CASE STUDY OF RURAL HIGH SCHOOL MATH TEACHERS OF AFRICAN

AMERICAN STUDENTS

A Record of Study

by

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Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

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May 2014

Major Subject: Educational Administration

ABSTRACT

The purpose of this qualitative study was to understand the reflective qualities of high school math teachers of African American students in a rural setting. The case study approach was chosen to capture the voices and instructional practices at Memory High School through the use of classroom observations and interviews.

Four research questions guided this study: (a) How do rural high school math teachers of African American students select instructional strategies while planning their lessons; (b) What are the reflective qualities of high school math teachers who are educating African American students; (c) To what extent do rural high school math teachers utilize culturally responsive pedagogy to influence their instructional strategies; and (d) To what extent does reflecting about student backgrounds influence the manipulation of the math curriculum.

Most of the studies regarding African American learners are done in urban and suburban settings. Few studies investigate the learning preferences of these students in rural settings. This study attempted to capture the voices of rural educators and analyze the strategies they used to create success with their African American students as well as document structural and personal barriers which impede the use of the ideal instructional strategies effective among African American students.

The constant comparative data analysis was used to analyze each research question and develop emergent themes to answer the research questions. For the first question, the findings were (a) student prior knowledge, (b) background information, (c) curricular information, (d) analyses and (e) select. For the second research question, the

findings were (a) reflection as a continuous part of practice, (b) student centered reflection, (c) selection, (d) transformation and (e) analyses. For the third research question, the themes were (a) curriculum adjustments, (b) popular communication strategies, (c) transformation and (d) appraisal. Lastly, the themes associated with the fourth research question were (a) in-class reflections, (b) student background reflection.

My findings suggest that campus structure, culturally responsive expectations and personal experiences can influence the way rural teachers modify their instructional strategies to meet the needs of African American learners.

DEDICATION

I would like to dedicate this study first and foremost to God, who has seen me through this study.

I would also like to thank my mother and father who instilled the importance of education from an early age. My father physically left me on December 21, 2002, but his spirit and guidance helped me to continue working when I felt defeated. Without my mother's assistance throughout this process, it would have been impossible for me to complete my study. From her tough love to help babysitting my son, her help was invaluable.

My significant other, Georgiana, has been a blessing from God. Without her encouraging words and help with our son, I would not have been able to complete this study. From taking my son to daycare, cooking his dinner, cleaning up and watching him while I studied, her help has also been invaluable.

My son Marcus Jones Jr. has been a blessing and he arrived while I was completing my journey through the doctoral program. I want him to know that I work to be someone he can be proud of when he grows up. I strive to be a man he can remember and be proud of, especially when I am physically no longer here with him.

My brother Major Jr. has always been a role model and his mental support was priceless to me during this process. I look forward to "hanging" out more at the completion of this study.

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

African American students continue to lag behind their European American counterparts in standardized testing scores despite decades of reform efforts (Darling-Hammond, 2010; Ladson-Billings, 2006). According to the National Center for Education Statistics (NCES), in 2011, African American students scored 31 points less than their European American counterparts on the National Assessment of Education Progress (NAEP) on the eighth grade mathematics exam (NCES, 2012). Moreover, researchers, Darling-Hammond (2010), Ladson-Billings (2006), and Macleod (1995) indicated social capital and historic funding inequities as an explanation for the disparate African American achievement scores. Furthermore, researchers such as Ogbu (2004) traced the educational misfortunes of African American students to historical social inequities such as slavery in the United States.

In the State of Texas, African American students did not do much better than the national average for such testers, scoring 27 points less than their European American counterparts on the 2011 eighth grade mathematics NAEP exam (NCES, 2012). Still, even with these only marginally better numbers, Texas led the country in the performance of African American students in the eighth grade math NAEP assessment. In the District of Columbia, African Americans scored 63 points less than their White counterparts and 21 points less than their African American counterparts in Texas (NCES, 2012). In Wisconsin, African American students scored 39 points less than their

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European American counterparts while scoring 21 points less than their African

American counterpoints in Texas (NCES, 2012).

Lastly, in California, African American students scored 36 points less than their

European American counterparts and 23 points less than their African American

counterparts in Texas (NCES, 2012). In Texas, African American students are achieving

at a comparatively high level, but they are still severely underperforming compared to

their European American counterparts. It is extremely telling that the state that boasts

the highest achievement of African American students in eight grade math on the NAEP

exam has a hefty gap between its European and African American students (NCES,

2012). Table 1 lists the top five states in regards to the performance of African

American students in their 2011 eighth grade NAEP Assessment and the gap between

those students and their European American counterparts in the perspective states.

Table 1

Top Five African American 2011 8th Grade Math NAEP Scores

State	AA* Scale Score	EA** and AA* Gap
Hawaii	277	13
Texas	277	27
Massachusetts	275	29
Alaska	273	23
New Jersey	272	33

Note. * = African American, ** = European American

A 10-point disparity on the NAEP assessment is equivalent to roughly one year worth of learning (Center for Public Education, 2013). That means that although Texas leads the nation in performance for African American students in their 8th grade NAEP examination, they are still performing nearly three grade levels behind their White counterparts. Despite these daunting statistics, there are several researchers who have been successful in highlighting thriving practices of triumphant high school math teachers of African American students (Leonard, Johnson & Berry, 2010; Leonard, Napp & Adeleke, 2009; Tate, 1995). These researchers indirectly link teacher self-reflection to the success of African American students because the teachers in these studies reflected on their student's background and adjusted their teaching strategies and curriculum to reflect the experiences and learning preferences of their pupils. There is research that has the potential to increase the mathematical performance of a historically marginalized population, but has not yet evolved into standard practice (Stinson, 2013). Stinson (2006) has done research which indicates that African American students achieve at similar levels to their European American counterparts when their school experience is altered and constructed to obtain success through strategies such as pre-school, parental education and extracurricular activity involvement.

Therefore, a goal of this study was to add a narrative about the self-reflection of math teachers of African American students in a rural setting to the literature because it could possibly help impact culturally responsive instructional practices. This chapter provided background knowledge applicable to the study, the problem statement, the

significance of the study, a presentation of the research questions, the theoretical framework for the study, and finally a discussion on the role of the researcher.

Background of the Study

In 2011, eighth grade African American students scored 31 points lower than their European American counterparts in the NAEP mathematics examination (National Center for Educational Statistics, 2012). Researchers have stated that African American students benefit from instruction that includes cultural perspectives within the curriculum and allows them to move and express themselves (Bailey & Boykin, 2001; Ladson-Billings, 1995). NCES (2012) indicated that students who receive hands on curriculum perform significantly better on the NAEP. Specifically, Butty (2001) noted that African American students scored significantly higher on math examinations when students received inquiry based instruction which allowed them to express themselves and solve problems through their own experiences. Further, research by Wenglinsky (2002) indicated that mathematics instruction, which allowed students to solve real world problems, was significantly related to higher achievement among African American students on their eight grade NAEP examination. Moreover, the 31-point gap is exacerbated by the fact teachers are not taught these culturally responsive strategies in teacher preparation programs (Bondy et al, 2007; Gay & Kirkland, 2003; Ladson-Billings, 1997). During this study, I observed several of the participants incorporating movement and music in their lessons. Consequently it was in these classes that the principal perceived their teachers as more successful. In this section of Chapter I, I will discuss math assessments in Texas, accountability crunches and instances of success

related to what the present literature says about effective instruction for African American students in math.

The troublesome reality that African American students trail their European American counterparts is also an area of concern not only nationally, but in Texas as well. Texas educators formally used the Texas Assessment of Knowledge and Skills (TAKS) test starting in the 2002-2003 school year and during the 2011-2012 school year, students in Texas transitioned to the more rigorous State of Texas Academic Readiness (STAAR) exam designed to increase college readiness. The STAAR examination has more tests questions at grade level than the previously utilized TAKS test. The exit math TAKS test, which students took their eleventh grade year in Texas and were required to master to satisfy their graduation requirements covered content from eight grade mathematics through the eleventh grade. The STAAR examination covers only the content these students receive in their math classes for the year in which they take the examination. For example, students in the eleventh grade in the 2013-2014 school year will take the Algebra II STAAR examination which will only cover content from that subject, while the TAKS test would have covered information from previous years.

Furthermore, the STAAR examination is a timed test where students only receive four hours to complete their examination, while the TAKS test did not have a time limit. For the purposes this study, I utilized success on the TAKS examination as one of the components of a successful math teacher. In addition, used achievement on the NAEP examination to compare student achievement in this inquiry because at the

time of this study, high schools were still transitioning to fully implement all of the STAAR examinations and were utilizing the TAKS assessment for junior and senior level student cohort groups. Therefore, there were not multiple years of data on the STAAR examination to analyze. Additionally, the use of the NAEP data was necessary because students in every state take the NAEP exam and it can be utilized to compare student academic performances between states because states assess students differently (Foote, 2007; National Center for Education Statistics, 2012).

It was extremely important that my study explore the achievement of high school students because the achievement gap increases both nationally and in Texas the longer students remain in school (NCES, 2012). For instance, in 2011, fourth grade African American students scored 25 points behind their European American counterparts on their math assessment, while eight grade African American students trailed by an additional 6 points. The gap in secondary math achievement has not changed substantially since 1990 (Bonner & Adams, 2012). Therefore, it was valuable to my research to explore successful practices of high school math teachers. The disparate passing rates are illustrated in Tables 2 and 3.

Table 2

8th Grade 2009 and 2011 Math NAEP Assessment

School Year	2009	2011
Scale Scores AA*	260	262
EA**	292	293

Note. * = African American, ** = European American

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Table 3

Scale Scores for 4th Grade AA and EA Students on Math NAEP Examination

School Year		2009	2011
Scale Scores	AA*	222	224
	EA**	248	249

Note. * = African American, ** = European American

Accountability Crunch

The disparate achievement of African Americans students on their high school

math assessments throughout the country has brought about increased scrutiny from

federal and state legislatures (Perna & Thomas, 2009). High Schools that serve African

American students are more likely to miss their accountability standards than the

elementary schools, which serve the same population of students (TEA, 2012). This is

evidenced by the fact that most of the schools in Texas that do not meet their

performance standards are secondary campuses (TEA, 2012). The pressure to meet

these standards has helped to ensure students are learning surface level curriculum

because they are not assessed on higher level thinking skills and struggle on college

entrance exams and higher education curriculum (Venezia & Kirst, 2009). This

adversely affects African American students because the curriculum they receive is more

likely to align with state standards and does not require critical thinking (Perna & Thomas, 2009).

To ensure all states are in compliance with the federal mandate of the No Child Left Behind Act (NCLB), all states require high school students to take assessments in math and English (Kober, 2006). Many states have answered this requirement by implementing high-stake standardized tests which students must pass in order to graduate. These high stakes examinations become the obstacle students must successfully overcome if they want to achieve a high school diploma (Perna & Thomas, 2008). By 2012, 25 of the country's 50 states required students to pass an examination before they graduated from high school (Kober, 2006). Because of the population density of the states that require passing a high stakes examination, this number comprised 65% of the countries high school students and over 75% of the students of color population (Kober, 2006). This is significant because examinations drive the curriculum students receive in their schools (Foote, 2007).

Foote (2007) suggested that NCLB has given many states incentives to "water down" their curriculum to give the appearance that they are successful. Under NCLB, if schools do not meet their state's Adequate Yearly Progress (AYP) goals as measured by their state tests, they face punitive disciplinary measures that can lead to school restructuring and job losses for principals and superintendents, which unfortunately, inspires school leaders to ensure teachers teach to the narrow confines of the state assessment and state legislatures to make the tests easier to pass (Perna & Thomas, 2008). This was observed in Texas during the early 90s when the Texas NAEP scores

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showed large and increasing scoring gaps, despite decreasing gaps on the state assessment between European and African American students during the same time period (Musoba, 2011).

Instances of Success Through Reflection

However, as mentioned earlier in this chapter, researchers have studied teachers who have individually been able to effectively educate African American students (Bondy et al, 2007; Ladson-Billings, 1995), chiefly by utilizing these students' culture to enhance their lessons (Ladson-Billings, 1995; Leonard et al, 2009; Leonard, et al 2010; Tate, 1995). With this in mind, in my study, I worked with administrators to gauge the way teachers adopt a more culturally responsive approach to the way in which they present their lessons. Culturally responsive pedagogy requires teachers to hold high expectations for all of their students, to help students develop and maintain cultural competence and assist students with developing a critical consciousness to challenge the societal status quo through the use of their curriculum (Ladson-Billings, 1995).

Also consistent with culturally responsive pedagogy is the act of deep reflective thinking about race and culture by teachers and administrators (Howard, 2003). At the core concept of this brand of reflection, an active and personal consideration is involved to address any belief or supposed form of knowledge (Dewey, 1933). That means that reflection requires practitioners to actively analyze personal beliefs and make changes to their actions based upon their analyses. A reflective teacher responds to any problems that might arise by analyzing how their actions possibly contributed to the problem, while a teacher who is not reflective assumes that the students are not successful because

of something they might have missed academically or socially (Watts & Lawson, 2009). With that being said, studies such as the ones completed by Tong, Irby, Lara-Alecio, Yoon and Mathes (2010) and Lunenburg and Irby (2011) have demonstrated that student groups like African Americans, which have been historically underserved, perform better on standardized tests when teachers receive training that shows them how to intentionally reflect on their practice and align their instructional practices to student needs. Moreover, researchers like Howard (2003) argued that teachers must be able to construct lessons in ways that incorporate their cultural learning experiences of students. Therefore, reflection is a key ingredient to culturally responsive pedagogy and can be taught to teachers throughout their careers to negate the cultural, age and social discrepancies between them and their students (Gay& Kirkland, 2003)

A teacher who is reflective, (a) analyzes the way he/she individually present their material, (b) takes ownership for the success of their student, and (c) attempts to find a way to ensure student success (Ward & McCotter, 2004). Furthermore, culturally responsive pedagogy requires teachers to acknowledge their own cultural affiliations and use their student's cultural preferences to enhance their curriculum (Gay & Kirkland, 2003; Howard, 2003; Ladson-Billings, 1995), thereby allowing teachers to reflect on the way their instructional methods impact their students. This is an extremely important detail to consider when analyzing the effectiveness of mathematics instruction because math has been traditionally taught from a European perspective which often manifests itself in lecturing, rote memorization, and worksheets (Tate, 1995).

Problem Statement

Math is a tool for understanding the world and it allows marginalized populations such as African Americans the opportunity to understand the social forces that contribute to their situation (Martin, Gholson & Leonard, 2010). Mathematics competence is important for establishing and maintaining a healthy lifestyle (Lipkus & Peters, 2009; Reyna & Brainerd, 2007). People with higher levels of math literacy are more likely to understand risks associated with the foods they eat and the type of medical care they receive from their health professionals (Reyna & Brainerd, 2007).

Gap Gazing

Practices which are consistent with the ineffective delivery of mathematics instruction to African American students are often highlighted by the tendency for researchers to focus on what Ladson-Billings (1997) referred to as the literature of failure. Although researchers have started to analyze successful practices in delivering instruction to African American students, there still exists a tendency to gap gaze (Stinson, 2013). Gutierrez (2008) defined gap gazing as documenting the existence of the of performance gaps without noting advancements and creating interventions for marginalized groups. This means that much of the literature regarding the mathematical achievement of African American students focuses on their educational misfortunes instead of successful ways of delivering instruction to these students.

Complicating the disparate achievement amongst African American students is the gap between research and practice (Cooper, 2007). Much of the research regarding teachers who are successful in educating African American students, is not taught in

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typical teacher preparation programs and many teachers can work their entire career without gaining instruction in these strategies because the research findings are often not conceptualized in a manner that is convenient and easily understood (Cooper 2007; Gay & Kirkland, 2003; Leonard et al, 2010). As a result, the research is not used to drive practice and improve the mathematic school experiences of African American students, thus creating a gap between research and instructional strategies that have been proven to increase the achievement of African American students (Stinson, 2013).

There have been a few studies that highlight successful practices of individual teachers of African American students (Bondy, et al, 2007; Gay & Kirland; 2003; Ladson-Billings, 1995; Leonard, et al, 2010 Tate, 1995). Fewer of these studies highlight the successful practices of successful high school math teachers (Leonard, et al, 2007; Tate, 1995). Not surprisingly, there are even fewer studies which examine the success of math high school African American students in a rural setting (Irvin, et al 2012). More telling, is the fact that studies such as the one completed by (Irvin, et al 2012) indicated that high school African American students living in rural parts of the south are more likely to have perceived barriers to obtaining post-secondary educational experiences than their urban counterparts. This is extremely important because the achievement gap amongst secondary students is not decreasing at the same pace as their elementary counterparts and this study attempts to add to the literature, practices of teachers who are educating African American high school math students. Moreover, this study will provide a practical, useful resource to help increase the achievement of African American math high school students and help eliminate the achievement gap.

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Rural Education

This study is important because relatively little work has studied the experiences of teachers who educate African American students in economically challenged rural settings. Memory High School, the site where this study was performed serves a population that is approximately 65% economically challenged (TEA, 2013). Moreover, economic and racial segregation hinders access to quality school experiences for African American students who live in rural settings in the southern portion of the United States (Irvin et al, 2012).

Economic inequities often lead to staff shortages and other program implementation problems in schools (Irvin et al 2012). This was evident at Memory High School because there were not enough teachers to offer higher level math classes like statistics or advanced calculus. Additionally, it was difficult for the teachers at the research site to plan together. Additional research is needed in rural settings because 30% of the schools in the United States are in these settings (Irvin et al, 2012). In Texas that population is slightly smaller at 20% (United States Department of Commerce, 2012).

<center>**Research Questions**</center>

By the year 2020, it is projected that 50% of the K-12 public education student population will be comprised of students of color, while 75% of the teachers will be European American (Morgan, 2010). European American teachers are part of the dominant culture and can live their life without reflecting on the impact cultural

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affiliations have on learning preferences (Howard, 2003; Shandomo, 2010). Thus, it was invaluable to my study to specifically address the following research questions.

1. How do high school math teachers of African American students in a rural setting, select their instructional strategies while planning their lessons?

2. What are the reflective qualities of high school math teachers in a rural setting, who are educating African American students?

3. To what extent do high school math teachers in a rural setting utilize culturally responsive pedagogy to influence on their instructional strategies?

4. To what extent does reflecting on the backgrounds of African American students, influence the manipulation of the math curriculum in a rural setting?

Significance of the Study

Many school districts in the United States indicate through their mission statements that improving student achievement and eliminating the achievement gap is an important priority (Dufour, Eacker & Dufour, 2005; Ladson-Billings, 2006). Yet, as mentioned earlier in the introduction, despite these calls for improving student achievement, African American students consistently perform at lower levels than their European American counterparts. Still, even in the face of the statistical disproportions highlighted in the literature, pockets of educators have been successful educating African American students in the area of math (Leonard, et al 2010; NCES, 2012).

More telling is the fact that math curriculum guides and standardized tests are written in contexts that are foreign to many African American students (Leonard et al, 2009). For example, Tate (1994) noted that many African American students did poorly

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on a district-level examination because they answered a bus pass question incorrectly. Students were asked if it was more cost effective to purchase daily or weekly bus passes if they had to make trips into the city. The answer was daily passes were cheaper, but that answer did not make sense to the African American students because, when considering their own lives and experiences, many of their families did not own cars and would have to use the pass multiple times. Therefore, it can be argued that in many instances, the curriculum guides indirectly discriminate against African American students before they are given a chance to learn the math concept and content (Leonard et al, 2010; Tate, 1994). Therefore, educating African American math students might require a teacher to critically challenge and analyze the experiences with which their students are familiar (Bonner & Adams, 2012; Leonard et al, 2010) in addition to instructing them on the quantitative components of the lesson.

Situations like the one described above inspired Ladson-Billings (1995) to analyze characteristics of successful teachers of African American students and contribute to a concept called culturally responsive pedagogy. These characteristics of such pedagogy include communicating in ways that are familiar with students, utilizing popular culture in their curriculum and challenging the status quo. One of the overarching components of culturally responsive pedagogy is self-awareness on the part of the teacher and how cultural affiliations affect the way they think and teach their students.

Further, the achievement gap between African American students and their European American counterparts can be traced to styles of learning (Bailey & Boykin,

2001; Carter, Hawkins & Natsean, 2008; Dunn & Dunn, 2005). In fact, Carter et al, (2008) noted that specific cultural learning preferences of African American students have been associated with lower performance in math when taught using traditional math methods. This suggests that traditional mathematic teaching methods, which feature such approaches as lecturing and rote memorization are not congruent with the learning preferences of African American students. Cultural patterns indicate they tend to prefer activities that allow them to move and are hands-on (Bailey & Boykin, 2001; McDougal, 2009; Tate, 1995).

Therefore, it was beneficial to this study to better understand the reflective qualities of high school math teachers in rural settings, who have been successful teaching African American students. This exploration provided a way to understand a tangible quality that is possibly associated with teachers who are successful when teaching African American students. Understanding these characteristics will add to the literature because it will give educators tools to better develop novice teachers because it is not possible to prepare teachers for every possible problem that might occur within their class, but the ability to reflect on their practice could provide them the skill-set to align their instructional strategies with their student's needs. Understanding successful teachers reflective thoughts as they instruct African American students was important to this study, hold promise in examining how they perceive their students perceptions and instructional needs through their lesson designs and the way they respond to student failures might give educators tools to develop novice teachers. Understanding the way teachers reflect on their practice could be useful in developing campus and district staff

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development trainings that might improve the educational experiences of African American students.

Theoretical Framework

Because I located this analysis within the parameters of interpretivism, it was crucial to determine how such a framework affected and supported my inquiry. A prevailing tenet of interpretivism is that human beings construct their realities (Piantanida & Garman, 1999). An interpretivist study tries to understand the phenomena it is attempting to capture by studying the way the participants assign meaning to their actions (Darke, Shanks & Broadbent, 1998). Also, interpretivist approaches try to analyze the meanings participants assign to their actions using a cultural and historical context (Darke, et al, 1998). These approaches are also concerned with symbolic meanings and other illustrations to help researchers understand the phenomenon (Darke, et al, 1998). The phenomenon presented in this study is the reflective behavior of successful math teachers who teach African American students in a rural setting. The meanings this study attempts to explore are the reflective qualities of these teachers. Therefore, I found it necessary to develop a concise understanding of the literature on reflection to analyze the experiences of the participants.

Conceptual Framework

The conceptual framework helps the researcher interpret the phenomenon under investigation. This study aimed to understand how successful teachers reflect on their practice. This study used Brown and Irby's (2001) reflective cycle framework. The

cycle helps guide educators through the act of reflection so that action can inform and change their practice (Edmonson, Fisher, Brown & Irby, 2002). The reflection cycle includes selection, description analyzing, appraising and transforming (Brown & Irby, 2001).

