teachers choose to be a part of the PLC. This assertion accords with the findings of Riveros, Newton, and Burgess (2012) which noted that the work in a PLC is centered on the learning process of students when being taught concepts, thereby connecting learning to teach practice. An example of professional development (PD) program, which focuses on the teaching of important mathematical concepts, is the Wolf Trap PD program.

The PD program above focused on arts integration, which is defined as instruction that incorporates content and skills from the arts with content and skills from other core subjects, with the purpose of increasing learning in both areas (Ludwig et al., 2014). Ludwig et al. suggested that the Wolf Trap PD program relies on annual summer institutes and in-classroom coaching during the school year. During the summer, Wolf Trap allowed teaching artists (in disciplines, such as dance, music, and drama) to work with teachers in teams to develop standards-based performing arts and mathematics experiences. During the school year, teachers and teaching artists collaborated to partner, plan, and implement lessons in the classroom. This is a research-based strategy frequently called the artist residency model (Ludwig et al., 2014). This will be particularly beneficial for African American students who are frequently influenced by

the arts, especially music and dance, through their various cultural expressions.

Furthermore, the researchers showed that the Wolf Trap PD program enabled students to outperform their counterparts in control schools on the Child Observation Record Scales in areas of mathematics and logics as well as language and literacy.

In a study by Stevens, Aguirre-Munoz, Harris, Higgins, and Liu (2013), it was found that mathematics teachers might feel confident in their ability to solve complex mathematical problems; nevertheless, they might not feel confident in their ability to teach students so that they can instruct students to grasp important mathematical concepts. The evidence presented in the existing literature illustrates the point that PD programs can have a positive impact on teachers' abilities to convey important concepts to students, or as they put it, self-efficacy (Stevens et al., 2013). On the other hand, Bedel (2016) defined self-efficacy as the belief that an educator subscribes to effectively engage the learning process of their students, irrespective of motivation or behavior, to ensure positive learning outcomes.

Project Description

I chose to provide professional development for the project because all the 8th grade mathematics teachers in this study agreed that professional development is needed. Several of the teachers also agreed that having a co-teacher would be beneficial. I decided to incorporate a lot of small group work in the professional development sessions because the research literature suggests that for staff development to be effective, teachers need to see how the professional development applies to them and need the chance to engage actively with and use what they are learning.

The purpose of this professional development plan is to instruct 8th grade math teachers with African American students with a deficit in mathematical achievement. To narrow the mathematical achievement gap between African American students and other ethnic groups, the 8th grade math teachers will be provided with strategies to help aid their students. The teachers will learn the various techniques and instruments associated with the team and co-teaching. Teachers will also learn how to align instruction to the needs of African American students' culture. Also, the teachers will gain knowledge about the different pedagogy strategies that can be carried to and implemented in the classroom.

Project Goals

The goals of this professional development plan are as follows:

1. Educate teachers on different co-teaching strategies.
2. Educate teachers on the importance of implementing co-teaching.
3. Educate teachers on how to conduct meaningful debriefing meetings throughout the year from outcomes.
4. Set expectations for teachers with meeting needs of students using co-teaching.
5. Provide adequate resources to teachers for effective co-teaching strategies.
6. Provide incentives to motivate teachers to carry out co-teaching effectively.
7. Educate teachers on effective co-planning and co-assessment.
8. Educate teachers how to use different pedagogical approaches and strategies by working collaboratively together in the same classroom setting.

Project Outcomes

Through class exercises, by the end of the training, participants will be able to:

1. Explain the importance of co-teaching in a multicultural classroom setting.
2. Demonstrate the effective use of co-teaching strategies.
3. Co-plan pedagogical strategies, co-assess outcomes, and collaborate with each other during co-teaching settings.
4. Set expectations to meet the needs of African American students.
5. Conduct successful debriefing meetings with peers, administrators, and parents about the mathematics achievement progress of their students.
6. Identify sources of resources and how to utilize those resources in the classroom to enhance math instruction and improve the achievement scores of their students.

Through their evaluation of the training, participants will also demonstrate an understanding of the cultural elements that guide teaching and learning in multicultural classrooms and provide feedback that could be used to improve the professional development program for future use.

The primary focus audience will be 8th grade junior high school math teachers who teach African American students. These teachers will be teachers in the junior high school in the home district and a neighboring district of the facilitator.

Potential Resources and Existing Supports

Necessary resources for the implementation of this project will be obtained from the school district. The school district has a professional development lab that is a “smart” classroom with internet access to show the videos and PowerPoint presentations.

During the process of the 3-day professional development training, substitute teachers will provide the necessary classroom support to ensure that classes remain operational. The school or the school district needs to provide the substitutes.

There are two teachers in the local district and one teacher in a neighboring district who have been co-teaching and who can be guest speakers to discuss how they have used co-teaching effectively, and the impact co-teaching has had on mathematics achievement. Teachers who have documented experiences in multicultural teachings will also be used as resource persons for the project. The training will be held in the professional development lab, and teachers need to bring their classroom curriculum. Hopefully, the teachers will agree to participate, but it will be helpful if the administrators offer some encouragement.

Potential Barriers

Potential barriers expected in the implementation of this project include initial recruitments of teachers to participate and expectations of benefits by the teachers as a direct result of their participation. The choice, whether or not to participate will be left entirely to the discretion of each teacher with minor encouragement to participate from administrators. As an incentive to participate, certificate of participation will be awarded to all participants who successfully complete the training project. The use of substitute teachers will also provide the project managers enough time to develop, implement, and evaluate the project. The process and logistics of how participants utilize their newly gained experiences of co-teaching will have to be decided by the participants with the approval of their respective supervisors. I will stress the importance of closing this

achievement gap and ask administrators or math coaches to follow up with observations and coaching sessions to encourage the implementation of the strategies.

