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Narrowing the Mathematical Achievement Gap Among African American and Latino Students

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Muriel Smith

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Doctorial Study Submitted in Partial Fulfillment

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Abstract

This study focused on the continued mathematical achievement gap between African American and Latino students in an urban elementary school. An illustrative case study design was used to examine the teachers' perception of factors contributing to this gap in mathematical performance, and what instructional math strategies can narrow the achievement gap. Socioconstructivism and culturally relevant pedagogy were the learning theories used to form the conceptual framework in this study. Qualitative data were obtained from 6 individual interviews with 4th grade math educators, classroom observations, and teacher artifacts. Data analysis in this study included data triangulation and coding, as well as identification of common themes as an important analytical approach to enhance the credibility of this study. Methods for minimizing bias and error included peer debriefing and member-checking, which consisted of obtaining feedback from participants to ensure the trustworthiness of findings. The key results of this study indicated that teachers perceived that 4th grade African American students often lacked basic skills and background knowledge for their school grade. Based upon the findings, the outcome was a plan for professional development training to help teachers gain knowledge on how to incorporate cultural relevant pedagogy, through strategies that include differentiating learning instructions and mastery learning into their classrooms, to narrow the mathematical achievement gap between African American and Latino 4th grade students. Implications for positive social change from this study include providing teachers with research-based strategies targeted toward narrowing the mathematical achievement gap between 4th grade African American and Latino students at the local and district site.

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Dedication

I dedicate this paper to my mother Mildred Bailey who started this process with me, but was unable to see me complete the process. I know that she is with me in spirit. I also dedicate this paper to my loving and supportive husband, Victor Smith, Sr. In addition, I dedicate this paper to my three wonderful children, Victoria, Victor Jr., and Vincent who have continually encouraged me to persevere. I dedicate this paper to my family members and friends who offered their encouragement and support whenever I needed it. I also dedicate this paper to my caring church members at Highland Heights Church of Christ, who would ask me every time we met "are you done yet?" Their encouragement spurred me to keep going. Thank you to all of you for ensuring that I had the space, time, and support needed to juggle school, work, motherhood, and being a wife. Lastly, I apologize for all of the missed functions due to my commitment to completing this paper.

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Section 1: The Problem

Introduction

The United States has a recurrent phenomenon in the public school system of mathematical achievement gaps between various student groups, particularly African American and Latino students (ACT Research and Policy, 2012). Achievement gaps have existed in school districts across the United States for many years (Lewis, James, Hancock, & Hill-Jackson, 2008; Salmonowicz, 2009). Trusty, Mellin, and Herbert (2008) reported the unbalanced academic success between student racial groups as a gap in academic achievement. According to Lopez, Gallimore, and Garnier (2007), mathematics achievement gaps begin in the primary grades, and society has deemed the responsibility of ensuring all students are equipped with skills needed to be critical thinkers and productive citizens as that of educators (Harrison & Killion, 2007; Woolfolk Hoy, 2012).

Although many students may have the desire to be academically successful, they often find themselves confronted with obstacles that impede success. African American and Latino students have traditionally been labeled as two of the low academic performing students in the United States (Epstein, Pianko, Schnur, & Wyner, 2011) and, as one of the low performing students, many African American students in particular, continue to struggle in math (Hines, 2008; Hood, 2011; White, 2009). The empirical questions then becomes why there has continued to be a mathematical gap between African American students and their fellow minority Latino students in math, and just how effective are the current mathematical strategies are when it comes to African American students.

A minority group in the United States that has shown gaps in academic achievement is that of African American students (ACT Research and Policy, 2012; Haycock, 2006). Narrowing the academic gap between students belonging to minority and non-minority groups is one of the major goals of the United States educational system, thereby increasing academic achievement of minority students through a series of laws, polices, and procedures (Berends, 2005; Bodovsky & Youn, 2012). The No Child Left Behind Act (NCLB, 2002), which marked the change to performance based accountability from compliance driven in education (Jehlen, 2009; Wong, 2008), is an example of one such policy. In addition, Race To The Top (RTT), which encourages transformative change within schools and, targets leveraging, enhancing, and improving classroom practices and resources (Schaffhauser, 2012), is yet another example of government policies. Even with the implementations of the national government educational policies, African American students have struggled to eliminate the achievement gap in mathematics.

According to Zach (as cited in Wheelwright, 2013), a futurist, which is someone who provides and understanding of choices that may affect the future, an individual's perspective life goals are less likely to be realized if they are not educated (Reese, 2009), and mathematics is an essential element to education (Lee, Grigg, & Dion, 2007; Ofstead, 2012). Individuals, who struggle to obtain an adequate education, may struggle to obtain employment (Wilkinson, 2012). Employers in today's global society expect their employees to be accomplished in math as well as other academic skills and be ready to compete in the world markets (Balfanz, 2009; Roman, 2009). According to McKinsey & Company (2009), the African American and Latino student groups were "on

average…two to three years behind white students of the same age" (p. 9) and "America's racial achievement gap worsens the longer children are in school" (p. 10). The purpose of this qualitative project study was to examine the factors that contribute to the mathematical achievement gap between fourth grade African American students and Latino students located in an urban elementary school in southwest Texas. In addition the purpose was to determine how instructional strategies can be developed and implemented to narrow the gap.

The first section of this study introduces the study and, provides a definition of the problem, rationale, definitions, significance, guiding research questions, review of literature, achievement gap, theoretical framework, and implications.

Definition of the Problem

There is a problem at an urban elementary school in South Texas where fourth grade African American students are continually performing below their Latino peers in mathematics according to (Texas Education Agency) records. The Texas Education Agency assessment reports from 2003 through 2014 reported a consistent lag among African American students behind Latino students in math.

The early recognition of the deficiency in mathematical progress along with the evaluations of growth in mathematics, is the beginning process of narrowing the achievement gaps of all students in mathematics (Jordan, Kaplan, Olah, & Locuniak, 2006). According to ACT Research and Policy (2012), the African American – Latino achievement gap is apparent even before the eighth grade, and this achievement gap increases through 12th grade as Latino students' growth rates have a greater advancement compared to those of African American students. It is imperative that educators, parents,

and students understand the significance of mathematical education for personal and social advancement in order for schools to be able to experience the positive outcomes of effective pedagogy, curriculum, and structural changes (Hill, Rowan & Ball, 2005; Posamentier, 2012; Silverman & Thompson, 2008; Tate, 2002). Therefore, students who do not obtain adequate mathematical skills in grade school will not gain access to advanced mathematics courses, such as algebra and other extended math courses. They will be limited in career choices related to the science, mathematics, and technology fields as well as nonprofessional jobs that require mathematics and reasoning skills (Lynn, 2011; Tate, 2002; Zuckerman, 2011).

The question of why fourth grade African American students' mathematics performance at this urban school has lagged behind their Latino counterparts remains pertinent. This study examined the contributing factors to the mathematics achievement gap between the fourth grade African American and Latino students in the elementary school and identified instructional strategies teachers were currently using in the classroom.

Rationale

Evidence of the Problem at the Local Level

Data has shown that achievement gaps continue to exist in urban school districts nationwide (Lewis et al., 2008). A mathematical achievement gap has been shown to exist between African American and Latino students (Asmivo, 2005). According to the National Assessment of Education Progress (NAEP, 2011), the mathematics national achievement for Latino fourth grade students improved from 5% proficient in 1990 to 22% in 2011 on math assessments, whereas African American students went from a score

of 1% proficient in 1990 to 15% in 2011. Although the preceding NAEP data showed evidence of mathematical growth with both groups, the data also showed that African American students still fell behind their Latino peers. Lopez et al. (2007) reported that primary grades experience achievement gaps between ethnic groups of students, more so in mathematics than reading. Many of the African American fourth grade students at this urban elementary school have continued to struggle with low mathematical achievement and lag behind their fellow Latino students. According to C. Smith, an elementary math program director for a school district in South Texas (personal communication, June 26, 2014):

> There should be a sense of outrage among everyone who cares about all children's education which this school's academic gap continues to happen year after year. A major focus of reform for the fourth grade mathematical achievement gap between this school's African American and Latino students should involve teacher development through more math staff development. I believe that situations have a tendency to become better when individuals are willing to fight for improvement, and [she] would like to see society fighting to eradicate the African American mathematical achievement gap.

Factors that may contribute to narrowing the mathematical achievement gap between the fourth grade African American students and their fellow Latino students at the school were examined.

Finkel (2010) reported that based upon the latest statistics available obtained from the Department of Education's Office of Civil Rights, 48.5 million United States' students, 56% European American, 20% Latino, and 17% African American, the African

American students had a lower high school graduation rate, and performed lower on standardized tests than other student groups in the general school population. Furthermore, African American students attending racially segregated schools fared the worst in relation to narrowing the achievement gap (Riegle-Crumb & Grodsky, 2010). According to a study conducted on the state of California schools, African American students were more likely to attend a low performing school than any other group in the state (Education Trust West, 2010).

The Washington Assessment of Student Learning (WASL, 2008) reported that 10th, seventh, and fourth graders showed a disparity in African American students' academic achievement behind students of other races. According to Education Trust (2011), fourth grade Latino students outscored African American students in mathematics by 5% on a national level. A Chicago report that tracked the test scores and graduation rates in Chicago's elementary and high schools since 1988, suggested that African American students were lagging behind all other racial groups (Luppescu, Allensworth, Moore, de la Torre, & Murphy, 2012). The achievement gap between African American students and Latino students has shown up in grades, standardized-test scores, and dropout rates, among other success measures (National Center for Education Statistics, 2009, 2011).

Alexander (2008) reported teacher expectations, instructional strategies, teacher satisfaction with resources, classroom management, and site-based professional learning, have a major influence on students' achievement in math. African American students are not receiving mathematics instruction consistent with the mathematical educational reform, which is in direct opposition to their learning preferences and culture styles

(Lubienski, 2001). Schmidt (2004) stressed the lack of coherence and commonality across curricula used in the United States. These practices have a negative impact on students because students are expected to learn different content in different settings (Linn & Eylon, 2006).

In Texas, on the mathematics subtest of the National Assessment of Educational Progress (NAEP) in 2009, the fourth grade African American students had an average score of 23% and Latino students 26% (National Center for Education Statistics 2009a, 2009b). According to the Academic Excellence Indicator System (2011), the fourth grade African American students at the urban elementary school scored 78% and the Latino students scored 99% on the 2011 Texas Assessment of Knowledge and Skills (TAKS) Mathematics assessment.

Although all students in Texas have performed better on the (TAKS) Mathematics over time, African American students continued to be outperformed by Latino students, and other students at every school level according to Texas Education Agency records 2003 through 2011. In 2011the last administration of the TAKS Mathematics was given and the results revealed that African American students continued to perform as the lowest group passing and having commended rates of all ethnic/racial student groups. At the elementary school level (Grades 3 through 5), 77.6% of African American and 85.4%t of Latino students passed the test; about 63% of African American, and 77% of Latino middle school students passed the test; only 50.6% of African American and 70.8% of Latino high school students passed the 2011 TAKS Mathematics test.

In 2012 the state of Texas introduced State of Texas Assessments of Academic Readiness (STAAR), a new state assessment for mathematics. Although the data from

this test were the first and would not count against students or districts until the following year, the statewide data results showed that the African American group was the lowest performing group in fourth grade (Texas Education Agency, 2012). Statewide, 64% of the Latino students passed the STAAR assessment, where as 52% of the African American students passed the assessment (Texas Education Agency, 2012). At the district level, 74% of the Latino students pass the 2012 STAAR assessment, but 51% of the African American students passed (Texas Education Agency, 2012). At the urban elementary school, 74% of the Latino students pass the 2012 STAAR assessment, but 38% of the African American students passed (Texas Education Agency, 2012).

The 2013, fourth grade STAAR Mathematics assessment scores revealed that the African American group was again the lowest performing group in the state (Texas Education Agency, 2013). Statewide, 64% of the Latino students passed the STAAR assessment, where as 52% of the African American students passed the assessment (Texas Education Agency, 2013). At the district level 71% of the Latino students pass the 2013 STAAR assessment, but 48% of the African American students passed (Texas Education Agency, 2013). At the urban elementary school, 60% of the Latino students pass the 2013 STAAR assessment, but 43% of the African American students passed (Texas Education Agency, 2013).

The 2014, fourth grade STAAR Mathematics assessment continued to show that the African American group scored lower than any group in the state (Texas Education Agency, 2014). Statewide, 69% of the Latino students passed the STAAR assessment, whereas 62% of the African American students passed (Texas Education Agency, 2014). At the district level, 70% of the Latino students passed the STAAR assessment, whereas

only 48% of the African American students passed (Texas Education Agency, 2014). At the urban elementary school, 70% of the Latino students passed the STAAR assessment, but 42% of the African American students passed (Texas Education Agency, 2014). This latest state assessment data showed the continued mathematical achievement gap between the African American and Latino students in this school.

Educators can no longer only rely on traditional methods, but instead must embrace the best practices in professional development, which recommends challenging assumptions about the most effective way of teaching mathematics (Leikin & Rota, 2006). It is important that educators actively engage in reflection while participating in professional development as a means of improving mathematics instruction (Gellert, 2008). The use of school-based coaching has become an increasingly prevalent method of ongoing professional development (Knight, 2009). Duke (2008) claimed that schools are low performing because of a lack of undifferentiated assistance for students, and ineffective staff development. Educators should actively engage in professional development in order to improve teacher quality and student achievement.

Evidence of the Problem from the Professional Literature

The current public schools have been failing African American students, and solutions for this problem are not adequate (Final Report, 2008; Ladson-Billings, 2006; Zirkel, 2005). Researchers have assessed that only 1 in 10 African American students obtain academic success at their grade level in urban areas with high poverty in the United States (Balfanz, Herzog, & Mac Iver, 2007). The failure to educate African American children is costly for the United States. A decrease in high school graduation rates can lead to fewer employment opportunities, which may result in an increase of

incarceration rates, and intergenerational poverty (Kober, 2010). The literature offered insight into the academic achievement gap of African American students in mathematics.

It is difficult to measure a teacher's competence, but the test scores of a teacher's students have shown a greater correlation with the amount students learn than any other measurement widely used (Choi, 2010; Gawlik, Kearney, Addonizio, & Laplante-Sosnowsky , 2012; Van den Bergh, Denessen, Hornstra, Voeten, & Holland , 2010;). In a research study ranking the equitable distribution of teachers to various groups of students, the United States ranked 42nd out of 46 industrialized countries in providing this service (Breaden, 2008). From that distribution of teachers, only 53% of students coming from low-income had math teachers who were considered to be excellent teachers (Breaden, 2008). Therefore, having a teacher that has the ability to combine an understanding of how students learn and can teach problem solving through the dissemination of their content area has been shown to be an important avenue by which African American students can obtain access to resources and success in mathematics (Van de Walle, Karp, & Bay-Williams, 2013). Clotfelter, Ladd, and Vigdor (2007) found teachers had expertise on subject content having positive effects on the students' achievement in elementary schools. Providing extensive professional development on effective pedagogical practices content instruction to teachers is a key component to assisting student academic achievement. According to Hill (2007) students' achievement in mathematics was higher in schools where educators had extensive professional development related to specific mathematics content, compared to schools that did not.

Research has shown that students perform better academically when there is a strong relationship with teachers that challenge them, and implement positive classroom management strategies (Scharlach, 2008). Some are studies that reportd that when educators exhibit high expectation for their students, those students buy into those expectations, but low expectations may cause the students not to put forth any effort to achieve academic success. Researchers reported that educators' expectations of what their students could accomplish became self-fulfilling prophecies in students' academic achievement (Hill, Phelps, & Friedland, 2007; Segedin, 2012; Sparks, 2010).

Allowing students to learn in meaningful ways affords them the opportunity to make gains towards narrowing the academic achievement gap (Glover & Vaughn, 2010). Researchers found that to decrease the achievement gap and increase student achievement, effective classroom and school practices are imperative (Bruce, Getch, & Zionek-Daigle, 2009; Geisler, Hessler, & Temple, 2009; Schellenberg & Grothaus, 2009). Banks (2003) reported that teachers need to obtain updated teaching skills, attitudes, and knowledge in multicultural and multiracial settings that will assist them in effectively relating and educating all students. When educators utilize strategies that are culturally relevant in their classrooms positive results are exhibited (Haynes, 2008).

Research revealed that the academic achievement of African American students in mathematics is contingent on several components (Waddell, 2010). These components consist of the ability to create positive relationships, teacher engagement in extensive professional staff development on subject content areas, along with the effectiveness of culturally relevant lessons (Waddell, 2010). The implementation of these components may be instrumental in narrowing the mathematical achievement gap between fourth

grade African American and Latino students, which was the focus of this qualitative study.

Definitions

The following operational definitions used in this investigation appear here as a resource for clarifying educational terminology and describing the problem:

Achievement gap: The U.S. Department of Education (2010) stated the achievement gap is "the difference in academic performance between different ethnic groups" (p. 9).

African American: Americans of African descent (Williams, 2008).

Academic Excellence Indicator System: All Texas school districts and campuses are evaluated by this system (Texas Education Agency, 2011).

Elementary school: A school that educates students from kindergarten through eighth grade (K-8) or kindergarten through sixth grade (K-6) (Education Portal, 2013).

Latino: Individuals of Latin descent (Gleason, 2008).

Mathematics achievement: The mathematical success of students in academic coursework (Benner & Hatch, 2009; Byrnes & Wasik, 2009). The NAEP in 2007 reported mathematical achievement to be "students' understanding of mathematics concepts and their ability to apply mathematics to everyday situations." (p. 2).

National Assessment of Educational Progress (NAEP): Test performed by the U.S. Department of Education utilizing a large representative national sample of students focusing on the reading and math performance of these students in fourth, eighth, and 12th grade (Mead, 2006).

No Child Left Behind Act (NCLB): In January 2002, President George W. Bush enacted an education reform bill that stated all states across the United States will obtain proficiency in reading and mathematics by 2013-2014 (NCLB, 2009). Yell (2010) wrote:

> The primary purpose of NCLB is to ensure that students in every public school achieve important learning goals while being educated in safe classrooms by well-prepared teachers…Furthermore, NCLB requires schools to close academic gaps between economically advantaged students and students who are from different economic, racial, and ethnic backgrounds as well as students with disabilities. (p. 180).

Professional staff development: The process of increasing the educator's knowledge and application practices about student teaching and learning (Hirsh, 2009).

Race To The Top (RTT): According to the White House (2009), RTT "is an education initiative that will provide $4.35 billion in federal grants to K-12 public school systems to make changes to help prepare America's students to graduate ready for college and career." (p. 1).

State of Texas Assessments of Academic Readiness (STAAR): A state-mandated test used in Texas's third through 11th grades, to assess students achievements and knowledge learned, beginning 2012, after the repeal of TAKS by Texas Senate Bill 1031 (Texas Education Agency, 2012).

Texas Assessment of Knowledge and Skills (TAKS): A standardized test used in Texas's third through 11th grades before 2012, to assess students' achievement in reading, writing, math, science, and social studies skills required under Texas education standards and which also complied with NCLB (Texas Education Agency, 2011).

Significance

The urban elementary school in this study, in South Texas had a minority/majority population that consisted of 58% African American, 41% Latino and 1% European American students. The school district, in which this urban elementary school in South Texas is located, also had a minority/majority population consisting of 71% Latino, 26% African American, 2% European American, and 1% Asian. Although both the school district and this urban elementary school had similar minority/majority populations, this study focused only on one urban elementary school in South Texas and its African American and Latino fourth grade student body.

Researchers have documented well that African American and Latino students have beenscoring academically below Caucasian students (Alexis, Webb, Brigman, & Peluso, 2007; Bodovsky & Youn, 2012; Peluso, 2007). The intent of this project study was to determine factors that may narrow the mathematical achievement gap between 4th grade African American, and Latino students at one urban elementary school in south Texas. The continual gap in the math scores of African American fourth grade students and Latino students is significant, because both are minority groups that lag behind the state's, and nation's White majority group. While both groups are lagging behind the White majority group, the fourth grade Latino students' math scores are narrowing the gap at a higher rate than the African American students' (Reardon & Galindo, 2009).

This qualitative study concentrated on the African American and Latino students. Focusing on these two groups to investigate why African American students score consistently behind the Latino students in math, would be beneficial not only at a local level, but at a national level as well. This qualitative doctoral project study examined

factors that contribute to the mathematics achievement gap between the fourth grade African American and Latino students in the elementary school.

According to Dee and Jacob (2011), there has been a significant increase in math achievement for fourth graders, but only with Latino and European American students. The academic gap numbers are larger sometimes than other times, but Latino students appear to have always out-scored the African American students in math. Haycock (2012) stated about 1 out of 100 African Americans and 1 out of 30 Latinos can easily do elementary algebra and multi-step problem solving, compared to about 1 out of 10 European American students; and 4 out of 10 Latino 17-year-olds and only 3 out of 10 African American have mastered the computation and usage of fractions, averages, and commonly used percentages, compared to 7 out of 10 European American students.

According to Banchero (2012) the nearly unaffected average math score since 2007 has been 514 out of a maximum score of 800, but since 2006 there has been a decrease by 4 points. In addition, Banchero (2012) reported that the African American and Latino students showed a lower score average than Asian and European American students. According to the National Mathematics Advisory Panel (NMAP, 2008) there is a need for students to develop mathematical fluency skills therefore, students having a significant shortfall in mathematical skills by the completion of middle school could find college entrance impeded. The U.S. Department of Education (1997) stated, "For many students…the die is cast by eighth grade. Students without the appropriate math and reading skills by that grade are unlikely to acquire them by the end of high school." (p. 2).

There is a need for studies concerning achievement gaps to address those factors contributing to the unbalanced achievement between racial groups of students. U.S. schools have put forth a great deal of effort to implement interventions and utilize universal resources targeting achievement gaps (Buffum, Mattos, & Weber, 2010). However, more research is needed to determine how to address math strategies that target the way African Americans students learn. Because every school and its circumstances are different, a general case cannot be made applicable to all school settings. Therefore, additional studies (both locally and nationally), over a period of time in different settings, would have to be performed to identify differences and similarities that would guide schools in narrowing fourth grade mathematical achievement gaps between African American and Latino students.

Guiding/Research Question

Research questions for this case study were conceptualized from the problem of consistent low state standardized math scores of the fourth grade African American students at the elementary school. The research questions for this qualitative doctoral study were developed to examine factors that could contribute to narrowing the mathematical achievement gap between African American and Latino fourth grade students.

1. What are the fourth grade math teachers' perceptions of the factors that could contribute to the mathematics achievement gap between African American and Latino students?

2. What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical achievement gap between African American and Latino students?

Review of the Literature

The content of this literature review focused on empirically-based factors that contribute to the mathematics achievement gap, on factors that may possibly narrow the achievement gap, on teaching and learning, on how minority students learn in general, as well as literature on the theoretical/conceptual framework. Various scholarly and professional literature was reviewed, including recent doctoral dissertations, peer-reviewed journals, along with subject-specific information from numerous electronic databases.