Reflective practice occurs frequently for teachers throughout Europe. (Darling-Hammond, 2010). European countries are significantly outperforming their American counterparts (Darling-Hammond, 2010). However, many teacher preparation programs in the United States are beginning to embed reflection as an implicit component of their curriculum (Edmonson et al, 2002). The reflective framework has been used by its designers to help graduate students purposefully reflect on their practices and promote professional growth (Edmonson et al, 2002). In addition, school district administrators have used the aforementioned reflection cycle to increase collaboration and facilitate growth amongst principals (Brown, Irby, & Neumeyer, 1998). In this section of the chapter, I will describe the selection, description, analyzing, appraising and transforming components of the reflection cycle.

Figure 1 is a visual representation of the Brown and Irby (2001) reflection cycle.
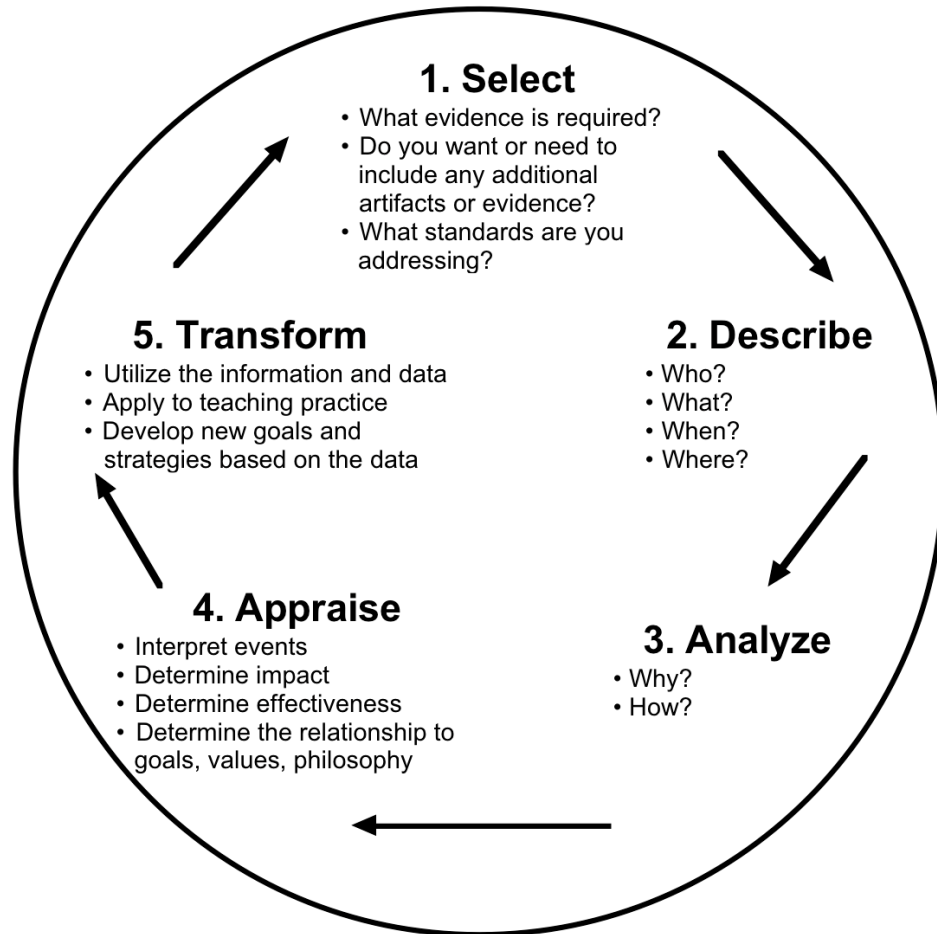
Figure 1 Used with Permission. *Brown and Irby (2001) Reflection Cycle*.

Selection

According to Brown and Irby (2001), the first step of the reflection cycle is to

find an artifact that is the most representative of the goals the individual is trying to find.

This framework is circular and starts with the identification of goals. Therefore,

reflective practice starts as an intentional practice to build skills. Most teachers in the state of Texas can use their curriculum guides and learning standards to start the selection component of the reflection cycle.

Description

According to Brown and Irby (2001), the second step of the reflection cycle is description. At this step in the reflection cycle, teachers are asked to describe the experience related to the artifact they selected in the first step. This step of the reflective cycle is similar to Ward and McCotter's (2004) technical levels of reflection because teacher's at this step in the reflection cycle give with responses to specific situations without analyzing the way their actions contribute to the situation. Teachers, who reflect at this level, typically focus on teaching tasks like planning and management, but do not consider the connections between teaching issues. Teachers who reflect at this level are likely to personally respond to situations without analyzing how their teaching strategies contribute to student success.

Analysis

According to Brown and Irby (2001), teachers at the analysis step of the cycle, analyze how the artifacts the teachers selected are related to their personal beliefs. Teachers reflecting at this point in the cycle analyze how their teaching strategies impact the way students are able to digest the learning targets they selected in the first step of the cycle. This is also consistent with Ward and McCotter's (2004) dialogic levels of reflection which are associated with an inquiry based thinking. Teachers who reflect on this level focus on student learning and these teachers often seek the perspective of

students and other peers. These teachers synthesize their inquiries to develop new insights about teaching.

Appraisal

According to Brown and Irby (2001), teachers at the appraisal step of the reflection cycle interpret the experience gained through the first 3 steps of the cycle. Teachers at this point in the reflection cycle evaluate the way their interpretation of their curriculum guides has impacted student learning. They evaluate the specific impact their personal values and beliefs intersect with their school's mission, vision and curriculum guides.

Transformation

According to Brown and Irby (2001), teachers who are at the transformation stage of the reflection cycle use the interpreted data to develop goals. This is similar to Ward and McCotter's (2004) transformational level of reflection because teachers question fundamental questions and change their practices. These teachers focus on personal involvement with teaching, ethical, moral, cultural or historical concerns and how these impact students and others. For these teachers, reflection is a long-term ongoing inquiry including engagement with model mentors, critical friends with careful examination of how it affects student learning. Furthermore, teachers who reflect at this level, challenge personally held assumptions.

Conclusion

I attempted to gain the perspectives of rural math educators of African American students. Memory High School was a very pleasant school with nice teachers. However, the problems I highlighted nationally and throughout the state in the first part of this chapter were also evident at the research site. If educators are going to improve the educational experiences of African American students in the area of math achievement, then we must embrace strategies such as culturally responsive pedagogy which could help improve their performance.

Operational Definitions

The following definitions provide an understanding of the terms used in this study.

Achievement Gap: Refers to the consistent disparity on a number of educational measures between the performances of groups of students. Particularly performance on standardized tests.

Academically Acceptable: The third highest possible rating in Texas Education Agency's (TEA) accountability system. Schools who receive this rating do not receive any sanctions from the TEA (Texas Education Agency, 2013).

Academically Unacceptable: The lowest possible rating of the Texas Education Agency's accountability system. A school or district with this rating is subject to sanctions and can be potentially closed (Texas Education Agency, 2013).

Adequate Yearly Progress: The measure by which schools, districts, and states are held accountable for student performance under Title I of the No Child Left Behind Act. The

goal is to have all students reaching proficient levels in reading and math by 2014 as measured by performance on state tests (Texas Education Agency, 2013).

African American: This refers to citizens or residents of the United States who have total or partial ancestry from any of the native populations of Sub-Saharan Africa (Unites States Department of Commerce, 2012).

 Culture: the beliefs, social forms, and material traits of a racial, religious, or social group:

European American: is a citizen or resident of the United States who has origins in any of the native populations of Europe (United States Department of Commerce, 2012).

Gap Gaze: documenting the existence of the of performance gaps without noting advancements and creating interventions for marginalized groups (Gutierrez, 2008)

 No Child Left Behind Act: A United States Act of Congress that is based on the premise that setting high standards and establishing measurable goals can improve individual outcomes in education. The Act requires states to develop assessments in basic skills. To receive federal school funding, states must give these assessments to all students at select grade levels. The Act does not assert a national achievement standard. Each individual state develops their own standards (Texas Education Agency, 2013).

Role of the Researcher

I focused my analysis on the reflective practices of math teachers teach African American students in a rural high school setting. My interest in this area stems from witnessing first-hand the difficulties many students face transitioning to high school mathematics. In particular, I have noticed African American students struggling in their

Algebra I classes, which serves as a gateway to higher-level mathematics courses and features concepts that are more abstract in nature than its lower-level counterparts (Leonard et al, 2009). I have continuously witnessed students who are not successful in their Algebra I class fail that class and become frustrated with school and sometimes drop out of school. I have also witnessed extraordinary teachers change their teaching strategies to meet their student's needs and assist students in experiencing tremendous academic growth. In some instances, I have witnessed teachers increase their student passing rate on the state assessment by 20 percentage points by reflecting on their practices and making changes.

As an African American male who watched my father's health deteriorate and ultimately die from diabetes and a best friend who matriculated through the legal system, I see the importance that education has in the lives of African American students. Therefore, I believe education can help eradicate the disparate life standards and educational outcomes between African American and their European American counterparts

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Educators are perpetually pressured to decrease the African American achievement gap because the NCLB act dictates that every student demonstrate proficiency on their math and reading state assessments by 2014. Therefore, school leaders are under increased scrutiny from federal and state legislatures to increase the achievement level of African American students in the aforementioned content areas, but primarily in math because nationally, and in Texas, African American students lag behind their European American counterparts in larger numbers (TEA, 2012;NCES, 2012) . The disparate achievement of African American students is nothing new, in fact, Ladson Billings (2006), noted that educators have been aware of the performance disparities amongst African American students for the past 45 years.

With that in mind, researchers have offered countless reasons and observations to explain why there are perpetual academic disparities between African and European American students. Researchers such as Fordham and Ogbu (1986) and Steele (1997) argued that cultural disconnections amongst African American students contribute to the achievement gap; however these theories have been widely debated in regards to their validity (Comeaux and Jayakumar, 2007;Whaley & Noel, 2011) because researchers claimed these theories indirectly blame African American students for their academic shortcomings without analyzing educational disparities such as funding inequities and teaching flaws.

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Similarly, other constructs attempted to explain the variation in achievement amongst African American students by arguing that historical, social and school inequities have created an oppositional culture to things such as speaking proper English and working hard to get good grades in school (Ogbu, 2004; Steele, 1997). Moreover, these theories claimed that identification with the academic domain, promotes European American perspectives and can create conflicts between African American youth because it implies a preference for that culture over their own community (Fordham & Ogbu, 1986; Whaley & Noel, 2011). This literature review will consist of the following topics: African American achievement gap, the social issues exacerbated by the disparate achievement of African American students in math, possible causal factors of the achievement gap, practices of Successful math educators of African American students, a conceptual description of Reflection, critical self-reflection and teachers, culturally responsive pedagogy and critical reflection and the conclusion.

African American Achievement Gap

According to the National Governors Association (2013), the achievement gap is defined as "a gap in academic achievement persists between minority and disadvantaged students and their white counterparts. This is one of the most pressing education-policy challenges that states currently face." Since the emancipation from slavery, African Americans students have historically strived to overcome the lack of equality as it relates to educational opportunities, which, in turn, has resulted in the ever broadening achievement gap that separates them from their European American peers (Chambers, 2009; Walker, 1996). Even today, these students are less likely to receive access to

advanced math curriculum to stretch their thinking (Terry & McGee, 2012) as evidenced by the rampant variance in achievement with their European American counterparts, which was discussed in the previous chapter.

Moreover, today's economy is heavily dependent on technological innovations that require advanced mathematical reasoning skills (Terry & McGee, 2013) and African American students are omitted from these opportunities because they are not receiving the mathematical skill-set typically acquired in advanced math courses that would allow them to compete in a global economy (Bonner & Adams, 2012).   As a result, these students are more likely to like to live a lower quality life as healthiness and life success are in part, correlated with mathematical skills (Levin, 2009; Reyna & Brainerd, 2007). This portion of the review of the literature will cover the African American Achievement gap from a national, state and local perspective, rural African American math education and discuss funding disparities

National

Decreasing the achievement gap amongst students is a popular slogan and rallying cry for practically every school district in the country (Dufour et al, 2005). In 2006, according to the Program in International Student Assessment (PISA) the United States scored 45 out of 55 participating countries in regards to the disparities between poor students of color and middle class European American students (Darling-Hammond 2010). The PISA program is an international assessment that measures 15-year-old students' reading, math and science literacy (NCES, 2012). European American students scored over 100 points higher in the math test than their African American

counterparts during the 2009 submission of the test (NCES, 2012). This is significant because in 2006, the United States ranked 30th out of 55 countries in the math assessment. More telling, is the fact that European American scores on this assessment were comparable with the sixth place country while, the African American student scores on the assessment were consistent with countries near the bottom of the rankings.

State and Local Perspective

In Texas, during the 2011 administration of the math TAKS test, African American students scored 16 points less than their European American counterparts (TEA, 2012).   In Memory ISD, the location I will conduct my study, African Americans scored 11 points less than their European American counterparts in their 8th grade math state assessment in 2011 (TEA, 2012).   By comparison, in 2011, there was a seven point gap between African and European American students on their TAKS reading assessment in Texas. In addition, schools that are located in rural locations and serve high numbers of impoverished students like the school listed in study, are four times less likely to meet federal performance standards (Irvin et al 2012). Although there is some national and state improvement in African American reading performance, there are persistent and wider disparities in math achievement (TEA, 2012).   African American students continue to make progress in subjects like English and Social studies which allow students to express themselves through writing or movement, but continuously lag behind in math, which is traditionally taught in more concrete manners (Tate, 1995). Tables 4 and 5 illustrate the achievement levels of African American and European American students on the 2011 8th grade math TAKS examination.

Table 4

Passing Rates of AA and EA on 2011 Math TAKS Assessment

School Year	2009	2011
TAKS Passing Rates AA*	70%	70%
EA**	91%	88%

Note. * = African American, ** = European American

Table 5

Passing Rates of AA and EA Students in Memory ISD on TAKS

School Year	2009	2011
TAKS Passing Rates AA*	69%	77%
EA**	87%	88%

Note. * = African American, ** = European American

Rural African American Math Education

Researchers have argued that rural math education has been recognized as an area of research that has not been adequately explored (Howley, 2003). More significant to my study, is that studies regarding African American learners are often situated in urban locations (Jones, Irvin & Kibe, 2012). That is quite interesting when national

trends indicate that African Americans are moving away from urban areas (Jones et al, 2012). In fact, nearly half of all African Americans live outside of urban areas with nearly 13% are living in rural areas (Bilefsky, 2011). With that being said, at the time of this study, there had not been large numbers of inquires which attempted to highlight academically supportive factors of high school African American math learners in rural settings (Jones et al, 2012).

Accordingly, educators who work in rural areas face tremendous challenges because these areas have higher incidents of poverty than the rest of the country and African American students receiving their education in a rural setting are much more likely to experience extreme poverty (Goodpaster, Adedokum & Weaver, 2012). Furthermore, isolation from economic and educational opportunities in rural areas such as the place I want to conduct my study, can constrain post-secondary opportunities for these students and manifest itself into lower educational aspirations.

In the face of these daunting statistics, educators like Lester (2012), have started to introduce place based education (PBE). PBE is similar to culturally responsive pedagogy because it forces teachers to use their student's background in the curriculum and empowers them to make changes in their community. Practices such as these have been linked to improved student achieving on standardized tests as well as increased grades. Moreover research (Irvin et al, 2012) has begun to develop which indicates there is a positive relationship between participation in school, community and church activities. This is important to my study because research indicates that African American students, who live in rural areas such as the area I am examining for my study,

have higher church attendance rates than their counterparts in urban and suburban areas (Irvin et al, 2012). This is a tool that a reflective math teacher in a rural area could use to enhance the school experience of this population of students by altering the curriculum to include experiences their students are likely to encounter in their daily lives, which research has proven to increase the achievement levels of African American and other underserved populations of students (Tong et al, 2010; Geier et al, 2008; Lester, 2012;)

Funding Disparities

States continuously disproportionately fund school districts (Darling Hammond, 2010). Darling-Hammond (2010) and Ladson-Billings (2006) highlighted funding disparities between school districts in the same state. They found wealthy districts within the same county get more than two or three times the money per student than their poorer counterparts (Darling-Hammond, 2010). In 2006, the Chicago public schools spent about $8,000 per pupil while Highland Park a suburban neighbor of Chicago spent approximately $17,000 per pupil (Ladson-Billings 2006). Consequently, Waters and Marzano (2007) noted that an increase in per pupil funding of $500 has been associated with significant percentile gains in student achievement depending on where that money is invested.

In Texas, public school funding does not appear to be allocated based on student needs. Smith (2012) noted that in 2008, Galveston ISD's target revenue was $5,651 per pupil and Deer Park ISD's target revenue was $5,651 per pupil. According to the 2011 Texas Academic Indicator System (AEIS) report, Galveston ISDs student population

was 70% economically challenged in contrast to Deer Park's 44% of students. These school districts received the same amount of funding per student, even though Galveston ISD had 26% more economically challenged students than Deer Park ISD. Research (Darling-Hammond, 2010) shows that it costs more money to educate students in economically challenged situations to the point where they are proficient on their state assessments because schools that serve higher numbers of these students must implement costly academic interventions like tutorials and computer based reading programs. For reasons such as those, Gronberg et al (2004) estimated that it costs approximately $2000 more per pupil to educate an economically challenged student. Furthermore, it has been argued by researchers such as Grongerg et al (2004) that equitably financing schools in Texas would require the legislature to analyze the amount of money it cost to get students to pass the state assessments and fund schools according to what it would take a student in that particular school to master their state assessment. However, the political landscape in Texas makes it hard to enforce such a system (Ladd & Hansen, 1999). Carr and Fuhrman (1999) pointed out that in Texas many of the tax payers in affluent school districts are European American and many of the more economically challenged school districts serve students of color. Therefore, the school districts that would benefit the most from restructuring the way Texas finances education serve those students of color. Polling data from failed educational finance reform efforts in Texas during the 1990s indicated that residents in wealthier areas were less likely to support tax increases if it did not benefit students in the school district in their area (Carr & Fuhrman, 1999). Funding disparities still exist in rural locations because in Texas

they are less likely to have representation in the state legislature to battle for finances (Smith, 2012).

Social Issues Related to the Achievement Gap

The monetary costs of not equitably educating the population is not only a moral injustice, it proves to be less than economically efficient as well (Levin, 2009). The cost of not equitably educating segments of the population has very damaging effects, resulting in a lifelong list of barriers for students to face (Deming, 2011). Prison and unemployment are two of those barriers. According to Deming (2011), only 35% of inmates in U.S. prisons graduated from high school. According to the Department of Justice statistics (2010), African Americans make up 12 to 13% of the United States population, but consist of approximately 41 percent of the prison population. In this section I will discuss the connection between education and incarceration and math skills and overall health

Incarceration

There is a documented correlation between high school completion and incarceration (Deming 2011; Himmele & Himmele 2010; Levin 2009; Stuit & Springer 2010). It appears that individuals who have higher levels of education have more employment options and are less likely to participate in criminal activity. In 2007 only 54% of African American students completed high school, while 75% of European and Asian American students completed high school in the same time span (Levin, 2009). According to Stuit and Springer (2010), in 2006-2007 the national rate of imprisonment was six times higher for high school dropouts than their peers with high school

diplomas. In 2011, African Americans comprised 12% of the Texas state population, but a sizeable 35% of the prison population (US Department of Commerce, 2012; Smith, 2012). Additionally, African Americans constitute a small ethnic population in Texas, but, in contrast, are the largest incarcerated population (US Department of Commerce, 2012).

Parents of students of color, particularly African American students are more likely to be incarcerated than their European American counterparts. Moreover, curriculum which blindly paints incarcerated persons as bad people without analyzing the sociopolitical aspects such as racial profiling and the war on drugs which disproportionately affect African students can be used to alienate students (Clopton & East, 2008). Therefore, reflection skills can be a valuable asset to high school math teachers because it gives them the ability to deconstruct their pre-conceived notions and make changes to their curriculum that kind alienate students (Clopton & East, 2008; Milner, 2003). Additionally, gaining an acute awareness of the world students' lives, allows teachers to take psychologically damaging subjects like parent incarceration and use these experiences to empower students by creating inquiry based tasks which helps them grasp the way societal norms such as racial profiling impact their daily life (Leonard et al, 2010). These practices are consistent with culturally responsive pedagogy and have been proven to increase student achievement on standardized tests (Annetta, Shawn, Holmes & Tzu-Cheng, 2009; Butter, 2001). Figure 2 illustrates the relationship between the population of African Americans in Texas and their

incarceration. This shows the disparate incarceration numbers for African Americans in the state of Texas.
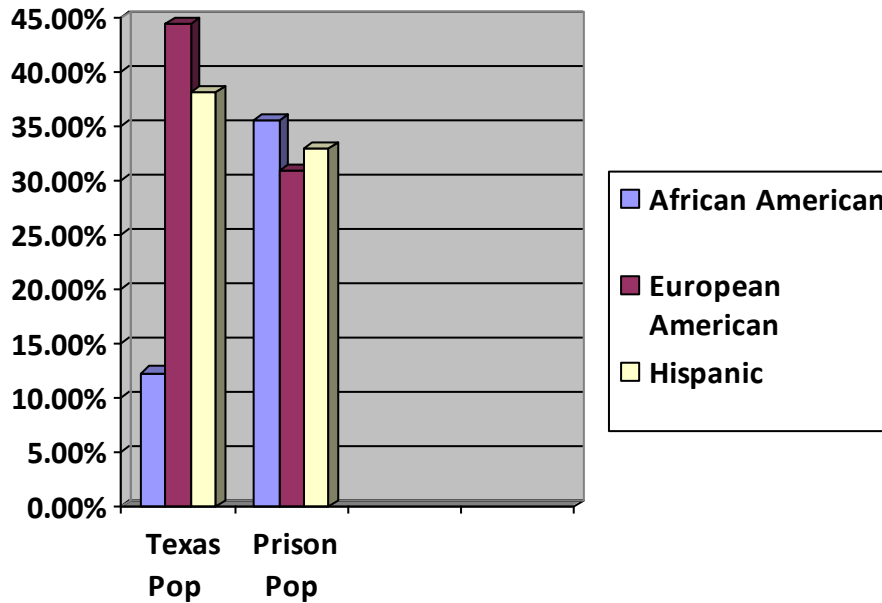
Figure 2 African American Prison Population

Math Skills and Health

The level of mathematical analytical skills an individual possesses is a predictor to executing activities that are risky (Freudenberg & Ruglis, 2007), as people with higher amounts of these skills are more likely go to the doctor for preventative care and diagnose complex treatment plans which could increase their likelihood of maintaining a healthy lifestyle. (Copeland 2005). Furthermore, mathematical competence helps build health literacy (Berkman et al, 2011). Health literacy refers to a set of skills needed to effectively perform in the health care environment (Osborn et al, 2009).   Particularly, advanced mathematics skills such as the ones students learn in high school are necessary

for individuals to interpret food labels, measure blood glucose levels and maintain diet and medicine routines (Berkman et al, 2011). Moreover, studies indicate that health literacy skills are associated with increased uses of preventative health care items such as mammography screenings (Berkman et al, 2011) and math skills have been traced to the incidence of diabetes. In fact, Osborn et al (2009) noted that studies have indicated higher-level mathematical analysis skills can mitigate the disparity in diabetes occurrences between European American and African Americans.