Other barriers include finding the money to provide co-teachers and substitutes. Even though co-teaching is beneficial, having two teachers in the classroom is a lot more expensive than one teacher. I will address these barriers by promoting the importance of closing this achievement gap.

Implementation

Activities under this project will require three days. Day One will be on the various techniques and instruments associated with team and co-teaching. Day Two will be devoted to understanding and alignment of instructions to the cultural needs of multicultural students and Day Three will be devoted to available technological resources and implementation exercises of the different pedagogy strategies that can be carried to, and implemented in the classroom. Folders containing copies of PowerPoint presentations, and blank papers to take notes will be prepared for each participant of the project. At the end of each activity project day, participants will be administered an evaluation questionnaire to record their knowledge and expertise on the subjects covered before their participation in the training project, and the knowledge and expertise gained as a result of their participation in the project. Each day's activities will begin at 8 a.m. and end at 3 p.m. with scheduled breaks for lunch, visits to the restrooms, and snack breaks. A detailed framework of the professional development program can be found at Appendix A of this study.

Roles and Responsibilities of Project Participants and Others

My role will be that of workshop instructor. I will conduct the workshop and assist teachers. It is important that teachers attend the workshop and give feedback on the professional development. The roles and responsibilities of the school administrators in the implementation of this project are the provision of substitute teachers to replace potential participating mathematics teachers for three day period of participation in the professional development project. Furthermore, school administrators will be expected to seek the approval of any authority necessary to conduct the training, to make available adequate space that will accommodate the training project, and to seek grants or provide funds that could enable the project to provide free food, refreshments, snacks, reading materials, and certificate of participation to participants of the training project.

Project Evaluation Plan

To evaluate the project study and examine the effectiveness of the professional development, participating teachers will be required to complete evaluation forms, located in the detailed plan in Appendix A. Professional development will take place for three days. To plan future professional development workshops, I will use the information obtained from the evaluation forms. To demonstrate effectiveness, I will examine the results from the math section of the CRCT. Since the purpose of this project is to narrow the mathematical achievement gap between 8th grade African American students and other ethnic groups, the measure of the project should be a lessening of the achievement gap. I will share the results with the key stakeholders who include the 8th grade mathematics teachers and the administrators of the two schools in this study.

Project Implications Including Social Change

Local Community

This project addresses the needs of 8th grade African American students who perform poorly in mathematics, and who are located in the rural southern community of Georgia. There is an achievement gap between African American students and other ethnic groups in mathematics. The teachers will benefit as they are the direct beneficiaries of this project. This project will provide teachers with strategies that can be utilized in the classroom. As a result of participating in this project, African American students should profit from an enhanced learning experience which should then improve their achievement in math. Also, the implementation of this project may contribute significantly toward positive social change in the community by adding to the conversation on how to support 8th grade African American students' performance in mathematics.

Far-Reaching

The outcomes of this project study can also reach beyond these two junior high schools. This study has the potential to benefit other junior high schools with similar demographics. Once the mathematical success of African American students begins to increase at these junior high schools, the project can be used as a model at other school districts in the state. This could help narrow the mathematical achievement gap between 8th grade African American students and other ethnic groups beyond these rural junior high schools in South Georgia.

Conclusion

In this Section, the cardinal steps that led, through a review of the literature, to the development of the professional development program, the objectives of the project, rationale, plans of implementation and evaluation components of the project were discussed. Required resources for implementation of the project, possible barriers, roles and responsibilities of study participants and others, and the social implications of the project were also discussed. In Section 4, a reflection on the study and project will be presented.

Section 4: Reflections and Conclusions

Introduction

This case study was conducted to assess the attitude toward and perceptions of mathematics teachers' instructional practices as they influence the mathematics performances of 8th grade African American students and to strategically develop a project that would help improve the students' future performances in mathematics. Section 4 supports my reflections of this project study. This section includes the project's strengths and weaknesses, recommendations for alternative approaches, scholarship, development and evaluation, and leadership and change. Also, this section includes analysis of self as a scholar, practitioner, and project developer, the potential impact on social change, implications, applications, and directions for future research, and conclusion.

Project Strengths

Strengths of addressing the problem are immense. This project study addressed a need in my local school system. One of the strengths found in this project study was the recognition of the problem regarding factors that contributed to the mathematical achievement gap between African American students and other ethnic groups in two rural junior high schools in south Georgia. The second strength was related to the 8th grade math teachers who teach African American students every day. These teachers have formed relationships with these students and knew their strengths and weaknesses. This is a projected strength because, to help your students, you need to know your students and their abilities. Another strength is the fact that I had the opportunity to conduct

research at my local junior high school and a neighboring junior high school where the participants allowed me to observe their classroom. These participants also responded candidly to interview questions.

Project Limitations

A limitation of this study is time. Teachers participating in the professional development will need time to create lessons. Three days of professional development is not enough time to create lessons for mathematics. This means teachers will need time throughout the school year to continue to create lessons for mathematics using the strategies learned from the professional development workshop. They also need ongoing coaching and a way to provide the co-teaching.

To remediate this limitation, the school administration will need to create a schedule which allows all the 8th grade mathematics teachers to have planning at the same time throughout the year (Dyer, 2013). At the beginning of the school year, an initial meeting with the 8th grade math department head, the math curriculum director, and administration will need to take place to allow time for the first collection of student data. The 8th grade math teachers will need to hold each other accountable and responsible for the planning and implementation of the instructional strategies (Eison, 2010; McGill, 2013). Administrators, the math curriculum director, and the 8th grade math department head must be committed to providing time to collect student data from 8th grade math teachers and to monitoring the progress of the students and the effectiveness of the lessons. However, for this to be successful, administration and the

math curriculum director must be a supportive resource for the 8th grade math teachers throughout the school year.