Current peer-reviewed journals, along with seminal works, were used to research literature related to the implications of achievement gaps between African American and Latino students. The current peer-reviewed journals included literature published from 2008 to 2013. However, literature published prior to 2008 may be used to document theories, concepts, or traditional methods, after the use of current literature has been depleted. In addition, older works were used to document changes in the study of achievement gaps over time. Search results using the following phrases were used: *achievement gap, achievement gap in math, low math scores, African American and Latino students' math scores,* and *factors contributing to achievement gaps*. Also the Boolean phrases such as *culturally responsive teaching, effective teaching, and culturally relevant pedagogy* were searched along with achievement gaps.

Along with peer-reviewed journals, the Internet, methodology books, and nonfiction books were used to find additional information related to the existence of achievement gaps between African American and Latino students. In addition, searches of dissertation databases were performed to find similar case studies that addressed narrowing the achievement gaps in the school setting. Supporting resources were found using ERIC, Education Research Complete, The Free Library, Center for Research Library, Questia, Highbeam, Jstor, EBSCO, Proquest Central, Proquest Dissertations and Theses, National Council of Teachers of English, Teacher Reference Center, and Ebrary to explore information about achievement gaps. Supporting resources aided in understanding the summative view of achievement gaps from the perspective of public resources that included public and government websites, university websites, and Power Point presentations.

It is important to investigate literature on achievement gaps to ascertain the various factors that may cause the gaps. The theoretical framework that guided this qualitative study explored how the mathematics achievement gap between in the fourth grade African American and Latino students could be narrowed. Narrowing the achievement gap was examined through socioconstructivism and culturally relevant pedagogy learning theories. Literature on the theoretical framework is important to include, because this study was based on the social construction of knowledge as a theory of learning. It included an examination of the Vygotsky's (1987) socioconstructivism theory. Attention was given to the basic doctrine of Vygotsky's theory as well as various constructs associated with it. Connections between his theory and this study were established. There was a review of current literature on the preparation and development

of teachers. In connection with this, the role of classroom interactions in the social construction of knowledge was examined.

Culturally relevant pedagogy was also relevant to this qualitative study with regard to African American students' mathematical achievement gap. Culturally relevant pedagogy has been defined as a set of explanations and beliefs that understands and gives value to the importance of cultural diversity in forming students' identities (Gay, 2013). These learning theories were utilized to examine the fourth grade African American students' lower mathematical achievement scores compared to those of the Latino students.

Achievement Gap

The achievement gap between African American and White students has been well documented in the area of mathematics, which led educators to conduct research as well as case studies investigating this problem (Douglas, Lewis, Douglas, Scott, & Garrison-Wade, 2008). According to Johnson (2012), NCLB defined the achievement gap in education as the states' accountability toward students' reading and math proficiency scores within different subgroups, along with teacher effectiveness. These achievement gaps can often be seen in grades, scores from standardized tests, and other success measurements (Frey, 2012). There also appears to be a mathematics achievement gap between African American students and Latino students (Peluso, 2007).

NAEP (2011) reported that academic improvements were made by Latino and European American fourth grade students in math. Both the Latino and European American students' percentages for performing proficient and advanced levels were higher in 2011 than in 2009, but there was no significant change for African American students (NAEP,

2011). Among fourth-graders who scored nationally above the 75th percentile mathematically in 2011, 72% were European American, 10% were Latino, and 5% were African American. According to NAEP (2013) 15% of Latino students tested proficient, but only 11% African American students in California tested proficient in eighth grade math.

According to Watanabe (2008), the racial achievement gap has been narrowing in reading, but the mathematical gaps are still prevalent in mathematics. Researchers have argued that some schools are struggling to meet the U.S. federal mandates of NCLB because of its flawed policy, which does not help narrow achievement gaps (Carlyle, 2008; Silber, 2008). Educators continue to be divided on the best way to implement NCLB to narrow achievement gaps (Hardy, 2006; Hess, 2011). Researchers have recommended that educators move beyond one definition of narrowing the achievement gap through the assessment of factors affecting the achievement gap (Carpenter, Ramirez, & Severn, 2006). According to MacInnes (2009), achievement gaps can show up as early as preschool. Although educators often engage in various strategies to address the needs of student achievement gaps (Grossman & Ancess, 2004; Swain, 2011), some researchers have reported that not enough is being done for narrowing the achievement gaps (Fuller, Wright, Gesick, & Kang, 2007).

Socioconstructivism Learning Theory

According to Glasersfeld (2008), constructivism is a learner-centered theory. Constructivism provides the learner the opportunity to process their own individual experiences by constructing current knowledge from their past experiences and their interpretation of the world in which they reside. Vygotsky (1978) conveyed that learning

is the use of social and cultural (sociocultural) order to comprehend the meaning of information. Vygotsky (as cited in Crawford, 1996), concentrated on the relationship among people and the sociocultural context in which they behave in shared experiences.

Vygotsky (1978) reported that social interaction plays a fundamental role in the process of cognitive development, in contrast to Piaget's (1952) understanding of child development, in which development necessarily precedes learning. Vygotsky felt social learning precedes development. He stated "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)" (p. 57). Vygotsky's theory encourages learning settings in which the roles of the educator and student are reversed and students' play a more active role in learning. Educators collaborating with their students to help facilitate meaning construction within students, provide a mutual learning experience for the students, and educator (Holt & Willard-Holt, 2000).

Vygotsky's (1978) social development theory is a key component for constructivism (Learning Theories, 2008). According to Vygotsky's (1962) social development theory, learning takes place when there is social interaction. Edgar (2009) stated that successful learning takes place when learners recognized their own needs. Students learn best when they interact with their fellow classmates and educators, which can be achieved through cultural tools and signs (Vygotsky, 1978; Yamauchi & Kuwahara, 2008). Cultural tools are items that aid students with accomplishing goals, and cultural signs are symbols that denote key meaning to individuals by evoking past thoughts, ideas, and feelings (McLeod, 2007; Vygotsky, 1978). According to Eckhoff

and Urbach (2008), an educational environment can either be supportive or suppressive of students' imaginative abilities.

In addition, Vygotsky (1978) advocated the view that there is an association between student achievement and the culturally facilitated learning experiences, or in other words, mathematical problem solving behavior should be centered on the current cultural practices of the classroom. According to Vygotsky a child mimics the example of the adult and slowly develops the ability to perform certain tasks without help or assistance. Vygotsky termed what a child can do with peer collaboration or with an adult's assistance, and the student's capability to problem solve independently, the "*zone of proximal development*" (Vygotsky, 1978). As students interact and play with each other at school and at home, they develop specific models of explanation, expression, and communication.

Grupta (2008) deduced that cooperative learning, peer collaboration, and grouping in mathematics improves problem solving skills and increases enthusiasm for learning. Vygotsky reported that learning occurs in this zone. Also Rudd, Lambert, Scatterwhite, and Smith (2009) reported that when students build upon their own understanding, they develop skills needed to think about, discuss, and incorporate new mathematical concepts. Researchers Newman, Griffin, and Cole (1989) proposed that the cultural background of the learner should be reflected in the activities included in the zone of proximal development.

Culturally Relevant Pedagogy

Culturally relevant pedagogy (CRP) is a multicultural education including interdisciplinary instructional programs that provide multiple learning environments to

meet the needs of the individual student, and ensuring equitable access and treatment for all groups in schools (Parekh, 1986; Suzuki, 1984). This style of teaching allows for the education of students to preserves their own cultural heritage while preparing them for living productive lives in society without having to eradicate their own cultural perspective. Educators continually face challenges in teaching mathematics problem solving in elementary schools to African American students (Leonard, Brooks, Barnes-Johnson, & Berry, 2010). According to Howard (2001) and Foster & Peel (2001) studies have been conducted that focus on teacher effectiveness through cultural responsive teaching, and culturally relevant pedagogy (Ladson-Billings, 2006), as effective ways to close the math achievement gap between African American students and their Latino counterpoints. CRP addresses the role that the connection between school and home-community cultures plays in the delivery of instruction in schools (Nieto, 2004).

Instead of teaching in the traditional manner of lecturing, educators must be creative in their teaching to students (Geist, 2010). Educators can no longer be content with students being passive learners, watching, listening, systematically mimicking the teachers, and becoming bored (Brush & Saye, 2009). According to Schmeichel (2012), as an equitable practice in education, culturally relevant teaching has developed as a good strategy in improving academic achievement. Multicultural educational scholars developed diverse strategies and pedagogies for increasing student achievement for marginalized children (Haberman, 2008). Ladson-Billings (2006) reported that CRP is an area that has developed in multicultural education literature (e.g., Harlin, Murray, & Shea, 2007; Hyland, 2009) that embraces the concept that teachers need to be judgment

free, and inclusive of their students' cultural backgrounds in order to be effective facilitators of learning in their classrooms.

CRP can bridge the gap in academic achievement (Boutte & Hill, 2006; Eun, 2008) through the validation of students' life experience and culture as a teaching resource. Ladson-Billings (2000) asserted that culturally responsive teaching strategies creates intellectual, social, emotional, and political learning through the use of cultural references to convey knowledge, skills, and attitudes. Moses and Cobb (2001) used culturally relevant teaching to formulate higher order mathematics knowledge reachable to African American middle school students by teaching algebra through the students' own cultural experiences. According to Stickey (2003), "research suggests that test scores can be raised and students empowered when educators teach in a culturally responsive manner" (p. 12). Educators, who are multicultural, reason that engaging students in their own culture and supporting CRP practices may develop students who can compete academically with students from the dominant culture (Ladson-Billings, 2006).

Culp and Chepyator-Thompson (2011) addressed the need for reform in the current U.S. public school system in order for students with diverse backgrounds to experience educational equality, which would come in the form of culturally relevant teaching practices. May (2011) defined culturally relevant teaching in terms of three characteristics: cultural competence, citizenship function of teaching, and student academic achievement. Educators utilizing CRP understand that education will require an entirely new way of thinking from the traditional ways of the U.S. school systems (Morrison, Robbins, & Rose, 2008). The classroom materials selected provides insight into an educators' cultural competence; and whether they attend to issues of

representation by looking at inclusiveness (May, 2011). According to McCallum, Schmitt, Schneider, Rezzetano, and Skinner (2010), school administrators, educators, along with curriculum specialists advocate the urgency of teaching problem solving skills. Martin (2009) reported that CRP would require teachers to teach mathematics in a "racialized" manner that would challenge social and racial inequalities. CRP is more than a holiday commemorative activity, but instead should be a part of the educator's daily classroom routine (Ladson-Billings, 2006). According to May (2011) students found culturally relevant teachers to be caring and made learning fun.

According to Siwatu (2007), there is an understanding among the culturally responsive pedagogues regarding how the theory should be utilized to assist in learning, provide students opportunities to exhibit knowledge, structure classroom management, and aid students in preserving their individual culture while steering through the majority culture. Teachers who are ethno-sensitive have been successful with minority students, acknowledging the importance of the student's own cultural experiences, and then employing this information to meet the educational need (Issue Brief, 2008; Murrell, 2001). The change in the role of the educator does not mean that the educator does not have an impact on the education process, but instead the educator is able to facilitate students in building knowledge (Glasersfeld, 1990).

CRP allows students to make connections between their reality and the lesson content, by using prior knowledge, past experiences, and cultural references to construct understanding (Siwatu, 2007). This instruction technique requires educators to visualize excellence as a standard that will take a student's diversity, take individual differences into account, and encourage students to work collaboratively while taking responsibility

for their own learning (Thompson, 2004). Where there are school-wide policies in which educators' independent decisions impact the regularity of mathematics instruction, and when educators do not always conceptualize students as mathematics achievers this may impact them in negative ways (Pringle, Brkich, Adams, West-Olatunii, & Archer-Banks, 2012).

The learning theories to be utilized will focus on socio-constructivism and cultural relative pedagogy. Teaching strategies using socio-constructivism includes teaching in contexts that might be personally meaningful to students, small-group collaboration, valuing meaningful activity over correct answers, and class discussions (Wood, Cobb, & Yackel, 1995). Ginwright (2004), utilizes the following African-centered teachings to focus on CRP: every child can learn; learning takes place when the knower, the knowing, and the knowledge is connected culturally; and when it is related to the individual's ability to contribute to the well-being/welfare of self, family, and community, the value of that individual's success becomes relevant. Exploring and identifying potential factors that may contribute to achievement gaps, along with the strategies that could be utilized to narrow those gaps, may be useful to administrators at the urban elementary school in understanding what actions might be taken to address the mathematical achievement gaps. The implications of narrowing the mathematical achievement gap between African American and Latino students were reviewed next.

Implications

While the academic achievement increases overall throughout the United States, the achievement gap between the African American and Latino students remains consistent. Based on the findings of this study, research can be extended to provide

national and state leaders, local school leaders, community members, parents, and educators, with data to evaluate where the current practices in education failed to eliminate the math gaps for African American students. This research has implications for extending mathematical strategies from the individual fourth grade teachers at the urban school, to encompass effective techniques through professional staff development in elementary schools with high African American and Latino populations, district-wide.

The mathematics strategies and research practices that encourage the understanding of math concepts must be deposited into low performing African American students' current experience in education. Supplemental funding could be provided for additional professional staff development on mathematics strategies that provide African American students with research-based methods designed at filling in the gaps. This qualitative doctoral study may afford school administrators with insight on how to identify needed professional staff development workshops, which may alter teaching practices, and create models of teacher education. In addition this qualitative study may also support the benefits of having professional staff development workshops to increase teacher knowledge of the current effective instructional practices. These staff development workshops may give educators incite on instructional activities that are meaningful in connecting African American students' everyday life situations with complex mathematical thinking. A series of professional staff development workshops for the fourth grade math teachers in the district was purposed, based upon the results of the data collection and analysis of this study. There is a need to begin doing things differently in this one elementary school, in order to obtain result that has not been achieved in the past.

Summary

The continual academic gap in mathematics of African Americans students behind other students, particularly Latino students, is a well-documented concern of researchers and educators (Johnson-Smith, 2010). According to Ali, Akhter, and Khan, (2010) traditional method of teaching may not be the most effective way to teach math to African American students. This dilemma is a significant problem in an urban elementary school. African American students must develop skills and strategies to become mathematical critical thinkers and problem solvers. Narrowing the achievement gap between African American and Latino students, will require an examination of the methods used by teachers to teach mathematics to determine if teachers are practicing constructivist and culturally relevant principles (McKinley, 2010), along with investigating factors causing the achievement gap. As stated by Einstein (2011) "insanity is doing the same thing over and over again and expecting different results." It is time for our educational system to stop engaging in insane behavior and try a different strategy when it comes to educating African American students in mathematics.

In section 1, the purpose of this study was to address the problem of an achievement gap between African American and Latino students, and to understand why the achievement gap exists. A conceptual framework was established explaining how Vygotsky (1978) conveyed learning as the use of social and cultural (sociocultural) order. A review of the literature related to the achievement gaps, examined current research surrounding how to improve the teaching and the learning among African American students in mathematics, was presented, analyzed and summarized. Section 2 includes the methodology used in this study.

Section 2: The Methodology

Introduction

This qualitative doctoral study was constructed within the framework of an illustrative case study research design. An illustrative case study is a descriptive type of study designed to bring awareness to the unaware (University of Florida/Center for Instructional Technology & Training, 2012). When conducting an illustrative case study the researcher usually focuses on one or two instances of an event to describe a circumstance by introducing the reader to a concept and using common language that everyone involved in the study can understand (Davey, 1991). The illustrative case study was used to ascertain, from the classroom teachers' perspective, factors that could possibly contribute to narrowing mathematical achievement gaps between fourth grade African American and Latino students, along with instructional and pedagogical strategies for addressing the mathematical gap in the classroom, at one urban elementary school in the south region of Texas. Triangulated qualitative data were obtained through classroom observations, interviews, and artifact reviews.

Design Selection

Creswell (2002) defined a case study design as a process of investigation, and reported the design involves "an in-depth exploration of a bounded system (e.g., an activity, event, process, or individuals) based on extensive data collection" (p. 485). Through the use of a case study approach, researchers deliberately cover related conditions that might be pertinent to a phenomenon of study (Yin, 2003). According to the United States General Accounting Office (1990) one type of case study is an illustrative case study. I chose an illustrative case study research design for this study

because I wanted to investigate factors that may contribute to narrowing mathematical achievement gaps between fourth grade African American and Latino students, along with instructional and pedagogical strategies for addressing the mathematical gap in the classroom, at one urban elementary school in the south region of Texas.

According to Davey (1991), an illustrative case studies is descriptive, which provides the reader with an understanding about the topic and gives familiarity to the unfamiliar. This illustrative case study focused on identifying the factors that may contribute to narrowing the mathematics achievement gap at a South Texas elementary school, between African American and Latino students.

I considered other qualitative designs for this study, such as grounded theory, ethnography, or phenomenology designs, but those were not used because of their disconnection with the goals of this study. The grounded theory design was not selected for this research because a theory was not formulated from this research (Creswell, 2003). The ethnography design was not appropriate for this study because a cultural group was not studied over a long period of time (Creswell, 2003; Fidgeon, 2011; Huberman, Miles, & Huberman, 2002). Finally, the phenomenology design was not chosen because the research focus was not used to "describe the meaning for several individuals of their lived experiences of a concept or a phenomenon" (Creswell, 2004, p. 57). Based on the nature of my research question regarding factors that may contribute to the mathematical achievement gap between fourth grade African American and Latino students, I used the illustrative case study methodology to analyze the data.

Setting and Sample

Setting

The setting was located in a Title I, metropolitan urban elementary school, in a southern district in Texas. According to the index of school segregation in Texas, this school would be considered a segregated population with 56.6% being African American, 41.6% being Latino, and .016% being European American (Horan, 2010).

Role and Relationship

I have been affiliated with this community for over 25 years as result of my family members residing and my church membership within this community. In addition, I have worked within this community as an educator for about 12 years, with my current role being that of a dyslexia specialist for 1 year, which improved accessibility and credibility among the participants. My role as the dyslexia specialist is to provide dyslexia intervention to the Grade K through 4 students (consisting of phonics, phonemic awareness, reading fluency, spelling and writing skills only; there is no intervention with dyslexia students when it comes to math) and provide dyslexia and Irlen syndrome screening and testing of any student exhibiting signs of dyslexia. Also, in this role I provide staff development on dyslexia and the law concerning dyslexia students with Grade K through 4 teachers, as well as conduct meetings with parents of students with dyslexia. Therefore, as a result of my role as an educator in this school, I was able to gain and had access to those with firsthand knowledge within this field of inquiry.

Prior to obtaining the position of dyslexia specialist, I was this school's writing curriculum specialist for 7 years. As the writing curriculum specialist, it was my role to provide Grade K through 4 teachers with building and district information, provide staff development on writing, model writing lessons to staff and students, along with providing

any needed resources that would aid them in teaching writing in their classroom. Although I had direct contact with teachers, I had no supervisory role over any of the participants who meet the criteria directly related to the nature of this project study. In this project study, the participants consisted of fourth grade math teachers and one math skills specialist at this school, which allowed them a firsthand knowledge regarding the African American and Latino achievement gap at this school.

The study was conducted in a comfortable environment with which participants and I were familiar. Trust, rapport, and communication had already been established; therefore, I was not seen as an outsider. Although there was a level of rapport with the participants, I recognized that trust had to be maintained with the participants in order for there to be openness and honesty with regards to the participants' opinions and personal lives (LeCompte & Schensul, 1999).

Sampling

In purposive sampling, I sought out those with credible and authentic experiences (Merriam, 2002). I had a specific group in mind for this study. Therefore, the participants included a purposive sampling design, which was consistent with the parameters of the research questions presented (Greenstein, 2006). The participants for this study were selected from the school, based on their roles in mathematics instruction of fourth grade students, preparing them for the states' math assessment, along with administering building, district and state assessments.

The fourth grade teaching staff consisted of five teachers, and one math skills specialist. The average years of teaching experience of those teachers ranged from 4 to 18. The five math teachers were assigned to a classroom, but the skill specialist was not.

Although the skills specialist was not assigned a classroom, she was still responsible for pulling small groups for math instruction, modeling math lessons, conferencing with the fourth grade math teachers concerning student progress, and creating grade level math building assessments. Due to the small number of fourth grade staff members, all were given an invitation to voluntarily participate in this qualitative doctoral study. Individuals who were not directly involved in the fourth grade math instruction were excluded from this study. In addition, protected class members, including minors, my students, individuals that were mentally and emotionally disabled, and residents of facilities, were excluded. The student populations of the urban elementary school's fourth graders included four European American, 41 Latinos, and 60 African Americans students.

A letter of cooperation describing the details of this research was presented to the principal (Appendix B) along with the request for permission to conduct research at the school. The letter included a timeframe for classroom observations, and other prominent information such as ethical issues. Hancock and Algozzine (2006) discussed legal and ethical issues for interviews and observations. Ethical considerations were put forth to allow for authentic thoughts to be shared and a positive relationship to be established between the participants and me. Before the project study began, all participants were informed of the subject matter. Data are stored on the hard drive of my private computer with a protected password. Only I am able to access these data. Interview data, artifacts documents, and notes from the observations will be stored in a secured and locked file cabinet at my home for 5 years, per the recommendations of Creswell (2009).

The school principal was contacted first to obtain written permission (Appendix B) to have access those potential participants in the study. After receiving written permission from the principal, the potential participants came from individuals who were responsible for the math instruction of fourth grade students. The identified participants were initially contacted through a face-to-face visit and a hand delivered form of consent (Appendix G) from me. The face-to face visits and forms described the project study, explained the participants' role in the study, the data collection process, and solicited the participants' permission to engage in the study along with consent forms explaining the procedure of the project study. The participants were given 48 hours to review the forms before signing or declining to sign consent form. After 48 hours, I e-mailed participants to schedule a time to pick up the consent form, or they could reply that they did not wish to participant at that time. All invited individuals agreed to participate in the study and were given copies of the consent forms with instructions to retain for their files.

The presented consent form (Appendix G) informed the participants of my name, the degree program I was currently in, along with the university that I am attending. A brief background on the study was provided. This form also provided the procedures for the classroom observation and the individual interview for those agreeing to participate in this study. The form informed that participation in the study was voluntary, and there was no obligation to participate in this study (Hatch, 2002). Although I was known to participants as the dyslexia specialist at an elementary school in South Texas, my role as a researcher for this project study was separated from the dyslexia specialist role. If the participant had initially agreed to participate in the study, but decided to stop, he or she had the right to do so without any fear of repercussion or loss of relationship with me as

the researcher. The participants were respected and protected from emotional, physical, and mental harm. The form mentioned that there were neither risks nor benefits for being a participant in this study (Creswell, 2012), and the information obtained in this study was confidential and for the purpose for the research only.

All individuals who were invited agreed to participate in the study, and the classroom observations lasted approximately 45 minutes. The interview process lasted between 30 to 45 minutes with each participant and all interviews were recorded. Participants were given notice prior to the interview via the consent form (Appendix G), that all discussions would be audiotaped, and by signing the consent form the participant agreed to be audiotaped. I transcribed each interview (Appendix J) immediately after they took place and reviewed the tape along with my transcription for accuracy (Hatch, 2002). It took me 5 weeks to complete the transcriptions, cross check the transcriptions with the audio taping, analyze the data, and present findings.