In an analysis of health studies they (Osborn et al, 2009) found that when patients had equal levels of mathematical skills, they could track the inequalities of diabetes frequencies based on math skills and not ethnicity. This is tremendously noteworthy because, African Americans are 77% more likely than their European American counter parts to contract diabetes, which can lead to heart disease, stroke, and pregnancy problems (Sebulius, Frieden & Sondik,, 2012). Furthermore, the life expectancy discrepancy, which was discussed in the previous chapter, between these groups is due to the pervasiveness of heart disease, cancer diabetes and perinatal conditions (Sebulius et al, 2012).

As noted earlier, mathematical skills in which individuals can understand and use in everybody life, in some instances eliminates disparities in the aforementioned aliments and eliminate the gap in life expectancy between African and European Americans. Therefore, making the mathematical curriculum in contexts the students are familiar with could improve health outcomes for the entire African American

community because many of ailments listed previously are preventable and have been shown to decrease with significant math analytical skills

When young people are denied an equal chance for a well-rounded formal education, the probability that those same people will depend on the government for welfare or Medicaid assistance or experience prison as an adult is dramatically increased (Stuit & Springer, 2010). Also, a high school education gives people the opportunity to live in safer neighborhoods and it also allows people to make better choices regarding health decisions because they have access to the proper information and tools needed to insure better quality of life. Moreover, African Americans are more likely to experience cardiovascular disease than any other ethnic group (Singelton, Robertson, Robinson, Austin & Edochie, 2008). It appears that people who graduate from high school are more likely to have a balanced diet and exercise and more likely to engage in behaviors that would typically prevent the onset of cardiovascular disease (Manchester & Topoleski, 2008). The literature regarding education and life expectancy indicates that cardiovascular disease is the biggest contributor to the disparities in life expectancy amongst people with varying levels of education (Manchester & Topoleski,, 2008).

Thus, it is reasonable to assume that health and the level of educational attainment are directly related to each other, but at this writing, the education and health professional communities have not joined forces to significantly bridge these gaps. Doing so would increase the level of educational attainment of all students, decrease chronic diseases, and possibly save more lives than any of the medical advancements that have thus far been made (Freudenberg & Ruglis, 2007). In fact, research is

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emerging (Francis & Chino, 2012; Francis et al, 2010) throughout various parts of the country which indicates teachers have started using aspects of culturally responsive pedagogy to disseminate information regarding diabetes and other health problems that African Americans and other people of color within math and science classes. The results appear to raise awareness amongst these students which could decrease the onset of this ailments amongst this population, while teaching in an inquiry based manner which has been proven to increase student performance on standardized assessments.

Unequal Education of African American Students

Historical inequities exacerbate the unequal education of African American students. From the 16th century until the 19th century, African Americans were denied the right of an education during their enslavement in the United States (Ogbu, 2004; Chambers, 2009). Students in the United States attended segregated schools for the first 100 years after African American students were emancipated from slavery. Even after African Americans were freed from slavery, they were not given access to significant numbers of qualified teachers or provided the same resources as other students during that time (Walker, 1996).

During the early periods after liberation, African Americans often attended schools for less amounts of times than their White counterparts. Even so, the African American community continued to fight for funding equality and that in part led to the integration of public schools throughout the United States. However, as mentioned earlier in these writing, schools that serve African American students continue to receive less funding than schools which serve European American students. Furthermore,

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incongruent instructional and discipline procedures have intersected with the abovementioned conditions to contribute to the distinct mathematical experiences of African American students.

<div align="center">**Ineffective Math Instruction Among African American Students**</div>

Math is a tool which opens doors to careers in the fastest growing career fields (Bonner & Adams, 2012), but African American students are not receiving this training at significant levels to allow access into these career fields. In this section of the literature review, I will give a brief historical overview of the African American educational experience in the United States, discuss tracking, instructional and discipline school policies that negatively impact African American students.

Historical Synopsis

African American schools during the period after emancipation used cast- off textbooks, as schools were designed to subjugate African Americans as a permanent servant class (Ladson-Billings 2006; Ogbu, 2004).   These schools were given the textbooks that the schools which served the European American students discarded because they adopted newer versions. Therefore, students received information which could have been out-of-date and invalid by the time they were received. In the 1970s after African American students integrated with European American students, many African American teachers lost their jobs or had to conform to the instructional practices of White teachers (Horsford & Mckenzie, 2008). This was prevalent because after the schools integrated, many African American schools were closed and there was not enough space at the integrated schools to accommodate for the increased number of

teachers (Chambers, 2009; Horsford & Mckenzie, 2008). This created problems for African American students because European American teachers were not prepared to meet the instructional needs of African American students once they arrived on their campuses, and as a result, were viewed as inferior and disproportionately placed in remedial classes (Chambers, 2009). Many of the teachers were used to teaching in a manner which was consistent with European learning preferences which manifested themselves in whole class lectures with minimal student participation (Tate, 1995).

Furthermore, in order to get a true depiction of the state of education, one must realize that the American school system is still operating under the accountability assumptions that were prevalent during the industrial revolution of the nineteenth century (Schlechty, 2001). Schools during this time were designed to track students into vocational tracks (Waters & Marzano, 2007). During this time the educational system was designed to teach students how to become better factory workers and high schools were designed with the factory assembly line concept which moved kids in and out of classes without differentiating for their specific needs (Schlechty, 2001). Moreover, middle class European American students were typically placed in higher level tracks that prepared them to become factory owners while African American and poor students were placed in tracks that prepared them to work in factories.

Incongruent Instructional Practices

Teachers have not historically had to reflect on their instructional practice because until the accountability era, there was not any emphasis on the achievement levels of African American students (Gay & Kirkland, 2003; Darling-Hammond, 2010).

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Before the advent of the NCLB act which I discussed earlier, schools were not held accountable for the achievement of their African American students and were not required to track and analyze the graduation rate of their students. Accountability from this act has placed more pressure on educators to find creative ways to meet the educational needs of African American students. Researchers like Darling-Hammond (2010) and Kerna and Thomas (2009) argue that the way most states have implemented the accountability requirements of the NCLB act have adversely affected the curriculum African American students are likely to receive, but until schools were required to track student progress, educators had no accountability for monitoring student achievement. Therefore, mathematics has traditionally been taught associated with a Eurocentric philosophy of competition and social stratifications (Tate, 1995), resulting in lecturing and rote calculations and leading to academic tracking (Chambers, 2009). .

Advanced courses serve as gateways for the American school system to track and differentiate instructional quality amongst students (Chambers, 2009; Terry & McGee, 2012). Furthermore, math classes have been used to afford privilege to some students while limiting opportunities with other students (Martin et al, 2010). Students who are afforded the privilege receive instruction that can prepare them for careers in engineering and high-tech areas that could drastically increase their earning potential as adults. Furthermore, those students who typically benefit from traditional instruction are likely to receive inclusion into higher level math classes while African American students who benefit from a culturally responsive instructional strategy are more often placed in lower-level remedial courses.

Because of academic practices like the traditional approach to mathematics discussed above, African American students are labeled intellectually disabled at three times the rate of European American students (Skiba, 2008). Intellectually disabled is defined as a disability characterized by significant limitations in intellectual functioning and in adaptive behaviors (American Association of Intellectual and Emotional Disabilities, 2013). Students often become labeled as mentally retarded in elementary schools because they score lower than a 70 on their IQ tests (AAIED, 2013). There are four levels of an intellectual disability: Mild, Moderate, Severe and Profound. Mild levels are characterized by an IQ score of 50-70. Moderate levels are characterized by an IQ score of 35-55. Severe levels are characterized by an IQ score of 20-40. Severe levels are characterized by IQ scores under 20 and are usually characterized by a neurological disorder like autism (AAIED, 2013).

African American students may suffer academically because teachers lack knowledge of students' learning and communication styles (Morgan, 2010). Bailey & Boykin (2001) noted that all students achieve at higher levels with a variety of instructional techniques; however, the achievement of African American students increases much more than European American students when they are exposed to a variety of instructional techniques such as collaborative learning, kinesthetic learning activities and curriculum that is taught in a context students are familiar with. Teaching math in a context the students are familiar with allows them to make sense of the quantitative instructions they are receiving by analyzing it through their own experiences. Teaching mathematics instruction in a variety of manners allows African

American students to experience the curriculum through their cultural preferences while reaching the learning styles of other students who are visual or kinesthetic learners (Bailey & Boykin, 2001; Dunn & Dunn, 2005).

Discipline for African American Students

African American students are suspended three times as often as their European American counterparts (Losen, 2011). Interestingly, African American students are more likely to receive harsher punishments when they are engaging in similar behaviors as European American students (Monroe, 2009). The discipline disparities are not a new phenomenon and in fact, have been studied since 1975 when the office of civil rights found that African American students at that time were suspended two and a half times more often than other peers (Monroe, 2009; Noltemeyer & Mcloughlin, 2010).

What's more telling is that even after adding socioeconomic factors into the equation, middle class African Americans are still more likely to be suspended than other students in lower socioeconomic stations (Gregory &Weinstein, 2008). Many school factors such as administrator philosophy and beliefs, per pupil spending and the district socioeconomic status are associated with higher suspension rates amongst African American students (Noltemeyer & Mcloughlin, 2010). These things negatively affect African American students because as mentioned earlier in this chapter, school districts where large numbers of African American students attend are more likely to spend less per-pupil than other districts (Darling-Hammond, 2010).

Moreover, the offenses that African American students are likely to receive serious sanctions are not dangerous ones such as weapon possession, but subjective

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offenses such as disrespect or insubordination (Monroe, 2009; Skiba et al 2011). The public has the perception that harsh exclusionary discipline tactics such as suspension and expulsion are effective ways to modify negative behavior (Skiba & Peterson, 2000). However, experts indicate that students suspended in sixth grade are for more likely to be suspended in the eighth grade and removing students from school where they are supervised puts them at a greater risk for gang and other delinquent behavior (Losen, 2011)

Teachers play the largest role in eliminating discipline discrepancies (Monroe; 2009; Skiba & Peterson, 2000) because most discipline problems originate in the classroom. In fact, researchers (Gregory & Weinstein, 2008) argued that power struggles between students and teachers comprise one of the largest discipline offense categories. Studies (Ferguson, 2007; Gregory & Weinstein, 2008) have argued that African American students sometimes exude a tough concealment to deal with racism in school. What is more, studies have shown that differences in classroom management can significantly contribute to student attitudes and disciplinary outcomes (Skiba et al, 2011). It appears the way students respond to their teacher's intentions has a significant and direct impact on their educational outcomes (Monroe, 2009; Skiba et al, 2011).

Zero Tolerance Policies

Some teachers view non responsiveness in class as disrespect and develop negative perceptions of students because they do not actively participate in lessons that teachers lecture. Behavioral expectations like responding to question by anxiously raising a hand or responding to a teacher by their last name might be culturally

embedded and in many instances students' cultural norms are not congruent with school expectations (Morgan, 2010; Verdugo, 2002). Students are often referred to administrator's offices because teachers feel as if they are disrespecting them by not responding appropriately to them.

In many instances, once they arrive in the principal's office, they are disciplined by Zero tolerance policies that include subjective student discipline offenses like the ones mentioned earlier in this sentence. Zero tolerance policies are defined as policies which schools punish any infraction of a rule with the same consequence, regardless of accidental mistakes, ignorance, or any other circumstance (Skiba, 2008). These policies that were developed in the nineties ensured a disproportionate number of students of color were referred to administrator's offices because teachers do not have the skill set to differentiate their instructional strategies to meet their needs (Bondy, et al, 2007; Carter, Hawkins & Natesan, 2008, Skiba, 2008).

Cultural Style and Discipline Among African American Students

These discipline issues often arise because of cultural disconnections between students and the teachers that serve those (Weinsten et al, 2003). For instance Bailey & Boykin (2001) noted that many teachers view behaviors that are associated with communalism and cultural expressions of African American students as negative because African American students value movement and a variance of activities while European American teachers may value individualism which often manifests itself in whole class instruction and competition amongst students answering questions (Bailey & Boykin, 2001).

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It has been observed, that African American students receive discipline referrals because they talk in class or have a hard time remaining in their seats (Bondy, et al, 2007) because those students benefit from activities that require movement (Carter, et al, 2008; Dunn & Dunn, 2005). Activities that require a person to move are considered kinesthetic activities and when a teacher does not differentiate their instruction to meet the needs of students that are visual and kinesthetic learners, they students up for failure if their learning styles do not match the way they are disseminating instruction (Bailey & Boykin, 2001; Dunn & Dunn, 2005)

Successful Instructional Strategies

Successful math teachers of African American students have been documented to possess pedagogical Content Knowledge (PCK) and an acute awareness of culturally responsive pedagogy (Leonard et al, 2009; Leonard et al, 2010). Culturally responsive pedagogy defined earlier in this paper provides foundational understanding of intentional engagement with students of color, is complemented by, PCK which is a teaching strategy that focuses on teaching mathematics instruction through mathematical thinking, language, culture and social justice (Aguirre et al, 2012; Leonard et al, 2009; Leonard et al, 2010). Before high school math teachers can successfully educate African American students, they must have an acute understanding of the content area (Aguirre et al, 2012; Newton, Leonard, Evans & Eastburn, 2012) and cultural contexts among students. In fact, Newton et al (2012) found significant correlations between mathematical content knowledge and the teacher's beliefs that they had the ability to teach their students.

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Furthermore, many successful math teachers of African American students make connections with student's home communities as their course content is situated in circumstances that the students are likely to encounter in their daily lives (Aguirre et al, 2012; Bonner & Adams, 2012; Leonard et al 2010), because students are more likely to remember math concepts when they are affixed in the culture of the community (Leonard et al, 2009). In this section, I will discuss culturally responsive pedagogy, vevre and culturally responsive classroom management in this section of Chapter II.

Culturally Responsive Pedagogy

Culturally responsive pedagogy is a technique used to draw out the meaningful aspects of the cultures, languages and experiences students bring with them to the classroom (Leonard et al, 2009). Ladson-Billing's (1995) study of successful elementary school teachers of African American students helped construct the concept of culturally responsive pedagogy, which she defined as "a pedagogy of opposition not unlike critical pedagogy but specifically committed to collective, not merely individual, empowerment" (Ladson-Billings, 1995b p. 160). Furthermore, culturally responsive pedagogy must ensure students experience academic success, develop and maintain their cultural competence and develop a consciousness to challenge the status quo (Ladson-Billings, 1995b).

An example of culturally responsive pedagogy in action can be found teacher in a study done by Canniff (2008) when a teacher challenged her students to research the actual legislation and court cases that have helped shaped the curriculum. The students were also charged with researching their family lineage and how their cultural

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background would have affected the quality of school they would have received at various parts of the last century. Students were forced to analyze their cultural affiliations and see if they would have likely attended a segregated school. They looked at the differences in the types of facilities available to students in segregated schools and made a final assessment on the likely quality of their education. Activities such as these validate students of color's cultural affiliations because they see their culture represented in the classroom and they are active participants in shaping their school experience during the process.

Allowing students of color to maintain cultural competence is a key ingredient of an inclusive education for every student. Teachers can support student's cultural competence by acknowledging the legitimacy of their communication preferences and using things that transpire in the community as forms of knowledge (Leonard, et al, 2009). For instance, Bondy et al (2007) noted that many of the teachers in their study modified the way explained directions to ensure their students were explicitly prepared, while using their classrooms to teach students ways they could communicate when they apply for jobs or speak to people who may not be familiar with them. Schools have historically been used to promote and perpetuate the norms and values of the dominant culture and indirectly invalidate cultures that differ from the dominant culture (Macleod, 1995).

Culturally responsive pedagogy ensures that educators use their curriculum guides to create an education that helps to close the divide currently existing between African American students and the dominant school establishment (Tate, 1995). For

instance, in Ladson-Billing's (1995) study she noted that one of teachers in her study had a student in her classroom that had previously been labeled as a troublemaker. The teacher encouraged that student to run for school office and organized her class to support that student. That enabled the student to use his leadership skills in a positive way, allowing that student to keep their cultural competence. The student was encouraged to become an academic leader while simultaneously having his cultural values and style appreciated. This resulted in the student feeling a connection to the curriculum which created confidence, empowered him, and gave credence and legitimacy to his learning style.

Teachers who are versed in culturally responsive pedagogy also utilize their student's experiences as a way to connect with them (Aguirre, Zavala, & Katanyoutanant, 2012). For instance, in a study done of culturally responsive pre-service teachers, Mensah (2011) noted that teachers in New York designed a science unit on pollution and made a connection to the students by challenging them to find out why their community is surrounded by air pollution. Next, she asked them if anybody they knew had asthma and informed them that studies show that Bronx County community to have one of the highest rates of asthma in the United States as a result of the pollution that is evident. The teacher effectively used personal experiences with asthma and their environment as background information to put air pollution in a context that they could be familiar with. Because students were able to make a direct connection with the situation and surrounding issues related to pollution in their neighborhoods, it can be argued that aligning personal and individual experience to a lesson is an effective way to

empower students through the manipulation of the curriculum. This is particularly useful to African American students because most curriculum guides do not include the experiences of these students. Curriculum guides are often politically driven and include the experiences of the dominant culture because cultures of color do not always have the political capital to influence legislative decisions like curriculum adaptations (Leonard et al., 2010).

Students will suffer academically if the curriculum and teaching styles do not match the experiences they bring to the classroom and the ways students communicate and learn (Dunn & Dunn, 2005; Morgan, 2010). Without a complete understanding of how their teaching strategies directly influence the engagement and achievement of their students, many teachers give up and do not have the skills to take ownership of their student's success (Dray & Wisneski, 2011). Teachers such as these would be more likely to blame students for their fails instead of analyzing the effect their own actions have on student learning. As mentioned earlier, studies have shown that African American students score substantially higher on math standardized tests when teachers communicate with students in ways that are familiar with them as well as include culturally relevant materials into their curriculum content (Butty, 2001).

Tate (1995) also suggested that math teachers who are proficient in culturally responsive pedagogy use student's current experiences to teach math. He noted in his study that a culturally responsive math teacher developed an interdisciplinary approach to community problem solving. One student had a mother who was an alcoholic and the class's personal project was to develop a multi stepped plan to move the liquor stores

away from their school. The students studied local codes and observed that the system

created tax advantages and other financial incentives to for liquor stores located in the

area of the school. Moreover, the students wrote letters to the city council and were

eventually able to get some of the liquor stores closed for various violations. Activities

like these bring relevance to the curriculum because they incorporate student's lived

experience and also make students agents for change within their communities (Ladson-

Billings, 1995; Tate, 1995).

Furthermore, Brantlinger (2005) linked cultural relevance in his study when he

observed a geometry teacher in an impoverished part of the Midwestern part of the

United States. The teacher used Google maps, scaling and geometry to investigate the

number of movie theatres and recreation centers located in an urban working class

neighborhood similar to their own. The students created a formula to determine how

many blocks were within the three-mile radius and they noticed there were not any

community centers or movie theatres there as was true of their own neighborhoods. This

activity drew attention to the similarities between the two areas and helped the students

understand that systemic issues can affect resident's quality of life (Leonard et al, 2010).

Another specific example of math instructions in a culturally responsive context

is a study by Leonard et al (2009). In this study, the teachers in a high school math class

placed the students in groups and they analyzed the amount of calories their favorite

meals contain at a fast food restaurant in their community and recorded data over a two

month period. This allowed the students to engage in meaningful social and cultural

issues that are relevant in their lives. It was later confirmed that before this study, the

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students in this class did not have knowledge about the impact eating at their favorite fast food location had on their health. The students were instructed to analyze the corporate profit of that restaurant and how the cost of higher education could possibly lead to an increased dependence on that restaurant for employment and the impact that had on their community. The cost of a higher education and the fact that this restaurant is one of the biggest employers in their community forced the students to critically think. The students concluded that the cost a higher education was not affordable to many of the residents who lived in the community and this business was one of the biggest employers in the community, which led to many community residents working at this establishment. Although, this fast food restaurant was unhealthy and could harm members of their communities, the intersection of opportunity and circumstances tied their community to the restaurant.

Lastly, Leonard et al (2010) noted in a study that calculus students at a high school were studying data and statistics. Through this study, the teacher presented them with the pronounced differences in income between affluent families and families living below the poverty line. The students grasped the differences because after the lesson was finished, they realized that the top 20% of households contained 47% of the nation's wealth. The students also examined the costs of social programs like Medicare and compared it to the costs of loopholes for the wealthy. The students observed that loopholes that wealthy individuals in the United States use to avoid paying taxes, far exceed the amount of money the country uses for social programs. This is an example of embedding student's lived experience and cultural relevance into the curriculum because

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students can see how calculus can be used to examine social issues that influence their lives. Studies such as the ones presented in this section of the literature review provide African American learners to experience the curriculum through their own experiences through inquiry based learning strategies which studies like (Butter, 2001; Tong et al, 2010) have proven to increase achievement on standardized assessments.

Dimensions of African American Culture

Boykin (1983) indicated that there are nine dimensions of African American culture. Those dimensions include *spirituality* which is the belief that powers greater than man exist, *harmony* is the belief that man operates interconnectivity with the environment rather than control it (Webb-Johnson, 2002). *Movement* is the emphasis on interweaving of movement, rhythm, music and dance. *Affect* refers to an emphasis on emotion and feelings. *Expressive individualism* signifies African American student's preference for their own personal styles. *Oral tradition* suggests the preference for oral modes of communication where speaking and listening are treated as performances. *Social time perspective* is the view of time as an event instead of the clock. For example, events start when people arrive instead of an actual time (Willis, 1989). In the next sections of this paper I will describe in detail *Verve* and *Communalism* and their usage in the math education of African American students.

Verve

Where culturally responsive pedagogy takes a macro approach on the manner that curriculum is introduced to students, verve takes a micro level approach and focuses primarily on the way curriculum is delivered to students without analyzing curriculum

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content. Bailey and Boykin (2001) described verve learning opportunities as stimulating learning environments that allow opportunities for movement, expressiveness, and group learning. Furthermore, Bailey and Boykin (2001) suggested that vervistic instructional techniques include communication infused with rhythmic language, encouraging gestures with many instances of call and response, variations in pace, opportunities for high emotional involvement, creative analogies, figurative language, catchy phrases, gestures, body movements, symbolism and lively discussions. Students who display tendencies for vevristic characteristics appear to perform well in reading and language arts where the content is less defined because these teachers use writing, music and other art forms to differentiate their instructional methods, while struggling in subjects like math where the dynamics of knowledge acquisition include listening, talking, dialogue and discussion (Carter et al, 2008).

Communalism

Communalism is defined as a preference for social bonds, an awareness of interconnectedness among people and a sense of mutual responsibility (Hurley, Boykin & Allen, 2005) and African American students have been shown to have a preference towards that modality (Bailey & Boykin, 2001; Hurley, et al, 2005; McDougal, 2009; Morgan 2010). Teachers who lecture and do not offer a variety of ways for students to interact with their peers and display mastery of their content in a variety of ways are indirectly discriminating against students that prefer to learn cooperatively. This disproportionately affects African American students because that group's predilection for cooperative activities, yet most teachers do not instinctively instruct in that manner

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(Morgan, 2010) because many of them prefer to learn in a more individualistic manner and are not taught these alternative methods in teacher-preparation courses (Gay & Kirkland, 2003). Many teachers do not understand the effect that this practice has on the behavior and educational attainment of students they are serving.