Recommendations for Alternative Approaches

Another way to narrow the mathematical achievement gap between 8th grade African American students would be to identify teachers who are very successful teaching math to African American students and have them observe and coach and act as mentors to other math teachers. Another option would be to create professional developments that provide 8th grade math teachers with additional mathematics training. This type of professional development would give teachers the opportunity to increase their understanding of mathematics. Also, teachers would also receive exposure to alternative instructional strategies and have more time to collaborate on creating mathematical lessons.

Scholarship

Through my doctoral journey, I have learned much about scholarship. Scholarship is the practice of gaining knowledge (Nicholls, 2008; Stewart & Webster, 2010). Not only have I learned how to conduct research, but I have also learned what to do with the research once it has been conducted. As a leader, it is important never to become complacent and be a life-long learner. Instructional leaders need to continually search for solutions to problems that exist in one's school and district. Through this project study, I understand this in much more depth.

I also gained a deeper understanding of a scholarly approach to research by completing this project study. I learned that to move all students forward academically,

effective professional development is essential. During this tedious process, I have seen a lot of improvement in my writing. Even though I knew completing this project study was not going to be an easy task, I was somewhat surprised at how hard this journey would be. However, by the grace of God, I was able to persevere.

Leadership and Change

Two unique characteristics that evolved simultaneously throughout this project study were leadership and change. Through this project study, I have become a leader in my field. I feel as though I have grown personally and professionally. Although many educators are afraid to step outside the box, I know that educators have to be flexible and willing to embrace change to keep up with the rapid educational requirements.

This project study developed me as a researcher and an instructional leader. Being an instructional leader is an important role in education. I feel as though my leadership abilities are endless. Through my studies, my confidence has increased, and I am more comfortable now taking that leadership role. In the field of education, I have learned the importance of change and leading change.

Analysis of Self as Scholar

As a scholar, this experience has strengthened my scholarship abilities. Even though at times it was extremely difficult and challenging, I recognize myself as a scholar by taking this step to pursue my doctorate in education to be a role model to my colleagues and students. Also, as a scholar and a leader, I have also learned that learning is infinite. I will always conduct research to stay abreast of any innovations and share the findings with my colleagues to close the achievement gap of students. The knowledge I

have gained throughout this process is not only beneficial to me, but it will also benefit the school I serve.

Throughout this journey, I have grown emotionally, mentally, physically, and spiritually. Completing this project study was a tedious process, but I did it. I am so proud of myself. I can finally hold my head up high and say that I am truly ready to learn and lead.

Analysis of Self as Practitioner

During this process, I have learned several things about myself as a practitioner. I have been a school counselor for 13 years. I know in the field of education continued learning is vital to the educator, as achievement is important to the student. This study had taught me never to give up. Now, I treat every student equally and allow him or her to have the same opportunities for achieving his/her highest potential. I am a lifelong learner, and I encourage everybody, especially the students to become one as well.

Walden University has taught me to be a consumer of research and strive for social change. Being on the leadership team at school, I have become actively engaged in learning about and solving educational issues that were present within my school. My critical thinking and problem-solving abilities have improved immensely. As a practitioner, I know educational research is important. It is our responsibility as educators to help students become productive members of society.

Analysis of Self as Project Developer

As a project developer, my confidence soared upon realizing that the ideas, which were conceived, have become a study. It was an exhilarating experience to know and

feel that I have the support and tutelage of so many learned professors ready to pick me up from failing. These skills I learned will be transferred to newcomers in our profession and into solving future problems for the betterment of the world in which we live. As a school counselor, I now see myself as a project developer daily. I aim to continue developing various projects that will help students succeed academically, professionally, and socially. I am on the leadership team at my school and by implementing strategies that I have learned through this process, I feel that I am now in a position to contribute to the solution of educational problems within my school.

Reflection on Importance of the Work

Multicultural students across America experience achievement gaps in many subject areas besides mathematics. In this study, the attitude and perceptions of math teachers of 8th grade African American students as they influence the mathematics performances of 8th grade students were assessed. Not too long ago, the legal system in our state imprisoned some teachers for what has been termed ‘grade points inflation’ which the teachers considered could be of benefit for their students’ success (Martel, 2011; Sarrio, 2011). The implementation of the training project of this study with the press release to the mass media has the potential of generating social change far beyond Georgia. It will demonstrate to the world that our state is repositioning itself through professional development of the teachers to resume his/her leadership roles in education and improved achievement scores of his/her students.

This study has provoked me to look much deeper into schools’, teachers’, and students’ problems by envisioning what types of initiatives and programs could influence

closing existing gaps in our education system. This project study also has the potential to add to the limited research on the mathematical achievement gap between 8th grade African American students and other ethnic groups. This will benefit students not only academically, but, hopefully, personally and professionally.

Implications, Applications, and Directions for Future Research

Obvious implications from the findings of this study were that attention must be given to the needs and styles of multicultural students in our schools. The lack of appropriate professional development for mathematics teachers led to the development of the professional development plan. This professional development plan included training in co-teaching, aligning instruction to the needs of African American students' cultures, and implementing different pedagogy strategies in the math classrooms. The rationale for developing the project was the evidence in the literature of the importance of professional development programs for teachers and finding of the study.

This project study applies to the field of education in a broader context as well. Mathematical achievement gaps exist among 8th grade African American students and other ethnic groups throughout the country. Based on the findings of this study, co-teaching, effective professional development, and the recruiting and retention of African American teachers (especially male teachers) will help close the achievement gap in mathematics. Provided this project study is successful, as it should be, other schools will be interested in using this method to close the achievement gap and ensure the mastery of skills for African American students.

There is not much research on the mathematics achievement gap that exists between 8th grade African American students and other ethnic groups. For future research, attempts should be made to use a randomized large number of participants to enable generalization of the results. Future studies should also look at students in other grades and in urban and suburban districts to determine if the needs there are the same or different. Further quantitative studies examining the effects on student achievement of particular instructional strategies such as the use of co-teaching or the use of different pedagogy strategies would be beneficial. Additionally, finding junior high schools where there is not an achievement gap among 8th grade African American students and other ethnic groups in the area of mathematics and examining the methods being used and comparing that to the methods being used at schools where the achievement of African American students is lower would also be beneficial.