I utilized member checking by sharing with participants their own individual data findings for review and obtained feedback through a discussion of the findings with each participant. This was done to ensure the credibility of the participants' own individual findings during the interview process (Angen, 2000; Creswell, 1998; Lincoln & Guba, 1985). The member checking process took between 30 to 35 minutes per individual. Before anyone was interviewed and classrooms observed, the participants were informed of their rights, including consent, confidentiality, anonymity, and their right to end participation (Merriam, 2002). In addition, Institutional Review Board (IRB) approval for conducting research was essential to ensure ethical responsibility to human rights.

Data Collection

According to Strauss and Corbin (1998), qualitative research may produce findings not arrived at by statistical procedures or other means of quantification, but through use of various sources, such as, interviews or written reports (Kohlbacher, 2006). A qualitative doctoral study can enable a researcher to collect data through classroom observations, documents, interviews, audio-visual materials, group feedback analysis, focus groups, any other individual or group activity, or informal conversation (Creswell, 2009; Dick, 2005). Qualitative data were obtained through the collection of math teachers' and math skills specialist interviews, math teachers' and math skills specialist classroom observations, and review of school artifacts. Preceding any data collections, a letter of cooperation (Appendix B) describing the details of this research was drafted and presented to the principal along with the request for permission to conduct research at the school.

Various school artifacts including individual fourth grade teachers' math lesson plans, response to intervention (RTI), math plans, and campus fourth grade level math plans, were reviewed using an artifact/document review protocol (Appendix C). The artifact/document review protocol included a brief description of the artifact/document and how it was used, as well as how these artifacts/documents related to the research questions. The participants identified the documents to be reviewed, and noted if it was a teacher or school artifact/document.

Observations

According to Hatch (2002), the goal of an observation is to understand the culture, setting, or social phenomenon being studied from the perspective of the participants. One classroom observation per teacher was conducted. Upon receiving

consent from the fourth grade math staff participants and the school principal, the observations took place in those fourth grade staff participants' classrooms prior to the interviews. Classroom observations and interviews were conducted on separate days. The data collected during the observations included the teacher's lesson objectives, activities for that objective, the mathematical instructional and pedagogical strategies used, as well as students' and teachers' interactions. A classroom observation protocol form (Appendix D) was used to record notes from classroom observation, from which themes were identified. According to Hatch (2002), in order to make the observations as effective as possible, it is essential that the field notes are as accurate as possible. Therefore notes included what was observed in the classrooms without imposing biases or interpretations. "The observational data should be as careful a representation as possible of the action observed in the research setting" (Hatch, 2002, p.78).

It was expressed to the participants not to make any changes to their class schedules. Each participant was informed that passive observation would be conducted by observing individual(s) in an area of the classroom that neither hindered nor distracted from the class activities (Potter, 1996). Notes were made of the verbal and nonverbal cues, from both students and teacher that occurred in the classroom, as well as, the instructional and pedagogical strategies used with the students on the observation form. The observation data was analyzed to determine the connection to other data sources and to validate themes found in the interviews, which is also known as triangulation (Merriam, 2009; Stake, 2010). Qualitative researchers use the triangulation method to establish and check credibility in their studies by using multiple data collecting methods to analyze a research question (Yeasmin & Rahman, 2012).

Interviews

The five fourth grade math teachers and the one fourth grade math skills specialist were invited to participate in the interview process. The interviews were conducted after the completion of each classroom observation, but not on the same day. After the completion of the observation, the participants were allowed to select a convent date for the interview. Participants were ensured them that there would be a sufficient amount of time to conduct each interview and 48 hours were allotted between each interview to transcribe the responses. Consent was obtained prior to the interview from the participants, to allow the use of audiotaping during the interview process, which permitted me flexibility to check for accuracy and increased credibility of results (Coleman & Briggs, 2005).

The interviews took place in the school's conference room after school, at a time that had been pre-selected by the participants. The conference room was reserve prior to each interview. The school's conference room was utilized because of its space, lighting, and environment which were conducive for the interviews. All materials needed for the interviews were available, organized and set up prior to the interviews, and the participants were made to feel comfortable during this process. Utilizing the interview process provided insight to the perspectives of those individuals who have firsthand knowledge of this topic.

The interview process was semi-structured, which included questions that were open-ended. Although the interview questions were open-ended, by using the semi-structured interview, this left room to probe the participants' responses by asking for clarification or additional information (Hatch, 2002; Hill, Grange, & Newmark, 2003).

Interview questions were constructed to align with the research questions of this project study (Appendix E). Prior to coming to the interview, the participants were given a list of the questions that were asked during the interview. This allowed the participants to prepare for the interview, and provided for a smooth transition throughout the questioning.

The consented recordings of each interview response were used for transcription, future analysis of coding and identification of themes (Merriam, 2009; Southall, 2009; Wengraf, 2010). The individual interviews were conducted following the five steps for a successful interview suggested by Hancock and Algozzine (2006), through the identification of the participant, development of an interview protocol, consideration of the setting, recording data, both written and audio, and strict adherence to ethics. Interview questions form (Appendix E), contained a heading, a project goal statement, the interview questions to be asked, space for recording the participant's comments and my reflective notes. The math teachers and my personal thoughts regarding insights, ideas, or themes that emerge during the classroom observations will be recorded in a reflective journal (Creswell, 2012).

Peer Debriefer

Peer debriefing consist of sharing analyzed data and conclusions with individuals knowledgeable about a research topic. These individuals did not have to include an expert in the field of study (Lincoln & Guba, 1985). Peer debriefing can take place with a pair or a group. Peer debriefing was utilized to assess the data collection to logically develop common themes and findings of the study (Creswell, 2009; Merriam, 2009). Peer debriefing was useful, because it provided another source to analyze the conclusions

of the study. Peer debriefing may take place with colleagues that have been conferred with throughout the process of the case study (Spillett, 2003).

The selected peer debriefers consisted of two colleagues that work outside of the school, and have been conferred with throughout the process of the case study. One of these individuals holds a doctoral degree in education technology and the other individual is a doctoral student currently pursuing a degree in education leadership. Their role was to review the collected data, review emergent themes, review the coding during the process of this project study, provide a check against any personal biases, and to aid with consistency and reliability. The peer debriefers were not able to identify participants, and signed a confidentiality agreement form (Appendix F).

The participants were identified based upon their involvement in the mathematical achievement success of fourth grade students at a south Texas elementary school. While I do have direct contact with, I have no supervisory role over the potential participants who meet the criteria directly related to the nature of this project study. I have worked at this school for twelve years in the capacity of a third grade teacher, kindergarten through fourth grade writing curriculum specialist, and now campus Dyslexia Specialist. Therefore, although I have a positive and long standing working relationship with all the teachers at this school, I was sure to refrain from sharing any personal biases or viewpoints on this field of inquiry with the potential participants. The use of member checking, rich data, and peer debriefing was utilized to remove personal biases. To allow for a researcher-participant relationship any possible misconceptions prior to data collections was eliminated by explaining the observation and interview process, and by providing for an opportunity to ask questions.

Data Analysis

According to Creswell (2007) there are three effective data analysis strategies: (a) preparing and organization the data, (b) reducing the data into themes through a process of coding and condensing the codes, and (c) represent the data in figures, tables, or a discussion. Researchers suggest coding data to arrive at five to seven themes (Creswell, 2012; Glesne, 2011). The data analysis procedures were supported with the Vygotsky's sociocultural theory. The conceptual framework was utilized to identify, organize and classify the interviews, observations, as well as documentary data, through coding, and arriving at themes (Creswell, 2012).

Observations

Classroom observations were intended to address the research questions, as seen in the Observation Field Notes sample (Appendix I). Research questions, "What are the fourth grade math teachers' perceptions of the factors that could contribute to the mathematics achievement gap between African American and Latino students?" and "What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical achievement gap between African American and Latino students?" were addressed by observing all factors in the classroom environment. All of the classroom observations were conducted prior to the interviews, this process allowed for clarification and deeper understanding of what had been observed. To address the research questions, specific data was looked for, such as, questioning strategies, instructional and pedagogical strategies used, how student engagement was ensured, what were the assigned activities, how teacher dealt with off

task behaviors, type of classroom management (whole group, small group, independent, etc.), and teacher-student interactions.

A total of six participant s received classroom observations, and each participant was observed for 45 minutes. The participants agreed to the observation time and date. The 45 minute observation time was agreed upon because it allowed for about 50% of the 90 minute whole group mathematics lesson. The actions and interactions of both students and teachers in the mathematics classrooms were observed without interruptions. The format of the protocol allowed for notes and comments on teacher and student actions (Appendix I). Although each teacher taught the same lesson objective in various ways, some commonalities were observed.

During classroom observations all teachers were noted utilizing both high and low levels of questioning. T6 asked the students did they use a strategy to find the answer. T3 asked the students to give the sum of half of 64. All the participants were observed engaging their students by calling on a variety of students. T1 had students working in small groups, one student from each group was called upon to present to the entire group. This strategy afforded the teacher the opportunity to hear from a student from each group and be able to examine the thinking process used by each group to solve the mathematical problem presented.

Another commonality observed in some of the teacher's classroom where the introduction and the reinforcement of vocabulary skills. Each teacher focused on utilizing correct math vocabulary, and instructed their students to use correct math vocabulary when answering or explaining a mathematical response. T4 aided a student in sounding out and finding the meaning of a mathematical word. T6 also emphasized the

use of content-appropriate vocabulary, and insisted on students using the correct vocabulary to answer math questions. T6 reported that this allows for enhanced student achievement in content comprehension.

Technology was also a common behavior exhibited in the majority of the observations. T2, T4, and T6 used elmo project projectors to display mathematical vocabulary and problems. T1 and T5 utilized the computer gaming website to review the mathematical object with the class.

Small group instruction was observed in all the classes observed. Students assisted each other with problem solving by working in pairs or groups of four to five students. Five of the teachers grouped students with one teacher for instructional purposes. T4 and T6 assisted the students by placing them in cooperative groups that worked on and presented strategies on problem-solving. T1, T2 and T5 allowed their students to work in small groups to complete a class assignment, and the teachers moved throughout the groups offering assistance and clarifying any question concerning the objective.

Many students from each class were observed asking questions and utilizing critical thinking skills to answer multi-step problems. In T6 classroom students were able to answer various questions presented by the teacher. Those students who were struggling to answer the questions were given the opportunity to consult with a peer for assistance. The students in T2's classroom were allowed to show how they solved multi-step word problems by modeling the problem for the class through kinesthetic. T3 students were observed giving their answers to word problems to the class verbally.

Interviews

The interviews afforded me the opportunity to obtain a firsthand account of the teacher's perceptions of the mathematical achievement gap between African American and Latino students. The data collection included interviews. I used note paper to record participants' responses to open-ended questions. Participants' responses were also audio recorded, to support clarity and accuracy of the data. I later transcribed responses as seen in the Sample Participant Interview Transcripts (Appendix J) to use during data analysis. The first research question was "What are the fourth grade math teachers' perceptions of the factors that could contribute to the mathematics achievement gap between African American and Latino students?" In an attempt to answer this question, the following interview questions and open-ended statements were posed:

1. Describe what you see as the mathematics achievement gap between African American and Latino students in your grade class.
2. What factors do you think contribute to the mathematics achievement gap between African American and Latino students at this school?
6. What do you think can be done at this campus to address the effects of the mathematics achievement gap between the fourth grade African American and Latino students?
7. What other insights would you like to share about how the school can narrow the mathematics achievement gap between African American and Latino students?

The other research question posed was: "What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical

achievement gap between African American and Latino students?" To address this question, several interview questions were asked, which included the following:

3. Has your knowledge of the achievement gap affected the way you teach mathematics? If so, explain. If not, why not?
4. What have you done to narrow the mathematics achievement gap in your classroom? Has it been effective? What data do you have to support this claim?
5. Do you feel you would benefit from additional professional development in the area of mathematics, specifically instructional and pedagogical strategies? Explain.

Coding is a way of identifying groups of words or important words, in the data and then labeling them accordingly. Coding was conducted by reviewing the data and highlighting, circling or marking information that appear multiple times throughout the transcription (Strauss and Corbin, 1998). Therefore, the data was coded based on similarities. Although I purchased transcription software to assist with transcriptions, the technology appeared to be more of a hindrance than an aid. Therefore, I decided to manually code my qualitative data analysis recordings and notes. A sample of the coding done can be found in Appendix H. I coded the data by hand, along with utilizing peer reviewers, who were not able to identify participants (Creswell, 2009). The peer reviewers aided in coding credibility.

During the coding process, I utilized a color code scheme to hand code the transcriptions, and to cut and paste text segments onto notecards (Creswell, 2009). I reviewed the codes and discard the codes that I feel are less useful, and merge smaller

categories with the larger categories. After I collected and coded all data, I organized my major code categories into larger themes that united the different codes. My collected data was analyzed and maintained on my personal laptop with password protection.

Memoing was utilized for my personal responses to the data (Gardner, 2008) note-taking allowed me to record, and store ideas and thoughts as the research was being conducted (Kawulich, 2005). All collected data is stored in a secured and locked file cabinet at me home in a secure location in hard copy form. Also data is kept electronically, which is located on my personal laptop with password protection and only I have access to this laptop during this qualitative study. To protect the confidentiality, and interest of the participants they each was identified by the alphanumeric codes of: T1, T2, T3, T4, T5, and T6. The research data for this study will be maintained/stored after the research has been completed, for at least five years, in a locked file cabinet in a secure location, and the study closed with the IRB.

Data was analyzed for themes and patterns in results (Allan, 2003). According to Creswell (2012) "themes is another way to analyze qualitative data" (p.248). Through the use of themes similar codes can be combined together to express one major idea in the data (Creswell, 2012). This researcher's theme labels were no more than five words, such as, "not seen," "present in lessen" (Creswell, 2012). Then the data, themes, and patterns was summarized and explained in narrative form.

Artifact Review

The artifact data, which including teachers' individualized math lesson, RTI intervention plans, and campus wide math fact plans were reviewed and analyzed using an artifact review protocol (Appendix C). The protocol included space for a brief

description of the artifact. The protocol also required specification of which research question the artifact was related to and determination of whether it was a teacher, or school artifact (Appendix C). Artifact descriptions were created, and then similarities along with differences between the participants' artifacts were identified.

The participants provided artifacts that they believed represented their efforts to help narrow the achievement gap between African American and Latino students. Each participant submitted three artifacts that were reviewed, and categorized as being either a teacher or school artifact. The artifacts were reviewed to determine which research question does the artifact document help to answer?

1. What teacher factors, as described by fourth grade math teachers of African American students, contribute to the narrowing of the mathematics achievement gap between fourth grade African American and Latino students?
2. What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical achievement gap between African American and Latino students?

The teachers' artifacts were created by the teacher, and implemented in the teachers' classrooms. The school artifacts included artifacts that applied to other grade levels in the school and not just to the fourth grade. Some artifacts were considered both teacher and school artifact. The artifacts provided strategies or programs that occurred on this campus. Samples of the artifacts are found in Appendix K.

Member checking took place when each participant was provided with my findings of their data, and they checked for accuracy along with discussing their findings with me (Creswell, 2009; Doyle, 2007). Although no discrepancies were found in the

data, had there been any discrepancies in the findings, and what the participants believed was said during the interview, then both the participant and I would have gone back to the original transcriptions to check the data (Curtin & Flossey, 2007). The answers or responses recorded in my reflective journal was reviewed and analyzed for common themes.

Findings

While analyzing my collected data, seven themes emerged. The emerging themes were; students' lack of mathematical background knowledge, students' lack of knowledge of basic math facts, building of self-confidence in students, insufficient time to achieve student mastery, grade-level intervention, variety of instructional strategies, and the need for teacher training on new mathematical state standards. Each of the themes will be addressed in more detail in the following discussion.

Theme 1: Mathematical Background Knowledge

A theme that emerged was the African American students' lack in mathematical background knowledge. The amount of background knowledge that a student has about a particular subject, is a strong indicator of how well they will receive new information pertaining to the subject content (Bodovski & Farkas, 2007; Marzano, 2004). Approximately 55% (Texas Education Agency, 2014) of the fourth grade African American students showed mathematical learning gaps that are causing problems with fully grasping the state's math standards at their grade level. Participant T6 stated, "My low performing African American students have a deficit in fundamental math skills along with a poor sense of reasoning that is being taught on their grade level." Participant T3 reported, "The majority of my Latino students reach the extension portion of most

lessons, while I tend to find myself re-teaching skills too many of my African American students that should have been mastered in the lower grade levels." To effectively narrow the mathematical achievement gaps, the teachers have to go back to lower grade level concepts and standards in order to build the background knowledge and teach the skills the students are missing.

Theme 2: Knowledge of Basic Math Facts

Each of the participants interviewed unanimously stated in one manner or another, that many of their African American students showed a deficit in the knowledge of basic math facts. Watts, Duncan, Siegler, & Davis-Kean (2014) reported that scores were taken from state standardized assessments along with clinical interviews which revealed considerable disparity among African American and White participants' mathematical competencies The African American students' failure to learn basic facts has hindered their ability to achieve in the same manner as Latino students who have mastered their basic facts, including multiplication and division facts. T3 stated, "I often experience some of my African American students having little to no determination or presence to study and know what they are taught to help them be successful." T1 noted, "I work with my students in small groups or one-on-on, and we work on daily problem solving using basic math facts. I use this format to help my students." T5 reported, "I have had to change my approach to teaching math facts. I sing more in my class, and utilize storytelling to help my student succeed in retaining math facts." Overall, the participants expressed that there is a tremendous need to help the African American students at this school, be able to grasp and maintain basic math facts, in order to help narrow the mathematical achievement gap.

Theme 3: Building Student's Self-Confidence

Another theme that emerged was building the students' self-confidence. According to Clements & Sarma (2014) students who experience low expectations perform at low levels while students who experience high expectations perform at higher levels. The participants in this study reported that they make effort to make sure that all their students feel successful. Their students began to feel more confident in their mathematical abilities, when they feel successful on math tasks, which entice them to want to achieve more. T3 admits that student self-confidence is still a struggle among the African American students, "my Latino students do not hesitate to let me know when they do not quite understand a math concept, whereas my African American students remain silent, even if they do not understand the concept as well." T4 stated,

> We [um] celebrate all gains, and you know, no gain is too small, for example when we [um] do multiplication fact drills, instead of the usual 40 facts in three minutes I start [um] my students off with 10 facts on Monday and add 10 more facts each day until we reach 40. Then on Friday we take the fact drill with all 40 facts. This helps my [um] students to mastery the skill, and it allows them to see growth throughout the week.

Theme 4: Insufficient Time

Another reoccurring theme observed is one of insufficient time for students to master math. Some of the students struggle to close the achievement gap because they do not have enough time to truly build and understand the concepts they are required to learn. Protheroe (2007) reported that math lesson cannot be successful unless other elements of teaching such as, a logical progression of lessons, classroom management, along with

time management are effectively in place. According to T6, "Our curriculum is set up so that it moves so quickly. There are so many standards that are mandated that we cover in a short period of time, that our students don't have time to master the skill before we move onto something else. In addition we have to get these students read for the state assessment." T2 stated, "I think the majority of my students could learn the fourth grade math standards if they had a sufficient amount of time to master the concepts presented."

Theme 5: Grade-level Intervention

Each participant described grade-level interventions as ranging from students being pulled out of class during the school day, extended week (Saturday school), and small group interventions provided by staff other than the teacher of record. Students failing to develop proficiency in math skills in the elementary grades are more likely to experience difficulties in the math curriculum later on, and a more targeted intervention would be useful to these students (Pool, Carter, Johnson, & Carter, 2013). T1 stated, "The entire school helps out in some form with different school-wide tutorials programs, including after-school tutoring, and lunch tutoring." All of the participants addressed the importance of having math interventions as a way to explain student deficits. T5 talked about how the math skill specialist worked with students, "our math skill specialist schedule extra time with students who are struggling, and I do see some improvement in my low performing students."

Theme 6: Varying Instructional Strategies

Another theme that all participants addressed was implementing a variety of instructional strategies to enhance the math instruction, student comprehension and achievement. Students come to school with various learning abilities and style; therefore, in order for

educators to meet the needs of all students they must utilize different instructional strategies (Rosenshine, 2012). Some of the most widely used instructional strategies were questioning and developing vocabulary, which were observed during some of the classroom observations. The participants reported at some point during their teaching, using some of the following math instructional strategies: modifying assignments, students working in small groups, utilizing hands on activities, additional practices, students having to explain the findings to their answers, vocabulary development, and providing students with experiences in real life settings. T6 stated, "I try to make mathematics meaningful from my students by utilizing hands-on learning, and using real life examples, activities, or problems." T4 noted, "My students work on solving word problems through small group settings, but I would like to know more strategies that I can use to help my students get math."

Theme 7: Professional Development

All of the participants involved in this project study reported feeling confident in their ability to teach mathematics to African American student. However, they all stated that professional development in the area of mathematics would be beneficial. Professional development allows teachers to stay current on new research on how children learn, provides information on emerging technology tools for the classroom, as well as new curriculum resources (Bol & Berry, 2005). T5 noted that professional development would be helpful because "we have a lot of new skills to teach this year, and these skills are more challenging with multi-steps equations." T4 stated, "We need professional development in [sic] instruction to prepare lessons for learners with an education gap." T1 reported professional development "would help teachers to share strategies they have

used to help students become successful in mathematics skills and concepts. I think we as teachers need to work together to say what works and what do not work." T3 stated, "Professional development would be beneficial to all, but especial for those teachers who struggle with being able to truly differentiate math instruction for students that don't have fundamental skills."

Evidence of Quality

To ensure accuracy, the combination of data from observations, interviews along with artifacts documents (multiple methods of data collection) with the different participants in each grade level (multiple sources of data) was used for triangulation. To establish credibility member checking was utilized for interviews to verify the data for each participant. The data came from more than one method of data collection and source.

Credibility is the ethical criteria that this research used to avoid producing an unethical emerging theory with unlikely interpretations. To establish the credibility of findings, member-checking took place with the five fourth grade math teachers, and the one fourth grade math skills specialist after the interview/observation (Yin, 2009). Each participant was provided a copy of my findings of their own individual interview data, with a request that they check for accuracy (Creswell, 2009; Doyle, 2007). The participants were afforded the opportunity to have feedback on the findings and allowed to ask questions. Creswell (2012) explained that the purpose of credibility is to have the participants corroborate evidence of accurate data in the study.