Researchers have suggested that mathematics instruction must include creative ways to use hands on manipulatives. (Carter et al, 2008; Muhammad, 2003) For instance, Aguirre, et al (2012) noted that successful math teachers of diverse students in their study used familiar games to explore probability and learned about the students and their community, while incorporating these elements into lessons to make math more meaningful. Furthermore, Hurley, Boykin, and Allen (2005) contended that cooperative learning is an example of an effective instructional technique that contains elements of verve and has been proven to increase student achievement. This was evidenced in a study done by Butter (2001) in which high school students scores increased once teachers started utilizing collaborative activities in their math classes like video games, seeing that they allow students to process abstract concepts in contexts familiar to them (Annetta, Shawn, Holmes & Tzu-Cheng, 2009).   Moreover, studies where participants are taught using video games as an instructional tool indicated that the students recalled complex concepts better through the utilization of video games than through deductions from the written text (Belanich, Sibley & Orvis, 2004).

Culturally Responsive Classroom Management

Dray and Wisneski (2011) observed that many teachers respond to the behaviors of students based on their own cultural frames of reference. A person's cultural frame of

reference and life experiences directly influence the way they perceive the behavior of people that are different from them (Dray & Wisneski, 2011). There is often a difference of perception between teachers and students which leads to behavior problems. For that reason, African American students are three times more likely to get suspended in their academic career than their White counterparts (Ladson-Billings, 1997). Culturally responsive classroom management requires teachers to recognize that they are humans with pre conceived biases and beliefs; there are pervasive cultural differences that exist within people and schools reflect and perpetuate discriminatory practices of the larger society (Weinstein et al, 2003). Organizing the classroom in a manner that encourages collaborative group work and cooperative learning is beneficial to all students, particularly African American students and can assist in preventing discipline problems within the classroom. The result is an effective teaching strategy that benefits all students.

Classroom management is linked to student engagement (Himmerle & Himmerle, 2010). Students are not likely to engage in classroom activities in environments that are not properly managed because they don't have the means to effectively participate in classroom activities. In order to effectively implement a culturally responsive classroom management plan, teachers must create a physical environment that supports academic and social goals, establish clear expectations for behavior, communicate in culturally consistent ways, develop a caring classroom environment, and work with families to use positive interventions to help students with behavior problems (Bondy, et al 2007). The seating arrangement of a classroom plays a

big role in regards to classroom management, with that in mind, teachers prefer to utilize seating arrangements that inhibit student's ability to communicate with each other and encourage isolation (Morgan, 2010) which indirectly discriminates against segments of students that come from cultures that value communalism.

Much of the literature regarding effective classroom management states that teachers must communicate clear consistent expectations to all of their students, but teachers must ensure that they are communicating this message in a clear and culturally responsive manner (Bondy, et al, 2007; Ladson-Billings, 1995). This is very important in culturally diverse classrooms because many cultures have different views about what is appropriate behavior (Weinstein et al, 2003). Successful teachers of African American students communicate by speaking in a demanding manner and maintaining very explicit expectations with their students in regards to communication within their classroom (Bondy, et al, 2007; Bonner & Adams, 2012).

Teachers must deliberately model a respect for the communication style preferences of the students they serve by structuring their curriculum so that it validates student's home language and links the instruction to the personal experiences of the students (Weinstein et al, 2003). For example, Bondy et. al (2007) noted that one of the teachers in their study used popular culture as they introduced themselves to their classes and listed famous African American actors like Chris Rock and Martin Lawrence when referencing their favorite actors.

Also, teachers that utilize culturally responsive classroom management understand that knowledge claims and communication styles are partial products of

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cultural affiliation while holding high standards for all of their students and communicating their expectations for success. Teachers can reinforce that expectation by communicating those expectations with parents to gather support in dealing with problem behaviors (Weinstein et al, 2003). Therefore, leaders must do an effective job of training teachers to proactively include parents in the education of their students, since parental involvement is associated with better attendance and higher math achievement scores (Larocque et al, 2011). However, Larocque et al (2011) noted that most teachers focus their energy on managing difficult parents rather than on strategies that foster more meaningful involvement. This is important because when students exhibit problem behaviors, novice teachers could be more likely to focus on dealing with their parents and their perceived feelings of distrust instead of finding ways for students in their class to become successful. Thus, successful math teachers of African American students must have the ability and desire to reflect on their student's backgrounds and configure their classrooms and instructional techniques to serve their students (Newton et al, 2012).

Reflection

Much of the literature regarding reflection lists Dewey (1933) as the originator of the idea of reflection. Dewey (1933) defined reflection as "active persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" (p. 9). Interestingly, the definition that Dewey (1933) used for reflection was more of a noun because it involved analyzing thoughts and making meaning from those thoughts. Schon (1983) expanded

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on Dewey's definition of reflection by including a technical application of reflection as well, explaining it as "on the spot surfacing, criticizing, restructuring and testing of intuitive understandings of experienced phenomena" (pp. 241-242).

Unlike Dewey's use of the term as noun, Schon's (1983) view leans more toward that of a verb because it involves making sense of individual thought and making changes to the way things are done as a result of those thoughts. But, for the purposes of my study, I will adopt a definition similar to Hatton and Smith's (1995) claim that it is deliberate thinking about an action with a view to its improvement I will cover the following concepts in this portion of the literature review: Conceptual constructs of reflection, cultural reflection, critical self-reflection and teachers and culturally responsive pedagogy and self-reflection.

Reflection Constructs

The concept of reflection is very difficult to grasp because it is vaguely defined (Rogers, 2002). According to Dewey (1933) reflection must happen in community or in interaction with the environment. This means that reflective thinking requires an individual to analyze the way their thoughts interact with their lived experiences. For Schon (1983), reflection is bound by practice where teachers and other professionals act on things that do not have a set defined way of intervening. There is no way that teacher preparation classes can teach new teachers methods for handling all potential problems, but they can give them reflective skills that allow them to problem solve situations as they arise (Hagevik, Aydeniz & Rowell, 2012). In this section, I will cover

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reflection as a professional practice, reflection in education and finally discuss the various levels of reflection.

Reflection as a Professional Practice

Reflection offers a variety of approaches to examining practice and it allows professionals to practically inspect assumptions they might take for granted (Loughran, 2002). Rationalizing experiences without analyzing their significance creates debilitating assumptions. Individuals that justify events fall into a routine of doing the same thing over and over without changing their actions (Ward & McCotter, 2004). Effective teachers think as they act and often do things with immediate insight (Van Manen, 1995). Most teachers find themselves reflecting on their actions without any consideration of the environment they were exposed to at the time. These actions often lead to a 'quick-fix' or a rapid solution (Korthagen & Vasalos, 2005). Effective teachers reflect upon their classroom practice as they deliberately scrutinize their actions with the intention of connecting their thoughts with the purpose of modifying them to find meaningful solutions (Marcos, Sanchez & Tillema, 2008).

Therefore, true reflection must be structured and intentional (Korthagen & Vasalos, 2005; Loughran, 2002,). Reflection is effective in changing behaviors when teachers understand that their actions are interrelated with their environment (Hagevik et al, 2012). They analyze the behaviors they have exhibited during a specific situation and offer more effective behaviors, construct alternate ways of framing the scenario and challenge their beliefs about why they reacted the way they did (Korthagen & Vasalos, 2005; Ward & McCotter, 2004). A teacher who is engaging in deliberate reflection

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steps back and asks himself or herself why they think the way they think and consider

alternative solutions to problems (Mezirow, 1990; Peltier, Hay & Drago, 2005).

Therefore, reflection is a continuous cycle of events that constantly shifts in response to

environmental actions.

Reflection in Education

Reflective thoughts emphasize active, persistent and careful considerations of

any assumptions or beliefs grounded in consciousness (Phan, 2009). Furthermore,

reflection cultivates meaningful learning and helps teachers develop specific skills that

may help them become more vocal and critical in their areas of expertise (Phan, 2009).

This allows teachers to reframe problems and look at scenarios in different ways.

Professional learning communities give teachers the means to engage in persistent

reflective activity (Dufour et al, 2005). Teachers are often asked to collectively analyze

data from their formative assessments and adjust their professional practice based upon

the analysis of their student achievement levels. Teachers that participate in strong

professional learning communities actively analyze specific successful instructional

practices and collectively make changes to the way that instruction is delivered based

upon what has been successful with the students they are serving. This gives teachers a

forum to collectively reflect on the successes of their practice.

Continuous successful reflective practices are a skill set that develops with

consistent deliberate practice. Furthermore, teachers must practice engaging in

professional relationships and establish meaningful connections between theory and

practice (Schon, 1983). Mezirow (1990) defines transformative learning as connecting

theory with practice. Transformative learning is grounded in awareness and content.

Transformative learning and reflection are key ingredients that must be intentionally

practiced in order for educators to challenge their deep rooted assumptions they have

about students who are culturally different than they are. According to Ward and

McCotter (2004), teachers who experience that level of reflection are able to see

problems as they are situated in a global context instead of an isolated vacuum.

Likewise, educational leaders who view scenarios from a global aspect are more

likely to make school a welcoming place for all students. A leader who simply

rationalizes problems without attempting to view it from another perspective would

assume that the parents who do not attend back to school night does not care about the

education of their students (Loughran, 2002). Consequently, a person who reflects on a

deeper level will take the time to analyze how their school environment either helps

perpetuate or eradicate historical, cultural, moral and ethical concerns (Ward &

McCotter, 2004). A proactive reflective leader analyzes situations and gives attention to

one's experiences and behaviors and uses those things to inform decision-making

(Achinstein, 2002).

Levels of Reflection

Many researchers have analyzed the aforementioned reflection concepts and

developed ways of abstracting levels of reflection (Nickson, 2010). Many of the rubrics

or reflection frameworks conceptualize routine acts of inquiry such as factual

descriptions of activities through transformational learning which is characterized by

consistent reflection in which teachers observe the way their thoughts and actions

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influence their instructional strategies and seek to challenge deeply rooted assumptions (Nickson, 2010; Pelliccione & Raison, 2009). These rubrics help make aspects of reflection visible so educators can utilize them in their practice. I selected the reflective cycle framework for my study because it gives teachers a practical tool to guide their reflective thoughts (Brown, Irby & Neumeyer, 1998; Pelliccione & Raison, 2009). Furthermore, formally reflecting on instructional practices gives educators the tool to gauge levels of reflection which will allow school principals and college professors to give teachers the tools to analyze their reflective practices (Brown & Irby, 2001; Nickson, 2010; Ward and McCotter, 2004)

As mentioned in Chapter I, the reflection cycle I have chosen to explore in this study has five steps: selection, description, analysis, appraisal and transformation (Brown & Irby, 2001). Selecting an artifact or goal to reflect upon is an effective way to establish a personal model for reflection (Russell, 2005). Without intentional feedback, many teachers will rationalize their actions without the ability to analyze their deeds (Loughran, 2002). The selection component of the reflection cycle gives teachers a starting point to intentionally reflect on their actions (Edmonson et al, 2002). Moreover, this framework helps teachers guide their thought patterns because without direction, teachers would not focus on their own personal problems, but blame others for their shortcomings or the lack of time and preparation for their classes (Ward & McCotter, 2004). Selecting an artifact to start the reflection cycle helps ensure teachers gain a sense of responsibility to change their behaviors (Buzza, Kotosopoulus, Mueller & Johnston, 2013).

Teachers who are describing and analyzing documents are starting to use the reflection cycle to solve problems, but have not started to question how their actions and beliefs have influenced their actions (Nickson, 2010; Ward & McCotter, 2004). A teacher reflecting on this level might question ways to make a lecture more entertaining, but will not question why students are bored and question if their teaching strategy is an appropriate match with their students' learning preferences. The selection and description component of the reflection cycle gives teachers the background knowledge to apply their experiences to their new environments (Hughes, 2009).

Teachers that are on the appraisal step of the reflection cycle analyze their actions and how it affects other students (Brown and Irby, 2001). A teacher reflecting at this level will view disengaged students as something they should address and will work on adjusting their teaching style to meet the learning needs of their students. According to Ward and McCotter (2004) teachers that reflect on this level continuously focus on struggling students, and as a result, new thoughts and changes are stimulated.

The transformative step of the cycle finds educators who question fundamental assumptions and think deeply. Transformative reflectors challenge long help views on ethical, moral, cultural and historical concerns and question curricular content (Ward & McCotter 2004). These teachers are likely to analyze the way they interact with students of color and include cultural aspects from their students in the curriculum. Teachers, who are at this step in the reflection cycle, use their interpretations of their experiences and develop projections and goals (Edmunson et al, 2002). At this point in the cycle, teachers are able to apply their content knowledge and experiences to enhance their

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understanding of the teaching and learning process (Hughes, 2009). Reflecting at this level is consistent with culturally responsive pedagogy.

Many teachers who lack the skills to critically analyze the way they think often refuse to adjust their instructional strategies to meet the needs of their students (Ward & McCotter, 2004). In fact, research indicates that all students perform better when teacher instruction correlates with their learning preferences (Dunn & Dunn, 2005). Educators without the proper training and tools to teach students that are different from them often blame students for their lack of skills (Ward & McCotter, 2004), even so, critical race theory researchers have found that educators grow in their cultural understandings and practices once they become comfortable with their own identities (Hairston & Strickland, 2011).

Reflection has been studied and utilized in other countries to enhance student achievement (Darling-Hammond, 2010; Gun, 2011). This is extremely telling because the United States continually lags behind other developed countries in student achievement (Darling-Hammond, 2010). A reflective approach to teaching requires practitioners to collect data about teaching and use that information to critically reflect on their practices (Gun, 2011). Furthermore, critical reflection requires teachers to acknowledge that some practices have good intentions, but can help perpetuate historic inequities the school system perpetuates (McDougall and Davis, 2011). For instance, as mentioned earlier, Tate (1995) noted that mathematics instruction is typically taught using lectures and whole-class instructions. Tate (1995), Bailey and Boykin (2001), Carter et al (2008) and Morgan (2010) argued that the aforementioned teaching

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strategies are consistent with European values and learning preferences. These

instructional strategies are often taught in American teacher preparation classes as the

appropriate way to disseminate information (Howard, 1999). Therefore, teachers who

utilize these instructional strategies think they are influencing their student's success,

while they are actually helping to contribute to the achievement gap amongst African

American students (McDougall & Davis, 2011) because they fail to be culturally

responsive to student learning preferences which may be influenced by dimensions of

culture (Boykin, 1983; Carter et al, 2008; Webb-Johnson, 2002)

Many teachers assume they are equitably serving all of their students, but their

instructional strategies can often discriminate against portions of their students (Morgan,

2010). For that reason, reflection is a valuable tool for educators to identify those

assumptions and uncover significant power relationships (McDougall & Davis, 2011).

Furthermore, through reflection, teachers can think about negative and positive aspects

of their teaching and gather a deeper understanding of their instruction (Gun, 2011).

Therefore, reflection requires teachers to focus on fundamental ethical moral, cultural or

historical concerns (Ward & McCotter, 2004). Thus, teachers must reflect on the

experiences of their students because they must learn the cultural backgrounds of their

students so the context of the instruction is relevant to them (Leonard et al, 2010).

Finally, self-reflection is an extremely important tool for educators to equitably

serve all of their students. The teacher's expectations in the ability of their students have

a direct effect on their performance (Shandomo, 2010). Many of the assumptions that

teachers have regarding their students are deep seeded and unconscious (Gay &

Kirkland, 2003), which makes, the ability to reflect essential for teachers to uncover and address their suppositions. Teachers who are the same culture and social status as students are more likely to have the same academic and behavioral expectations as each other because expectations are often implicit and a result of cultural preferences (Ryan & Cooper, 2006). Thus, with the student population becoming increasingly diverse, self-reflections are essential so educators can understand who they are, uncover their pre-conceived assumptions and grow so that they can equitably serve all of their students.

Cultural Self-Reflection

The process of cultural reflection is a skill set that must be fine-tuned in order to gain proficiency (Gay & Kirkland, 2003; Ward & McCotter, 2004). According to Mezirow (1990), many people take for granted belief systems that include power and social relationships, especially those legitimized and enforced by institutions. Education is an institution that has historically been used to marginalize certain groups of students (Macleod, 1995). According to Howard (1999), a dominant culture manifests itself in ways that are so prevalent that members who are a part of that culture are not aware of the dominance. That means that the way the dominant culture communicates or raises their family is viewed as "normal", while people who have different values are seen as different.

Transformational reflection is the process by which individuals identify the assumptions governing their actions, locate the historical and cultural origin of the assumptions, question the meaning of the assumptions governing their actions, locate the historical and cultural origins of the assumptions and develop alternative ways of acting

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(Shandomo, 2010). The more alike students and teachers in social and cultural

characteristics, the more likely they are to share expectations about behavior and

academic performance. Conversely, the less like students and teachers are then they are

even less likely to share similar expectations (Ryan & Cooper, 2006). Therefore,

discussing race and culture requires an extra level of inquiry (Milner, 2003) because race

and cultural reflections are a result of social dynamics. Human beings live with defined

social dynamics and develop pre-conceived assumptions they have about themselves as

well as people who are racially and culturally different from them.

Critical Reflection and Teachers

Moreover, many teachers lack the skills to critically analyze the way they think

often avoid engaging in racial issues in education. Teachers without the proper training

and tools to teach students that are different from them often blame students for their

lack of skills (Ward & McCotter, 2004). Blaming students without setting the stage for

their academic triumph is not setting them up to be successful. Critical race theory

researchers have found that educators grow in their cultural understandings and practices

once they become comfortable with their own identities (Hairston & Strickland, 2011).

Most of the literature regarding cultural awareness states that educators must

know who they are as a person and who they are culturally to be proficient in educating

diverse students. However, cultural reflection is often and painful and difficult process

for most people (Gay & Kirkland, 2003) and is hard to conceptualize because it is

difficult for people to put themselves in the shoes of people that are culturally different.

According to Bruner (1997), the construction of meaning is influenced by a person's

socio-historical context. Therefore, one's personally held assumptions are constructed by one's perceptions, which may contain partial truths as well as myths constructed within these interactions. According to Milner (2003), reflecting about race and cultural contexts refers to the many educational issues associated with race such as endemic and ingrained perceptions and realities that exist in education as a consequence of one's skin color.

Teachers of any color that work with students that come from different cultures than them must challenge their deep rooted assumptions and make purposeful attempts to connect with their students. With globalization and migration patterns, teachers all over the world are forced to work with groups of students that are different than them (Howard, 2003). As noted earlier, the majority of the teachers in the United States come from the dominant culture of the country. Critical reflection is very important for all teachers and specifically teachers in the dominant culture because members of that culture can live their life without reflecting about their cultural affiliations (Howard, 1999).

Furthermore, many of these teachers have not experienced any interactions with people of color until they enter the classroom. Hairston and Strickland (2011) note that many European American teachers report that they had experiences with stereotyping and prejudices of people of color s in their childhood. These experiences helped to frame their beliefs and thoughts about people that are culturally different from them (Bruner, 1997). Additionally, the only cultural knowledge they have about African

American students are the negative stereotypes they have heard growing up and the images of black culture portrayed on television (Shandomo, 2010).

These stereotypes can indirectly influence the perception that teachers have about their students. Therefore, educators must create an environment that makes people aware of cultural disconnections and work towards a mutual understanding between students, teachers and families (Gay & Kirkland, 2003).

Culturally Responsive Teaching and Critical Reflection

One of the main tenants regarding culturally responsive teaching is that the educator must realize who they are as a person and how their cultural affiliations interact with the way they communicate with their students (Bondy et al, 2007; Ladson-Billings, 1995). Keeping Dewey's (1933) take on reflection as active and personal consideration of any belief or supposed form of knowledge means that reflection requires practitioners to actively analyze personal beliefs and make changes to their actions based upon their analysis. A reflective teacher responds to problems by analyzing the context of their problem (Shandomo, 2010). A teacher that is not reflective assumes that the students are not successful because of something that the students missed (Loughran, 2002). A teacher that is reflective analyzes the way they presented the material, takes ownership for the success of their student and attempts to find a way to ensure their students are successful (Ward & McCotter, 2004).

Many districts have set up the systems for teachers to reflect on a superficial level through professional learning communities. Typically, groups of teachers work with each other and analyze test results on the surface level (Dufour, et al, 2005). For

instance, if a teacher gave an assessment and if more than 50% of the students were not successful and they assumed that the students were not successful for reasons that are specific to the students such as a lack of vocabulary skills and lack of attention; it would be an example of a lower level of reflection or simply rationalizing actions because the teachers are not analyzing the reasons why the students were not successful in relationship to their classroom environment (Loughran, 2002). According to Mezirow (1990) Critical reflection requires teachers to understand why they think, act and perceive the way that they do.

Teachers that critically reflect on their actions understand that many of their actions are governed by a set of beliefs and values that have been ingrained in their minds and is directly related to their environment and experiences (Kember, Leung, Jones, Loke, Mckkay, Sinclair, Tse, Webb, Wong, Wong & Yeung, 2000). Teachers who have the skills to critically reflect on their work analyze the way that their actions and the students they serve are an intersection between their environment and their experiences (Buzza et al, 2013; Hughes, 2009).

Critical reflection is a key component to culturally relevant pedagogy (Howard, 2003). According to Howard (2003) the idea of a teacher analyzing how their cultural affiliations interplay with the way that there students perceive them and the way they interact with students requires a higher level of consciousness than routine or habitual actions. Additionally, Ladson-Billings (1995) and Bondy, et al (2007), have highlighted a few things are consistent with teachers that are successful with African American students. Those conceptual things require teachers to consistently synthesize their

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interactions with students and consciously reflect about how their instructional practice affects students.

Conclusion

The disparities in the achievement of African American students in American schools have been documented throughout the first two chapters of this study. Practically every school mission statement or campus improvement plan discusses decreasing the achievement gap. The under education of African American students has a direct correlation to the amount of money our country spends on health care and incarceration (Levin, 2009). Ogbu (2004), Steele (1997) and Macleod (1995) are a few of the researchers which provide reasons for the disparate levels of achievement between African American and their European American counterparts. There are isolated schools and districts that are successfully educating every child. Studies done by Ladson-Billings (1995) and Bondy et al (2007) indirectly indicate that self-reflection is critical for teachers to successfully educate students that come from different racial and socio-economic backgrounds.

Furthermore, authentic self-reflection gives teachers the tools to ask themselves "why aren't my students learning" and objectively analyze their practice and its effect on their students. By understanding the reflective qualities evident in successful teachers of African American students, educators can use that knowledge to help other educators become successful and can severely increase the health outcomes of African Americans throughout the country because, as mentioned in this chapter, complex mathematical

analysis skills could help eradicate much of the life expectancy disparities between African Americans and their European American counterparts.

In sum, this study adds to the literature because at the time of this investigation there were not any studies which attempted to understand the reflective qualities of high school math teachers of African American students in rural settings. Besides, close to twenty percent of the school population in the United States is served in rural locations (Griffin, Hutchins & Meece, 2010; Irvin et al 2012). This is exacerbated by the fact that there has not been a tremendous amount of research which attempts to understand practices of high school math teachers in rural areas (Reeves, 2012). For that reason, this study explicitly attempted to add the literature, reflective practices of rural high school math teachers of African American students.