Conclusion

In this Section, the strengths and weaknesses of the project were reflected upon. An analysis of self as a scholar, as a practitioner, and as a project developer was presented. The Section ends with the many conclusions on the experiences gained from pursuing this study on implications, applications, and directions for future research.

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Appendix A: The Project

Purpose

The purpose of this professional development plan is to instruct 8th grade math teachers with African American students with a deficit in mathematical achievement. In order to narrow the mathematical achievement gap between African American students and other ethnic groups, the 8th grade math teachers will be provided with strategies to help aid their students. The teachers will learn the various techniques and instruments associated with team and co-teaching. Teachers will also learn how to align instruction to the needs of African American students. In addition, the teachers will gain knowledge about the different pedagogy strategies that can be carried to and implemented in the classroom.

Program Goals

The goals of this professional development plan are as follows:

1. Educate teachers on different co-teaching strategies.
2. Educate teachers on the importance of implementing co-teaching.
3. Educate teachers on how to conduct meaningful debriefing meetings throughout the year from outcomes.
4. Set expectations for teachers with meeting needs of students using co-teaching.
5. Provide adequate resources to teachers for effective co-teaching strategies.
6. Provide incentives to motivate teachers to carry out co-teaching effectively.
7. Educate teachers on effective co-planning and co-assessment.
8. Educate teachers how to use different pedagogical approaches and strategies by

working collaboratively together in the same classroom setting.

Objectives of the Professional Development Program

The objectives of the professional development plan fall within the following three categories:

1. Educate teachers on the importance, methods, and practice of implementing effective and efficient co-teaching strategies.
2. Provide teachers with the skills and available resources necessary to identify the cultural backgrounds of multicultural students and to align teaching instructions to meet the needs of such students.
3. Reinforce and enable teachers to improve their teaching strategies, their knowledge and skills by utilizing various pedagogy strategies that address the mathematical knowledge of African American 8th grade students in ways that will improve their understanding of the concepts, and improve their achievement scores.

Project Outcomes

Through class exercises, by the end of the training, participants will be able to:

1. Explain the importance of co-teaching in a multicultural classroom setting.
2. Demonstrate the effective use of co-teaching strategies.
3. Co-plan pedagogical strategies, co-assess outcomes, and collaborate with each other during co-teaching settings.
4. Set expectations to meet the needs of African American students.
5. Conduct successful debriefing meetings with peers, administrators, and parents about the mathematics achievement progress of their students.

6. Identify sources of resources and how to utilize those resources in the classroom to enhance math instruction and improve the achievement scores of their students.

Through their evaluation of the training, participants will also demonstrate an understanding of the cultural elements that guide teaching and learning in multicultural classrooms and provide feedback that could be used to improve the professional development program for future use.

Project Activities

Activities of the professional development plan will include:

1. Conducting a pre-assessment study among participants using an informal formative method to determine group and pairing of participants at the beginning of the training.
2. Providing instructions and demonstrations on how to use different co-teaching strategies, including the “one teach one observe,” “one teach one assist,” “parallel teaching,” “station teaching,” “alternative teaching,” “classroom collaborations,” and the “team teaching” methodologies.
3. Engaging in exercises demonstrating meaningful ways of conducting debriefing meetings with students, parents, and administrators on monitored progress of students in math subjects.
4. Participation in various activities and practices on expectations settings for students’ progress and performances in mathematics, identifications of the learning styles of students, supervision of students, and diversity in the format of instructional presentation.
5. Identification of teaching resources, meaningful practices in the use of such resources

to supplement the use of textbooks and technologies in structured activities that will enhance the math skills of African American students.

6. Creating the avenue for participants to work on pedagogical strategies, using individualized instruction, self- assessments, interactive atmospheres, self-regulated learning methods to actualize self-development.

Audience

The primary focus audience will be 8th grade junior high school math teachers who teach African American students. These teachers will be teachers in junior high school in the home district and a neighboring district of the facilitator.

Outline of Components

This professional development training will consist of 3 consecutive days of training. The teachers will learn the various techniques and instruments associated with team and co-teaching. Teachers will also learn how to align instruction to the needs of African American students' culture. In addition, teachers will gain knowledge about the different pedagogy strategies that can be carried to and implemented in the classroom. The facilitator will be available to assist with the process. After the implementation of the first unit, the teachers and the facilitator will meet again for a debriefing. This will continue for the rest of the school year.

Professional Development Training Schedule

This professional development training will occur over the course of three professional development days.

Day One: Co-teaching

Time	Activity
8:00-8:30	Meet and greet. Continental breakfast served.
8:30-10:00	PowerPoint on definition of co-teaching and the different types of co-teaching approaches. Teachers and presenter will discuss the different types of co-teaching approaches orally with meeting the need of African American students. Questions will be answered. Teachers will learn how to use essential questions with the students by using co-teaching approaches in the classroom. Teachers will learn the importance of co-teaching and how to use it effectively. At this time, the teachers will learn the obstacles that are present with co-teaching. Teachers and presenter will discuss this orally.
10:00-10:15	Restroom and snack break.
10:15-11:30	Presenter will demonstrate the different ways to implement the co-teaching approaches in the classroom with another teacher. There will be different teachers sharing their experiences of co-teaching and demonstrating some of the ways in which they use co-teaching in the classroom. Teachers will discuss the different strategies demonstrated. Teachers will share the expectations they have for their classroom and their success of meeting the goals and expectations by using co-teaching strategies.