Merriam (2009) recommended triangulation of various data to achieve credibility (Uwe, 2007). According to Merriam & Associates (2002) the use of multiple data

sources will help to understand the connections of related themes and categories during data analysis. Glesne and Peshkin (1992) stated, "three data gathering techniques dominate in qualitative inquiry: participant observation, interviewing, and document collection" (p. 24). Data triangulation in a qualitative research offers credibility to the study (Creswell, 2009). Data triangulation included fourth grade math teachers and the math skills specialist classroom observations, fourth grade math teachers and math skills specialist interviews, and collection of school artifacts. The observation in this qualitative study revolved around the actual witnessing of the events taking place in the fourth grade math classrooms (Creswell, 2009). The fourth grade math teachers and math skill specialist interviews extended the depth of the observations along with providing additional information (Creswell, 2009). The school artifacts/documents provided a written record of the research.

The transcripts of the interviews were reviewed and coded by hand. Prior to the coding process each individual interview transcript's line was reviewed and read carefully. Factors described by the participants that directly or indirectly contribute to the narrowing of the African American, and Latino mathematical achievement gap to determine the initial codes were identified. In congruent with the research questions, the data was separated into themes, and patterns were identified based upon the participants' responses from the interviews and what was observed in the classrooms. Codes were calculated to determine the consistency of the codes among the participants.

Through the use of the artifact/document review protocol (Appendix C), artifact/document data was reviewed and analyzed. The artifact/document review protocol included a space for a brief description of the artifact or document. The

artifact/document review protocol specified whether the artifact or document was a teacher or school artifact/document (Appendix C). Any artifact/document provided was reviewed based upon its relationship to the research questions. A description of the artifact/document was created, and the differences as well as the similarities between each participants' artifact/document was identified.

Classroom observations were analyzed to determine if and how they related to the artifacts/documents and to validate themes found in the teacher interviews. The observation data was analyzed to determine the frequency of the teachers' and the students' behaviors, and instructional math strategies used in the classroom. The interviews provided the teachers' perceptions of the mathematics achievement gap among fourth grade African American and Latino students, along with what type of instructional strategies used in the classroom.

The participants' artifacts/documents were examined using the artifacts/documents protocol to identify similarities and differences. According to Creswell (2007), "triangulate different data sources of information by examining evidence from the sources and using it to build a coherent justification for themes" (p. 191). The observation data was reviewed in relation to the research questions along with the other data collected, and the similarities and differences between the participants' observations were identified. Then, the interview data was analyzed to give a presentation of data, identify themes, and any similarities and differences among the participants. This is an example of triangulation. Interviews, observations, along with artifact/document data from the fourth grade math teachers' was used for triangulation to arrive at trustworthy interpretations.

The commonalities in the observation data submitted supported the themes identified in the interviews. The observational process provided insight into teachers' actual mathematical instructional strategies when working with African American and Latino students, while the interview data provided evidence concerning teachers' perception of the mathematical achievement gap between African American and Latino students. The classroom observations were reviewed individually to achieve clarity. An analysis of the observation data of the teachers and the skills specialist identified frequencies of particular math strategies utilized by the teachers in the classroom. Data was further analyzed by matching the observed teacher and student behaviors with the notes taken in each observation. Once this was completed, the frequencies and identified commonalities, as well as, differences in the observations were charted.

The artifact data were reviewed and analyzed utilizing the same process as the observation data. The artifacts provided (teachers' individualized math lesson plans, small group plans, RTI intervention plans, and campus wide math fact plans) represented what the teachers believed to be their efforts in narrowing the achievement gap between African American and Latino students. Each teacher submitted artifacts which included small group instruction and intervention plans (RTI). The intervention and small group instruction plans were created by teachers through the use of their own data analysis findings to identify strong and weak objectives for each student, and to group students according to their specific mathematical needs. The intervention plans varied in specificity but all included the teacher, days, times, specific students, objectives to be taught, resources materials, and assessment. The artifact data was related to the other data sources to determine if cohesion was present. After analyzing all data sources (teacher

interviews, observations, and artifacts) individually, an analysis across the data sources was conducted to identify common themes.

The trustworthiness of this study was based on Lincoln, Guba (2000) concept of the credibility, dependability, and conformability of a study providing assurance in the findings, providing data that the findings are consistent and may be repeated, as well as showing the neutrality of the researcher. Authenticity of the analysis was strengthened through an awareness of educative and tactical truths (Lincoln & Guba, 2000).

In addition, to strengthen the trustworthiness of my work, peer debriefers were recruited, to play a role in the analytical process (Creswell, 2009; Merriam, 2009). The peer debriefers consisted of two colleagues that work outside of the school, and had been conferred with throughout the process of the case study. Both individuals hold doctoral degrees in education, one in leadership, and the other in technology. Their role was to review the coding as the process went along, provide a check against any personal biases, and aid with consistency and reliability throughout the coding process. The peer debriefers were not able to identify participants, and were provided with a confidentiality agreement form for signature (Appendix F). The feedback from both peer reviewers was positive, and no adjustments were required to be made.

Outcomes

The outcomes of this project study are based on the results of the observations, interviews conducted, and the artifacts collected. The observations and interviews that were conducted, along with the collections of artifacts were done in order to identify factors that may contribute to the narrowing of the mathematical achievement gap between African American and Latino students in one urban elementary school.

The first research question was, "What are the fourth grade math teachers' perceptions of the factors that could contribute to the mathematics achievement gap between African American and Latino students?" T4 state,

> My students who continue to struggle with fundamental basic skills are the students that are not successful [sic] with campus, district and state assessments, **but** my students [um] who have a good understanding of the math basic skills [um], although they may have difficulty in applying those skills to problems, hey, they tend to show the most growth."

T6 reported that success came for one student in particular, when they started receiving additional intervention time, through pull-outs and RTI, to focus on mathematics. T1 noted that success was seen when there is constant review and re-teaching, and spending more time on skills, to ensure conceptual understanding, but this participant also stated that extra time is often not a luxury that is afford to the students. T3 stated, "I attribute a lack of mathematical success with my students due to poor fundamental skills on the part of my students, and a lack of teacher resources for me to teach these skills. This is discouraging to me as well as my student."

The second research question, "What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical achievement gap between African American and Latino students?" Participants reported implementing small group instruction. Plans for students' small grouping were provided as a source of artifact/document data. T5 and T2 both mentioned providing manipulatives for the students to use as a classroom strategy. The use of math counters, base ten blocks, as well as protractors was observed being utilized in the classroom

during math instruction. Some teachers reported having to be creative and think outside of the box when it came to math strategies. T2 was observed utilizing playing a game as a strategy to introduce and teach the skill of angles. T5 reported, "I have had to change my approach to teaching math facts. I sing more in my class, and utilize storytelling to help my student succeed in retaining math facts."

As a whole, the participants in this study expressed that although many of their African American students were lagging behind their Latino counterparts, they believe that all of their students could be successful with the necessary aid. The findings indicated this achievement gap may be due to a lack of sufficient time for teaching to mastery, lack of basic mathematical foundation skills, need for the variation of mathematical strategies, and the need for professional development. Therefore, as an outcome of these findings a mathematical professional development plan was created for the teachers that will address those issues.

Conclusion

This qualitative doctoral study's purpose is to identify factors that may contribute to the narrowing of the mathematical achievement gap between African American and Latino students in one urban elementary school. This section addressed the methodology, data collection, data analysis, and findings that were used in this project study. An illustrative case study research was conducted to investigate this mathematical achievement gap among African American and Latino students. This research provided a better understanding of the factors that may contribute to the mathematical achievement gaps among African American and Latino students.

Based on the research conducted, Section 3 will include a literature review to find the best solution on how to narrow the mathematical achievement gap among African American and Latino students. A project and a plan of implementation to solve the problem of the mathematical achievement gaps in African American and Latino students will be included. Section 4, will engage in a summary of this case study, reflection, conclusions providing recommendations, commentary, and outline future research and implications for social change.

Section 3: The Project

In Section 1, the literature review addressed the current research surrounding ways to improve African American students' mathematics achievement. Research findings suggested utilizing strategies that included teaching students in ways that are personally meaningful to them, valuing meaningful activity over correct answers, small-group collaboration, and providing opportunities for daily guided and independent practice along with, class discussions. The findings from the data analysis showed that the fourth grade math teachers from the project study were struggling to effectively implement the mathematical strategies mentioned above. The teachers reported a barrier to utilizing the mentioned best practices and that there was the need for more training on how to implement these strategies.

The research finding from this project study were used to design a plan that would provide educators with staff development workshops on mathematical diverse strategies that could increase African American students' math scores and narrow the mathematical achievement gap between African American and Latino fourth grade students at the urban school in this study. In this section, the project is presented. A description of the project is included, along with the project goals, the project rationale, and a review of literature supporting the project choice and design. In this section, a plan for implementation and project evaluation was also included.

Description and Goals

The project that resulted from this study was a professional staff development training plan for fourth grade math teachers of students with African American students with a deficit in mathematical achievement. Through a detailed plan (Appendix A), the

fourth grade math teachers were provided with tools to aid in narrowing the mathematical achievement gap between African American and Latino students at this school, by learning how to implement culturally relevant pedagogy through the use of strategies that included differentiating learning skills, and mastery learning.

This project study was performed to address the factors perceived by teachers that facilitated the achievement gap between African American and Latino students in an urban elementary school in southwest Texas. This research was performed after receiving IRB approval (number 12-02-14-0242701), and there were several factors perceived by teachers that contributed to the mathematical achievement gap. Included in these factors were a lack of sufficient time for teaching to mastery, lack of basic mathematical foundation skills, need for grade-level intervention, building students self-confidence, need for the variation of mathematical strategies, and the need for professional development. A plan for professional development training was created to address these factors. The goal of this professional development plan was to provide the fourth grade math teachers with strategies for addressing those mathematical skills that are lacking, based upon the scores of classroom quizzes, campus assessments, district benchmarks, and state assessments, while still teaching the fourth grade math objectives.

The project (Appendix A) was designed to provide training in cultural relevant pedagogy, through the use of strategies that include differentiating learning, and mastery learning (Beswick, 2012; Unal, 2011). This project was designed to provide the fourth grade math teachers tools to narrow the African American and Latino mathematical achievement gap. The training ensured that fourth grade math teachers were provided with specific classroom strategies and teaching tools needed to motivate African

American students to learn the mathematical objectives presented. Through the variation of the teaching strategies and students' mastery of basic skills, their self-confidence will improve. The professional development plan did not address the factors of lack of time and grade-level intervention, because these are factors that are controlled by the administration of the school and not the teachers.

The professional development plan includes curriculum strategies that are culturally relevant and provide motivation to the at-risk African American student to desire to learn. The training included conducting a diagnostic assessment to the specific mathematical skills that the student may lack, and how teachers would be able to differentiate instructions based on how their students learn. Teachers were then able to create lessons to meet those individual African American students' need in the classroom.

Rationale

This project was selected in order to address the factors of the mathematical achievement gap between fourth grade African American and Latino students. The findings of my project study and the literature review showed that professional development would aid the fourth grade math teachers in ensuring they would have strategies to meet the academic needs of the students. Quick, Holtzman, and Chaney (2009) supported this by reporting that with professional development, when it engages teachers for many hours, such as in-services and workshops, the effects on teaching practices and student learning results were positive.

While conducting the research to this project study, there were many articles on culturally relevant pedagogy, differentiating learning, and mastery learning used as interventions (Guskey, 2007; Rasool & Curtis, 2000; Sleeter, 2001; Zimmerman &

Dibenedetto, 2008). After reading and further research on cultural relevant pedagogy, differentiating learning, and mastery learning, a determination was made to craft a professional development plan for training on cultural relevant pedagogy, through the use of strategies that included differentiating learning, and mastery learning. This plan would offer fourth grade math teachers the tools needed to make lessons with African American students in mind, while still meeting the district mathematical objectives in the classrooms.

Review of the Literature

The focus of this review of literature was on professional development, and culturally relevant pedagogy, through the use of strategies that included differentiating, and mastery learning. The findings of this study showed that teachers would benefit from professional development on mathematical strategies to bridge gaps in background knowledge and facilitate the mastery of basic math facts. A plan for a professional development series focusing on cultural relevant pedagogy, through the use of strategies that include differentiating and mastery learning was a viable solution to these factors.

Reviewing the literature on these factors was necessary to create a successful project. Articles were found using database searches that included Educational Research Complete, ERIC, ProQuest Central, Boolean and Education from SAGE in both Google Scholar and Thoreau from the Walden University Library. The searches included *professional development; professional development + mathematics; cultural relevant pedagogy; cultural relevant pedagogy + mathematics; cultural relevant pedagogy + mathematics + African American students; differentiating learning; differentiating learning + mathematics; differentiating learning + mathematics + African American*

students; mastery learning; mastery learning + mathematics; and mastery learning + African American students.

Professional Development

There are some parents and community leaders who are unaware of what methods local school district's use for improving teaching and student learning (Mizell, 2010). Professional staff development is a strategy school districts use to strengthen an educator's performance levels (Mizell, 2010). Professional staff development is also a way educators are able to increase their teaching performance and students' academic achievement. Based upon the research performed in this project study, the fourth grade math teachers communicated a need for more professional development in order to narrow the mathematical achievement gap for African American students. To ensure an effective professional development activity, this section of the literature review addressed what is effective professional development. The remaining focus of the literature review was culturally relevant pedagogy, through the use of strategies that included differentiating and mastery learning.

Professional development influences student academic achievement in phases, and improves teachers' knowledge and skills (Guskey &Yoon, 2009). Where there is improved knowledge and skills there should be an improvement in classroom instruction. Also, where there is improvement in a teacher's ability, the level of student academic achievement should rise (Guskey &Yoon, 2009). Some variables that are related to professional development and student achievement are the school, the teachers, and the student's academic level related to learning within the classroom, instructional strategies, curriculum design, student background knowledge, and student motivation (Marzano,

2003). A continuation in professional development for teachers is imperative. In order to obtain true change in education, the focus of the professional development must be on increasing teacher learning utilizing methods that teachers learn best (Hord, 2004; Petrie & McGee, 2012), and professional development must be continuous and orderly if it is to truly affect student achievement (Sappington, Pacha, & Baker, 2012). Professional development should provide teachers with understanding and skills that are necessary for their classrooms (Riggsbee, Malone, & Straus, 2012).

Research showed that professional development should support a teacher's commitment and motivation to the process of engaging learners, as well as combining the needs of the individual with the goals of the school and the district (Flores, 2005; Guskey, 2009; King & Newmann, 2004). Teachers should become familiar with their students' ability to problem-solve, and doing this will result in a deeper understanding of appropriate teaching strategies for mathematics (Bailey, 2010). Doig and Groves (2011) reported that before the teachers present their lessons, they must engage in the problem solving activities and know the probable methods for solving the problems that the students will use. In addition, professional development should incorporate teachers' ideas on what they are interested in learning (Lieberman & Pointer Mace, 2008; Saphier, 2011) as well as initiating educational change.

Current research reported that a basic component with regard to student academic achievement is effective teaching (Kane, Taylor, Tyler, & Wooten, 2011). Schools rely on qualified educators to achieve significant academic growth. Educators must be trained to meet these demands. Educators need support from their peers to convert theory into practice, and professional development transforms theory into practice (Burke, 2013;

Evans, Williams & Metcalf, 2012; Wlodkowski, 2008). Through participation in professional learning communities (PLC), professional development for educators can be collaborative when it stresses both interactive and active learning experiences.

PLC is an environment of learning that includes trust and relationship-building along specific characteristics, such as having collective creativity, principals that are supportive with shared leadership, supportive conditions, shared personal practice, and shared values and vision (Cranston, 2011; Doolittle, Sudeck, & Rattigan, 2008; DuFour, 2004). Riveros, Newton, and Burgess (2012) expressed the importance of members in the PLCs reflecting upon and evaluating what they are teaching, as well as, the methods being used to teach. PLCs allow educators the opportunity to seek assistance or support with their teaching practices, and this is beneficial to both the novice and veteran educators, allowing grow professionally by linking theory to practice (Burke, 2013). PLCs allow educators to vent with one another concerning issues related to implementing pedagogy and gives experienced educators the opportunity to teach others how to implement pedagogy through modeling (Croft, Coggshall, Dolan, & Powers, 2010). Prytuia (2012) not only addressed the importance of metacognition and reflection, but determined that PLCs are an excellent environment for this to take place.

Jenkins and Yoshimura (2010) stated that it is important to have teachers in the same school engaging in cooperative professional development. Research showed that educators want the opportunity to work and learn from each another with regard to common goals, for example, examining student work and planning instruction (Lieberman & Pointer Mace, 2008).

Professional development should be both relevant and authentic. When the professional development directly addresses the educator's specific needs and concerns, then it is deemed as relevant, or when a teacher can see the connection between their daily responsibilities and the learning experience (Guskey, 2009; Linder, 2011; Tate, 2009). Marzano (2003) stated that the professional development activities experienced by teachers have an impact on student achievement. Marzano also warned that standardized staff development activities that do not allow for effective application would be ineffective in changing teacher behavior.

Professional development should facilitate learning through the educator's responsibilities and daily activities. It should also involve educators taking time to ponder new ideas and possibilities, and examine the success of their actions through a reflection or evaluation (Tate, 2009). Improving teaching practices should be the concentrated goal of all professional development (Kuijpers, Houtveen, & Wubbels, 2010). Effective professional development takes place when principals maintain an organized school environment, consider both educator and student data when planning workshops, listens to the educators' concerns, and lead educators by providing them with meaningful and continuous feedback (Johnson, Kraft, & Papay, 2012; Lutrick & Szabo, 2012; Marzano, 2003).

Schools have had to design professional developments that address their own individual need, due to lack of funds available in school budgets. There are factors that are important in crafting a successful professional development program (Darling-Hammond, 2005; Kelly, 2012). One critical factor is the understanding that professional development is essential to teacher retention and growth and that all educators need to

participate in these programs. The program should offer choices to ensure individual needs are being met and provide valuable experiences to the teachers involved (Easton, 2008; Kelly, 2012). Educators' professional development should be continual, which consists of coherence, contact hours, and duration. Research showed that changes and learning in educational practices includes a recurring procedure that takes place over a process of time (Lieberman & Pointer Mace, 2008). When educators engage in physical, cognitive, and emotional activities such as problem solving, sharing, and discussion, this is when professional development is active (Lieberman & Pointer Mace, 2008).

According to Guskey (2009), changes from a professional development typically may take 3 to 5 years. Educators may require months or years to move from their own individual fears about a new way to plan, implement, and manage concerns intended at facilitating student academic requirements (Loucks-Horsley & Stiegelbauer, 1991; Peled, 2010; Walker, 2007). When professional development is linked to clear goals such as, a school's improvement plan or the state's learning standards, it is understood by educators and perceived as a valued learning experience (Baeder, 2010; King & Newmann, 2004). This perception may possibly aid educators in changing their teaching practice to positively affect student academic outcomes. To promote a successful professional learning program, all educators should participate and be trained, so that all members are engaged in the learning process.

Culturally Relevant Pedagogy

Culturally relevant pedagogy is a term that was created by Gloria Ladson-Billings (1994) to define "a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes."

Culturally relevant pedagogy uses the backgrounds, experiences and knowledge of the students to guide the educator's lessons and methodology (Sleeter, 2011). Culturally relevant pedagogy basically means that educators build a bridge between students' school lives and home, while still meeting the expectations of the district and state objective requirements. Educators have the responsibility for teaching their students and for making sure that they all learn. Therefore, educators must utilize their knowledge of their students' backgrounds and integrate this knowledge into quality learning experiences.

When educators plan for successful learning, they make an effort to plan for classroom experiences where all learners can be reached at various points throughout the learning experiences (Rothstein-Fisch, & Trumbull, 2008). Culturally responsive pedagogy includes integrating into learning experiences components of what is known about the students' knowledge of their own culture, students' previous experiences in their current living situations, and the learning styles of diverse students (Gay, 2006). When educators utilize a culturally relevant pedagogy in their classrooms, by using familiar contexts that trigger prior experiences or cultural knowledge, they empower their African American students to engage in learning (Ensign, 2003; Hefflin, 2002; Ladson-Billings, 1995).

Educators help their students achieve academic success while developing or maintaining their culture. This type of teaching relies on the educator, the instructional strategies and the content used to teach the lesson objectives. The current mathematical pedagogy has been associated with Eurocentric instructions and does not necessarily include the African American experience (Howard & Terry, 2011; Tate, 1995). Therefore, African American students need their interests and experiences that are

supported by those who promote culturally relevant pedagogy, built into the curriculum and pedagogy (Ladson-Billings, 1995; Tate, 1995). When educators craft activities based on students' interests and experiences, they are not only extracting prior knowledge but also give students incentives to learn the objectives in a relevant and engaging manner. Cultural relevancy starts with the educator's own perception as well as those of his/her students.

According to Richards, Brown, and Forde (2007) culturally relevant pedagogy comprises three dimensions: (a) instructional, which includes materials, strategies, and activities that form the basis of instruction, (b) institutional, which reflects the administration and its policies and values, and (c) personal which refers to the cognitive and emotional processes teachers must engage in to become culturally responsive. These three dimensions significantly interact in the teaching and learning process and are critical to understanding the effectiveness of culturally responsive pedagogy. According to Ladson-Billings (1995) five perceptions impact teachers actions with students, especially those students of color: (a) the belief that all students can succeed academically, (b) the understanding of their teaching process, (c) their self-perception as being a part of the community, (d) the belief that their profession is a service to the community, and (e) their perception that they are pulling knowledge out of students verses pouring knowledge into students. Educator's interaction with their students is also a part of culturally relevant pedagogy. These educators will maintain strong and active relationships with their students by connecting with them and by creating a community of learners.

In this type of pedagogy students are not in competition with each other, but instead they are collaborating with each other, because these educators hold high expectations for all students. The tasks that are created by educators require shared responsibilities between both students and educators to ensure that all students are learning. The educators promote students' responsibility to learn and a sense community, by insisting that all succeed. The students work together to boost and support the success of all students (Ladson-Billings, 1995; Zientek & Thompson, 2010).

Another area that influences how educators become culturally relevant is their knowledge perception. Those educators who are more critical about the knowledge they accept as legitimate, and believe knowledge is socially constructed are more likely to involve students in doing what is relevant to those students' lives (Brown, 2012; Evans, 2011). By doing this, students feel that their teacher's acceptance, gives their knowledge as sense of validation. When teachers are passionate about their subject or lesson content, they are creative in their ability to involve students in constructing content knowledge (Brown, 2012). Culturally relevant educators believe that it is imperative to bridge the gap from the students' prior knowledge or experiences to aid in learning (Howard, 2010). In addition, they believe that knowledge is assessed in many different ways, and not always the way the typical textbook assesses. This assessment may not ask the student to provide one correct answer, but allow the student to formulate how the questions should be answered (Bates, Latham, & Kim, 2011; Briley, 2012; Ladson-Billings, 1995).

According to Martin (2009) mathematics has maintained negative stereotypes of African American students. He reported that the way African Americans students are educated in mathematics strategically, excludes them from higher mathematics and all

those job opportunities which requires higher mathematics skills. When teachers utilize culturally relevant pedagogy to connect and validate their students' culture in the elementary years, those teachers may facilitate the prevention in this destructive pattern.