CHAPTER III

METHODOLOGY

Introduction

This chapter describes the research methodologies used to answer the research questions presented in Chapter I that were used to guide this study. Using a qualitative design, this research study provided a case study approach to understand the reflective qualities of teachers who are effectively instructing math to African American students in a rural setting. According toYin (1981), case study research attempts to examine a "contemporary phenomenon in its real-life context (p.59)". Furthermore, Creswell (1998) states case studies provide an exploration of a "bounded system" (Creswell, 1998, p. 61). For the purposes of this study, the bounded system was Memory High school, a pseudonym for the site that serves as the focus for this analysis.

The literature review in Chapter II of this study, provided a detailed description of the educational disparities between African American students and their European American counterparts from a national, state and local perspective. The following qualitative methods were used to answer the research questions associated with the study. (a) Open ended interviews (b) classroom observations. This was a qualitative case study with an interpretivist perspective. I analyzed the research questions presented in the following section using the constant comparison method where he reviewed the observations and interviews, compared their responses and develop themes. After that for each question I compared the participant interview responses and evaluated their answers comparing them to the Brown and Irby (2001) reflection cycle and developed

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further themes which indicated at what point of the reflection cycle the participants performed in relation to each question.

Research Questions

This inquiry was positioned to understand the reflective qualities of high school math teachers who taught African American students in a rural setting. According to Gay and Kirkland (2003) successful teachers of African American students should intentionally reflect on their practice to adequately serve their students. Because I wanted to understand the reflective qualities of rural high school math teachers of African American students, this study attempted to understand and interpret the experiences of these teachers. As the researcher, I tried to understand and construct meaning of the reflective practices and experiences of the participants in the study. The related research questions were:

1. How do high school math teachers of African American students in a rural setting, select their instructional strategies while planning their lessons?

2. What are the reflective qualities of high school math teachers in a rural setting, who are educating African American students?

3. To what extent do high school math teachers in a rural setting utilize culturally responsive pedagogy to influence their instructional strategies?

4. To what extent does reflecting on the backgrounds of African American students, influence the manipulation of the math curriculum in a rural setting?

The theoretical framework mentioned in the first chapter of the study is an interpretivist one which attempts to understand the experiences of rural high school math

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teachers of African American students. This inquiry is using Brown and Irby's (2001) reflection cycle as a conceptual framework to interpret the data that was collected during the study. The reflection cycle has five components which include: selection, description, analyzing, appraising and transforming (Brown & Irby, 2001). This case study is an interpretivist one, based on the tenets of reflective practice.

Research Design

Qualitative research in its most basic terms is a way to place systemic inquiry into meaning (Shank, 2002). Furthermore, the primary focus of qualitative research is an examination and inquiry into meaning. The researcher serves as the tool that helps translate the initial inquiry into a meaning. A case study is a tool researcher's use to conduct qualitative experiments. In fact, Denzin and Lincoln (2003) stated case studies draw attention to the question of what can be learned from a single case. This method has many advantages for researchers that want to conduct exploratory research and use multiple methods of data collection to conduct their study.   Case study research is based on the relationship between the participant and the researcher (Shank, 2002) and has been recognized as a useful tool for studying political science, sociology, social sciences, education and urban studies (Creswell, 1998).

Site Selection

Memory High School was selected for the research site because of the following criteria: (a) the school has shown consistent growth in their mathematics achievement over the past few years within the African American population; (b) Memory High School serves a student population that is more than 30 percent African American; (c)

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the school is making deliberate steps to increase the performance of African American students; and (d) the school is located in a rural area. Table 6 illustrates the ethnicity of the teachers and students at Memory High School.

Table 6

Ethnicity of Teachers and Students

	Teachers	Students
Ethnicity AA*	10%	33%
H**	10%	33%
W***	80%	33%

_____

Note * = African American, ** = Hispanic, *** = White

Consistent Growth

According to TEA (2011), Memory High School earned seven point gains among African American students in mathematics instruction, which also helped lead to the campus receiving a state deemed accountability rating of academically acceptable. Although, this rating is not as prestigious as a recognized or an exemplary rating, it is significant because many other campuses within their region who serve the similar populations of students are rated academically unacceptable which is the lowest rating designation by the state of Texas. Table 7 shows the passing rate on the math state assessments at Memory High school for the five yyears leading up to this study.

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Table 7

Math Passing Rates on TAKS and STAAR for All Grade Levels

School Year	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	STAAR
Ethnicity AA*	50%	62%	65%	65%	63%	56%
H**	61%	70%	78%	67%	66%	69%
W***	80%	89%	74%	74%	77%	70%

_____

Note * = African American, ** = Hispanic, *** = White

African American Population

I wanted to study a campus that had a varied population to see how teachers reflect on their practice to meet the needs of African American students within the context of a multicultural school because as mentioned earlier in this writing, teachers who serve students who come from multiple backgrounds have to work vigorously to ensure their instructional styles meet their students' needs (Morgan, 2010). According to TEA (2011), 30 % of the student population is African American, 30 % of the population is Hispanic and 40% of the population is European American. There is also a small percentage of Asian, American Indian or multi-racial students.

Deliberate Steps

Memory High school has developed professional learning communities where teachers routinely meet, plan lessons and modify the school curriculum. Researchers (Darling-Hammond; 2010; Dufour et al, 2005; Waters & Marzano, 2007) argue that professional learning communities are an essential component to meeting the needs of

students because it allows teachers to collectively analyze their job expectations and plan their instructions. Furthermore, the school leaders routinely provide academic interventions to struggling students who need extra assistance. The campus has modified its schedule to allow teachers to give tutoring assistance during the day to struggling students. It can be argued that these interventions have helped increase achievement among African American students.

Rural Areas

Rural areas have been experiencing population shifts as the job markets are bringing many populations of students to areas where they previously were not present (Reeves, 2012). One of my goals was to understand how teachers who work in a rural area reflect on their practice to improve student achievement among African American students. Therefore, I selected Memory High School because it is in a rural location.

Principals within the area were solicited to participate in the study where their high school had more than twenty five percent of the student population who were identified as African American. Furthermore, campuses were included that showed gains of ten points or more between the 2008-2009 and 2010-2011 school year. Furthermore, via information retrieved from TEA and campus Academic Excellence Indicator System (AEIS) reports, campuses were included who showed gains of ten points or more between the 2008-2009 and 2010-2011 school year. Memory High School was selected, in part, because I was familiar with the area.

Memory High School was selected for the investigation when the superintendent of the district agreed to allow me to conduct the study upon approval of the school

district and Texas A&M University's Institutional Review Board (IRB) approval for the use of human subjects. I requested official, written permission from the research department in the school system where Memory High School is located to obtain permission to conduct the study. Further, I solicited approval through Texas A&M University's IRB application process. Once written approval was secured through both sources, I started the study.

Memory High School is located in a small town in the greater Waco, Texas area. It is at the intersection of two highways. The median household income of residents is $29,375. 22% of the residents live below the poverty line. This is not reflective of the school population because 58% of the students at Memory High School are economically disadvantaged and live in poverty. The population in this small town has not increased much since the 1950s. In 2000, the population was 7,000 while in 2010, the population was similar. The area experienced an oil boom in the earlier part of the twentieth century, but has not experienced much growth since that era. The school district is one of the biggest employers in that area.

The school serves approximately 500 students in ninth through twelfth grade. The campus has approximately 50 professional staff members. 45 of them are teachers, 5 are support staff and 3 are campus administrators. 10% of the staff is African American, 10 % are Hispanic and 80% are White. 25% of the staff is beginning teachers, 35% of the staff has between one to five years of teaching experience, 25% of the staff has between six and ten years of teaching experience, 5% of the staff have between

eleven and twenty years of experience and 10% of the staff have over twenty years of teaching experience.

Participants

The teachers who participated in this study were identified through a similar process employed by Ladson-Billings (1995) in her groundbreaking study on culturally responsive pedagogy. During this study Ladson-Billings (1995), utilized state assessment information, school administrator and parent feedback to locate successful teachers of African American students. Therefore, I surveyed parents at the school through two conversations with the superintendent. I spoke to the administrator who monitors the math department at Memory High School and gathered feedback. The parent's suggestions on outstanding qualities were based on qualities like enthusiasm and firmness, the principal's feedback might be based on things like standardized test scores, discipline referrals and personal observations. I chose to involve the entire math department in my study because I wanted to see if the administrators and parents ideas about the participants teaching abilities were similar to mine.

All five of the math teachers at Memory High School agreed to participate in the study. I collected data until I secured a sufficient sample size to ensure informational redundancy (Lincoln & Guba, 1985). I also attempted to obtain a diverse sample of participants. All of the math teachers at Memory High School were European American. The teachers had a range of experience between 10 and 30 years of teaching experience. I conducted 34 total observations for approximately 15 minutes each observation. Table 8 shows demographic information for the study participants.

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Table 8

Information Regarding Participants in Study

Participant	Grade/Area	Ethnicity	Other Information
Peggy	Algebra/Geometry White		10 years of experience
Mandy	Algebra/Geometry White		20 years of experience
Cathy	Algebra	White	10 years of experience
Bryan	Various classes	White	30 years of experience
James	Various Classes	White	20 years of experience

Data Collection

Audiotaped interviews, classroom observations, document analysis and field notes were used to collect data for this study. Once participants agreed to participate, they received an Informed Consent document outlining the study and the agreement to confidentiality of myself. I implemented the use of audio-taped, one-on-one interviews and classroom observations, field notes from the classroom observation to collect data. I conducted one interview and 34 total classroom observations. On my second visit, I gave the participants a second set of questions which they answered individually (See APPENDIX F). The interviews lasted approximately 60 minutes and I hoped to gain an understanding about the way the participant's reflect on their practice.

Observations

According to Creswell (1998) fieldwork involves gathering information through observations, interviews and materials to gather an "embedded analysis" of a specific aspect of the case (p. 63). This falls in line with Shank's (2002) suggestion that observations should not be the primary source of data collection for case studies, but they help researchers analyze more complicated phenomenon's and are viewed as a means to an end.

Observations allow the researcher to observe the phenomenon in its natural setting and the data collected represented a firsthand encounter with the experiences of the teachers experiences (Creswell, 1998). This will make it possible to observe teacher reflections as they are happening. And so, I followed Stake's (1995) recommendations to prepare for the observation, which included: (a) considering the questions, hypothesis, or issues already raised; (b) arranging preliminary access; (c) identifying informants and the sources of the data; (d) allocating attention to different viewpoints and conceptualizations; (e) keep careful records of field notes and triangulate data.

Field notes and a recording device were used to record the observations. According to Shank (2002) field notes are a way to capture the moment of the observation. They capture what happened, but they also measure the researcher's thoughts as the researcher observes the phenomenon. Field notes were used as tools to register any thoughts, descriptions, actions, conversations and perspectives of the setting throughout the study. In the current study, the goal of the interview process was to

gauge the level of reflection that was evident in the rural high school math teachers of African American students.

I conducted 34 observations during the two site visits and used an observation protocol to reflect during the data collection period (See Appendix C). According to Shank (2002) field notes are a way to capture the moment of the observation. I used field notes to reflect during the observational data collection period. Included in the journal were the thoughts and feelings of the researcher and the participants, research site as well as the research process (See Appendix E). Shank (2002) says that maintaining accurate field notes is essential to collecting quality data in spite of the availability of recorders which can gather data because notes are the only way to gather things like facial expressions and the internal thoughts of the researcher.

Interviews

Interviews were also used as a source of data collection. Shank (2002) says qualitative study interviews attempt to discover the everyday lived world of the participants and search for meaningful themes that are a part of that world.   According to Creswell (1998) the main focus of an interview is to connect with the study participants. I conducted one with each participant.

Shank (2002) described three types of interviews structured, semi-structured or unstructured. In semi-structured interviews, the questions are arranged in manner that guides the topics of the participant, but allows them to expand on the questions. Semi-structured interviews ensure that the participants will receive questions related to the study research objectives. For the purpose of my study, semi-structured interviews were

conducted. Informal conversational interview responses were audio recorded as I engaged in conversations with individuals during the interviews. The conversational interview technique allowed for flexibility and naturalness for the purposes that this study helped capture the teacher's level of reflection as they contemplated their classroom experiences.

Because this study required interviewing five people, I thought it was best to utilize the interview guide method to gather data. The interview guide approach is more structured in that there is a basic outline and order of questions to be asked of participants in a face-to-face interview. The use of this approach helps to ensure a systemic and thorough process of participant responses about their specific shared experiences. Also, the use of open-ended questions requires the researcher to carefully script questions before the interview with probes in strategic places to expound on the participant responses.

Finally, Shank (2002) suggested four strategies for conducting successful interviews: (a) practicing the interview in the mirror before engaging with the participants; (b) successfully interpreting participant responses; (c) learning to embrace surprises and (d) ensuring you credibly represent the participant's thoughts. The purpose of practicing interviews before interacting with participants is important because it allows the researcher to cultivate their listening and observational skills. Correctly interpreting the participant's responses is essential to interpreting the interview data, as researchers must sort out facts from beliefs. Researchers must sort out facts from beliefs. Shank (2002) stated that surprise is one of the best elements of qualitative research

because it ensures that the researcher is not dealing with their own "presuppositions" (p. 48) anymore. Thus, ensuring the transcripts properly represent the participant's response, guarantees that the interpretation process does not maliciously misrepresent answers. The interviews lasted for approximately 90 minutes and ranged from 17 minutes to 23 minutes.

Trustworthiness

This study followed the trustworthiness standards set forth by Lincoln and Guba (1985). These four standards are: (a) credibility; (b) transferability; (c) dependability and (d) conformability. Denzin and Lincoln (2003) suggested cross-checking research through member checks and audit trails. The researcher must decide what form the member check will take. Many researchers have utilized member checks by reviewing their interpretation of their findings with the study participants. Credibility was established through the use of triangulation. I used interviews and observations to get multiple forms of data and utilized his study chair to help conduct a peer review of the data.

According to Schwandt (2007), triangulation is a procedure that is used to establish that the criteria of validity has been met. Triangulation is a way to measure the authenticity of the researcher's interpretations. Denzin and Lincoln (2003) said there are four types of triangulation procedures: (a) the use of a variety of data sources; (b) the use of multiple researchers; (c) the use of multiple perspectives to interpret a single data set and (d) the use of multiple methods to study a single problem. This study used multiple data sources and multiple data collection methods. Data was triangulated by conducting

interviews and an observation. I also used member checking, conducted multiple interviews and made several notes of descriptive information pertaining to the site while waiting for interviews to be conducted as other data sources.

Trustworthiness was also demonstrated through providing thick description so the reader can interpret. According to Schwandt (2007) transferability refers to the ability to transfer information from one setting to another setting and if the findings could possibly transferred to other settings. I shared the transcripts with the participants after I transcribed my field notes and audio taped interviews into written form.

Dependability refers to the process researchers undertake to ensure the study was logical, traceable and documented (Schwandt, 2007). According to Denzin and Lincoln (2003), qualitative researchers do not search for a definite answer, but it is important that the results shared are consistent with the data collected. In order to establish dependability for this study, I utilized auditing. Schwandt (2007) defined auditing as a process by which a "third party examiner systemically" reviews the researcher's audit trail (p. 299). An audit trail consists of the data generated in the study, theoretical frameworks and any information that guided me in making sense of the data collected. To ensure dependability for the current study, my committee chair performed an audit of the data collection materials.

Conformability was the final element to establish trust worthiness. According to Schwandt (2007), conformability refers to establishing the fact that interpretations are credible and not a "figment of the researcher's imagination" (p.299). This standard for trustworthiness is extremely similar to dependability. In fact, researchers suggest using

the same technique for establishing dependability and conformability (Lincoln & Guba, 1985, as cited by Schwandt, 2007). For the purposes of this study, I performed the same procedure he executed to establish dependability which is auditing.

<div align="center">**Researcher's Role**</div>

As the researcher, I served as the principal investigator. As the principal investigator, I act as an observer and as facilitator of the individual interviews. According to Shank (2002), the participant observer is charged with physically engaging in the observation, while simultaneously detaching emotionally. According to Denzin and Lincoln (2003), "we can not study the social world without being a part of it" (pp. 180-181). This observation data allowed me to get firsthand knowledge of the phenomenon that was studied, which would not be possible to obtain through interviews.

Researcher Position

As a district level administrator at a large urban school district in Texas, this researcher acknowledged any personal biases during the study. One of the biases included my personal feelings towards increasing the achievement of African American students. As an African American school leader who has witnessed students fail in math, I have been responsible for changing instructional practices at my own campus. Furthermore, I have led groups of teachers in reflective meetings which have helped increase student achievement at previous campuses. Information from this study may be used to drive staff development at my school district as well. I remained fully aware of these biases throughout the study to prevent their influence on the results. As Shank (2002) pointed out that field notes are essential for gathering the researcher's thoughts

and for the researcher to properly decode their interpretations, observer comments were noted as a part of the researcher's field notes and recorded in the researcher's journal. I transcribed the audio-taped information into legible transcripts. Member checking was used as a mode to check for researcher bias, which allowed me to confirm that what was transcribed was stated during the interviews.

Institutional Review Board Approval

I submitted an application for Research and Human Subjects at Texas A&M University's Institutional Review Board (IRB) for approval, as well as to the IRB of Memory Independent School District. Once approval was received from Texas A&M's IRB and from the research department of the selected sight, I started the data collection process. All guidelines and requirements from Texas A&M University's IRB and the selected site were observed during the collection phase of the study. Confidentiality of all participants and the site was established through the use of pseudonyms and non-specific demographic descriptors.

Based on the availability of the participants' schedule, participants were interviewed in a private room located within the front office area of Memory High School. I checked and verified all transcripts. This researcher analyzed and coded all data. Field notes and recordings were maintained on my personal computer, notebook, recording device and within my home office. Only I will have access to the recordings which will be destroyed in 3 years.

Data Analysis

The analysis of data was related to the literature guiding this study. Stake (1995) stated that data analysis is the most crucial component to a qualitative study because the analysis is the way researchers reach new meanings of the data they have collected. Information was collected and coded based on the responses. The codes were generated using the Brown and Irby (2001) reflection cycle to analyze the interview and observation data. According to Stake (1995), case study data analysis involves interpreting the participant's responses to generate codes and categories that will appear in the final report. Furthermore, Schwandt (2007) stated that case study research involves combining the information collected by myself from the one-on- interviews and the observation to produce findings.

The transcripts of the interviews and observations were analyzed to detect and discover similarities and differences in the responses of the participants using the constant comparative method. I utilized an excel spread sheet to develop themes and codes to respond to each research question. Next, I analyzed the conceptual framework while answering all of the research questions to see at what point of the Brown and Irby (2001) cycle the teachers reflected. After the transcripts were coded and the similarities that existed were identified the themes for the study were generated. I used this information to group similar responses to provide answers to the research questions. The information was used to identify commonalities in the responses and draw conclusions. Data were divided into themes after coding the transcripts. The

appropriate themes were matched to the research question and compared with the Brown

and Irby (2001) reflection cycle.

Summary

This chapter included background information for the selected site and

participants who volunteered for the study. An in-depth description of the site was

provided to support the rationale for the site selection. Chapter III is focused on

presenting a detailed description of the research design for the study as a single case

within a natural setting (Creswell, 1998). This chapter also was a detailed description of

the research methods which consisted of one-on-one interviews and classroom

observations continued the chapter with a detailed description of the selected site,

participants of the study, description of the population, and the site selection process.

Procedures for collecting data, the Institutional Review Board approval process, and data

analysis and how results will be reported followed. Interviews, focus group and

observation will be used to collect data. Information recorded will be transcribed

verbatim and all transcripts were coded to identify common themes. Chapter IV will

include the results of the research described in this chapter.

CHAPTER IV

RESULTS

The purpose of this research study was to understand and construct meaning from the reflective practices and experiences of rural high school math teachers of African American students. Likewise, this study attempted to measure the reflective qualities of these teachers as they manipulate their curriculum and instructional delivery to their students. After an extensive literature review, this researcher decided to conduct a qualitative, single case study of rural high school math teachers of African American students.

The chapter is organized into several sections, which includes a description of the respondents and visit to the site with an explanation of events during observations. The remaining sections are guided by the four research questions where repeated themes were identified. These themes were based on the frequency of responses from participants during the individual interviews and classroom observations.

The overarching research question for the study was: How do rural math teachers of African American students reflect on their practice to improve student achievement? Additionally, there were also four supporting research questions to consider.

1. How do rural high school math teachers of African American students select their instructional strategies while planning their lessons?

2. What are the reflective qualities of rural high school math teachers who are educating African American students?

3. To what extent do rural high school math teachers utilize culturally responsive pedagogy to influence on their instructional strategies?

4. To what extent does reflecting about student backgrounds influence the manipulation of the math curriculum among rural high school math teachers?

Respondents

Five teachers participated in one-on one interviews. I conducted 34 total classroom observations. The teaching experience of the participants, which consisted of three females and two males (one of whom was identified as a coach), ranged from 10 to 30 years in the classroom environment (See table 7). Also, the teachers worked with students in every grade level of the high school setting (9th -12th), and all taught special education and ELL students within the regular classroom setting. Finally, as mentioned in the previous chapter, all of the participants were European American.

Site Visits, Correspondence and Observation

Residing in a major metropolitan area of over a million residents in Texas, I drove to the research site on the day of the visits. The drive was approximately two and a half hours from my residence, and while driving, I took a major highway through the city, traveled through the suburban areas of the city and after driving for approximately an hour and a half, I transitioned to a smaller two-lane highway and while traveling through several two-lane high ways, observed miles of agricultural land.   Unsure about the exact location of the campus because the GPS signal on my phone was not functioning properly due to poor signal strength in the area, I was forced to stop at a nearby gas station to receive final directions to the campus despite the town consisting of

only one main street that stretched throughout its entirety on my initial visit. On my

second visit I was aware of the location of the campus and did not have to stop for

directions. Approaching the campus I noticed the school was medium sized and was

connected to both the junior high and elementary schools. The football stadium

appeared to hold approximately 4,000 fans, while the baseball stadium appeared to hold

200 to 300 people. The football and baseball stadium were also adjacent to the school.

Correspondence

I visited the site on two occasions for approximately 18 hours, speaking

extensively with the superintendent of the school district prior to making contact with

the principal. Before both site visits, I corresponded with both the superintendent and

the principal to ensure that my visit would not interfere with any school activities or

functions. Once approved for observation, I mailed questions similar to the ones I

planned to ask the participants of the study before my arrival to eliminate any perception

of surprise.   On the initial visit, I arrived to the campus approximately an hour before

the school day started and was immediately greeted at the entrance of the campus by the

principal. On the follow-up visit, I arrived during second period of the school day and

was greeted by the principal between classes. On the initial visit there was already some

familiarity between myself and participants as both had been corresponding for weeks

prior to the campus visit.

Because of my early arrival, I was able to meet with all of the teachers involved,

explain the study to them, and review the informed consent forms with each of them.