11:30-12:00	Presenter will share handouts of the information on the different co-teaching approaches with results of math instruction of African American students. Discussions will follow the handouts.
12:00-1:00	Lunch on your own.
1:00-2:30	Break out session of teachers collaborating by being given math problems of how they would use the co-teaching strategies to teach African American students. Teachers will be broken into groups of two and they will present information.
2:30-2:50	Wrap up. Teachers will complete a ticket out the door.
2:50-3:00	Teachers will complete an evaluation.

Day Two: Aligning Instruction to the Needs of African American Students Culture

Time	Activity
8:00-8:30	Meet and greet introductions.
8:30-10:00	PowerPoint presentation over general information of African American culture. Presenter will provide information on how to structure math lessons for these students. Presenter provides information on the importance of one on- one instruction with the students. The presenter provides information on how to implement diverse presentations with math on content in the classroom. Different types of assessments are provided and to monitor the progress of the students. Presenter and teachers will discuss information. The teachers will be taught how to use essential

	questioning with students on the lessons and align with the math standards that are to be taught to the students. Information was aligned with the different components that are present within the culture of the students by meeting the needs of the students as well.
10:00-10:15	Restroom break.
10:15-11:30	Teachers will watch video of some stories on African American students along with their teachers discussing how learning the culture of the students made a difference with structuring and planning the activities and lessons to cater to the culture of the students.
11:30-12:00	Teachers and presenter will discuss the video.
12:00-1:00	Break for lunch on your own.
1:00-2:30	Breakout sessions for the teachers where the teachers will work in groups of three on identifying different assessment methods that can be used with the students in the area of math. Teachers will share one of the assessments that they use in their classroom. Also, teachers will develop some pre and post-assessments in math for the students.
2:30-2:50	Wrap up. Teachers will complete a ticket out the door.
2:50-3:00	Teachers will complete an evaluation.

Day Three: Implementing Different Pedagogy Strategies in the Math Classrooms

Time	Activity
8:00- 8:30	Continental breakfast and introductions.
8:30-10:00	Power Point information over how to implement self- regulated strategies

	<p>and organizing ideas strategies in the math classrooms. The presenter will introduce the topic in the PowerPoint. There will be discussions after each slide so that the teachers can get an understanding of how to use the strategies in the classroom with these students effectively.</p> <p>Teachers will learn how to teach the students to self-assess themselves with using the strategies. Teachers will also be provided with information on the PowerPoint of how to co-plan and co-assess these strategies collaboratively in the classroom setting.</p>
10:00-10:15	Restroom and snack break.
10:15-11:00	Teachers will practice the strategies by being given complex math problems to solve with African American students so that they can be effectively using the two strategies. Teachers and presenter will discuss during the practice sessions in the classroom.
11:00-12:00	Teachers will practice co-assessments and co-planning together with a partner sitting next to them. The presenter will facilitate this lesson.
12:00-1:00	Lunch on your own.
1:00-2:00	Teachers will be provided worksheets on the effective ways of carrying out a debriefing in the classroom with the students. The teachers will be taught the importance of having the debriefing sessions in the lessons so that they can pinpoint problem areas with the students.
2:00-2:15	Restroom and snack break.
2:15-2:50	Teachers will be taught different ways to teach students to self-assess

	themselves with the math problems. Teachers will have practice sessions with group members of four by observing each other self-assess themselves while they are given a math problem.
2:50-3:00	Teachers will complete an evaluation.

Evaluation of Day One Professional Development Session

Topic:

Facilitator(s):

Date of Professional Development Workshop:

Place: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) for each question.

1. The professional development was meaningful to your profession. _____
2. The presenters were knowledgeable of the content. _____
3. Presentations provided adequate information that pertains to your students in need.

4. Activities were helpful with providing instruction. _____
5. Assessments were meaningful to the lessons. _____
6. Is there anything else that you would want to add?

Evaluation of Day Two Professional Development Session

Topic:

Facilitator(s):

Date of Professional Development Workshop:

Please answer each question to help maximize the usefulness of this session.

1-Not Helpful

2-Somewhat Helpful

3-Very Helpful

1. Materials used in session _____

2. Presenters in the session _____

3. Power point presentation _____

4. Group activity _____

5. Assessment used after the session _____

6. Additional information that you would like to add about the professional development session

Evaluation of Day Three Professional Development Session

Topic:

Facilitator(s):

Date of Professional Development Workshop:

Please place a number at the end of each question.

1-Poor

2-Average

3-Above Average

1. Presentation of PowerPoint _____

2. Presentation of presenter _____

3. Information was relevant to using with group of students _____

4. Activities were useful for professional development session _____

5. What would you like to add about the professional development session?

Co-Teaching, Culture, and Pedagogy Strategies



Sandra Richardson
Walden University

Day One: Co-Teaching

- **Co-teaching:** This is when there are two teachers teaching in the same classroom setting. The teachers may have different roles, but they are working together educating students in the same setting.
- **Importance:** The importance of co-teaching is for the teachers to plan together and teach lessons collaboratively in the classroom.

Types of Co-Teachings Strategies

- One Teach One Observe: There is one teacher who is teaching while the other teacher is observing the students.
- One Teach One Assist: This is when there is one teacher who is teaching and the other is assisting the students.
- Parallel Teaching: Teachers divide the classroom and are teaching the same information.

Continued Types of Co-Teaching

- Station Teaching: Teachers divide the students and one teacher is teaching the students while the other is teaching different lessons.
- Alternative Teaching: This is when one teacher will teach the large group of students and the other teacher would teach the small group of students.
- Team Teaching: The teachers are delivering the same instruction to the students.