Differential Learning

A strategy that is utilized to encourage teachers to develop classrooms where students' varied learning abilities are revealed and observed is through differentiated instruction (Tomlinson, 2005). Because of the diversity of students in U.S. classrooms that has consistently increased over the past decade, this method is especially important (Tomlinson, 2005). Learning styles often proves to be a challenge for teachers due to the growth in diversity, and with the inception of the NCLB this challenge grew (Logan, 2011).

According to Smit and Humpert (2012), differentiated instruction is a strategy that provides a variety of means to obtain the objective that students can learn effectively. The goal of differentiated instruction is to allow students to learn in the best environment utilizing various interests, and assignments (Levy, 2008). According to Smit and Humpert (2012) teachers who facilitate the use of differentiated instruction in their classrooms allow their students to grow academically in an inviting environment and with confidence. Tomlinson, (2012) stated that utilizing differentiated instruction is today's classroom strategy is a positive addition, especially in mathematical education. Differentiated instruction is bases for which a teacher could create lessons for their diverse learners (Tomlinson & McTighe, 2006).

Differentiated instruction is a strategy of instruction with the purpose of making certain teachers focus on the techniques that will ensure learning for various students

(Tomlinson & McTighe, 2006). Because many students struggle with learning mathematics, and to ensure student success for all, it is imperative that teachers utilize differentiate instruction in their classrooms (Berch & Mazzocco, 2007). In order to effectively facilitate differentiated instruction teachers should embrace, accept, and plan for a diverse body of students along with their individual differences (Alt, 2004). Ireh and Ogo (2010) listed several classroom differentiated instruction characteristics: (a) the engagement of students with multiple learning instruction methods, (b) instead of competing with other students, students compete against themselves, and (c) instruction adjustment according to individual student progress. When a teacher utilizes the strategy of differentiated instruction they take on the role of a diagnostician, and propose the best possible learning instruction for individual students (Tomlinson et al., 2003).

According to Alt (2004) if students were afforded the opportunity to be taught in ways that were more responsive to their own interests, learning profile and ability levels, they would find greater academic success and satisfaction in school. Teachers can utilize differentiated instructions for student achievement through the usage of the following components: (a) What do you want the students to learn? (b) Where will learning take place? (c) How will you get them to learn it?, and (d) What the product or results of the students' interaction will be?. This type of strategy has been used and shown reading growth in pull-out programs, and school are now are utilizing it in math (Brighton & Wiley, 2012). This strategy is an enticing option for administrators and teachers, because of the appeal to multiple student abilities and learning styles without the need for more staff or instructional support sources (Tomlinson, 2004).

The National Assessment Governing Board (NAGB) inquired in to what was essential to increase waning math achievement and after much discussion, a decision to transform the framework of mathematics was made (Driscoll, 2008). In the mathematical education area there has been an ongoing debate between those educators who advocate continuous math fact drills and those who are proponents of a students' complete understanding of objects as a way of student learning (Driscoll, 2008). This debate can be put to rest when educators understand both approaches can be incorporated to lead to lasting student success (Driscoll, 2008). A strategy that incorporates math differentiated instruction, based upon student math readiness, will address what African American students need academically.

African American students' achievement in math is declining (Vannerman, Hamilton, Anderson, & Rahman, 2009). African American students who are only receiving a surface level of math learning is a great concern; in other words the students understand some concepts, but are not able to extend further on that knowledge (Driscoll, 2008). A great deal of preparation is required for differentiated instruction, because teachers will need to adapt lesson plans, continual assess, and reassess to meet the needs of every student (Grimes & Stevens, 2009). Although it can be rewarding for both the teacher and student, it can be time consuming.

An area of struggle for African American students is the traditional mathematical approach which does not take in account for the diverse learning styles of students. The design of the traditional mathematical approach is for the student to listen to the lesson, take notes on the lesson, and apply any learning that was comprehended from the lesson. According to Johnson (2010) this method does not adjust for the learning styles of

African American students. When educators recognize and understand the various learning styles, students have less math anxiety, especially the African American student (Jackson and Wilson, 2012). According to Driscoll (2008), researchers have found that the effects of differentiation instructional methods, in mathematic classrooms on student achievement as measured by standardized tests, is benefiting students in mathematical preparation to enter into the collegiate arena or into the working world.

Mastery Learning

Bloom (1968) was first to introduce mastery learning. The objective of mastery learning is for all students to obtain mastery in learning concepts before moving to the next set of concepts. Bloom addressed the concern that not all students were having successful educational experiences, and that all students must be presented with the opportunity to learn. Bloom believed that the mastery of skills before moving on to a new skill set is a way to afford students with the opportunity for learning success.

Mastery learning can be used to teach all grade level content in order to ensure the success of all students. Research addresses mastery learning effectiveness (Zimmerman & Dibenedetto, 2008). According to Senko, Hulleman, and Harackiewicz (2011) there are benefits to mastery learning when combined mastery learning goals with performance goals. Mastery learning goals allow for the mastery of the objectives the teachers deem important, and performance goals allow for students to explore and learn the objectives that interests them. When these two goals are effectively combined together, the students should obtain a deeper understanding in the objective they need to learn as well as the objective that interests them.

According to Guskey (2007), mastery learning is a way to close achievement gaps, by allowing for a form of differentiation that each student gets the time needed to master the learning objectives. When students do not master the learning objectives in the original time frame, students are given specific activities or corrective work designed to help them achieve mastery, such as, different textbooks, alternative materials, or computerized instructional lessons (Guskey, 2007). Teaching mastery learning in mathematics is a more effective and lasting strategy in increasing mathematics fluency and accuracy (Mong & Mong, 2010). Students' mathematics accuracy and fluency increase is an important foundational component.

Implementation

In Section 2 of this project study, research findings were summarized and recommendations were made on how this one elementary school could address factors surrounding narrowing the mathematical achievement gap between fourth grade African American and Latino students. This project was designed to address factors that were reported by teachers and were observed during the data collection process. This section describes the plan for implantation of the project which includes needed resources descriptions, potential barriers, roles and responsibilities, evaluation measures, and implications for social change.

Administration will work with the math skills specialist and the fourth grade math teachers throughout the school year. Administration, the math skills specialist, and the grade chairperson (fourth grade math teacher), will collaborate on identifying topics for in-house workshops during PLC time. The teachers will explore hands-on practices for increasing teachers' culturally relevant pedagogy within the classrooms. Administration,

the math skills specialist, and the fourth grade chairperson will review data reports from the previous year along with each fourth grade math teacher at the beginning of the school year. Based upon the reviewed data professional development workshop activities will be developed. The data reports will consist of a third and fourth grade district benchmark math scores as well as state assessment scores for the previous year. After reviewing of the data reports, administration, the math skills specialist, and the fourth grade chairperson will collaborate to plan workshops for monthly professional development sessions. Workshops will focus on specific areas of improvement based on data. The fourth grade math teachers will practice strategies that include differentiating and mastery learning, taught in the professional development workshops, and discuss any issues that occurred with implementation those new strategies.

Potential Resources and Existing Supports

To implement this professional development plan, the training would begin when the teachers return back to work for the new school year, prior to students' arrival, during preplanning days, and continue throughout the school year during the PLC days , which are already set aside in the school calendar by the school campus. Educators will need to come to the PLCs prepared with their classroom objectives, because during the professional developments they will be required to create cultural relevant pedagogy math lessons and strategies that include differentiating and mastery learning, along with assessments that are based upon the state's objectives they are required to teach. The fourth grade math educators will also need the campus, district, and prior year's state's grade level assessments to utilize for reference. These assessments are created by the campus, district, and state for teachers to use. In order to ensure a level of mathematical

achievement comparable to the level expected by the campus, district, and the state, educators should use these assessments as a model.

Potential Barriers

There are potential barriers to this professional development plan. One potential barrier is teachers' attitude. When new polices or procedures are presented to teachers it is often meet with resistance. The professional development plan may be perceived as one thing more to their already full schedule that has to be done. Another potential barrier is sufficient time. Time is a factor in implementing new polices or procedures. The fourth grade teachers would need to be willing to allocate time to create the pre and post-assessments for students. They would also need to avail themselves to meet and collaborate with their peers for support.

The issue of teachers' attitude may be difficult to combat. The teachers will have to buy into the plan and understand the necessity of cultural relevant pedagogy, through the use of strategies that include differentiating, and mastery learning as factor in narrowing the fourth grade African American students' mathematical achievement gaps. One way to possibly combat this issue is to allow the fourth grade math teachers to benchmark other schools in and out of the district where these strategies are being utilized. If the teachers can actually see the process at work, they may be more willing to embrace the changes.

Another way to possibly combat teachers' attitude would be to selectively invite teachers to participate in the professional development. Invite those teachers to participate who are receptive to the plan. However, to eliminate the potential barrier of sufficient time, teachers could be given time during PLC time to collaborate on lessons

and strategies. In addition, the fourth grade math educators are giving a 60 minute conference time each day where they can meet and collaborate with their peers for additional help. This would remove the feeling that teachers had to complete the lessons and formulate strategies on their own time.

Proposal for Implementation and Timetable

The implementation of this professional development plan would take place in one school year. The first sessions would begin during the teachers' back to school planning. This would allow the fourth grade math teachers involved to begin collaborating on learning strategies, as well as pre and post-assessments over those learning and strategies. During the school year, the fourth grade math teachers would have opportunities to meet and work together in order to evaluate the effectiveness of what they have accomplished up to that point and formulate any additional assessments for their learning strategies. Also the fourth grade math teachers would meet with the facilitator of the professional development monthly during the PLC time, and any other time needed by the teacher. By the end of the school year, the fourth grade teachers would meet to evaluate the total effectiveness of the plan and if the plan proves to be beneficial it will continue into the next school year.

Roles and Responsibilities of Administrators, Teachers and Others

I will be responsible for writing and presenting this project study to the school's administration, and offering any assistance needed during the planning and implementation phase. The roles and responsibilities of the administrators would be to organize professional development opportunities, provide resources and support for teachers during planning meetings along with this plan's implementation, provide the

teachers time for the debriefing meetings that follow throughout the year, and monitor the evaluation process. The teachers would be responsible for implementing culturally responsive lessons and strategies by attending the professional development activities, engage in collaborative meetings to design culturally responsive lessons, as well as the debriefing meetings that would be held throughout the year.

Project Evaluation

To evaluate the project study and examine the effectiveness of the professional development, participating teachers will be required to complete an evaluation form each month, located in the detailed plan in Appendix A. Professional development will take place monthly, and the information obtained from the evaluation form will be utilized for planning future professional development workshops. The effectiveness of teachers facilitating culturally relevant pedagogical lessons and strategies to students may be shown through students' classroom, campus, district, and state mandated assessment scores, which will be reviewed throughout the year, as well as, upon the completion of the academic school year. The evaluations will be formative and will provide information for future professional development workshops that aids the growth of culturally relevant pedagogy in classrooms. By the completion of the school year, the fourth grade teachers would meet to evaluate the total effectiveness of the plan, and if the plan proves to be beneficial it will continue into the next school year. Key stakeholders would include participating fourth grade math teachers, the math skill specialist, and school administration.

Implications Including Social Change

Local Community

This project addresses the factors that affect fourth grade African American students' mathematical achievement. There is a mathematical achievement gap and utilizing cultural relevant pedagogy, through the use of strategies that include differentiating and mastery learning will lead to a decrease in this gap, by offering teachers an alternative for teaching fourth grade African American students in a method that will narrow the mathematical gap at this school.

The stakeholders (students, parents, and teachers) have a desire for students to be academically successful. This project will aid fourth grade African American students to become more successful in math. The effective of this project implementation will permit teachers to craft valuable teaching strategies that can be utilized in their classrooms. The result will be fourth grade African American students at this urban elementary school, profiting from an enhanced learning experience. When students obtain success in one level of learning, they will then be equipped for the level next, and poised for success during their academic learning. This is especially critical in mathematics, where objectives regularly build on one another, and by not mastering one objective it can have substantial results. When strategies that support student learning are recognized and incorporated into the curriculum, student academic achievement improves.

Mathematical strategies are beneficial to the student, as well as, the community where that student is educated and resides. When education attainment increases, a stronger community will be able to support the school, and the school will no longer be recognized for their failures, but instead for their success. For African American fourth

grade students in particular, this project provides engaging strategies and activities that will promote mathematical achievement.

When there is change, teachers can begin focusing on improving student learning, as well as, achievement scores. If this project is effective, teachers can stimulate learning within their own grade levels and encourage the usage of new and innovative learning strategies. This project provides a means toward positive social change in the community by adding to the conversation on how to support fourth grade African American students' achievement in math, thereby, enhancing learning and increasing test scores, building stronger relationships within the school, and the local community.

Far-Reaching

This project study has the potential to go beyond this one elementary school, and to benefit other elementary schools in this district. Once African American students begin to demonstrate mathematical success at this elementary school, the project can be used as a model of other schools in the district, as well as, other school districts in the state. This would narrow the mathematical achievement gap between fourth grade African American and Latino students beyond the urban elementary school in south Texas. The overall possible far reaching benefit of narrowing the fourth grade African American students' mathematical achievement gap would be, increasing their chances of making a substantial impact in their communities through greater access to continued education and opportunities for higher paying jobs.

Conclusion

In this section, the project study, a professional development for plan for training on cultural relevant pedagogy, through the use of strategies that include differentiating

and mastery learning was introduced. The rationale for choosing the project was presented with research support. An evaluation plan was presented and implications for the results of the project were also discussed.

Based on the data collection from teacher interviews and classroom observations, the instructional strategies that would be beneficial in impacting fourth grade African American students' academic achievement in math was addressed. The information obtained was utilized to craft campus level professional developments that the fourth grade math teachers acknowledged as helpful for increasing student achievement. Learned practices that create classroom environments that were beneficial in increasing teacher and student growth were identified. This project plan provides educators with a pathway for implementing campus level professional development. This project plan focused on cultural relevant pedagogy, through the use of strategies that include differentiating and mastery learning to narrow the mathematical achievement gap between fourth grade African American and Latino students at one urban elementary school in south Texas.

Section 4, will engage in a summary of this project, reflection, conclusions providing recommendations, commentary, and outline future research and implications for social change.

Section 4: Reflections and Conclusions

Introduction

In Section 3, a project for a professional development to provide for training on culturally relevant pedagogy through the use of strategies that included differentiating and mastery learning was introduced. The purpose of this project study was to address the factors that facilitated the achievement gap between African American and Latino students in an urban elementary school in southwest Texas. In addition, the rationale for choosing this project was presented with research support, along with a discussion on an evaluation plan and implications for the results of the project.

Section 4 provides a study of the project and the process of completing the project. I discuss the limitations and strengths in addressing this educational problem, and I suggest alternative ways to combat the problem in the reflections of this project study. In addition, my leadership, my role as a practitioner, scholarship, project development, and change reflections are discussed in this study. The conclusion provides information about what was learned concerning the factors that facilitated the achievement gap between African American and Latino students in an urban elementary school in southwest Texas. Additionally, it includes the implications for future research.

Project Strengths

The project created in this EdD project study has several strengths. One of the strengths found in this project study was the recognition of the problem regarding factors that contributed to the achievement gap between African American and Latino students in an urban elementary school in southwest Texas. The project study was designed to address the factors that facilitated the achievement gap between African American and

Latino students in an urban elementary school in southwest Texas. Researchers have found that mathematics is a gateway to achievement for students as they transition through life (Lubienski, 2007). Tapping into this problem will aid in decreasing inequality in mathematical opportunities that exists for the population of African Americans (Johnson, 2006; Sasso, 2008; Washington, 2011).

Another strength of this research paper was the recommendation. According to Lingenfelter (2011), the multifaceted nature of educational problems means that educators need to design multifaceted solutions. The strength in the recommendation was the creation of a plan for a professional development that focused on culturally relevant pedagogy, through the use of strategies that included differentiating and mastery learning. This approach addressed factors that are important to the accomplishment of employing a new policy. Effective professional development employs educators to center on the needs of their students (Mizell, 2010). Professional development was a need according to the research conducted in this project.

The research revealed a need for time with peers to devise intervention strategies for African American students when they are not achieving the standards. Educators problem solve and learn together in order to make sure all students achieve success (Mizell, 2010). An additional strength is the professional development (PLC) activities that may fortify the culture of the fourth grade mathematical educators though common planning and on-going collaboration (Croft, Coggshall, Dolan, & Powers, 2010). The project study creates opportunities for fourth grade mathematical educators to build trust and learn from each other within the grade level. The teachers of this grade level will be

provided the opportunities to implement new instructional strategies and step outside of their comfort zone.

The professional development training addressed factors that facilitate narrowing the achievement gap between African American and Latino students in an urban elementary school in southwest Texas. This was done by ensuring that educators understand the importance of and how to formulate classrooms that provide a culturally relevant pedagogy, through the use of strategies that include differentiating and mastery learning, and by allowing PLC time for teachers to work together to craft lessons using these strategies.

Recommendations for Remediation of Limitations

A limitation of this project is time. The educators participating in the professional development will need time to craft lessons. For an entire year of math instruction, 3 days from the professional development is not enough time to craft lessons for mathematics. This means the educators will need time throughout the school year to continue to craft lessons for mathematics using strategies that include differentiating and mastery learning.

In order to remediate this limitation, the school administration will need to make modifications to the staff meeting schedules to allow for the fourth grade mathematical educators to have common planning time throughout the year (Dyer, 2013). At the beginning of the school year, an initial meeting with the mathematical fourth grade chairperson, the math skills specialist, and administration, would need to take place to allot time for the first collection of student data. The fourth grade math educators will need to hold each other responsible and accountable for the planning and the implementation of the instructional strategies (Eison, 2010; McGill, 2013).

Administration, the mathematical skills specialist, and the fourth grade chairperson must be committed to providing time to collect student data from the fourth grade math educators, and to monitoring the progress of the students and the effectiveness of the lessons. Administration and fourth grade mathematical skills specialist must be a supportive resource for the fourth grade math educators during the school year.

Another way to narrow the mathematical achievement gap between fourth grade African American and Latino students would be to provide professional development activities throughout the school year. Crafting professional developments that would provide educators additional mathematics training would be an option. With this type of professional development, the educators would have the opportunity to increase their understanding of mathematics; they would also receive exposure to alternative instructional methods throughout the school year, as well as have more time to collaborate on crafting mathematical lessons.

The foundations of this EdD project study pivots on educators' being able to have collaborative meetings, to engage in learning from each other, and to be able to put in practice the new knowledge obtained on a consistent basis. Small group dialogue offers educators a structure of support, and educators will be more engaged in the learning process when they are afforded the opportunity in the decision making process to determine best practices (Berry, Daughtrey, & Wieder, 2010). In addition, administration must engage early in the process of supporting the implementation of the professional development of this project study through scheduled collaboration to ensure the fourth grade math educators' participation. When educators receive support from administration this provides those educators with another layer of resource support. Administration

should have a clear understanding of what is being discussed during the collaboration meetings, if they are going to hold their educators accountable for instructional strategies (Branch, Hanushek, & Steven, 2013).

Scholarship

Through this journey, I have learned that scholarship is the practice of gaining knowledge (Boyer, 1996; Nicholls, 2008; Stewart &Webster, 2010). This EdD project study and the formulation of this research paper have afforded me the opportunity to present a scholarly position, as well as teaching me a great deal on how to obtain knowledge. I have also learned about the importance of reaching saturation with the literature (Pearson & Pearson, 2007), through the process of conducting two literature views to address the factors that facilitated the achievement gap currently existing between fourth grade African American, and Latino students in an urban elementary school in South Texas.

I presented an accurate reality of the problem under study through gathering multiple perspectives, utilizing multiple databases and search terms, and by engaging in a saturation process. Reaching saturation with the current literature gave me information about mathematical instruction for struggling African American students. The scholarship obtained as a result of my study, will provide information to the mathematical educators at the school of study. Passing on knowledge obtained from engaging in the research process is a goal of scholarship, and the information that I have obtained I will gladly pass on to other mathematical educators and administrators (Brancaccio-Taras, Gardner, Jacob, Miller, & Segura-Totten, 2014).

I have learned not only how to conduct research but also what to do with the research once it has been conducted. It is important, as a leader in education, to continually search for solutions to problems that exist in one's classroom and school. I have also learned the importance of finding reliable work that has already been completed. It is important to search through what has been done in an attempt to find solutions that worked in similar situations and with similar problems (Ranjith, 2011). Scholarship is a life-long process. Life changes therefore, education must change to meet the needs of students. Schools engaging in the scholarship process will allow them to keep up with the transforming world. This research can be used as a guide for possible solutions.

Project Development and Evaluation

Project development is an important component of education. It is important to use research that has already been conducted (Ranjith, 2011). Many times, projects have already been developed to address the issues occurring at a school. Sometimes, however, it is important to conduct original research in order to find solutions specific to the situation. Project development should be the result of research and should focus on a solution for an existing problem (Day-Miller & Easton, 2009). It should also be founded on research-based strategies or methods in order to produce the best results possible.

I have learned that project development and evaluation is most effective when the school's community collaborates in analyzing and developing projects related to educational issues. Evaluation is used to determine the success of a project. There are many different types of evaluation. Guskey (2002) noted five levels of professional development evaluations (a) the reactions of the participants, (b) learning of the

participants, (c) change and organization support, (d) the use of new knowledge and skills by the participants, as well as (e) the learning outcomes of students. Each of these components is important. Of these five levels of evaluation, I chose the three following: the teachers' reactions, the learning of the teachers, and the outcomes of the students. In a professional development designed to increase student achievement, the most important is the learning outcomes. If the students do not achieve the desired improvement, then the professional development needs to be examined more closely to determine how it could be improved, or if it would work at all. However, it is also important to ensure the participants felt the training was worth their time, and they learned what they needed to learn.

Leadership and Change

Leadership is an important role in education (Scott, Coates, & Anderson, 2008). Many people think of leadership as administrators of a school, but teachers can be important leaders in a school as well (Boyd-Dimock & McGree, 2015; Danielson, 2007; Harrison, & Killion, 2007). Whether formally or informally, teachers help build the school's capacity to improve (Berry, et al., 2010).

Administrators understand that they need to utilize the skills of their most effective teachers in order to make sure that they have the greatest impact on student academic growth (Aguilar, 2010; Farr, 2011). Teachers in leadership roles are not just steppingstones for future principals, but they are also fundamentally important roles that should be seen at every school and are essential to creating successful, strong schools (Aguilar, 2010; Farr, 2011). As teachers begin to take on roles of leadership, change begins to occur. When the teachers are involved in making important decisions about

curriculum, instruction, and student achievement, the effects are lasting. This is due, in part, to the feeling of ownership and investment in the decision-making process. The teachers feel empowered and want to do what is best for the students they teach. Also, when the ideas come from other teachers, they are sometimes more readily accepted. This is due in part to teachers having a feeling that sometimes administrators are too far removed from the classroom and do not really remember what it is like to be a classroom teacher.

A leader should include other educational stakeholders in school improvement development plans, provide communication to the stakeholders on the steps of the plan, and provide support to those implementing those plans (Branch, Hanushek, & Steven, 2013). A leader must be able to accept productive feedback from other stakeholders and make the needed changes that are best for the growth of the school. What are best for students should be the bases for administrative decisions that may influence the components of a school's climate.