Before collecting data, I obtained signed letters of consent from all the participants,

made copies, and returned them to the perspective participant. The students and faculty

members were very accommodating to my requests and went out of their way to ensure

that I felt part of the Memory High School family. Because of these niceties, I was able

to build rapport with the participants by talking about personal experiences such as

sports or deaths of family members. After talking about those things, the participants

appeared comfortable discussing their thoughts about reflection and their approaches to

teaching and education.

Observations

During the observations, I was able to sit quietly to observe the classrooms

before the school day started to watch the operations of the school. The classroom

designs of the teachers varied and a few teachers classrooms were very student centered

and had student work posted through the room. The participants with student-centered

classes arranged their classrooms in ways that helped students collaborate when they

were completing independent practice activities. The rooms often had desks arranged in

circles or ways that allowed teachers to walk around throughout the classes and interact

with students throughout their lessons. Furthermore, a few of the classes received a

grant to implement technology in their classroom that appeared to be rather engaging to

the students. The classes that were not as student centered, appeared very drab and

uninviting. I noticed that in the classes that were more student centered, the students

appeared to be more engaged and actively involved in the classes and answered teacher's

questions. In the classes that were not student centered, they struggled to remain awake

and the teacher did most of the talking without stopping to get student feedback.

Conversely, several of the teachers had environments where students participated in collaborative group activities. One teacher utilized dimmed lights in her room because bright lights bothered her eyes. She explained to me that her students really enjoyed the lighting arrangement. Most of the classes contained between 8 and 14 students. I had worked at various urban and suburban schools throughout my career and the class sizes appeared very small.

I met with all of the math teachers during their conference periods and observed all of the teachers during their 50 minute classroom periods. In between interviewing teachers on their conference period. I spent the school day alternating between interviews on teacher conference periods and observing other teachers while they taught their classes. After spending the entire day at Memory High School, I left the campus and met with the superintendent. The district office where the superintendent is housed was located less than a mile away from the campus. In that time span, I noticed there were several vacant homes and lots. Moreover, the community was extremely quiet and slow paced, beret of traffic and an abundance of people. Once I arrived at the superintendent's office, I met with her, informed her that the school was very hospitable, the students were extremely well-behaved and thanked her for her hospitality and returned home.

Because I was informed by the principal that teachers were working feverishly to prepare students for the upcoming TAKS and EOC examinations for students who did not pass the test during the previous test administration during the spring semester, I asked all of my interview questions at one time during the initial interviews. All five of

the participants were interviewed during their conference periods, lasting between 15 and 25 minutes each. While I was not able to do every interview before I observed their respective classes, I was able to conduct several classroom observations and ask all of the initial questions in one interview.

The following section provides results that suggests answers to the research questions and identifies recurring themes resulting from the interviews and multiple classroom observations. The themes were developed after transcribing the interviews and comparing the participant responses as they related to the research questions, the observations and the reflection cycle conceptual framework.

Participants

Peggy was the first person I interviewed. She was European American, appeared to be in her mid-30s and worked at the campus for approximately 10 years. Her classes were typically student centered and upbeat. Her class is set up in three symmetrical rows that point towards the front of the class. Her class is full of student artwork and is very colorful. The class is extremely colorful. She was working personally with her students and there are posters of African American, Hispanic and European American leaders all over the room.   The teacher appeared at ease with the students. She helped them with their assignments. The teacher was very friendly and cordial with the students it appeared she had developed personal relationships with them. She walked around and joked with students and played popular music in the background while they did individual practice.   The teacher displayed a tremendous amount of energy in all of the observations. Appeared to be upbeat and supportive of students in her class. The

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teacher was rarely in one spot, she acted very informal, but stern with students in her class. She consistently elicited student feedback and her students were usually engaged. I observed her Algebra classes. Her classes were welcoming and I felt like I were a part of the glass.

Mandy was a European American woman over the age of 40. She had worked at various schools throughout the district and was in her fifth year at Memory High School. She mainly taught several different subjects. This class was set up in traditional rows. Facing the front of the room. The class seems fairly relaxed. There are allot of math related posters throughout the room that appear to be thematically organized. The teacher has a very informal, but stern demeanor with the students. The kids talked a bit in her class, but we're generally on task and working on their assignments. Student work posted throughout the room. The teacher has a wall where she highlights successful work assignments of the students in their classes and a portion of one of her walls where she has pictures of prior and current teachers. The room is very organized, there is a space in the room for gathering assignments when the students arrive and for turning in assignments once students finish.

Kathy was a European American woman in her early 40s. She taught honors several math classes. She has been teaching at Memory High School for approximately 10 years. The room is set-up in adjacent rows facing the front of the class. The rows are set up in a way that divides the class in three separate ways but face the front of the class. The seating arrangement allows the teacher to walk seamlessly through the class and check for understanding. This teacher delivered instruction by walking around the

classroom. She used the overhead to deliver instruction and once she explained her expectations, she walked around the room to check on her students. She used two different screens to explain her instructions, one screen had the calculator which she used to show students how to answer questions using the calculator. The teacher mixes in jokes with her lessons stating "if you ain't having fun, you ain't doing it right". Her class has visual representations of the students through her pictures and posters. She had several humorous posters of quotes throughout her room. Pretty consistent that she gave instructions and then walked around the room and checked for understanding, giving the students time to work through their problems. There were several posters telling the students they would be successful in her class. Her classroom management system felt collaborative and not forced and in all of the classes I observed, the students worked collaboratively during independent practice with teacher assistance.

Bryan appeared to be in his 50s. He has taught in various urban and rural schools throughout his 25 year teaching career. I observed several of his math classes.   There were not any posters in this room. It felt very sterile. Over 50percent of the students in this class, had their head down and were utilizing their electronic devices. In his interview, he complained about students utilizing electronic devices, but I did not observe him re-directing students when they were utilizing those devices while he was teaching. The teacher lectured, but did not have a way to check for understanding. The room was set up in a traditional rows way of seating facing the overhead, this seating arrangement makes it very difficult for the teacher to freely walk around the room and re-direct off-task behavior and check for understanding. The rows were set-up in 4 rows

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of five desk all facing the front of the class. The teacher continuously talked and went through his lessons without checking for understanding. Throughout my seven observations of his class, approximately 40 to 50 percent of the class had their head down on a desk. The teacher did all of the talking.

James was a European American male who appeared to be in his 50s. He had been at Memory High School for many years. I observed several of his math classes. The room had a few posters, but not many math posters that depict math in contexts familiar to the students. The room had a sterile feel to it. The seating arrangement was 5 rows of 4 desk facing the front. This type offsetting arrangement makes it difficult to interact with students. I didn't see any kind of representation of the diverse ethnic backgrounds of the students, because most of the posters on the wall (sports, music, rap) depicted European American celebrities and athletes. His class felt very empty.

Observations

I conducted 34 observations while at Memory High School. I informed the principal and teachers of the campus that I would conduct several short observations. I wanted to be sure I met with the teachers before I started my observations to build a rapport with them to ensure the interactions I observed in their class were authentic and not staged because of my presence. During my observations, I noticed that Peggy, Mandy and Kathy led more student centered classes where students collaborated with each other and explored their answers. In Bryan and James' class observations, I noticed they were more teacher led instruction where they lectured to students and called on one or two people to answer questions. According to the 2012 campus AEIS report (TEA,

2013), the campus had a similar population of African American, Hispanic and European American students. However, the math classes appeared to be segregated. In the higher level classes such as calculus or Algebra I honors, most of the students in those class were European American, while in the classes that were on-level. Approximately 80 to 90% of those classes were students of color.

I conducted my first visit in the fall part of the school year and conducted my second one during the spring. During my second visit it became more apparent that Mandy, Kathy and Peggy did an extensive job of checking for understanding in their classes and gathering feedback from students, while Bryan and James consistently lectured without gaining feedback from students. The staff was very friendly and welcoming on my first and second visits.

Interviews

Peggy, Mandy, and Kathy were relatively open with their responses. They were able to articulate to me their beliefs and the way they intervened when students struggled in their class. Moreover, they all indicated through some of their responses that they Observed a relationship between their instructional strategies and student achievement. Table 9 lists information about the interviews that were conducted in the study.

Table 9 information Regarding Interviews

Participant	Time	Disposition
Peggy	18:00	Fairly Open
Mandy	19:00	Very Open
Kathy	21:00	Fairly Guarded
Bryan	23:00	Fairly Guarded
James	17:00	Fairly Guarded

Mandy and I connected very well and discussed a few personal connections we had which I believe helped facilitate our interview. Interviews were done during the teacher's conference periods. Peggy, Mandy, Kathy and James indicated that they reflect before school, during their conference periods and after school. During the interviews, I had to consistently try to get Bryan to answer questions about the way cultural preferences intersect with learning styles, and he tried to deflect the answers by saying every student is the same. I used the interviews and observations together to develop themes and codes to answer each question. Furthermore, I evaluated the

conceptual framework when answering each question to see what level of reflection the participants were reflecting on while answering each question.

First Research Question

The first research question addressed how rural math teachers of African American students select their instructional strategies while planning their lessons. The following themes were identified from the participants' responses: (a) student prior knowledge, (b) background information, and (c) curricular information. This study utilized the Brown and Irby (2001) reflection cycle. Using the interpretist framework, I analyzed each research question as it related to the reflection cycle and reflective practices of the study participants. In addition, the following themes were discovered which correlate with the conceptual framework: (d) analyze, and (e) select.

Student Prior Knowledge

During the one-on-one interviews, Peggy shared how she chooses her instructional content based on the academic level the students are functioning on when they enter class. She discussed the way she modifies her content delivery according to the response of students to her instructional efforts. Mandy added that he has to present information "on a level where students can understand it."

Both Peggy and Mandy, discussed in detail how student prior knowledge is a critical component to the way they deliver instructional content. Kathy reiterated her colleagues' process by informing me of her own methods of adjusting the district scope and sequence to reflect student performance. She explained that she does not move on to other areas of the curriculum until most of her students have grasped the content of

focus. In another situation, Peggy spoke in detail about how her honors level students prefer to do more independent practice work after lectures, but in contrast, her on-level students did not learn better in that type of instructional atmosphere, furthermore, she stated the following comment in regards to the way she tailors her curriculum deliver, stating:

> Actually probably the level the students are on, and probably if I don't feel like they got it in the first time I taught it, the next time I might do something more hands-on and might allow them to work in groups if I feel like peer tutoring might help them and it depends on where I'm at in the lesson.

Mandy discussed how she uses student prior knowledge to manipulate the way instructional content is delivered to students. She extensively uses student's prior knowledge to deliver instructional content to her students. She provided the following example of how she selects her instructional strategies and manipulates the prescribed district scope and sequence:

> For me, I tailor my scope and sequence around what the kids are learning. I realize there are certain things I had to get done, there other things that I can backup and reteach. For other things, I have to offer tutorials before and after school and during my advisory. If they are free to come into another class, I let them see the lesson again.

Background Information

Utilizing student background information to alter instructional delivery was a second recurring theme from the participants. Mandy and Bryan talked about the influence of student backgrounds on their manner of selecting instructional strategies. Mandy for example, explained how a student's home life might affect their performance in the classroom as well as the necessity of adjusting mathematical word problems to address their brand of domesticity reasoning:

> Socioeconomic status is something that's very big at the small school of ours because we have so many students that are living below the poverty line. You can't focus when you're hungry, and it hurts kids to have to do stuff like that. Some of our kids not all of them but some of them have juvenile records so they are in and out of school for court dates. I try to take the word problems and take what I see in the lesson and relate it to what I see in their lives.

Extending on the Mandy's comments, Peggy indicated she believed students who came from families who valued education needed more hands-on activities and more practice stating:

> I think it depends, I think honors students… a lot of those students that come from families where education is important… a lot of those kids prefer that I just give them an example and give them the work (to do on their own). I think students where education is not as important at home…like more hands-on activities. They need a lot of the more slow

pace and more repetition and stuff like that. It depends on if education is important in the family.

Curricular Information

The third theme that addressed how the respondents selected their instructional strategies while planning their lessons was the content they were scheduled to teach. Kathy, Bryan and James revealed the required scope and sequence they were assigned to follow primarily drives the selection of their instructional strategies. During the interview, Kathy replied:

Most of the way I teach is by the content I teach… I do a lot of direct teaching, you know a lot of lecturing putting the information out there… that's what I do, in math I don't think there is a lot of discovery types of stuff…I could be wrong…. That's just me I don't a lot of discovery stuff… I say the things they need to learn… Most of the kids don't know algebra, it is totally new so there's a lot of presenting the information …I don't know how other subjects do it, but I do a lot of presenting.

Mandy and Kathy during their interviews also reiterated this as well. Likewise, it was also observed during their classroom observations. Most of these classes were characterized by lectures and call and response type questions. For example, the teacher asked a question and waited for the entire class to answer the question instead of doing any individualized checks for understanding. Bryan commented:

So basically, I have been in this position for a long time and taught all across the math curriculum and one thing I've learned is you have to

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present the information on a level where the students can understand it. In

math, it is pretty technical, and there have been many times I have

presented materials and theorems how they were presented in the book

and said this is what it means…Let's take the quadratic formula for

example, I want my students to know the technical components of a

quadratic formula and how each coefficient represents something in the

formula. And not necessarily to memorize the formula. I will say here is

a set of equations use a quadratic formula to solve this and explain to

them the differences they come across because not every quadratic

formula is in the same format. They might have to change the format.

Something that I teach them is that the quadratic formula can be used to s

will any quadratic equation even if they could have factored it.

James strengthens the connection between the required scope and sequence and

instructional strategies when an observation in one of his classes saw students

performing less than successfully on a previous assessment he gave earlier in the week.

Moreover, he further insisted that he only uses the required scope and sequence to select

his instructional strategies at several points during the interview. The teacher did not

adjust his instructional techniques after the students performed poorly on their

assessment. James shared the following:

In my class they tend to get left behind. It's up to them to catch-up.

There are opportunities for them to catch up at tutorials. It's up to the

student to come on. We're not gonna go back to square one for one or

two students… For every student that is hanging behind, there is another one ready to move forward. To be honest with you, if I've exhausted all the interventions I can, I keep moving on… Eventually maturity level or something will cause a kid to say I need to do this and do it right. Or excuse the expression, poop or get off the pot.

Analyze

One of the recurring themes recognized when analyzing the conceptual framework with the way rural high school math teachers of African American students select their instructional strategies context of the study is analyze. Teachers at this stage of the Brown and Irby (2001) reflection cycle analyze how their teaching strategies impact the way students learn. This was characterized when Peggy commented:

At that point, I start talking to other colleagues, or if it is a freshman, I might even speak to an 8th grade math teacher to see what exactly works with that student. I would like to see maybe if they delivered it a way that the students grasped it easier, or if the students are missing a brick in their foundation. Sometimes the 8th grade teacher will say the student didn't grasp it in there, at that point I back up and teach the foundation skill that the student needs. Usually we can build on that…The foundation might not be there.

Consistent with Brown and Irby's (2001) reflection level of analysis, Kathy, in her discussion of the changes she makes to the math curriculum to meet the needs of her students, examines the effect this approach has on student achievement disclosing:

Socioeconomic status is something that's very big at the small school of

ours because we have so many students that are living below the poverty

line. You can't focus when you're hungry and it hurts kids to have to do

stuff like that. Some of our kids not all of them but some of them have

juvenile records so they are in and out of school for court dates. With all

those things in mind how do they affect the way you deliver instruction?

What I try to do is I try to make a list of things we went over the day

before and when I see things the kids missed, next I make sure I go back

over it, which is a good thing because it's a review for all the kids. So

much of math builds from day to day you have to have a plan and   have a

structure for it… **Me:** So knowing that knowing where the kids are from,

how does it affect the different examples you present like if you're using

the word problem?)… **Kathy:** I try to take the word problems and take

what I see in the lesson and relate it to what I see in their lives.

This also became apparent in my conversation with Mandy when she shared the

following in her interview:

Let me give you an example of them are earlier classes the students got it

in my 5th period class the one you saw, there was a dazed look in the kids

eyes so I was like: I need to stop before I move forward.

Select

Select was the second and last recurring theme associated the conceptual

framework and first research question. Select is the lowest level on the Brown and Irby's

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(2001) reflection cycle and is associated with identifying teaching goals based on the utilization of curriculum guides and standards. This was observed when teachers blamed students for not mastering their assignments. This is also associated with Ward and McCotter's (2004) routine level of reflection, where teachers focus their energy on things they cannot control such as student behavior, background problems or avoiding blame for failure. I observed this from James when he berated his class about their grades without analyzing the way he taught the subject. He did not think that lecturing might not be the best way to inspire his kinesthetic and visual learners. Furthermore, Bryan was teaching a remediation class for students who were not successful taking their state assessment the previous year.

He told me, in front of the class, that he was not very familiar with the expectations of the new assessment. I suggested he look at prior test results of his students and adjust the curriculum based on the needs of the students. He told me, while he thought that was a good idea, he did not feel as though he had enough time to adjust his curricular delivery to accommodate such a method: He stated the following in his interview:

> You know the distractions they slip around and try to listen to music they
> start fiddling with their cell phone try to work on it. Every day I try to get
> them to focus on what I'm doing and what I'm saying and what they
> should be doing. Every now and then I have to tell them to put their cell
> phones away, and sometimes I tell them to put the toys away. I guess
> sometimes I can just look at my students. The two classes you came in

were small. Some of my pre-calculus classes have 20 in each class …I

have six kids that are taking pre-and that are also in my TAKS

remediation class that did not pass the TAKS test.

Bryan and James consistently reiterated, through their responses, that they did

not analyze the way their instructional strategies influence student achievement and did

not think about any student-centered factors, such as learning preferences while planning

their lessons. James declared:

I think some people make school seem like if they are not having fun, it is

not beneficial to them. Therefore if the class is not fun, they aren't going

to grasp anything. That goes against the old school system where certain

things aren't always meant to be fun. I think kids don't do the work

outside of the room because it's not going to be fun. I mean hell it's like

I'd rather tweet and do this other social stuff that's fun. I'd rather go play

ball, I'd rather not do this. I'd rather not take 30 minutes out of my day

and just do the work. Kids today are the same as I was, I mean kids are

going to tell you a lie if they think they can get away with it. They say it

to the parents, they say it to whoever and then they will beg and apologize

to get out of it when they are caught. That's just the nature of human life.

The ones who are not grasping it are the ones who are not putting in any

practice.

That quote is consistent with lower levels of reflections such as the select level

on the reflection cycle because teachers at that level do not have the skillset or either

desire to change their instructional strategies to meet the needs of the students they serve.

Second Research Question

The second research question explored the reflective qualities of high school math teachers who are educating African American students. The following themes were identified from the participants' responses: (a) reflection as a continuous part of practice, (b) student centered reflection. Moreover, select, transform and analyze were recurring themes with the conceptual framework that appeared as components of their reflective qualities.

Continuous Reflection

A few respondents indicated they continuously reflect on student achievement. I observed Peggy re-teach a lesson based on the way students in previous classes responded to her instruction. When I originally observed the class, she was teaching the lesson utilizing a lecture style approach of disseminating instruction. Later, I observed her teaching the same lesson, but this time, teaching it in an inquiry based manner where students were working in groups to answer questions. She shared the following in her interview:

> **Me**: What happens when a student is not ready to move on to the next lesson as prescribed by your curriculum guide?
>
> **Peggy:** Do you mean individual student or the whole class?
>
> **Me:** Okay let's differentiate between 5% in your class or 15 to 20% of class.

Peggy: If it is 5% of my class, I bring the students in for tutorials. Or I will use my inclusion teacher to review things with them.

Me: Do you use the inclusion teacher for all students?

Peggy: Yes I use them for all students. If it is 15-20% of the whole class looking at the unit tests and quizzes I feel I need to go   back over that. At that point, I will chose some activity for the whole day and do a different kind of a lesson or activity to address those needs.

Me: But what you do with an academic intervention is a working?

Peggy: Define what you mean by academic intervention.

Me: Let's say, you analyze the data and 15% you students were not grasping material and you teach it a different way and is still not working, what do you do next?

Peggy: At that point, I start talking to other colleagues, or if it is a freshman, I might even speak to an 8th grade math teacher to see what exactly works with a student. I would like to see maybe if they delivered it a way that the student grasped easier or the students are missing a brick in their foundation. Sometimes the 8th grade teacher will say the student didn't grasp it in there.   At that point, I back up and teach the foundation skill that the student needs. Usually we can build on that. The foundation might not be there.

Me: So if students are grasping material, you figure out why students are not getting it and go from there?

Peggy: If students miss something in seventh or eighth grade, I try to

go back to reteach that.

Continuous reflection is a sentiment expressed by Mandy as well. Kathy also continuously reflected in her classes she asked several questions during class and altered the way she presented her material after discovering several misconceptions. She indicated that this is a practice in which she engages on a consistent basis. She explained how after each class, she modifies her lessons based on student responses. I noticed such to be the case in my observation of her classroom pedagogical routines. She explained her approach this way:

First and foremost, I read the problem and see where they are lost

because when I present it to the whole class, some may get it and there

might be a couple who don't. You need to know who that one student is

who isn't getting it. You also got to know where they're getting stuck

because not all students get stuck at the same place.

Student Centered Reflection

Student centered reflection was also a common theme amongst the respondents in this study. Many of the participants shared with me in interviews that they utilize student's proficiency level as a point of reference to reflect on their practice. I observed Kathy's several posters about how students would use algebra in their everyday lives and during one of the observations, she started her lesson on cylinders and a few of the students had a difficult time grasping the concept so she took her speakers to her Ipod which were shaped like a cylinder and used that as an example for the students to follow.

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Mandy shared with me in her interview that she intentionally plans her lessons based on the performance level of the students in her class. She shared with me the following things:

> For me, I tailor my scope and sequence around what the kids are learning… I realize there are certain things I have to get done and there other things that I can backup and re-teach. I offer tutorials before and after school and during my advisory. If they are free to come into one of my other classes, I let them see the lesson again. I think that a lot of us who have been here for a while realize our situations are not the same and we are not all brought up the same way as some of these kids. Some of us have been more fortunate, but I'm not one of those, I am more in line with the kids that we teach. Being poor, not knowing where things like food are going to come from, you know that type of thing. It makes a difference…. I think that's why a lot of the kids don't call me Mrs. _____, they call me mamma.

Through the interviews and classroom observations, it was evident that a few of the teachers reflected on their student's learning preferences to enhance their instructional techniques. In one of the observations of Peggy's classroom, I noticed the way she modified the way she was teaching literal equations. Her reasons for doing so were quite enlightening.

> **Peggy:** What I have noticed is they can't do literal equations so I had to back it up and noticed some other classes can't do literal equations. A

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literal equation is taking a formula and moving things around and solving

for something different. Well, what I've done is we've gone back and we

started something very similar to that. I worked it into my lesson plan to

the point where it is all we working on for the next three days I noticed

that this is something that is a really big problem and something they

need in chemistry, physics and algebra 2 not only for the test with just for

everything.

Me: Okay what ways did you teach it differently?

Peggy: So then we went back and we did a hands-on activity, we used

pictures of different things and we moved them around so we decided

how we were going to move them around and subtracted or whatever.