One Teach, One Observe

Recommended Use (Limited)

Implementation:

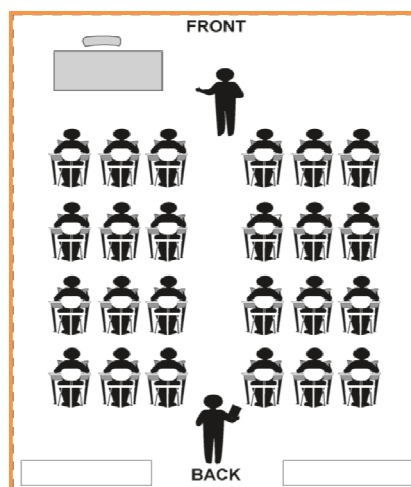
- Review instruction and mastery of concepts.
- Review and record student behavior(s) for decision making.
- Use this model to evaluate the effectiveness and delivery of instructional strategies.

Opportunities:

- Focus on students' needs more explicitly.
- Teachers may monitor their own skills.
- Data for Individualized Education Program (IEP) planning.

Challenges:

- Teachers need to know how to collect and analyze appropriate data.
- Teachers' trust level needs to be strong.
- Teachers may overuse.



Video Clip ~ [One Teach, One Observe](#)

One Teach, One Assist

Recommended Use (Seldom)

Implementation:

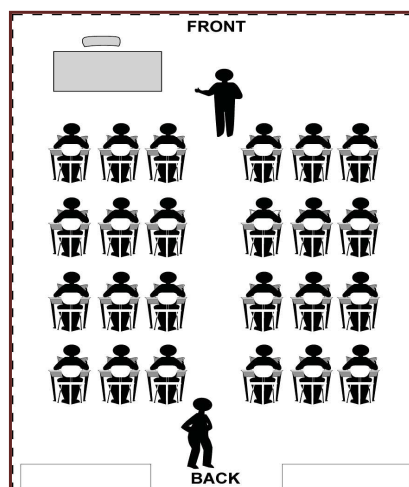
- Assisting teacher collects data and observes for understanding.
- Assisting teacher provides assistance to struggling student(s).
- Assisting teacher may monitor student behavior.
- Instructing teacher orchestrates learning tasks and classroom discussion.

Opportunities:

- Students may silently signal an adult for assistance.
- Closely monitor students' social and academic behavior.

Challenges:

- Assisting teacher may act as a passive partner while instructing teacher maintains a traditional teaching model.
- Students may view one teacher as the "real" teacher and the other as an assistant or aide.
- Students may be distracted by teacher walking around.
- Students may expect one-on-one assistance.
- Special educators need to be experts in the content area.
- Teachers should use this model sparingly
- Teachers should alternate roles, balancing instruction and assisting.



Video Clip ~ [One Teach, One Assist](#)

Parallel Teaching

Recommended Use (Frequent)

Implementation:

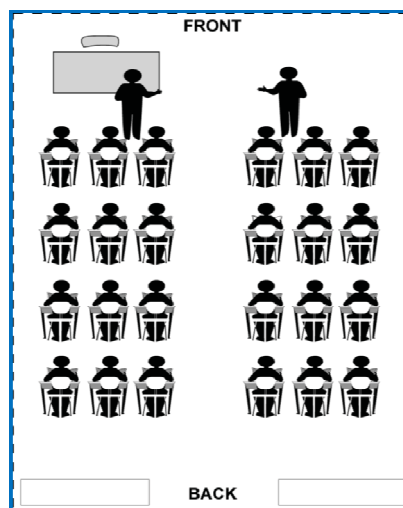
- Students are divided into equal-sized groups.
- Each teacher teaches the same content in the same amount of time.
- Instructional methods may differ.
- Groups do not rotate.

Opportunities:

- Students may be divided into groups using a variety of strategies based on student or curricular needs.
- Teacher flexibility can enhance instruction.
- Student-to-teacher ratio may be lower.
- Students have an increased opportunity for response and participation.
- Both teachers play an active role in instructing in this model.

Challenges:

- Teachers need to identify appropriate physical space.
- Teachers must have adequate knowledge of content and pedagogical skills to provide equally effective instruction.
- Having two teachers instructing at the same time may be distracting.
- Teachers must consider noise level tolerance and purposefully plan for an effective classroom environment.



Video Clip ~ [Parallel Teaching](#)

Station Teaching

Recommended Use (Frequent)

Implementation:

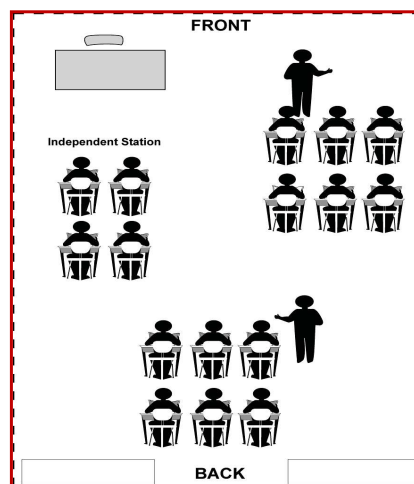
- Students are divided into equal-sized groups.
- Each teacher teaches a portion of the content in the same amount of time.
- Teachers prepare two or more stations in advance.
- Groups **rotate** from station to station.
- Secondary teachers may consider station teaching, especially if they are in block schedules.

Opportunities:

- Work with every student in the class.
- Allows for a lower student-teacher ratio.
- Results in fewer behavior issues.
- Closely monitor student learning and behavior.
- Increased student participation.
- Use when content is complex but not hierarchical.

Challenges:

- Identifying appropriate physical space
- Teacher instructional methods may differ.
- Teachers must have adequate knowledge of content and pedagogical skills to provide equally effective instruction.