My journey in this project study has changed me as an educator. I am more confident in my knowledge about mathematical instructional strategies. I was able to obtain that confidence as a result of being able to identify a local educational problem, analyzing the literature concerning that problem, conducting a study, being able to analyze data, and finally crafting a recommendation for change. This process has also given me a greater insight to the fourth grade math educators' frustrations as they endeavor to increase the academic achievement in struggling learners. I feel that it is my responsibility to share the knowledge I have obtained to create change: therefore, I will

provide the findings from this EdD project study to the fourth grade math educators and administrators at the school under study.

Although my recommendations provided in this research paper were scholarly, I realize that my recommendations to address the factors that facilitated the achievement gap between African American and Latino students may not be fitting for this school. If my recommendation is not appropriate for this school, I will work with the fourth grade mathematics educators, as well as and the math skills specialist to develop a viable plan to address the mathematical achievement gaps of the African American students.

Analysis of Self as Scholar

The term scholar invokes the thought of someone who has knowledge concerning specific topics or issues. It is my thought that obtaining the level of a scholar in the field of education is not an easy task, due to student diversity, the unpredictability of human behavior and the complexity of learning. As a scholar, this process mandated numerous hours of reading, data analyzing, about various educational sites. The completion of this project required knowledge about mathematics instructional strategies, computation, problem-solving, working memory, number sense, best practices, cultural relevant pedagogy, mastery learning strategies, and differentiated learning strategies, in order to recommend a solution for increase the mathematical achievement of African American students. Numerous revisions to the final EdD project study were the results of utilizing scholarly peer reviewed articles.

Countless sacrifices were made throughout the years spent learning how to effectively write with clarity. Through this process I improved my ability to prioritize tasks, intrapersonal skill set, organizational skills, and learned to accept as well as

appreciate constructive criticism. The development of this EdD project study was often time consuming, frustrating, but beneficial to process of implementing educational change.

Through this process, I have learned much. I have always loved to learn and strive to implement what I learn with student, and share with my peers. Working on this project has allowed me to grow in knowledge. I have learned how to conduct research, and to find solutions to problems that exist. I have learned to search through research already conducted in order to see if a solution has already been created. Through the review of the literature, I was able to see how over time theories change. I have realized that the education is constantly transforming, and as society changes, students' needs are evolving as well, and what once was beneficial may no longer be effective. Overall, I have grown tremendously. I do, however, still need to work on an issue I have had most of my life as a student and a scholar. I am a procrastinator. Although I have improved somewhat in this area, I still need to work to improve my time-management.

Analysis of Self as Practitioner

As a practitioner, I developed a greater understand of the differences and the commonalities when it comes to teaching adults and children. One must understand that there is a difference between developing educators to facilitate decisions for the development of the school, and developing educators to make educational decisions for students. A collaborative effort must be put forth from all faculty members in order to prepare students to be able to thrive outside of the educational walls in the 21st century. Utilizing outside agencies with large price tags for rendered developmental services is not always necessary to grow as a faculty (Aguilar, 2010; Farr, 2011). Often staff members

are the one tool needed to bring out the best of other staff members. Implementing a structure that is sustainable is the key to longevity in facilitating the growth of individual educators (Berry et al., 2010).

Student achievement is important to me as a practitioner. I find that I want all students to achieve and be successful in all areas of education. Having a passion for African American students, I find it upsetting when decade after decade this race of students continue to lag behind other groups of students in mathematical education. In elementary education, the focus is often on literacy and reading skills. Mathematics continue to be the wave of the future and without the knowledge of how to maneuver through the mathematical maze, African American students will continue to be "left behind." It is also important to build conceptual understanding in mathematics for students to build upon as they continue their education.

I want to be the best possible educator, and I have a desire to be knowledgeable in education. I also have a desire to help other educators become better educators. As a practitioner, I see myself as not only an educator, but also a leader. A leader sees potential in staff members and cultivates that potential into positive change (Aguilar, 2010; Scott et al., 2008). My development as a leader was emphasized through the facilitation of a group of educators in collaborating on a school wide goal, assessing the mathematical needs of the fourth grade level, and developing an action plan to meet those identified needs. I desire to continue to increase my knowledge, and as my knowledge increases, I want to help others learn more.

Analysis of Self as Project Developer

Project development is an area that I would like to improve. Creating the project was, probably, the most challenging component of this study. It required research and analysis of different works in order to create the project. Although I have created lessons of learning for students, creating a professional development activity was out of my comfort zone. Project development is an important aspect of education and projects will continue to be developed to increase student achievement. Project development is preceded by a project study (Day-Miller & Easton, 2009).

Thinking back to my doctoral residency, I am amazed at the progress I made in the process of project development. Time was spent to formulate a problem statement, and although the task was challenging, I was able to find the words to describe an educational problem in a scholarly way. With the prospectus development, I sought to obtain evidence to create a rationale for the educational problem and methods for my qualitative research study. As demanding as the aforementioned first two steps were, the proposal and project development phases presented me with the greatest challenge. I overcame the challenges by relying on Walden's guidelines and rubrics, and analyzing other project studies and research papers to aid my understanding of the process. In addition, I could not have made it without the expert knowledge and valuable advice from my doctoral chairs that empowered me to navigate the project development process successfully. Although I feel that there is still much more to learn about the research process, concept of developing a problem statement, conducting a research study, and formulating a project to address a local problem, I am no longer intimidated by the process.

Potential Impact on Social Change

This EdD project study has potential to impact social change on the local level for fourth grade African American students. In reflecting upon the research that was done and the project that was created, there is a huge potential impact for social change. So many times African American students are left struggling and only gaining parts of the skills they should be learning. This project provides information about the benefits of utilizing cultural relevant pedagogy for African American students.

Culturally relevant pedagogy can provide a classroom environment utilizing research-based practices of differentiated and mastery learning strategies. Through increased exposure of research-based practices, African American students', as well as other students', mathematical achievement can increase (Vega, 2012). Increasing academic achievement on the State of Texas assessments (STAAR) has the potential to provide more opportunities for African American students. The district can also benefit from an increased performance by having this school avoid the ranking of a focus school. This research paper has the potential to spark discussions concerning the current mathematical program, non-instructional practices, and biased thinking, evoking change in educational inequalities for the population of African American students.

I have learned the importance of providing educators with the opportunity to participate in the decision-making process. Educators were given a platform, as well as, the opportunity to voice concerns about student progress through the interview process. The fourth grade math educators wanted to present and discuss their experiences about educational issues. The fourth grade math educators at the school of study want to improve instruction in the classroom, but these educators often work in isolation. I have

learned that educators need time to collaborate with each other in order to grow professionally.

In today's educational climate, it is vital for all students to learn and demonstrate achievement. By incorporating cultural relevant pedagogy, through the use of strategies that include differentiating and mastery learning into their educational program, the African America students will be able to master concepts and skills, and the mathematical achievement gap will close. This will benefit them not only in school, but, hopefully, as they proceed into the working world to become productive members of society, they will have confidence in their ability to be successful.

Implications, Applications, and Directions for Future Research

This EdD project study findings and research paper was intended to motivate more interest about the phenomenon. This project study findings could have implications for the local district and the field of education. This project study recommended utilizing culturally relevant pedagogy through the use of differentiated and learning mastery strategies to create an environment that is conducive to student learning (Mong & Mong, 2010; Sleeter, 2011; Smit & Humpert, 2012). The recommendation included providing educators with professional development on how to implement these strategies, as well as, designated times to collaborate with their peers to prepare lessons and actives using these strategies to improve fourth grade African American students' mathematical achievement.

This study is significant to educators with African American students in the area of mathematics. It provides evidence for the reasons the achievement gap exists and strategies to close that achievement gap. Utilizing a cultural relevant pedagogy, through

the use of strategies that include differentiating and mastery learning will allow all students to achieve mastery before moving on to the next unit of study (Senko et al., 2011; Tomlinson, 2012). Administrators will also find this study significant. Closing the achievement gap among fourth grade African American and Latino students will help them in achieving AYP and meeting growth goals that have been established.

This EdD project study has several applications for future research. It would be interesting to see the growth of the fourth grade math educator's pedagogy after the implementation of this project for a year. The results would not only show the shift from a traditional style classroom practice of stand and lecture practice, to that of one that is focused on high student engagement in the classroom, increased accountability, and shared leadership. After each nine week grading period, an evaluation form of the project would need to be created for the fourth grade teachers to complete. The evaluation form would provide educators the chance to discuss sections of each meeting that they found useful. Reviewing the evaluations could reveal new learning objectives and goals that might aid in the development of the school.

This project applies to the field of education in a broader context as well. Mathematical achievement gaps exist among African American students throughout the country. Provided that this project is truly successful, other schools may be interested in using this method to narrow the mathematical achievement gaps between African American and Latino students. There is not much research on the mathematical achievement gap that exists between African American and Latino students. The major focus of research on achievement gaps is on between African American and White, or Latino and White students. Therefore, much research could be conducted in this area.

One direction would be why is there a growing gap between the two groups, when both groups struggle behind their White counterparts. Another direction future research could take is in conducting a quantitative study to demonstrate the improvement in achievement between African American and Latino and even White students among students when teachers are using cultural relevant pedagogy, through the use of strategies that include differentiating and mastery learning in their classrooms. Additionally, finding schools where there is not an achievement gap among African American and Latino students and examining the methods being used there would be beneficial.

Conclusion

Throughout this process I have learned much. This section explained what I learned about scholarship, project development, and myself as a practitioner. It also included strengths of the project and limitations of the project. Additionally, the implications for social change and future research were included in this section. Finally, I was able to ascertain valuable information concerning factors that influence the achievement gap that exists among African American and Latino students, and the need for teachers to have additional professional development to help narrow or even close that gap.

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Appendix A: Professional Development Plan

Purpose

The purpose of this professional development series is to instruct the fourth grade math teachers of students with African American students with a deficit in mathematical achievement. The fourth grade math teachers will be provided with tools to aid in narrowing the mathematical achievement gap between African American and Latino students, by learning how to implement cultural relevant pedagogy, through the use of strategies that include differentiating learning skills, and mastery learning. The teachers will be introduced to cultural relevant pedagogy and learn to craft various aspects of differentiating and mastery learning lessons, including pre-assessments, formative assessments, parallel assessments, instructional lessons, correctives, and enrichment lessons. Additionally, the teachers will gain knowledge of how to implement differentiating and mastery-learning units within their classrooms in order to narrow the mathematical achievement gaps between African American and Latino students. The purposes of the debriefing sessions, included in the professional development series, are to follow up with the teachers to support the teachers' implementation cultural relevant pedagogy in their classrooms through the use of differentiating and mastery learning lessons and support the creation of additional differentiating and mastery learning units.

Goals

The goals of this professional development series are as follows:

1. To introduce teachers to culturally relevant pedagogy, differentiating and mastery learning.

2. To instruct the teachers how to create culturally relevant classrooms, and differentiating and mastery learning lessons.

3. To instruct teachers how to create differentiating and mastery, assessments, correctives, and enrichment activities

Learning Outcomes

During this professional development series, the teachers will learn:

1. What created culturally relevant, and differentiating and mastery learning is and how to use it in their classrooms.

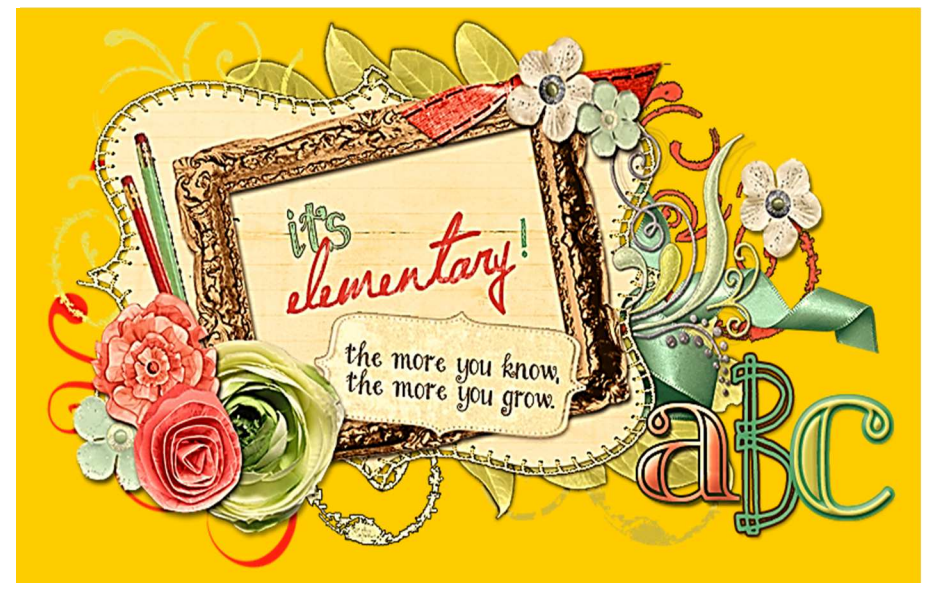
2. How to create culturally relevant classrooms, and differentiating and mastery learning lessons, assessments, correctives, and enrichment activities.

Audience

The primary focus audience will be fourth grade elementary math teachers who teach African American students, and are the home district of the facilitator(s).

Outline of Components

This professional development activity will initially consist of 3 consecutive Saturdays of training. The teachers will learn what the components along with the dimensions of cultural relevant pedagogy, differentiating and mastery learning are and they will have the opportunity to begin creating units of study. They will then take these units of study back to their classrooms and create cultural relevant pedagogy environments by implementing differentiating and mastery learning. The facilitator(s) will be available to assist with the process. After the implementation of the first unit, the teachers and the facilitator(s) will meet again for a debriefing. This will continue during the academic school year.



Math Professional Development

Increasing African American Students' Math Scores

Saturday 1, February 21, 2015 [8:00 a.m. – 3:30]

(Culturally Relevant Pedagogy)

Saturday 2, February 28, 2015 [8:00 a.m. – 3:30]

(Differentiated Learning Instructions)

Agenda

Time	Saturday1	Saturday 2	Saturday 3
8:00-8:15	Introductions by facilitator(s) and teachers.	Introductions of new facilitator(s) and any teachers.	Introductions of new facilitator(s) and any teachers.
8:15-8:30	Discussion of why African American students are not meeting standards.	Review of prior Saturday's learning.	Review of prior Saturday's learning.
8:30-9:00	Read and discuss dimensions of a culturally responsive education research article titled Challenges to Conceptualizing and Actualizing Culturally Relevant Pedagogy: How Viable is the Theory in Classroom Practice?	Read and discuss differentiated learning research article titled Differentiation of Instruction in the Elementary Grades.	Read and discuss Mastery learning research articles titled Mastery-based learning in action, and Formative classroom assessment and Benjamin S. Bloom: theory, research, and implications.
9:00-9:15	Break	Break	Break
9:15-10:30	Presentation: What is a culturally responsive pedagogy?	Presentation: Differentiating instruction for the students' skill levels and interests.	Presentation: What is mastery learning and how can I use it in my classroom?
10:30-11:00	Group Discussion: What do you already do? How can you transform yourself into a culturally responsive teacher?	Group Discussion: Effective grouping strategies.	Group Discussion: Mathematics Instructional Strategies-What are they and how can they be used in mastery lessons?
11:00-12:00	Work Session: Present elements of a culturally responsive classroom.	Work Session: Develop a whole-class lesson plan using flexible groups, centered on a single objective.	Work Session: Create Initial Mastery Lessons.
12:00-1:00	Lunch	Lunch	Lunch
1:00-2:00	Presentation Video: Features of a culturally	Presentation Videos: Fourth grade math	Presentation: What makes a quality

	responsive instructional lesson.	differentiation instruction strategies lessons	assessment?
2:00-3:00	Presentation: Formative assessment strategies. (Teachers will take a 15 minute break at their discretion.)	Identify curriculum goals and the materials to support them, and determine different instructional strategies for teaching the objective. (Teachers will take a 15 minute break at their discretion.)	Determine goals and outcomes for mastery learning unit and create pre-assessment. (Teachers will take a 15 minute break at their discretion.)
3:00-3:30	Wrap-up and evaluation.	Wrap-up and evaluation.	Wrap-up and evaluation.

Saturday 1

Saturday 1 will be divided into 2, 3-hour sessions. The first session will be an introduction to culturally relevant pedagogy and beginning at 8:00 a.m. until 12:00 p.m. The teachers will have the opportunity to learn about the theory and research behind the implementation of culturally relevant teaching. The second session will be on culturally responsive instructional lessons and assessment. Teachers will gain an understanding of the importance of assessments and feedback on the culturally relevant pedagogy process. During the first hour of Session 1, 8:00-9:00, the facilitator(s) and teachers will introduce themselves and be encouraged to think about and discuss, in general, the African American students who have not met the standards in their classes. What are the characteristics of those students? What do they have in common? What are some things they have tried in order to help those students reach the goals that have been set for them? This will be followed by an introduction to culturally relevant pedagogy. It will include research on culturally relevant pedagogy. The teachers will visit the website,

http://ncrel.org/sdrs/areas/issues/content, review and discuss the research articles presented on the site as well as the research article titled Challenges to Conceptualizing and Actualizing Culturally Relevant Pedagogy: How Viable is the Theory in Classroom Practice?. The teachers will be asked to read an article with the other members of their groups. They will note the important ideas from the article they read, including results, components of culturally relevant pedagogy, etc. They will then share these ideas with the rest of the group.

During the second and third hours of Session 1, 9:00-10:30, the facilitator(s) will present a detailed description of what is culturally relevant pedagogy. Facilitator(s) will address what is a culturally responsive pedagogy. Culturally responsive pedagogy is grounded in the belief that a student coming from a diverse cultural and linguistic background can exceed in academia if their experiences, culture, heritage, and language and are used and valued to assist their development and learning. This type of pedagogy focus on implanting caring ethics in educators that serves a diverse student population. This pedagogy supports the use of curricula with cultural diversity and ethnic content, as well as, encourages the use of strategies in communication that builds upon a student's culture. To engage in a culturally relevant pedagogy it requires that a teacher commits to the building of knowledge through sharing power and authority between teacher and student, be courageous enough to give up control of the curriculum, and by challenging the harmonic ideas of what school is and should be.

During the last hour and thirty minutes of Session 1, 10:30-12:00, the teachers will be given the opportunity to discuss what has been learned so far. This includes the implications for use in their classrooms, what they see as a benefit for using culturally

relevant pedagogy, and what they see as the deficits in using culturally relevant pedagogy. There will also be a short time for teachers to ask questions of the facilitator(s).

Session 2 will take place from 1:00 pm to 3:30 pm. This session will focus on the instructional lessons and assessment components of culturally relevant pedagogy. The facilitator(s) will review the importance of having quality instructional lessons and assessments and giving feedback. The teachers will have the opportunity to view a culturally relevant instructional lesson video and to create an assessment.

During the first hour, from 1:00-2:00, the focus will be on instructional lessons. The teachers will have the opportunity to view a culturally relevant instructional lesson video and to create an assessment based upon the video.

From 2:00-3:00, teachers will choose the math objective of their choice and craft a culturally relevant lesson and assessment. When crafting the lesson teacher must be sure that the lesson is responsive to student diversity, and is conducive to the students' academic and cultural needs. Before the teachers begin writing the assessment, the facilitator(s) will instruct them to use various types of questions. They should not all be selected-response or short answer questions, but both should be used. The facilitator will also ask them to determine if an extended-response question would be appropriate for the unit they are creating. If so, the teachers should also include an extended-response question. Then, teachers will determine the final learning outcomes and goals for students and base the assessment on those outcomes and goals. Teachers will write their own questions, or they may choose some questions from previous assessments they have

given on the topic they choose for their unit. The facilitator(s) will monitor the teacher's progress and answer any questions that may arise during the work period.

As a wrap-up for the day from 3:00-3:30, the facilitator(s) will bring the teachers back together. During this last 30 minute sessions, the facilitator will review what has been learned during the first day and ask teachers if they have any questions. The facilitator(s) will also give the teachers the evaluation form. Once teachers have completed the evaluation, they will be dismissed.

Saturday 2

Session 1 on Saturday 2 will take place from 8:00-12:00 and will focus on differentiated instructions. The first session will be an introduction to differentiated instructions beginning at 8:00 a.m. until 12:00 p.m. The teacher will have the opportunity to learn about the theory and research behind the implementation of differentiated instructions. The second session will be on differentiated instructions strategies. During the first hour of Session 1, 8:00-9:00, the facilitator(s) and teachers will review prior Saturday's lesson and introduction to differentiated instructions. It will include research on differentiated instructions. The teachers will visit the website, http://www.glencoe.com, and review the research articles presented on the site, as well as the research article titled Differentiation of Instruction in the Elementary Grades. The teachers will be asked to read an article with the other members of their groups. They will note the important ideas from the article they read, including results, components of differentiated instructions. They will then share these ideas with the rest of the group.

During the second and third hours of Session 1, 9:00-10:30, the facilitator(s) will present a detailed description of what differentiated instructions looks like. Differentiated

instruction operates on the premises that perform better academically when they make connections between their diverse experiences and interests and the curriculum, and when they are nudged somewhat beyond where they feel they are able to perform without aid. For those students not performing on grade level, and for students performing above grade level, this would look different. Instead of just "focusing on the middle" by providing all students in classroom one type of instruction, teachers should couple their students' learning preferences, interests, and abilities with differentiated instruction class activities, tasks, along with assessments.

During the last hour and thirty minutes of Session 1, 10:30-12:00, the teachers will be given the opportunity to discuss what has been learned so far. This includes the implications for effective grouping strategies in their classrooms. There will also be a short time for teachers to ask questions of the facilitator(s). Depending upon the objective, teachers will need to know where each student should begin their study of a given objective and this is done through a pre-assessment. Teachers should motivate thinking at different levels of Bloom's taxonomy by utilizing a range of methods to delivery instruction addressing diverse styles of learning. Teachers will be given materials which focusing on diverse learning abilities and preferences. Teachers will need to create activities that focuses on kinesthetic, visual, and auditory learners, crate stations for independent learning tasks, craft activities varying in levels of difficulty and a degree of higher level thinking is required. Teachers should avail themselves to utilizing flexible grouping to group and regroup students based on: subject matter, what the student's capable of, and the results of the student's assessment. Flexible grouping is a way of putting students together for instruction delivering. Sometime this may take the

form of a whole-group class, a small group, or with a peer partner. This type grouping produces short-term groups that can last a month, a week, or even an hour. Flexible grouping is not a permanent group, but it is a way for students to work together in a various ways contingent upon the learning outcomes and the activity on a short-term bases. To obtain success through differentiate instruction's flexible grouping, teachers must know the student learning process. Students' frequent movement among groups based on their specific needs, will encourage learning outcomes.