Yesterday we took the math chart into actual formulas that they would

use all the time. Today each of the classes on each row will get a folder

and now choose the activity that they wanted to do and compare with

someone who chose the same activity. That is working by yourself but,

feeling confident when you turn it in you've got the right choices using

hands-on activities and things that they are familiar with.

Moreover, on my second visit to Memory High School Peggy shared with me the

following:

I treat each student individually and day by day according to their own

needs.

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Appraise

One of the recurring themes that emerged when applying the conceptual framework to the question that asks about the reflective qualities of high school math teachers who are educating African American students was appraise. According to Brown and Irby (2001), teachers who are operating at the transform level in the reflection cycle use interpreted data to develop projections and goals. This was captured in an interview with Peggy when she shared:

> **Peggy:** This is something I do class by class I mean there's some things I present to the first class that I say I need to do something different. My first algebra one class is fourth period and I might do some things and look at my   students and say well need to change that.
>
> **Me:** What triggers your reflection about that?
>
> **Peggy:** Questioning, observation, walking around, just   from doing that I can see that they are not getting it and I might need to backup. In fourth period, if I see they don't remember this from 8th grade I'll go ahead and change it for fifth period.
>
> **Me:** So is something you consistently do?
>
> **Peggy:** Yes I go class by class and I remediate as needed.
>
> **Me:** With that being said I'm getting how you reflect during the class. Do you have a time when you sit after the class and where you reflect on how things went?

Peggy: At the end of the day I reflect and look at how things went to see if I need to make any changes for the next day I review over things to make sure everything is good and I always do that at the end of the day also.

Kathy and Mandy further characterized this further when they modified their instructional content after students struggled with grasping the material earlier in the day. They went through the process of interjecting student's personal experiences within the curriculum to enhance the experiences of the students in her class. In her interview with me, Kathy shared the following:

I think teachers are naturally reflective from class to class. They reflect on what you did the previous day is just something that we do a lot of the time. I see if students do not get it the previous day and see why it didn't make sense to them and come back the next day and do something different. I think that being reflective is just something that we always do. Like for example, this is a lesson on formulas, I think about what were some of the misconceptions from last year. I think about this is something that I need to do different this year so you're always reflecting, rather it is the day before of the year before.

Analyze

One of the other recurring themes that emerged was analyze. According to Brown and Irby (2001), teachers who are at the analyzing level understand the way their instructional strategies affect student achievement, but have not made substantial

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changes to their practice like teachers who are reflecting at the appraise level.   Bryan

and James also reflected at this level and was characterized by their acknowledgment of

student failure, but unwillingness to change their practices. Mandy's comments

regarding the socioeconomic status of the students at their school was also evident in the

way she selected her instructional techniques. She relayed the following:

> **Mandy:** Socioeconomic status is something that's very big at his small
>
> school of ours because we have so many students that are living below
>
> the poverty line. You can't focus when you're hungry and it hurts kids to
>
> have to do stuff like that. Some of our kids not all of them but some of
>
> them have juvenile records so they are in and out of school for court
>
> dates.
>
> **Me:** With all those things in mind how do they affect the way you
>
> deliver instruction?
>
> **Mandy:** What I try to do is I try to make a list of things we went over the
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> day before and when I see things the kids missed, next I make sure I go
>
> back over it, which is a good thing because it's a review for all the kids.
>
> So much of math builds from day to day you have to have a plan and
>
> have a structure for it.

Select

The last recurring theme that emerged when analyzing the conceptual framework

in relationship to question two was select.   As mentioned in my analysis of the first

question, this is the first level of the Brown and Irby (2001) reflection cycle and through

my observations and interviews with Bryan and James, it was apparent that their mainly taught their curriculum without reflecting on the way their instructional strategies impact their students. Bryan's unwillingness to adjust his instructional delivery was reflected in the manner he delivered instruction to class and is also a representation of his reflective qualities. Actually, Bryan shared with me the following during the interview when I asked what happens when students are not grasping the material in his class:

> In my class they tend to get left behind. It's up to them to catch-up. There are opportunities for them to catch up at tutorials. This up-to-date student to come on. We're not gonna go back to teachings square one for one or two students. To be honest with you if I've exhausted all the interventions I can, I keep moving on. Eventually maturity level or something will cause a kid to say I need to do this and do it right. Or excuse the expression, poop or get off the pot. For every student there is hanging behind, there is another one ready to move forward. If I have people in there making those grades than it is not me... It's out there that is not applying themselves fully to it.

Moreover, Bryan indicated that he was not particularly interested in learning about student's backgrounds to modify his instructional methods. This indicates a lower level of reflection because their responses blame the students and do not analyze their own instructional delivery styles. In fact, he indicated that he did not see student's backgrounds when working with them in class. This was evident when he shared with the following with me an interview:

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We have a tutorial period in the morning it's 45 minutes or so. If I see

directly students aren't understanding something I don't want to pry into

their background. If it is because of their background. For an hour a day,

those kids are mine and if they lacking something in their background, I

don't need to know about that. There's always that cluster kids that no

matter what you do form and not interested in what you try to teach them

until the beginning of the sixth week of the six weeks then they get

serious about their grades whatever their needs are I try to do whatever I

can help them.

Third Research Question

The third research question of the study was to what extent rural high school

teachers utilize culturally responsive pedagogy to influence their instructional strategies.

Through classroom observations and interviews with the participants I found that a few

of the teachers utilize parts of culturally responsive pedagogy to relate to students but it

was not something that was a priority of the entire campus. I observed that the

participants made curriculum adjustments and used popular music and communication

strategies. Additionally, it was found that the respondents in this study reflected at the

transform, and appraise level after analyzing classroom observations, interviews, with

question three according to the Brown and Irby (2001) reflection cycle.   The teachers

who the campus administration believed were outstanding teachers exhibited aspects of

culturally responsive pedagogy in their classes such as utilizing popular music and

communication strategies when speaking with students. Leonard et al (2010) suggested

that researchers who are proficient in culturally responsive pedagogy understand the political context of their student's lives, challenge the status quo and change it.

Curriculum Adjustments

It was noted in my observations and interviews that the research participants changed their curriculum content to empower their students. In several of the classroom observations of Peggy, Mandy and Kathy, I noticed that they modified their instructional deliveries to fit the scenarios students are likely to observe in a rural area. This was also evidenced by the following statement with respondent two in my interview with her:

Mandy: I try to take the word problems and take what I see in the lesson and relate it to what I see in their lives.

Me: You have an example?

Mandy: Example is a few years ago I was using some curriculum that came from a predominantly white school and the situations they use and the word problems were things our students can't relate to and had no concept of so, therefore I try to make it (curriculum) towards the experiences of our students. I try to make the material similar to what our kids deal with on a daily basis as opposed to what other kids are doing on a daily basis.

Me: You have an example?

Mandy: Well an example is the talk about going to an expensive summer camp, well my students don't have any concept of going to a summer camp because they can't afford it… so our students go to sports camps, so

I would use the small sports camps that we have around here and ask them how they can raise money to go to sports camps. Anything I can do to bring it back to things that they are aware of, things they experience in their lives.

Curriculum adjustments were also noted in conversations with Kathy. She told me that students struggle with grasping new vocabulary words. Therefore, when she teaches difficult concepts, she reflects on how students are grasping the material and makes adjustments to word problems and other content to empower students and ensure they grasp the content.

> **Kathy:** Perceiving information is important. For example, were doing a lesson on… let me think about it… like, let's say would doing in a lesson on area and we talk about shingles on a roof and the kids have no idea what shingles are. To me, everybody should know what shingles are. There are some students who don't know because it's not in their background and it's not in their vocabulary, so it has a great effect on them.
>
> **Me:** I mean some of your students live in apartments, right?
>
> **Kathy:** Different things in their background do affect their learning, I mean their vocabulary is not the same as if they were to come from different places.
>
> **Me:** How do you make your teaching more relevant to them if they don't have that background information?

Kathy: If they don't know what shingles are you try to bring in what

shingles are, you might have to talk for a few minutes about shingles and

if they don't know what a slope is you gotta give them an example of

what a slope is. So then you gotta talk about a wheelchair ramp because a

lot of kids have wheelchair ramps in the house or their grandparent's

house. Real-life situations, something that I see in this town that these

kids ought to see. So you try to bring those things out so the kids can

identify with something when it taken the test or doing homework.

Popular Music and Communication Strategies

Through my classroom observations and interviews, I noticed Peggy, Kathy and

Mandy communicating with students in ways that are familiar with them. This was

illustrated with Peggy in her class when a student yelled "you trippin'!" and the teacher

told the student "No, *you* trippin,'!" This student was an African American female

student in one of Kathy's Algebra I classes. The student thought the comment made by

Kathy was funny and it appeared that the entire class enjoyed the exchange.

Additionally, Peggy played popular music in her classes. I was not able to decipher the

song that was playing, but it appeared that her African American students enjoyed the

selection. . This teacher shared with me that she works on building a community in her

class where students feel comfortable expressing themselves when they need assistance:

Similarly, Peggy noted a similar response: These strategies were also noted in an

interview with Peggy when she shared:

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Peggy: I use questioning and you know the kids around here let me know if they don't get it. At the beginning of the year I build social contracts and talk about how in math, you have to be sure about everything, so we talk about norms and asking for help so the kids will very comfortable in my class letting me know if they don't understand something.

Me: Is that all of your classes?

Peggy: Yes they feel comfortable with that because once they ask for help and nobody makes fun of them, someone will say out that I need help with this too, so they are really comfortable to say they need help.

Me: So you are saying that because of the way you present your lessons students will come right out and let you know when they need assistance.

Peggy: Yes because they know nobody is going to make fun of them if they don't know the answers that's something I spent a lot of time working on and at beginning of the year we build social contracts.

Additionally, Mandy notified me that the way she communicates with her students emboldens students in her classes to confide in her when they are having problems with math even after they are no longer taking her class. This was conveyed to me in the interview with her when she conveyed the following:

Mandy: I have 163 kids running around saying mama and I say what. I pride myself in having a good relationship with the kids. I have a lot of students coming from other classes because they understand the way I

teach it they might not understand the way the teacher is teaching it if I can teach a different way than they will understand it.

This teacher appeared to be admired by most of the student population. The teacher felt as if she was able to share a close bond with many of her students because she comes from a poor background like many of the students who attend Memory High School. I believed that helped her get the students to perform at a higher level.

Transform

After analyzing observations and interviews, comparing responses, reviewing the third research question and applying the conceptual framework, the theme of transform appeared in a few of the participant's responses. It was observed by Peggy and Kathy as they adjusted their teaching strategies later in the day after observing student difficulties. Mandy shared the following during her interview:

> **Mandy:** It's easier for me because I come from a bigger city and I moved to a small town so is easier for me to relate. An example is I used it to teach third grade and I actually had a student come up to me in asked me what a polar bear was because they knew what a brown bear was and a black bear was, and this child had no concept of a polar bear. All they had seen pictures of were black bears and brown bears… So I had to go about thinking you know what a black bear is and you know what a brown bear is, a polar bear is the same, but it is
>
> **Me:** Do you have an example of something you might have done in your geometry classes?

Mandy: I have been an algebra example I taught algebra for four years

and this is my first year teaching geometry. We have we have a huge

rivalry here with the school name Grosbeck. So I tell them to build a box

and build a river and send those bad kids back to Grosbeck. Well I say

box River move the kids and the kids get it because they can relate to

that.

Appraise

My observation found the respondents in this study to be reflecting at the

appraise portion of the Brown and Irby(2001) reflection cycle because they started to

understand how students who come from different backgrounds than their own might

differ in the way they interpret their instructional delivery. Moreover, Mandy and Kathy

consistently analyzed student responses when students were completing their warm-ups

and went back over the problems by presenting the information in a familiar context to

the students. This was also apparent when Peggy stated the following when talking about

how she tries to change parents and student's perception of math:

I think there's a lot of different reasons some kids are not ready for

abstract material. I've done a lot of studying on that in the abstract things

in algebra some students are just not ready for that. They just are not there

yet so helping to bring them to that point is my job. I think attitudes about

math, you know some people think math is hard and some of the parents

think the same thing. I hear parents say at conferences all the time" I'm

horrible at math, so no wonder they are". It gives them that excuse and

then they are off the hook then. I think a lot of things like that. I try to

work with parents and students and let them know they can be successful

with hard work. I understand they might need assistance and I do

whatever I can to bridge the gap.

Fourth Research Question

The fourth research question was to what extent does reflecting about student's

backgrounds influence that manipulation of the math curriculum. Teachers reflected in

class to manipulate the math curriculum and other participants reflected about student

backgrounds as a continuous part of the planning process. Also, it was discovered that

participants were reflecting on the describe and appraise levels on the Brown and Irby

(2001) reflection cycle.

In-Class Student Reflections

One of the recurring themes that evolved when analyzing the observations and

interviews in this study and attempting to answer question four was in-class reflections

on backgrounds. Peggy divulged that her honors students typically chose to work on

problems individually because of, what she feels is, their stronger academic

backgrounds. She routinely makes these observations in her class and makes adjustments

accordingly. This was conveyed to me when she said the following during our

interview:

I think students where education is not as important at home, they like

more hands-on activities, they need a lot of the more slow pace and more

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repetition and stuff like that, it depends on if education is important in the family.

This theme was also present in my interview with Bryan and Mandy. As mentioned earlier in this chapter, she believes reflection is a very necessary component to altering the curriculum to correlate with the experiences of her students. He felt like students in his class did not retain things they learned in previous years. He feels that because of student backgrounds, he has to consistently re-teach concepts in his Algebra II class that he reflects upon in class while teaching a concepts. He went on to share in detail that at the beginning of the school year he analyzes student responses to questions and from that point he understands the academic proficiency of the students in his class. That was characterized by the following statement in our interview:

> I mean the culture…I observe what it is the kids don't know or retain coming into the school year. What they're supposed to do coming in. That's a direct reflection of reflecting and going back and teaching what needs to be taught. We do have the junior high school right behind us so we could easily meet with junior high school teachers. It's small town and it is not like you are driving across town to see the junior high school teacher. As far as physical structure the proximity is cool. Knowing the kids when they walk in and listening to what they have to say. And teachers that have been here and that's another thing, there's a lot of new teachers here. I mean, I have to analyze what students know and make changes from there.

Reflection as a Part of Planning

Reflection as a part of the planning process is a theme that developed when comparing the observation and interview data and answering research question four. Each of the respondents discussed their individual process when constructing lesson plans that took their student's respective backgrounds into account. Peggy had this to say:

> **Me:** What about the subject areas that are tested like algebra one or do you always plan together?
>
> **Peggy:** We talk quite a bit about how we're going to teach things and that is Mrs. Brown and I, we're the only two algebra one teachers and we talk about a lot of things like how the information is tested and how we want to get the information to them, we do talk quite a bit about that.
>
> **Me:** So I get the impression that you all talk but that you do it on your own, but it's not part of a campus structure.
>
> **Peggy:** The curriculum is very structured, but the delivery is completely up to us. My delivery might be different in one class than the other it depends on the students.
>
> **Me:** How do you make sure you stay on the same pace like the same scope and sequence?
>
> **Peggy:** It depends on where we are, sometimes when I'm doing the same thing if I feel I must do more work on something, sometimes I backup and sometimes I do something a little bit different than she might.

Sometimes were not exactly at the same place, but at the end of the six weeks we always end up back where we need to be.

It appeared from speaking to this participant and observing her classroom that reflecting about student's backgrounds is a part of the planning process. Additionally, Mandy told me that vocabulary is something that students struggle with in her class with. For that reason, she intentionally makes plans to bridge the gaps students have because of their background. This was exemplified by the following response shared with me during her interview:

> **Mandy:** Let me give you an example of that, the earlier classes the students in my 5th period class the one you saw… there was a dazed look in the kids' eyes so tomorrow I will need to re-teach it before I move forward. So like I need to change something and do something different so it did. That was one of those classes with a deer in a headlight look, so tomorrow I would have to bring something else in for them to understand.
>
> **Me:** So what are you going to bring in?
>
> **Mandy**: We have a lot of visual aids and we have a notebook that the kids carry around with a lot of math examples. I know that they would have to get their dictionaries out so we can make some examples and never had to go back and look?
>
> **Me:** So you talk about bringing visual aids. What is something unique that you might have to do here is you might not have to do it in the bigger

cities like Austin or Dallas or somewhere else? What are the visual aids
or something that is specific for here?

Mandy: A lot of times we use different highlighters with different colors
of ink so students can highlight different things and at that point they
know that this yellow color means something and another colors mean
something else. Whatever the highlighted thing is, helps them remember
it easier. I also use a lot of manipulatives have you ever heard of
versatile?

Me: Are they algebra tile things?

Mandy: This is a self-checking the where the kids can answer questions
and their questions had to be a certain order to make this pattern fit. The
kids can see because the blues and oranges are supposed be together and
they know which questions are gone wrong

Appraise

It was found that respondents in the study reflected on the appraise section of the
Brown and Irby (2001) reflection cycle because they interpreted the way a student's
background knowledge has on their interpretation of math and accordingly determine the
impact their backgrounds have on their learning preferences. As mentioned in one of the
analysis of the other research questions, Peggy and Mandy also utilize formal
assessments and student backgrounds to construct their curriculum delivery. Kathy said
the following during our interview:

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I do have a journal I write things down and go back when I'm teaching

the lesson this year and reading last year's notes when I'm thinking

talking change things to make the kids better understand if they haven't

trouble with something.

Select

Select was another theme that was discovered while analyzing the observations

and interviews conducted for this study and comparing the responses to the Brown and

Irby (2001) reflection cycle. This was noted in an interview with Bryan when he stated

the following:

I mean you always look back especially as a coach. Rather it is looking at

film from the game or that kind of stuff. This is natural for me to do that.

When I finish out the day, I'm like crap what we do have to do today and

what do we have to go over tomorrow. I don't know if there is a textbook

process or ones innate ability. I mean it's just like in sports, if you do, that

doesn't mean every coach does that. I'm a firm believer that you have to

find the error of your ways. Sometimes the error of your ways can be

found by itself and sometimes you need the assistance of others.

That same theme was observed in an observation of James' class when he

attempted to decipher the expectations for the STAAR examination. This was further

noted in the interview with Peggy when she said the following:

I teach how I was taught and I do a lot of teacher led instruction with the

teacher next door does a lot of discovery type of activities. If I had time to

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talk to the teacher to see exactly how she is presenting information and what she's doing that could possibly affect the way I deliver instruction. Last year I met with the other algebra teacher and that helps with the brainstorming and delivering instruction. It can be a good thing.

Summary

This chapter revealed the thoughts of the participants through observations and interviews about the way they reflect on their instructional strategies, which aiding in their ability to identify reflective qualities that drive their practice and influence the way they deliver content to their students. It became apparent that Peggy, Mandy and Kathy used student prior knowledge, background knowledge, content knowledge, continuous and student-centered learning in the preparation of their lessons and approach to classroom instruction. Most of the reflecting from the participant's came from individual preparation and was not attributed to any campus structure or a result of any mandate. Peggy, Kathy and Mandy shared with me that they consistently reflect on their own, while Bryan and James did not reflect and had no intention of trying to add this practice to their daily habits.

For the first research question, how do rural high school math teachers of African American students select their instructional strategies while planning their lessons, it was determined that these teachers utilized: (a) student prior knowledge, (b) student background information, and (c) content information. This information was found through interviews and classroom observations and this was something that teachers did individually without collaboration.

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Findings for the second research question, which was what are the reflective

qualities of high school math teachers who are educating African American students,

found that Mandy, Kathy and Peggy utilized continuous reflection and student-centered

reflection to make their content relevant to their students, This reflection allowed some

of the teachers to make math more relevant to their students by finding misconceptions

they have and adjusting their teaching strategies.

For the third research question, which attempted to answer to what extent do

rural high school math teachers utilize culturally responsive pedagogy to influence their

instructional strategies, it was found that teachers used isolated portions of culturally

responsive pedagogy such as curricular adjustments and student centered communication

strategies (Leonard et al, 2009; Tate, 1995). This was something that teachers did

individually, but was not something they consistently did as a campus.

The final research question, to what extent does reflecting about student

backgrounds influence the manipulation of the math curriculum, saw the teachers at

Memory High School employ reflective methods such as in-class reflections on

backgrounds and a few of the teachers use reflection as a continuous part of their

planning process. Some teachers continuously reflect on their practice while they

manage their instructional delivery, while others did reflect on student background

during classroom instruction, but was not a part of their planning procedures.

The answers to the research questions sought to explain how rural teachers

reflect on their instructional strategies. The skill-set, desires and individual efforts of the

Respondents directly influence their capacity to reflect. The responses of the

Respondents were gathered from classroom observations and interviews. Chapter V will

present a discussion of the results, conclusions drawn from the results, implications for

educators, and recommendations for further studies.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS AND IMPLICATIONS

Chapter V provides a summary of the results of this case study and discusses the major findings as related to the literature review. Conclusions are drawn from the research findings that were presented in Chapter IV and the themes identified from the data sources explored. Implications of the study for educational leadership as well as recommendations for further research to educators who have a desire to use this body of research of math teachers of African American students in rural settings for additional studies are addressed in this chapter as well.

The purpose of this study was to understand the reflective qualities of five high school math teachers of African American students in a rural setting. Chapter IV presented the findings from the data which described how rural math teachers of African American students reflected on their practice. It also described ways rural high school math teachers of African American students find ways to plan their lessons despite their lack of planning time or campus expectations. This single site case study revealed answered to the following research questions:

1. How do high school math teachers of African American students in a rural setting, select their instructional strategies while planning their lessons?

2. What are the reflective qualities of high school math teachers in a rural setting, who are educating African American students?

3. To what extent do high school math teachers in a rural setting utilize culturally responsive pedagogy to influence on their instructional strategies?

4. To what extent does reflecting on the backgrounds of African American students, influence the manipulation of the math curriculum in a rural setting?

Gathering information from teachers was vital in ensuring that participants directly supplied answers to the research questions were involved in the delivery of instruction at Memory High School. Therefore, such an imperative provided me great insight into this particular case to develop answers to the research questions in this study.

Summary of the Study

In order to document the experiences of this case study, several data sources were used to triangulate the data. One-on-one interviews and multiple classroom observations were used to provide documentation for responses to the research questions. Observations allowed me to gain an awareness of how closely the Respondent's interview questions correlated with their teaching strategies and record interactions between the teachers, curriculum and students, which were logged using an observation protocol (See Appendix C). The interviews were audiotaped to allow the conversations to occur without any disruptions and ensure I accurately captured the thoughts of the participants. I transcribed all of the interviews once they were completed (See Appendix D).

The individual interviews recorded the responses of high school math teachers of African American students as they planned and modified their lessons. I found that the participants were very enthusiastic about discussing their instructional strategies with me. The teachers said they felt that reflecting about their practice was extremely important, but due to the restraints of their master calendar, they are not able to plan with

their colleagues as much as they preferred. This was apparent in several of the interviews and exemplified when Peggy said the following in her interview:

> I don't mean that in a negative way, it's just with small schools there are not a lot of teachers, I mean there are five math teachers, five social studies teachers, and my planning time is not aligned with anybody else who teaches the same thing I do.