Video Clip ~ [Station Teaching](#)

Alternative Teaching

Recommended Use (Limited)

Implementation:

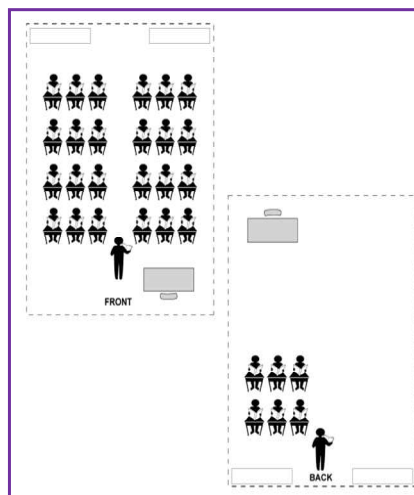
- Determine instructional/intervention needs of class
- Both teachers follow the same lesson plan.
- Small group instructor makes accommodations and/or modifications to meet the needs of students.

Opportunities:

- Students' content knowledge varies tremendously.
- Managing student behavior to focus student learning.
- Monitoring student performance
- informal assessment
- Pre/re-teaching, enrichment activities, and intentional observation time.

Challenges:

- Students with disabilities may always be in the same group at the same time.
- Students may perceive a stigma.
- finding adequate planning time.
- One teacher may dominate the other in content and/or teaching style.



Video Clip ~ [Alternative Teaching](#)

Team Teaching

Recommended Use (Occasional)

Implementation:

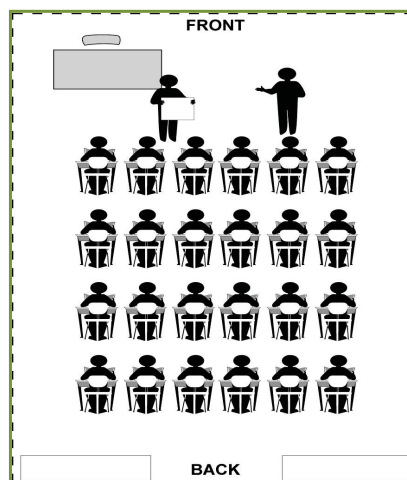
- Both teachers deliver core instruction.
- Both teachers are responsible for classroom management and student behavior.

Opportunities:

- Energizing model.
- Allows a variety of teaching strategies.
- Teachers work together collaboratively.
- Teachers can demonstrate individual expertise.
- Orchestration of instructional conversation.
- Teachers can introduce new topics/concepts.

Challenges:

- Both teachers must have strong content knowledge.
- Maintaining pacing.
- Requires significant planning time.
- Teachers are required to collaborate effectively.
- May not be as aware of individual student needs.
- Demands the greatest amount of trust and commitment from teachers.



Video Clip ~ [Team Teaching](#)

Advantages of Co-Teaching for Students

- Students receive instruction from curriculum experts that are highly qualified in the content.
- Students receive tiered and differentiated instruction on core standards.
- Students receive a variety of instructional strategies from two highly qualified instructors.
- Students are educated in the same environment as peers which reduces a negative stigma that is often associated with pull-out models.
- Accommodations can be made while students access general education standards and curriculum.
- Increases opportunity for appropriate peer interactions and positive social role models.
- Maintains high academic rigor and expectations for all students.

Disadvantages of Co-Teaching for Students

- Academic level may be far above student's current abilities.
- Instruction of standards may not account for pre-requisite skills that have not been mastered.
- Student may be intimidated to ask questions in front of peers.
- Rigor and expectations may be too high for students.
- Content of class may not align with students transition goals.

Advantages of Co-Teaching for Teachers and Schools

- Shared responsibility, which can lessen the workload
- Combined ownership of instructional environment
- Increased collaboration in lesson development and instruction
- Mutual goals
- Less teacher isolation
- Sharing of ideas and expertise in various areas
- Increased efficiency
- Classrooms with two adults may result in fewer behavior referrals
- School-based culture of collaboration
- Decrease of student-to-teacher ratio

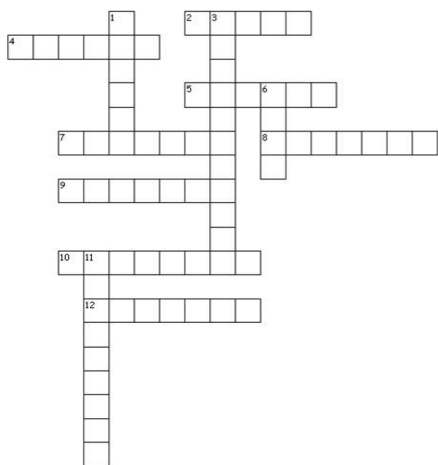
Disadvantages of Co-Teaching for Teachers and Schools

- Co-teaching partners need to share vision and beliefs about co-teaching
- Requires 100% support from all stakeholders
- Finding equality of responsibilities may be challenging
- Finding time to plan and collaborate may be challenging
- Scheduling students and teachers can be intense and frustrating
- Becoming an effective co-teaching team will take a long period of time, effective co-teaching is a process

Essential Questioning

- What are some strategies that can be used to solve math problems?
- How can I use creative thinking in solving math problems?

Let's Play



Across

2. The student-to-teacher _____ is lowered when using **Parallel Teaching**
4. During **Station Teaching** students _____ from station to station
5. How often should **One Teach, One Assist** be used
7. This model allows teachers to work with every student in the class
8. This model is known as "tag-team teaching"
9. Using teaming both teachers must have a strong _____ knowledge
10. Teachers teach the same information at the same time
12. During **One Teach, One Observe** student and _____ data should be collected

Down

1. This may be one challenge of using **Alternative Teaching**
3. Model where one teacher teaches whole group and the other teacher a small group
6. During **One Teach, One Observe** one teacher collects _____ while the other teacher handles instruction
11. In all models of co-teaching teachers should _____ roles

Day Two: Culture

What Affects African American Students Learning?