Session 2 will take place from 1:00 pm to 3:30 pm. This session will focus on differentiated instructions strategies. The facilitator(s) will review the importance of having differentiated instructions strategies. During the first hour, from 1:00-2:00, the focus will be differentiated instructions strategies. The teachers will have the opportunity to view several fourth grade math differentiated instructions strategies lessons videos and discuss the strategies utilized.

From 2:00-3:00, the teachers will engage in a study of the objectives and the instructional goals for math created by the State of Texas' department of education also known as Texas Essential Knowledge and Skills (TEKS). The teacher will need to pinpoint the major objectives, and skills the students should learn. They will then select a two skills or objectives that can be taught at various levels of difficulty. Then brainstorm, preferably with a peer, ideas for activities, tasks, material and any other needed resources, along with an assessment that address a specific objective or skill. The teacher will use various assessment strategies, including open-ended assessment and performance-based, afford students the opportunity to choose projects that reflect a variety of learning styles and interests, as well as make assessment an interactive, ongoing process. The

facilitator(s) will monitor the teachers' progress and answer any questions that may arise during the work period.

As a wrap-up for the day from 3:00-3:30, the facilitator(s) will bring the teachers back together. During this last 30 minute sessions, the facilitator will review what has been learned during the second Saturday and ask teachers if they have any questions. The facilitator(s) will also give the teachers the evaluation form. Once teachers have completed the evaluation, they will be dismissed.

Saturday 3

Saturday 3 will be divided into 2, 3-hour sessions. The first session will be an introduction to mastery learning beginning at 8:00 a.m. until 12:00 p.m. Teacher will have the opportunity to learn about the theory and research behind the implementation of mastery learning. The second session will be on assessment and mastery learning. Teachers will understand the importance of assessment and feedback in the mastery learning process.

During the first hour of Session 1, 8:00-9:00, the During the first hour of Session 1, 8:00-9:00, the facilitator(s) and teachers will review prior Saturday's lesson facilitator(s) which will be followed by an introduction to mastery learning. It will include research on mastery learning. The teachers will visit the website, http://mastery-learning.com/, and review the research articles presented on the site, as well as the research articles titled Mastery-based learning in action, and Formative classroom assessment and Benjamin S. Bloom: theory, research, and implications. The teachers will be asked to read an article with the other members of their groups. They will note the important ideas from the article they read, including results, components of mastery

learning, how mastery learning works, etc. They will then share these ideas with the rest of the group.

During the second and third hours of Session 1, 9:00-10:30, the facilitator(s) will present a detailed description of the steps in mastery learning. The first step is giving a diagnostic pre-assessment. Before the unit can begin, teachers must ensure the students have the background knowledge to be successful. Next, the teacher must determine what will be considered mastery. What achievement level must the students reach in order to be considered for enrichment? What achievement level will require the student to be given correctives? The teachers must determine how the initial instruction will be delivered, deliver the instruction, and give the formative assessment. Once the teacher has graded the formative assessment, the teacher will then break the students into two groups. The first is the enrichment group and the second is the corrective group. Lessons must be designed for the students in both groups. The enrichment group should receive assignments that will further their knowledge of the content in the unit of instruction. The correctives group receives teacher directed instruction in order to help them achieve mastery. It is important to note that different instructional methods should be used for correctives. Additionally, formatives can come in many forms and do not necessarily have to be paper-pencil tests. Once all students have received their correctives, the teacher will give a second formative assessment. This cycle will continue until all students reach mastery.

During the last hour and thirty minutes of Session 1, 10:30-12:00, the teachers will be given the opportunity to discuss what has been learned so far. This includes the implications for use in their classrooms, what they see as a benefit for using mastery

learning, and what they see as the deficits in using mastery learning. There will also be a short time for teachers to ask questions of the facilitator.

Session 2 will take place from 1:00 pm to 3:30 pm. This session will focus on the assessment component of mastery learning. The facilitator(s) will review the importance of having quality assessments and giving feedback during the mastery learning units. The teachers will have the opportunity to choose a mastery learning unit focus and to create a pre-assessment for the unit.

During the first hour, from 1:00-2:00, the focus will be on creating quality assessments. The facilitator(s) will review and instruct the teachers on what makes a quality assessment. This will include instruction on different types of questions, selected response, short answer, and extended response and the need for using each different type of questions in order for students to truly demonstrate their knowledge of the topic about which they are learning. The facilitator will also inform the instructors of the importance of using different types of questions throughout the assessments they create. When discussing selected-response questions, the facilitator will note the importance of creating quality distracters. The distracters should be of similar length and should be plausible answers, so as not to make the correct answer obvious to the students taking the test. The short answer responses, such as fill-in-the-blank, should be worded so that the blank is at the end of the stem, requiring students to read the entire stem before answering. Other types of short answer responses, including those that require students to answer in one or two sentences, should be carefully examined to ensure students can easily understand what is being asked of them. Any extended-response questions should be as specific as possible as to what the teacher wants the student to write and should give a rubric or

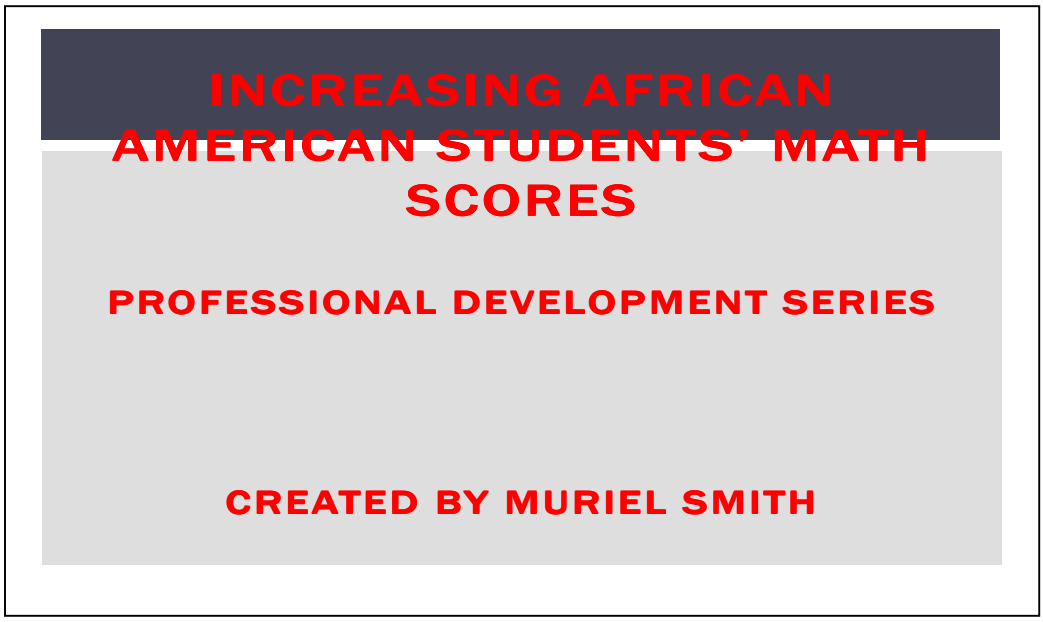
checklist in order to ensure the students know exactly what is expected. However, with mathematics assessments, there will not be many, if any, extended-response questions.

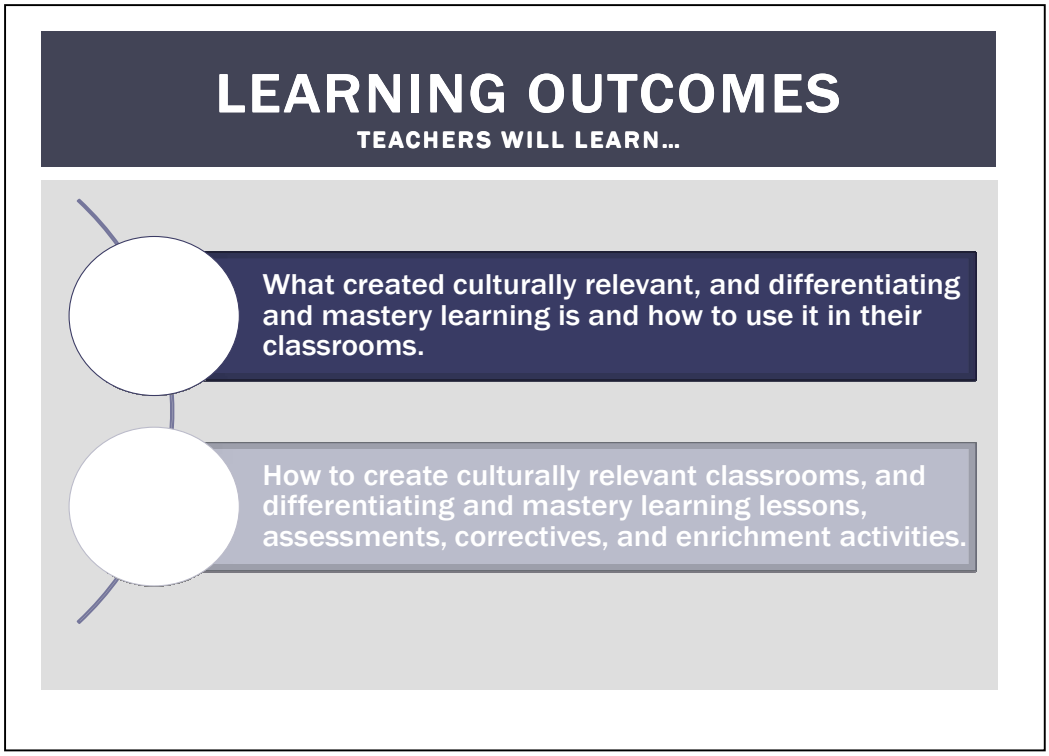
From 1:30-3:00, teachers will choose the topic of their first mastery learning unit and begin creating a pretest. Before the teachers begin writing the assessment, the facilitator will instruct them to use various types of questions. They should not all be selected-response or short answer questions, but both should be used. The facilitator will also ask them to determine if an extended-response question would be appropriate for the unit they are creating. If so, the teachers should also include an extended-response question. Then, teachers will determine the final learning outcomes and goals for students and base the pre-assessment on those outcomes and goals. Teachers will write their own questions, or they may choose some questions from previous assessments they have given on the topic they choose for their unit. The facilitator will monitor the teacher's progress and answer any questions that may arise during the work period.

As a wrap-up for the day from 3:00-3:30, the facilitator will bring the teachers back together. During this last 30 minute sessions, the facilitator will review what has been learned during the first day and ask teachers if they have any questions. The teachers will also be asked to be thinking ahead about the way they will specifically break down the unit into workable mastery lessons that last 30-45 minutes. From 3:00-3:30, the teachers and facilitator will have a final discussion over what has been learned over the Saturdays. Teachers may pose questions and comments regarding mastery learning and the training they received on culturally relevant pedagogy and differentiated learning instructions. The facilitator(s) will also give the teachers the evaluation form. Once teachers have completed the evaluation, they will be dismissed.

PowerPoint Presentation

The following slides will be used during Session 1 of Day 1





The two above slides will be used to introduce the professional development series and to express the learning outcomes of this series to the participants.

What is Culturally Responsive Teaching?

the **method** teachers utilize to deliver instruction, through the use curricular materials, formulating educational choices, which include student corrective actions, and including students and their families in the learning process.

the **eyes** through which educators see their students and their learning.

how teachers **listen** to the ways their students' express their desires and needs.

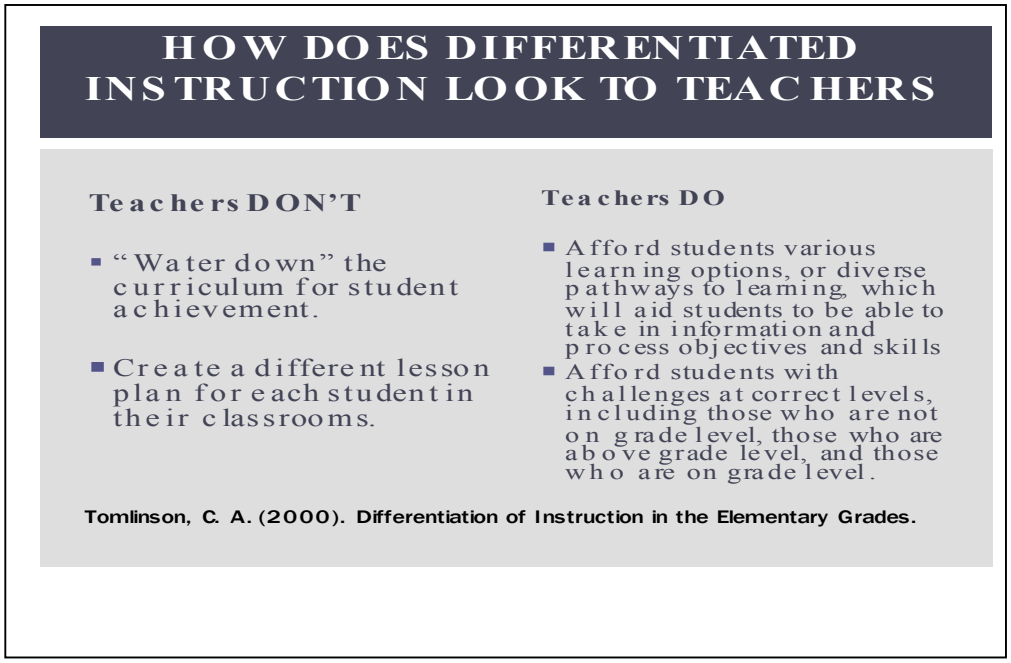
Young, E. (2010). Challenges to Conceptualizing and Actualizing Culturally Relevant Pedagogy: How Viable Is the Theory in Classroom Practice?

TALK AMONGST YOURSELVES

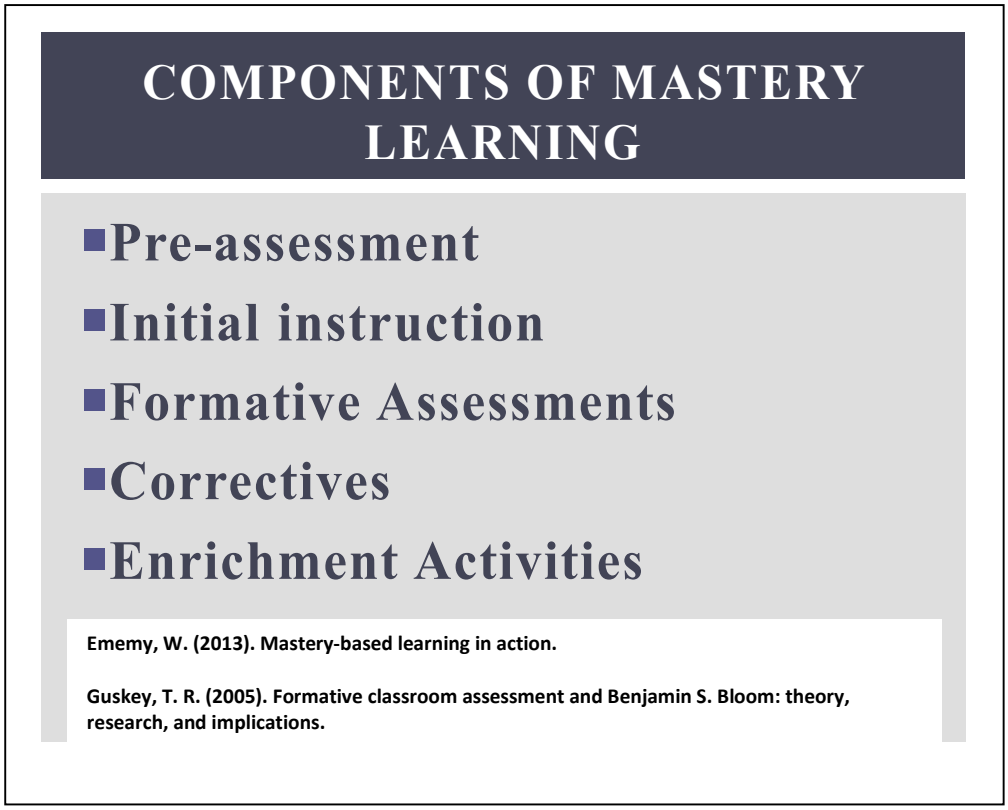
- Think about two students African American students from your classroom who did not achieve the success you desired for them.
- Share the following information with your table group.
  - What characteristics did they have in common?
  - What skills did they lack?
  - What do you feel kept them from being successful?

The above two slides along with the article titled Challenges to Conceptualizing and Actualizing Culturally Relevant Pedagogy: How Viable Is the Theory in Classroom Practice? by Evelyn Young, along with articles from the designated website, will be presented on Session 1 on Saturday 1 during the introduction to introduce culturally

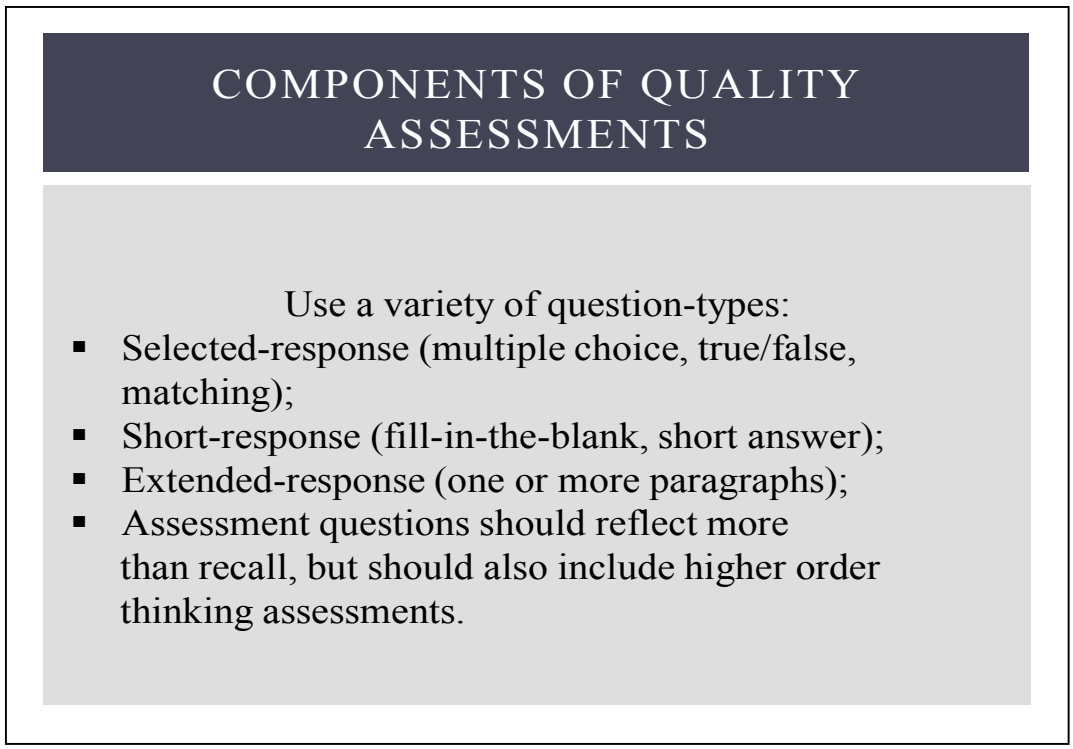
relevant pedagogy and to get the teachers to think about students who have not been successful. It will also allow the teachers a chance to share with their peers.



The above slide along with the article titled Differentiation of Instruction in the Elementary Grades by Carol Ann Tomlinson, along with articles from the designated website, will be presented during the Session 2 of Saturday 2 to address what differentiated instruction looks like.



The above slide along with articles titled Mastery-based Learning in Action by William Ememy, and Formative classroom assessment and Benjamin S. Bloom: theory, research, and implications by Thomas R. Guskey, along with articles from the designated website, will be used during Session 1 of Saturday 3. This slide will address the components of the mastery learning.



The above slide along with the article titled Lessons of Mastery Learning by Thomas R. Guskey will be used during Session 2 of Saturday 3. This slide will address the components of the mastery learning assessment.

Professional Development Evaluation Form

Topic:

Facilitator(s):

Date of Professional Development Workshop:

1. Please circle YES or NO to the following questions below:

A	Did you find the workshop helpful?	YES	NO
B	Did the workshop meet your needs?	YES	NO
C	Did you find the workshop too extensive for the time allocated?	YES	NO
D	Was the information too technical?	YES	NO
E	Did you find the facilitator satisfactory?	YES	NO
F	Did you find on-going sessions beneficial for the year?	YES	NO

2. Which aspects of the workshop have you found most useful?

3. Which aspects of the workshop did you find least useful?

4. What would you like to see discussed in a future workshop?

Appendix B: Letter of Cooperation

Dear [redacted],

Wednesday 22, 2014

As you know, I am a current Ed. D student at Walden University. My specialization area is in Administrator Leadership for Teaching and Learning. I am interested in conducting a qualitative doctoral study at your elementary campus in the district, to examine what factors may contribute to narrowing the mathematic achievement gap, between 4th grade African American and Latino students at your campus. I seek to understand the teachers' perspective of what mathematical strategies along with staff developments, could be implemented to narrow the achievement gap. As the building principal, I would appreciate you granting me the permission to conduct this qualitative doctoral study at your elementary campus. If granted permission, the 4th grade math teachers along with the 4th grade math skills specialist will be invited to participate in interviews, classroom observations, and provide copies of math lesson plans, RTI plans, as well as, campus math plans. Participants will not receive benefits for choosing to take part in this study nor, will there be any penalties for not participating.

The interviews will last between 30-45 minutes with each participant in the school's conference room after school, and will be recorded. The scheduling of classroom observations will be at the convenience of the classroom teachers and math skills specialist, and the dates as well as the times will be forwarded to you prior to the observations. Classroom observations with the teachers will last approximately 45 minutes. On the days of scheduled classroom observations, I am requesting that any dyslexia students in that class be placed into another math classroom for that time period. This will allow for those students to still receive their daily math lesson, and help remove any possible researcher bias from the observations. I will be a passive observer by keeping my distance in an area of the classroom that will neither hinder nor distract from the class activities, and observe individual(s), as well as, the instructional and pedagogical strategies used. Both the classroom observations and interviews will be scheduled at the teachers' and skills specialist convenience. I agree to submit a copy of the final study upon completion. Choosing to participate in the study is on a voluntary basis. There will not be adverse reactions for choosing not to participate in the study. Measures will be taken to ensure anonymity for the school district, school site, and participants. Security procedures will be taken to ensure that all information remain confidential. I look forward to hearing your decision to continue with this qualitative research study.

Sincerely,

Muriel Smith

Muriel Smith, Doctoral Candidate
Walden University

Appendix C: Artifact/Document Review Protocol

Artifact/Document Title:_____ Date:_____

Artifact/Document Description:

1. Which research question does this artifact document help to answer?

____ What teacher factors, as described by fourth grade math teachers of African American students, contribute to the narrowing of the mathematics achievement gap between fourth grade African American and Latino students?

____ What instructional and pedagogical strategies are utilized in the classroom and in instructional planning to address the mathematical achievement gap between African American and Latino students?