- Lack of resources because of funding and poor conditions in neighborhoods
- Using dialectic language (Language barriers)
- Lack of parent participation
- Lack of parental knowledge
- Single parent households



Structure Math Lesson

- Identify learning styles of students
- Identify needs of students
- Align lessons with culture of students
- Use diverse presentations with students

One-On-One Instruction

- Identifying needs of students
- Teaching to learning styles
- Providing tutoring to students

Assessments

- Develop Effective Assessments
- Formative Assessments
- Checklists
- Rubrics
- Summative Assessments
- Pre-Assessments

Use Essential Questioning For Lesson

- How can I match assignments with culture of students?
- How can I help these students feels comfortable with speaking out in class?

Day Three: Using Different Pedagogy Strategies

- Self-regulated learning detail ways students interpret information. Teachers should implement self- regulated learning into their math lessons. Teachers should guide students by instructing their own meaning of math content.



Continued Information on SCL

- Teachers should act as facilitators.
- Teachers should allow students to participate in active problem solving.
- Teacher should guide students into developing goals for solving problems.
- Teachers should formulate strategic questions for students.

Organizing Ideas Strategy

- Teachers guide students to build a mental representation of math problems
- Group problems by the types of problems
- Examine for the known strategies that can be applied to the classroom
- Guide students to recognizing the underlying problem model
- Organizing ideas about math problems by identifying key features and elements
- Using graphic organizers effectively

Self Assessment Strategies

- Teacher should allow students to assist with setting goals.
- Teachers should allow students to assist with planning lessons.
- Group students to evaluate each other's work.
- Students use checklists or rubrics to self-monitor their progress.

Co-Assessing and Co-Planning

- Teachers should plan lessons together.
(before school, planning periods, after school)
- Teachers should plan assessments collaboratively.
(formative assessments, pre-tests, summative assessments)
- Teachers should analyze data from assessments collaboratively.
(code data, use themes)

Appendix B: Permission To Conduct Study

Date

RE: Permission to Conduct Research Study

Dear Superintendent,

I am writing to request permission to conduct a research study in your school system. I am currently enrolled in the Curriculum, Instruction, and Assessment Doctoral Program at Walden University and am in the process of writing my dissertation. The study is entitled Junior High School Teachers' Perceptions of Math Instruction for African American Students.

I hope that the school administration will allow me to recruit 8th grade mathematics teachers from the school to participate in an observation and interview (copy enclosed). Interested participants, who volunteer to participate, will be given a consent form to be signed (copy enclosed) and returned to the primary researcher at the beginning of the observation process.

If approval is granted, participants will be observed in their classroom during school time and participate in an audio recorded interview after school. I ask permission for use of this time as well. The observation process should take no longer than one hour. The interview should take no longer than one hour as well. The observation and interview results will be pooled for the dissertation project and individual results of this study will remain absolutely confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by either your school system or the individual participants.

Your approval to conduct this study will be greatly appreciated. I will follow up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: sandra.richardson3@waldenu.edu.

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope.

Sincerely,

Sandra Richardson, Walden University

Enclosures

cc: Principal

Approved by:

Print your name and title here

Signature

Date

Appendix C: Recruitment Letter

Dear Potential Participant,

My name is Sandra Richardson and I am a doctoral student at Walden University. I am writing to invite you to participate in my research study about the attitudes and perceptions of math instructional strategies on student achievement of African American students. You are being invited because you are an 8th grade mathematics teacher.

If you decide to participate in this study, you will be observed in your classroom and interviewed. I would like to audio record your interview and then I will use the information to add literature to math instructional strategies, which may contribute to the closing of the achievement gap between African American students and students from other racial groups in mathematics.

Remember, this is completely voluntary. You can choose to be in the study or not. If you would like to participate or have any questions about the study, please email or contact me at sandra.richardson3@waldenu.edu or (229) [REDACTED].

Thank you very much.

Sincerely,

Sandra Richardson

Appendix D: Observation Protocol

Notes and Comments	Observations
	<p data-bbox="873 365 1166 401">Instructional Strategies</p> <p data-bbox="873 474 1110 510">Teacher Proximity</p> <p data-bbox="873 583 1166 619">Questioning Strategies</p> <p data-bbox="873 693 1024 728">Scaffolding</p> <p data-bbox="873 802 1127 837">Assigned Activities</p> <p data-bbox="873 911 1377 982">What was being done to ensure student engagement?</p> <p data-bbox="873 1056 1406 1127">What were the teacher's interactions with the African American students?</p> <p data-bbox="873 1201 1419 1236">How do teacher address off-task behavior?</p> <p data-bbox="873 1310 1370 1381">Classroom Management (whole group, small group, etc.)</p>

Adapted from Janesick, V. J. (2004). Figure 2.1. In "Stretching" exercises for qualitative researchers (2nd ed., p. 20). Thousand Oaks, CA: Sage.

Appendix E: Interview Protocol

1. How long have you been a mathematics teacher?
2. What instructional strategies do you use to teach mathematics to African American students?
3. What are your perceptions regarding the effectiveness of each strategy you mentioned?
4. Why do you think the performance in mathematics by African American students is lower than the performance of other ethnic groups?
5. What strengths do you perceive as influencing the mathematics achievement of African American students in math?
6. What challenges do you perceive as influencing the mathematics achievement of African American students in math?
7. What can you do to help reduce the achievement gap in mathematics?
8. Do you think it is important for teachers to receive training in multiculturalism? Please explain.
9. How confident do you feel in your mathematical ability? How do you feel this affects your ability to teach mathematics?
10. How confident do you feel in teaching mathematics to your African American students?
11. Describe your greatest strength in the classroom and how do you use it in your teaching?
12. What is your greatest weakness? What are you doing to conquer it?

13. What strategies are currently being implemented to help ensure the success of African American students in the area of mathematics?
14. How successfully do you feel these strategies are being implemented?
15. What could be done differently to improve the success of these strategies?
16. What instructional strategies, methods, or steps do you feel could be put in place to improve the success of African American students in mathematics?
17. Generally speaking, how would you rate African American students' mathematics achievement?
18. Is there anything you would like to add?