2. This is a ___ Teacher, ___ School Artifact/Document.

Appendix D: Classroom Observation Protocol

Observers:_____ Pseudonym ID:_____

Date: _____ Time started: _____ Time Ended: _____ Total Time: _____

Lesson Objective/Activity:_____

# of Students:_____

Observation/ Objective Observation	**Notes to Self**
Teacher Was:	
Student Was:	
Instructional and Pedagogical Strategies Used:	

Appendix E: Interview Questions for Participants

Name and Position: _____ Pseudonym: _____

Date: _____ Time started: _____ Time Ended: _____ Total Time: _____

The goal of this project study is to examine the fourth grade math teachers' perspective on the factors that have contributed to the African American students' mathematical achievement gaps.

Interview questions:

1. Describe what you see as the mathematics achievement gap between African American and Latino students in your grade class.

2. What factors do you think contribute to the mathematics achievement gap between African American and Latino students at this school?

3. Has your knowledge of the achievement gap affected the way you teach mathematics? If so, explain. If not, why not?

4. What have you done to narrow the mathematics achievement gap in your classroom? Has it been effective? What data do you have to support this claim?

5. Do you feel you would benefit from additional professional development in the area of mathematics, specifically instructional and pedagogical strategies? Explain.

6. What do you think can be done at this campus to address the effects of the mathematics achievement gap between the fourth grade African American and Latino students?

7. What other insights would you like to share about how the school can narrow the mathematics achievement gap between African American and Latino students?

Interviewer's Notes:

Appendix F: Confidentiality Agreement

Name of Signer:

During the course of my activity in collecting data for this research: "Narrowing the Mathematical Achievement Gap Among African American and Latino Students." I will have access to information, which is confidential and should not be disclosed. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant.

By signing this Confidentiality Agreement I acknowledge and agree that:

1. I will not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
3. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
4. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
5. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
6. I understand that violation of this agreement will have legal implications.
7. I will only access or use systems or devices I'm officially authorized to access and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions stated above.

Signature: **Date:**

Appendix G: CONSENT FORM

You are invited to take part in a research study. The purpose of this study is to examine the factors which contribute to the mathematical achievement gap between fourth grade African American students, and Latino students located at this urban elementary school in southwest Texas. You were chosen for the study because you are a fourth grade math teacher who is directly involved in narrowing the mathematics achievement gap. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.
This study is being conducted by a researcher named Muriel E. Smith, who is an Ed. D. student at Walden University. You may know the researcher as a Dyslexia Specialist at an elementary school in south Texas, but this research is separated from that role.

Background Information:

The purpose of this study is to examine the factors which contribute to the mathematical achievement gap between fourth grade African American students and Latino students, and how to narrow that gap.

Procedures:

If you agree to be in this study, you will be asked to:

- Sign a consent form.
- Provide researcher with the following school artifact documents for review (your individual fourth grade math lesson plans, Response to Intervention (RTI) math plans, and campus fourth grade level math plans) three days before scheduled math class observation.
- Allow a math class to be observed for approximately 45 minutes.
- Respond to interview questions that will last between 30-45 minutes, and will be audio recorded with your permission.
- Review draft of the findings of the study for your own data, and share feedback within two weeks if needed. It will take approximately 30-35 minutes to review the draft of your individual findings. The reviewing of the draft of your individual findings is known as member checking.
- You will be given an opportunity to meet with the researcher to discuss your findings if you wish. That meeting will last for approximately 10 - 15 minutes.

Voluntary Nature of the Study:

Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. No one at the school site or school district will treat you differently if you decide not to be in the study. If you decide to join

the study now, you can still change your mind during the study. If you feel stressed during the study you may stop at any time. You may skip any questions that you feel are too personal.

Risks and Benefits of Being in the Study:

There will be no risk to you if you decide to participate in this study. The benefit to being a participant will be you making a contribution to understanding the factors that contribute to narrowing the mathematical achievement gap between African American and Latino students.

Compensation:

There will be no compensation for participating in the study.

Confidentiality:

Any information you provide will be kept confidential. The researcher will not use your information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.

Contacts and Questions:

You may ask any questions you have now, or if you have questions later, you may contact the researcher via [redacted] or [redacted]@waldenu.edu. If you want to talk privately about your rights as a participant, you can contact Dr. [redacted] at irb@waldenu.edu. She is the Walden University representative who can discuss this with you. The researcher will give you a copy of this form to keep.

Walden University's approval number for this study is 12-02-14-0242701 and it expires on December 1, 2015.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below, I am agreeing to the terms described above. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Legally, an "electronic signature" can be the person's typed name, their email address, or any other identifying marker.

An electronic signature is just as valid as a written signature as long as both parties have agreed to conduct the transaction electronically.

Printed Name of Participant

Date of consent

Participant's Written or Electronic* Signature

Researcher's Written or Electronic* Signature

Appendix H: Interview Coding Sample

Mathematical background knowledge [code green]

Basic math facts [code red]

Building of student's self-confidence [code turquoise]

Lack of time [code yellow]

Grade level-intervention [code gray]

Varying instructional strategies [code magenta]

Professional development [code tan]

1. Describe what you see as the mathematics achievement gap between African American and Latino students in your class. (T6)

Most of the gaps are in basic fundamentals such as addition and subtraction facts [code red]. I spend a majority of my time revisiting previous TEKS (Texas Essential Knowledge and Skills) [code magenta]. The negative side is the students are expected to multiply, add, subtract, and divide fractions, [code red] and they simply don't have the skills in order to do those concepts [code red]. There is not enough time [code yellow] to keep going back to teach/reteach fundamental skills, so often theses students fall through the cracks and have very little achievement.

3. Has your knowledge of the achievement gap affected the way you teach mathematics? If so, explain. If not, why not? (T2)

Yes. I constantly introduce concepts by going back to the previous year's standards [code green] and starting with those because most students have not mastered those. Then I build on the current year [code gray]. I am consistently teaching by drawing things out [code magenta] and reputation for vocabulary knowledge [code magenta].

5. Do you feel you would benefit from additional professional development in the area of mathematics, specifically instructional and pedagogical strategies? Explain. (T4)

Yes. Hey, I can always [um] benefit from seeing new strategies and activities to the students [code tan].

2. What factors do you think contribute to the mathematics achievement gap between African American and Latino students at this school? (T3)

I believe the majority of the Latino students come to tutorials, have help at home, and are encouraged to study and value their grades. Now this is not true of every one of my students [code turquoise].

Appendix I: Sample Observation Field Notes

Observer: M. Smith Pseudonym ID: (T2)

Date: 12/14/14 Time started: 9:05 a.m. Time Ended: 9:50 a.m. Total Time: 45 min.

Lesson Objective/Activity: Join and separate angles

# of Students: 23

Observation/ Objective Observation	**Notes to Self**
Teacher Was: Teacher introduced a lesson in geometry by discussing with student prior knowledge of protractor through the use of playing "Simon says"	***Teacher gave an example how game would be played.***
Teacher called out different angles for students to perform.	***"Show me an obtuse angle."*** ***"Point to the classroom's back wall. Point to the walls that run perpendicular to the wall I'm pointing to."***
Teacher gave students a protractor to draw angles.	***Modeled for students how to separate angles*** ***Teacher walked around room and answered questions.***
Student Was: Students began lesson in whole group instruction. Students begin using protractor.	***5 students appear to have prior knowledge of angles.*** ***Some students actively engaged, and some students were trying.*** ***The other students appeared to be looking at those students for clues.*** ***Students were laughing.*** ***10 students raised hand to go to board to show answers.***
Instructional and Pedagogical Strategies Used: Utilized questioning strategies Engaged in scaffolding Modeling Whole group instructions	

Appendix J: Sample Participant Interview Transcripts

Participant's Pseudonym ID: (T6)

Date: _12/16/14_ Time started: 4:00 p.m. Time Ended: 4:45 p.m. Total Time: _45 min.

Interview Question	**Response**	**Interviewer's Notes**
Describe what you see as the mathematics achievement gap between African American and Latino students in your grade class.	Most of the gaps are in basic fundamentals such as addition and subtraction facts. I spend a majority of my time revisiting previous TEKS (Texas Essential Knowledge and Skills) that are not mastered. The negative side is the students are expected to multiply, add, subtract, and divide fractions, and they simply don't have the skills in order to do those concepts. There is not enough time to keep going back to teach/reteach fundamental skills, so often theses students fall through the cracks and have very little achievement.	Participant appeared to be very passionate about students. Students coming to 4th grade with a weak math foundation. Having to go back a teach lower grade level skills, but still have to teach current grade level skills.
What factors do you think contribute to the mathematics achievement gap between African American and Latino students at this school?	That's easy; I believe the lack of a foundation in mathematics and a lack sense of reasoning are some factors. My low performing African American students have a deficit in fundamental math skills along with a poor sense of reasoning that is being taught on their grade level. But I also think the socio-economic status, the extent of parental involvement, and cultural differences are some other factors which contribute to the achievement gap not only in math but academic achievement in general.	Again participant appeared to be very passionate about students. Intense facial expression and a great deal of talking with hands. Again lack of math foundation.
Has your knowledge of the achievement gap affected the way you teach mathematics? If so, explain. If not, why not?	Yeah of course. Such knowledge does affect my teaching in such a way that I know the approaches I can implement in my teaching. And let me say this while we are on	Time is a constraint. Students do not have enough time to

	this topic, our curriculum is set up so that it moves so quickly. There are so many standards that are mandated that we cover in a short period of time, that our students don't have time to master the skill before we move onto something else. In addition we have to get these students read for the state assessment. So again my teaching has to be done in such a way that I can reach my students where they are.	learn/master concepts.
What have you done to narrow the mathematics achievement gap in your classroom? Has it been effective? What data do you have to support this claim?	Well in my class, I treat my students, all of my students, fairly and equally despite socio-economic status and cultural differences. I do early interventions if and when possible. I know of math success coming for one student in particular, when they started receiving additional intervention time, through the use of pull-outs and RTI. I try to make mathematics meaningful from my students by utilizing hands-on learning, and using real life examples, activities, or problems. Now for my students who are below grade level, I make an effort to do after school tutoring. By the way, you know I don't get paid for doing that either. I do this because I want to see my students learn and do well while they are with me. I also expose my babies to learning through technology. You know kids love the computers and technology. Most of all I try to connect my lessons to real life situations. For the most part I think what I do is effective with most of my students, but I do have some students who still struggle no matter what I do. I look at my quizzes, campus and district benchmarks to see if my students are growing academically.	Willing to do whatever it takes to help students' achievement math success. Need for interventions to help students.
Do you feel you would benefit from additional professional development in the area of mathematics, specifically instructional and pedagogical strategies? Explain.	Regular and additional professional development has always been	Sincerely seeking help

	beneficial. Teachers' preparation does affect student achievement. Professional development is really helpful for those teachers who are lacking in math skills, and they do not have a true understanding of math themselves, which would make it hard for them to teach math to others. Right? Because this school year we (the state/district) have a lot of new math skills to teach, professional development is surely needed on how to present these new skills to my students in a way that they will understand it and master it.	through professional development for ways to reach students.
What do you think can be done at this campus to address the effects of the mathematics achievement gap between the fourth grade African American and Latino students?	Well, I think administration needs to understand that the achievement gap doesn't start in the fourth grade. The problem starts before those kiddos leave Kinder. Those kiddos have got to get that foundation down at the Kinder level so they would struggle so hard when they get to fourth grade.	Need for grade-level intervention.
What other insights would you like to share about how the school can narrow the mathematics achievement gap between African American and Latino students?	I must say early intervention must be done as early as Kinder and first grade. Having a strong foundation in the early years will have a long-lasting impact in academic achievement especially in math.	Grade-level intervention needed.

Participant's Pseudonym ID: (T2)

Date: _12/17/14_ Time started: 3:45 p.m. Time Ended: 4:15 p.m. Total Time: _30 min.

Interview Question	**Response**	**Interviewer's Notes**
Describe what you see as the mathematics achievement gap between African American and Latino students in your grade class.	There are two factors that have contributed to mathematics achievement gap. The gaps I see in my class across the board are basic concepts about numbers sense mentally and basic recalling of facts. The struggling students have little math foundation skills let alone understand the concept I am teaching them on the fourth grade level.	Lack of background knowledge. Lack of basic math skills.
What factors do you think contribute to the mathematics achievement gap between African American and Latino students at this school?	One factor I believe affects the gap is the lack of basic math foundation, and this affects the struggling students' self-confidence and belief in his or her self to be successful. They stop trying and fall back on learned helplessness. I try to find ways to motivate my students to want to succeed. Small gains can help get my students moving toward feeling better about their selves. A 3 point gain on a fact drill is something. It shows growth and it says I did better this time than I did the last time. So what can I do the next time to get an even higher grade?	Lack of self-confidence(student)
Has your knowledge of the achievement gap affected the way you teach mathematics? If so, explain. If not, why not?	Yes. I constantly introduce concepts by going back to the previous year's standards and starting with those because most students have not mastered those But doing this does make life harder on me because I still have to cover this year's concepts and there is just not enough time to get everything in to student mastery. Then I build on the current year. I am consistently teaching by drawing things out and reputation for vocabulary knowledge.	Time is a constraint. Students do not have enough time to learn/master concepts. Varying strategies to achieve mastery.
What have you done to narrow the	I teach my students every day that they show	Instructional

mathematics achievement gap in your classroom? Has it been effective? What data do you have to support this claim?	up at school. I model for the students and allow them to practice. Most of my students retain the information and skills by doing. I provide manipulatives for the students to use. I utilize teachable moments to help my students. I use the diagnostic approach. I look at the results of the homework, independent classwork, fact drills scores, weekly assessments, campus assessments, and district benchmarks.	strategies
Do you feel you would benefit from additional professional development in the area of mathematics, specifically instructional and pedagogical strategies? Explain.	Lord YES! I would like to see some professional staff development in math instructions to prepare lessons for learners with an education gap. Is that too much to ask?	Serious about the need for professional development for ways to reach students(instructional/pedagogical)
What do you think can be done at this campus to address the effects of the mathematics achievement gap between the fourth grade African American and Latino students?	We need to focus on the core skills for mathematics and provide more open ended questions. Also, on mathematics test take away multiple choice answers.	Varying strategies.
What other insights would you like to share about how the school can narrow the mathematics achievement gap between African American and Latino students?	All students must master core skills for mathematics. We need to have pull-out groups early on in the lower grade levels. Adjustments need to be made in the lower grades to get this math foundation down and mastered. There might need to be a need for major change across the grade levels, I don't know what, but something. We have to start working toward a common goal. It has to be all hands on deck for every child at this school in order to begin seeing some type success in getting rid of this gap.	Grade-level intervention needed.

Appendix K: Sample Artifacts

[redacted] Class Plan---[redacted]

First Block
8:10-9:40am
Week of Jan-26-29

Name	Test Scores: STAAR/ 1st 9 Wks (5th Wk) Campus Assessment/ 1st 9 Wks District BM/ 2nd 9 Wks Campus Assessment	Focus TEK/S (Daily Warm-Up)	Interventions/ Enrichment
A[redacted], E[redacted] (A)	91/84/84/80	4.2A, 4.2B, 4.2C, 4.2D	Enrichment/**Number Scramble Activity-**
S[redacted], C[redacted] (A)	96/--/--/96	4.2A, 4.2B, 4.2C, 4.2D	Enrichment/**Number Scramble Activity**
M[redacted], G[redacted] (A)	--/80/--/100	4.2A, 4.2B, 4.2C, 4.2D	Enrichment/**Number Scramble Activity**
*D[redacted], M[redacted] (A)	78/68/40/44	4.2A, 4.2B, 4.2C, 4.2D	Enrichment/Intervention
B[redacted], J[redacted] (A)	New		
J[redacted], J[redacted] (B)	76/84/52/52	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
D[redacted], W[redacted] (B)	74/52/40/52	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
K[redacted] H[redacted] (B)	72/60/48/64	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group
J[redacted], S[redacted] (B)	70/64/60/80	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
W[redacted], C[redacted] (B)	70/68/44/80	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
L[redacted], G[redacted] (B)	76/76/40/56	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
	59/52/44/56	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group
	43/36/20/24	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables
	33/56/28/44	4.2A, 4.2B, 4.2C, 4.2D	Guided Math/Small Group Place Value Foldables

Hot List Students

Daily Plan

- **Fact Drill (8:10-8:15)**
- **Warm-Up (Review 4 TEKS per Week/1 per day – Mon-Thurs) (8:20-8:35)**
- **Standards-Based Lesson - Guided Math -(8:40-9:40)**

*Resources Texas Go Math, Motivation Math, Texas Coach, Measuring Up

Countdown to STAAR 2014-2015

4th Grade

16 Day Plan

Day	*Supporting Standard Warm-up (10 min.)*	*Readiness Standard Review (80 min.)*
1	4.2F-Compare and order decimals	4.2B-Represent the value of a digit up to 1,000,000,000 and decimals to the hundredths 4.2G-Relate decimals to fractions
2	4.3B-Decompose a fraction in more than one way	4.3D-Compare fractions w/different num./denom. 4.3E-Add./subt. fractions
3	4.4B-Determine products of a numb. and 10 or 100	4.4A-Add./subt. whole numbers and decimals using the standard algorithm 4.4H- One/two step mult./div. problems including interpreting remainders
4	4.4D-Use strategies and the standard algorithm to multiply up to a 4-digit by 1-digit number and 2-digit by 2-digit	4.5A-Multi-step problems involving all operations 4.5B-Input/output tables
5	4.6B-Lines of symmetry	4.5D-Perimeter and area 4.6D-Classify 2-d figures
6	4.7E-Determine the measure of an unknown angle	4.7C-Determine measures of angles with a protractor
7	4.8A-Identify relative sizes of measurement units	4.8C-Solve problems that deal with measurement
8	4.10B-Calculate profit	4.9A-Represent data on a freq. tab., dot plot, and stem and leaf

Created by [redacted] Spring 2015

Name: _____

4th Grade Weekly Math Quiz

Mathematics Chart

LENGTH

Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
	1 mile = 5280 feet
1 meter = 100 centimeters	1 yard = 3 feet
1 centimeter = 10 millimeters	1 foot = 12 inches

CAPACITY AND VOLUME

Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces

MASS AND WEIGHT

Metric	Customary
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

1. Samantha has a box of heart shaped candies as shown in the chart below. If a candy is picked from the box without looking, which color of candy will it most likely be? Mark your answer.

candy types	number of candies
white color candies	5
blue color candies	7
orange color candies	2
yellow color candies	14

- **A** blue color candy
- **B** orange color candy
- **C** yellow color candy
- **D** white color candy

2. Hannah bought 7 bags of bell peppers. If each bag of bell peppers is priced at $3.60, then what is the total price? Mark your answer.

- **A** $25.20
- **B** $28.80
- **C** $21.60
- **D** $10.60

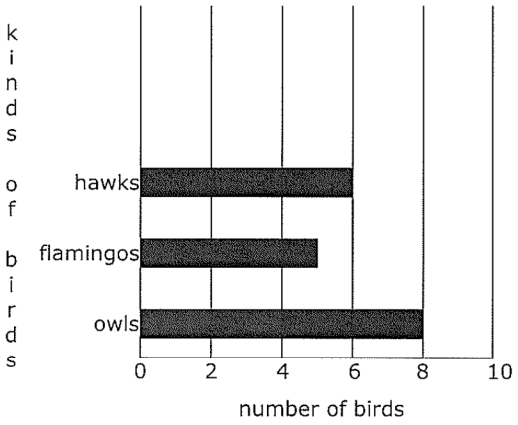
3. The numbers on the tiles follow a pattern.

7 9 6 8 5 7

Find the next number in the pattern.

- **A** 3
- **B** 6
- **C** 2
- **D** 4

4. Jacob created a graph to show how many birds he saw in a zoo. How many owls and hawks are there? Mark your answer.



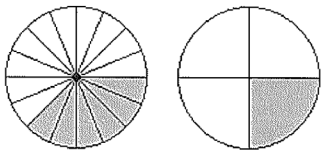
○ **A** 11

○ **B** 14

○ **C** 13

○ **D** 19

5. The first shape is divided into 16 equal parts and the second shape is divided into 4 equal parts.



The shapes are shaded to show that

○ **A** $\frac{6}{16} = \frac{1}{4}$

○ **B** $\frac{1}{16} = \frac{1}{4}$

○ **C** $\frac{6}{16} < \frac{1}{4}$

○ **D** $\frac{6}{16} > \frac{1}{4}$

[redacted]

Intensive Instructional Plan- Third/Fourth Grade Math
2014-2015

Goal: To increase students' math computation and Math Reasoning skills

Objective: [redacted] Intensive Instructional Plan ($3^{rd}/4^{th}$ grade Math) will assist students with developing proficiency with the Texas Essential Knowledge and Skills (TEKS) standards that are eligible for assessment on the Math STAAR. Each lesson will consist of scaffold instruction, beginning with modeled and guided instruction, and then gradually releasing the student into fully independent practice of the skills and strategies behind the TEKS standards.

The lessons will cover reading standards within the following reporting categories:

Focus Skills

Skills	TEKS	TEKS
1. Addition/Subtraction Word Problems	**3.4 (A) Solve with fluency one step and two step word problems involving addition and subtraction.**	**4.3 (D) Compare two fractions with different numerators and diferent denominators and represent the comparison using symbols**
2. Multiplication	**3.4 E Represent Multiplication Facts by using a variety of approaches.**	**4.4 (C) represent the product of two digit numbers using arrays, models, or equations through 15 by 15**
3. Multiplication/Division Word Problems	**3.5 (E) Represent and solve one and two step multiplication and division word problems within 100 using arrays.**	**4.4 (H) Solve with fluency one and two step problems involving multiplication and division including interpreting remainders**
4. Geometry	**3.6 (A) Classify and sort two-three dimensional figures**	**4.6 (D) Classify two dimensional figures based on the presence or absence of parrellel or perpendicular lines,**
5. Graphs	**3.8 (A) Summarize a data set with multiple categories using a frequency table, pictograph, and bar graph with scaled intervals**	**4.9A represent data on a frequency table, plot, stem-and leaf marked with whole numbers and fractions.**

Math Workshop Daily Plan
Feb 2-6, 2015

Math Warm-ups: (15 min)

* Reviews concepts previously taught and allows students a chance to practice and solidify those concepts.

(ie. Motivational Math, Rigorous Problem Solving, Go Math etc…)

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Whole Group Mini-Lessons: (20 min)

* Standards-based lesson **(Geometry and Measurement (4.8A) Mon-Thurs, Friday Assessment, Reteach and Retest**

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Daily 4 (30-min)

***Guided Math---Small group instruction (3-5 students)**

Four Rotations (10-15 min per station)(May rotate to only 2 stations)

1. ***M***ath Facts --- Practice math facts: Matho.com, aplus.com, Math Battle with playing cards, flash cards, fact drills.

2. ***A***t your seat---Group1- work pg. 522, Group 2- work pg. 524 - 2nd in ***Go Math*** workbook

3. ***T***eacher Table----Work with the teacher

4. ***H***ands-On --- Manipulatives or games, writing math songs or puzzles or raps

Created by [redacted]