Mandy shared a similar response when she stated the following:

> I do value the opinions of my colleagues very much, but the subjects I'm teaching this year nobody else teaches them. That makes planning with my colleagues this year impossible because I'm only geometry teacher and am only teacher that teaches math models so I'm kind of planning on my own so to speak.

Kathy also shared a similar response when she added:

> If I had time to talk to the teacher to see exactly how she is presenting information and what she's doing that could possibly affect the way I deliver instruction. Last year I met with the other algebra 1 teacher and that helps with the brainstorming and delivering instruction. It can be a good thing

Consistent with Peggy's estimation, researchers like Marzano and Pickering (2011) indicated that teacher quality has the most significant impact on student achievement. What's more, teacher collaboration and reflection have been shown to increase achievement levels and educational outcomes amongst African American and

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other students of color (Darling-Hammond, 2010; Leonard et al, 2010). It has also been found that teachers in rural settings (Howley, 2003; Irvin et al , 2012;) struggle to get time to plan with their colleagues because of campus structures, which appeared evident in many of the interviews with the participants in this study.

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Summary of Major Findings

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Rural Math Teachers Instructional Strategies

The major findings related to the first research questions which was: How do rural high school math teachers of African American students select their instructional strategies while planning their lessons was that teachers at Memory High School used a variety of techniques to select their instructional strategies. When the teachers analyzed their curriculum, they typically utilized student prior knowledge, background knowledge and curriculum guides.

Mandy, Kathy and Peggy made changes to their instructional strategies during class as they taught their lessons, decisions typically made in isolation from other participants. The level of intentional selection of instructional strategies varied greatly from each participant. Peggy and Mandy intentionally manipulated their prescribed curriculum, while other teachers blindly followed their guides without making any adjustments to accommodate for student's needs. The culture of the campus did not make modifying curriculum to meet student's need a priority. And so, teachers who are not inclined to reflect on their instructional techniques or have the skillset to intentionally adjust their teaching strategies did not. Reflection was a consistent part of Peggy's, Mandy's and Kathy's practices, while Bryan and James sporadically reflected

on their instructional practices. This is consistent with problems that have been documented (Irvin et al, 2012; Reeves, 2012) with rural teachers because many rural schools such as memory high school do not have the resources to influence collaboration amongst teachers.

Reflective Qualities of Math Teachers

The major findings related to the second research question: What are the reflective qualities of rural high school math teachers who are educating African American students? I found that Peggy, Mandy, and Kathy continuously reflected on their practice throughout the lesson planning process. While Peggy reflected on her practice to the point where every instructional activity she completed was based on student needs. Peggy spoke in detail about the way she rearranged and modified her instructions every day based on how they performed on their daily assessments. Besides, Bryan did not reflect on their practice at all. Peggy's reflection was exemplified by the following response:

> **Me:** Let's say you analyze the data and 15% you students were not grasping material and you teach a different way and is still not working what he do next?
>
> **Peggy:** At that point, I start talking to other colleagues, or if it is a freshman, I might even speak to an 8th grade math teacher to see what exactly works with a student. I would like to see maybe if they delivered it away that the students grasped easier or the students are missing a brick in their foundation. Sometimes the 8th grade teacher will say the student

didn't grasp it in there, at that point I back up and teach the foundation skill that the student needs. Usually we can build on that. The foundation might not be there

The participants varied in their reflective qualities and strategies and I believe that disparity to be the result of a campus culture which does not make teacher reflection an explicit priority. This was noted in Chapter IV when I noted that James did not reflect on his practice or care to make any changes despite the disparate results of his students on an assessment he gave. Bryan was teaching a STAAR remediation class and informed me during the class that he did not know how to teach the class and hadn't taken the initiative to figure out how to teach the content despite the fact that students were scheduled to take a make-up examination a few weeks after my observation. As mentioned in the previous question, reflection about student achievement was not expected at Memory High School and in fact, DiPaola (2008), said that the campus structure is related to teacher reflection. All of the teachers indicated that reflection was not a requirement or expectation for teachers at Memory High School. Therefore, it was not something consistently practiced at Memory High School as evidenced by the responses of several of the study participants.

Peggy, Mandy and Bryan stated in their interviews that the campus was very small and there was little opportunity for the math department to plan on a consistent basis because of the insufficient number of teachers teaching the same subject. Moreover, many of the participants shared they were the only person teaching their content area, leaving nobody to plan with or help with their teaching strategies. James

indicated that team planning was required in the past, but was not a present expectation. In contrast, the small size of the school district does make it easier for high school teachers to collaborate with their middle school counterparts, creating a tremendous opportunity to plan with teachers at the middle school.

Mandy, Bryan, and Kathy informed me that they have worked at other campuses where team planning was expected and ingrained in the campus culture. The teachers were not exactly unhappy with their current campus structure, but many of them agreed that planning with colleagues is a tremendous asset and wished that it were a part of the planning expectations at their current campus. As mentioned earlier in this section, this explains the significant differences amongst the participants in this study in regards to their reflective qualities.

High School Math Teachers and Culturally Responsive Pedagogy

Peggy, Mandy, and Kathy were the only participants who used any aspect of culturally responsive pedagogy and consequently were the most reflective participants in this study. Mandy was the only participant who grasped the concept that curriculum should be used to empower students, while Peggy and Kathy utilized surface level aspects of culturally responsive pedagogy such as popular communication strategies and using popular music. From findings in reference to the third research question, which asks to what extent do high school math teachers of African American students utilize culturally responsive pedagogy to influence their instructional strategies, I determined that participants individually used concepts of culturally responsive pedagogy such as

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communicating in ways consistent with student preferences and adjusting the curriculum to present math in a content the students are familiar with.

Since planning together was not often feasible or even a campus priority, the research participants varied tremendously in their insight and ruminations. Bryan and James indicated that they believed that student backgrounds did not have an effect on their learning preferences. This effects the use of culturally responsive practices on the campuses because teachers like Peggy, Mandy and Kathy utilized these strategies and I observed they had higher student engagement and according to the principal, they also had higher standardized test scores. Therefore, I believe if planning and utilizing culturally responsive strategies were required, more teachers at Memory High School would utilize them.

Nevertheless, I got the feeling that they generally cared about the performance of the students under their direction, but were not able to find the correlation between student backgrounds and the way that might influence the way they perceived information. As a researcher, I find that to be problematic because I feel that way of thinking indirectly discriminates against students who come from different cultural backgrounds as the teacher because their learning preferences might significantly differ from the teachers instructional strategies. This was noted when James stated the following in his interview:

> **Me:** What effects do students backgrounds have on their learning
> preferences it could be racial, cultural, socioeconomic or whatever? How
> do you think that affects how they perceive the information given to you?

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James: Again they are creatures of habit. It is their raise in a household where was someone checks and sees if they've done their homework. Same thing I used to do when I was a kid. I would take my homework and hide it in the garage and tell my mom I didn't have any homework. For night after night, she would ask about my homework and I would tell her I didn't have any. One day she went in the garage and found my homework and I got my but tattooed for that. We talk about background that's what needs to be done, I mean that was done to me when I was in elementary school. I'm 50 years old right now and you're talking about 40 years ago and that's what happened. Kids do the same thing today maybe not the same extreme, but they do the same thing. The background is at home to where parents understand what the kids needed to do. It doesn't matter rich to poor they need their support at home. Now you can say if they don't eat right they will not have the energy to learn in class but we have free meals here at school. I mean if you can't afford to eat we have the free meals here school. I mean how many kids eat lunch here at school or pass it up. That that's a choice.

I personally do not believe James harbors any personal ill-will towards the students he serves. James previously taught at a high school in an urban city in Texas where the population was 80% African American and was a successful coach. Still, I believe he had an unconscious bias against people from backgrounds different than his because of his failure to acknowledge that students background could possibly influence

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the way they perceive information. Shandomo (2010) indicated that when teachers do not acknowledge student backgrounds it can lead to lower expectations about behavior and academic performance. I believe that is the case with James because I never heard him say in any of my interviews that his students can do better and he expects from the best from them. I only heard him blame student failure on their shoulders.

Furthermore, researchers, Gay and Kirkland (2003), indicated that avoidance of cultural awareness is a way to thwart multi-cultural education and was exemplified when Bryan shared the following in his interview:

> On the one hand, I want all students who walk in the door to learn. Some of the kids who walk in my classroom, I know their families. Those tendencies will always be there so I'll say I'm going call your mom. On the other hand there are students that I don't know their families. I have it in my heart that I see them as students only and I try not to hold any kind of tendency or whatever because I know this student comes from a poor family and the other one doesn't. For an hour a day, those kids are mine and if they lacking something in their background, I don't need to know about that. And I asked them to me what I can do to help you be successful. Whatever their needs are I try to do whatever I can help them.

In my opinion, culturally responsive strategies should be implemented at Memory High School because not all of the teachers are voluntarily adjusting their instructional strategies to meet the needs of all of their learners. As mentioned in the review of literature, there is an 11 point disparity between African American students

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and their European American counterparts. Inquiry based learning strategies that allow students to experience the curriculum through familiar contexts has been proven to increase student achievement (Butter, 2001; Tong et al, 2010) and I believe would benefit the African American students at Memory High School.

Reflection about Student's Backgrounds

Considering the fourth research question, to what extent does reflecting about student backgrounds influence the manipulation of the math curriculum, I found that some teachers utilized student's background as a continuous part of their lesson planning and brief in-class reflections, which instigated adjustments when students did not grasp material. As mentioned in my analysis in previous questions, most of reflection about student backgrounds that influenced the participants was the result of individual efforts and not a campus initiative. The lack of consistent planning among the teachers was evident in the varying levels of reflection amongst teachers at Memory High School.

Each teacher makes an individual contribution to their planning. Peggy, Mandy and Kathy were able to connect with the students at Memory High School, while Bryan and James struggled to see any connections between themselves and the students, making it all too apparent that many participants were not aware that student's backgrounds influence learning preferences. Peggy, Mandy, and Kathy utilized student's backgrounds to reflect because of their own personal initiative. Mandy for example, spoke in detail about how growing up poor in a small town influences the way she presents her lessons as she stated:

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Mandy: Me being from East Texas are grew up in South Grand   Prairie until I was 15 Years old. There is a world of difference from what we knew versus what these kids know it just comes from living in a small town. These kids don't have all the opportunities that some of the bigger school districts have.

Me: With that being said how does that affect the way you present materials and instructional content to students limited in the small town?

Mandy: It's easier for me because I come from a bigger city and I moved to a small town so is easier for me to relate.

Kathy, for example expressed the following in her interview with me.

Me: Can you tell me what affect you think students backgrounds have on their learning preferences and that can be anything nonracial cultural or social economic**?**

Kathy: Perceiving information is important, for example were doing a lesson on let me think about it like let's say would doing in a lesson on area and we talk about shingles on a roof and the kids have no idea what shingles are to meet everybody should know what shingles are. There's some students who don't know because it's not in their background and it's not in their vocabulary so it has a great effect on them.

Me: I mean some of your students live in apartment's right?

Kathy: Different things in their background do affect their learning, I mean their vocabulary is not the same as if they were to come from different places.

Me: How do you make your teaching more relevant to them if they don't have that background information?

Kathy: If they don't know what shingles are you try to bring in what shingles are, you might have to talk for a few minutes about shingles and if they don't know what a slope is you gotta give them an example of what a slope is. So then you gotta talk about a wheelchair ramp because a lot of kids have wheelchair ramps in the house or their grandparent's house. Real-life situations, something that I see in this town that these kids ought to see. So you try to bring those things out so the kids can identify with something when it taken the test or doing homework.

Peggy also shared with me the following statement in her interview:

Me: Okay what ways did you teach it differently?

Peggy: So then we went back and we did a hands-on activity, we used pictures of different things and we moved them around so we decided how we were going to move them around and subtracted or whatever. Yesterday we took the math chart into actual formulas that they would use all the time. Today each of the classes on each row will get a folder and now choose the activity that they wanted to do and compare with someone who chose the same activity. That is working by yourself but,

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feeling confident when you turn it in you've got the right choices using

hands-on activities and things that they are familiar with.

Me: Okay so it appears that if you present the material in a way that a

visual kinesthetic learner might not grasp it at first, you go back and

present it in that way. Okay so maybe you're not thinking intentionally

that I'm doing this for my visual or kinesthetic learners but you're

thinking they didn't grasp it this way I taught it so let me teach it

differently**.**

Peggy: For most lessons I try to include all the different learning styles of

all the different kids.

Discussion of Findings

Student Prior Knowledge

Instructional delivery that builds on student prior knowledge is extremely

important for students to grasp the math content. Illeris (2007) indicated that individuals

learn concepts through their individual understandings, meaning each new concept

student learns is based on their perspective. Furthermore, Milner (2003), suggested that

when teachers who come from different backgrounds than their students, such as the

teachers at Memory High School, reflection must be meaningful and focused.

As mentioned in Chapter II, many schools plan and reflect through professional

learning communities (Dufour et al, 2005). This structure was not present at Memory

High School and contributed to the lack of congruence amongst the teachers at this

campus. Moreover in studies completed by Pelliccione and Raison (2009) indicated that

reflection can be taught if the campus has a strong leader who provides strong guidelines and makes planning and reflective practice a nonnegotiable part of the campus culture. The teachers at Memory High School conveyed that they did not plan with other teachers and many of them described their relationship with the principal as more of a motivator than an enforcer of any pedagogical instructional practices. I did not hear any of the teachers comment during their interviews about interactions with the principal in which he discussed instruction in their classes. It supports the aforementioned assessment that he is more of promoter than responding critically to their instructional practices when Bryan shared:

> I've been here for 20 something years and worked for a number of different principals. Our current principle is excellent, he is a former head football coach. And when he was a former head football coach he loved the kids and the kids loved them. His attitude as principal spills over to us. It's not the school building. It's all about the overall personality of the school and I think that starts at the top principle helps us to want to get the best out of our kids. I work with some campuses were principals sit in their office but this principle wants to make changes.

Background Information

As mentioned earlier in this study, researchers like Leonard et al (2010), found that African American students perform better when the context of the instructional material is linked to their experiences. Mandy and Peggy shared that same belief, but their practice was isolated because of the structure of the campus. Rural schools have

unique challenges because they are teaching more diverse populations than they in the past, but do not have the internal expertise to help teachers meet the changing needs of the diverse population of students they serve. This was the case at Memory High School where the population is approximately 33% African American, 33% Hispanic and 33 % European American students. Reflection about student backgrounds through the use of video games, music and stories have been shown to be important components to increasing student achievement (Gutierrez, 2013) and reduce student stereotypes. I observed Peggy and Kathy utilizing instructional devices in their classrooms that were similar to video games while Mandy utilized stories in her expression of the math curriculum.

Participants of this study did not communicate with me through interviews that there was a concerted effort at the campus level to alter the school curriculum to reflect on student background information to modify instructional delivery. DiPaola (2008) and Marzano & Pickering (2011), indicated that the campus leadership is responsible for setting the stage for establishing systems to reflect on student achievement and modify instructional delivery based on the student's background.

In the opinion of this researcher, the entire campus cared about the success of the students who attended Memory High School. However, based on the skill-set and knowledge base of the study participants, meaning cultural self-reflection was not possible or expected. The campus serves approximately 70% students of color, while 70% of the teachers are European American. Gay and Kirkland (2003), Milner (2003) and Shandomo (2010) stated that when teachers are educating students who share

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different backgrounds than the students they serve, they must purposefully reflect on their practice to become sensitive to the unique cultural needs of their students. That is the case at Memory High School where the school population is becoming predominantly culturally and linguistically diverse and the teaching population is not. That means teachers there will need continued practice modifying math curriculum to meet the needs of students who are culturally different than them.

Curricular Knowledge

Aguirre et al (2012) and Leonard et al (2010), stated that teachers of diverse populations of students must possess an acute awareness of the knowledge and belief about teaching a particular subject and horizontal and vertical directions within a subject. Many of the teachers at Memory High School relied solely on the presented curriculum to select their instructional strategies. However, the lack of structural planning requirements became evident in interviews with the participants. This was characterized by Kathy in an interview:

> The curriculum is very structured, but the delivery is completely up to us. My delivery might be different in one class than the other it depends on the students. It depends on where we are, sometimes when I'm doing the same thing if I feel I must do more work on something, sometimes I backup and sometimes I do something a little bit different than she might. Sometimes were not exactly at the same place, but at the end of the six weeks we always end up back where we need to be.

These responses do not indicate there is a consistent and expected requirement that they meet with their colleagues to plan their lessons. The scope and sequence is generated by a third party outside of the district and participants did not have to meet to discuss the way the curriculum was disseminated because it was given to them by a third party. This can potentially negatively affect Memory High School. Because as mentioned earlier, researchers such as (Aguirre et al, 2012; Bonner & Adams, 2012 &Leonard et al, 2009) indicated that students from diverse backgrounds perform substantially better on standardized tests when it is modified to make it authentic to students' lives and community experiences. The teachers who utilized curricular knowledge at as the basis of the selection of their instructional strategies lacked the skill-set to modify the enacted curriculum to include student experiences. This was exemplified by the following statement from Bryan:

> I usually try to work with them one-on-one and small groups because math is sequential. An example is pre- calculus, we are studying the basic units of trigonometry, and next week we're going to do the law of sins and cosines. And I showed them how to do it today on the calculator. I try to work with them as much as I can. Like, an example is the class you came in earlier. That's a TAKS remediation class and in that class you have to focus on the individual. I make an effort to say you got to know this and I say which formula is the one you use to find the hypotenuse. If they are not grasping the material, I try to help them individually or in small groups. One young man came to me during the

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tutorial period and acted like he knew what to do and I told him to show

me on the calculator and he did it and got some weird answer. The

setting on the calculator was in radiants and has to be in degrees. In it was

a simple matter of changing his calculator from radiants to degrees and

once he got it a light came on.

Reflective Qualities of High School Math Teachers

As mentioned earlier in this study, teachers who serve diverse populations of

students should reflect on their practice to meet the needs of their students (Gay &

Kirkland, 2003; Milner, 2003; Russell, 2005). The participants in this study displayed a

variety of reflective qualities throughout the study such as continuous and in-class

student reflections. Peggy, Mandy, and Kathy continuously reflected on their practice

while other ones reflected in a student centered manner, but reflection was not on

continuous part of their lesson planning.

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Continuous Reflection

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Continuous reflection was a theme which occurred when answering the second

research question. Brown and Irby (2001) argued that continues reflection should be a

part of each teachers practice. This is consistent with Aguirre et al (2012) & Leonard et

al's (2010) best practices for teaching math to African American and other students. In

fact, Leonard et al (2009) suggested that math teachers utilize family and community

activities in class such as gardening, sewing, weaving, fishing, cooking and video games.

Providing inquiry based instructional techniques such as the ones listed in the previous

sentence have been proved to increase the achievement of African American students in

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Math because it allows students to experience the math curriculum in contexts familiar to them (Butty, 2001).

One of those activities was observed during an observation of Peggy and Kathy's classes where they used calculators to answer warm-up questions. The calculators allow students to answer questions and their responses are posted electronically on the overhead when they select their responses. This mode of checking for understanding is similar to video games the students play at home. Remarkably, the teachers who parents and administrators feel are the most effective teachers seamlessly integrate activities such as those in their classroom. This practice as noted in previous actions was done in isolation from colleagues. This was characterized by the following statement by Respondent Three:

> The things that influence things for me would be… like special needs
> kids. I teach several special needs students. I have to make sure my
> content is reachable for them as well as regular ed students… I also make
> an effort to make relationships with my kids so I know what their
> backgrounds are and what things influence them. Like if they have home
> problems or problems in school, if they've ever been arrested, if they
> gone to the court system because of abuse, socioeconomic factors play a
> vital role in what I do.

In-Class Student Reflections

In-class student reflections were another theme that occurred while analyzing the second research question. The participants who reflected in-class did not make such a

continuous part of their lesson planning. These teachers made small, minute adjustments

to their classes like changing instructional techniques during the day when students in a

particular class did not seem to be grasping the material. The teachers at Memory High

School care very deeply about the academic success of their students, but many were

lacking the skill-set to reflect on their instructional strategies which, according to the

Brown and Irby (2001) reflection cycle, indicated reflection at the describe level.

DiPaola (2008) and Dufour et al (2005) stated that teacher reflection must be an

explicit part of campus expectations, while Gay and Kirkland (2003) argued that teacher

accountability *must* be a part of cultural critical reflections. In order to build cultural

consciousness, self-reflection must be part of a continuous staff-development plan.

Moreover, many of the obstacles to building meaningful self-reflection throughout the

entire campus involve teachers not understanding what constitutes meaningful self-

reflection, much like some of the respondents at Memory High School. When asked

about the way student's backgrounds possibly influence their learning preferences,

Bryan made this comment:

> Again they are creatures of habit. It is their raise in a household where
>
> was someone checks and sees if they've done their homework. Same
>
> thing I used to do when I was a kid. I would take my homework and hide
>
> it in the garage and tell my mom I didn't have any homework…. Night
>
> after night, she would ask about my homework and I would tell her I
>
> didn't have any. One day she went in the garage and found my homework
>
> and I got my butt tattooed for that. We talk about background that's what

needs to be done, I mean that was done to me when I was in elementary

school. I'm 50 years old right now and you're talking about 40 years ago

and that's what happened. Kids do the same thing today maybe not the

same extreme, but they do the same thing. The background is at home to

where parents understand what the kids needed to do. It doesn't matter

rich or poor, if they need support at home. Now, you can say if they don't

eat right, they will not have the energy to learn in class, but we have free

meals here at school. I mean if you can't afford to eat we have the free

meals here school. I mean how many kids eat lunch here at school or

pass it up. That's a choice.

The research participants varied in their reflection level. Bryan and James

reflected on the lowest levels. They continuously blamed the students for their

educational failures. After visiting the research site on two occasions and speaking

informally with both of the participants, I never heard them speak about the way their

instructional strategies effect their student's learning preferences. The women in this

study reflected at higher levels than the men, however, Peggy, Kathy, Bryan and James

refused to acknowledge that racial affiliations could possibly affect the way students

perceived information. This was characterized when Bryan stated:

I have concerns about all of my students. I make no difference in any of

My students by race, gender, any handicapping condition or

socioeconomic status.

Similarly, when asked if she had any new understandings about African American students during my second visit, Kathy responded:

> My goal is for all students to pass the End of Course exams, African American or not.

Peggy responded to the same question by stating that she treats each makes an effort to deal with student's individual needs, but did not make any distinctions for racial affiliations. She stated:

> No, (I don't have any new understandings about African American learners) although I treat each student individually and day by day according to their own needs.

Mandy was the only participant in this study to explicitly discuss race and the effect it has on the perception of the curriculum. In fact, when asked if she had any new understandings regarding African American students, she responded:

> I find myself needing to understand more about their (African American) culture in order to better understand their needs as students.

She told me her education and upbringing allowed her to reflect on the way race and culture can influences learning preferences.

Culturally Responsive Pedagogy and Rural Teachers

Through my classroom observations and interviews, it became apparent to me that the teachers at Memory High School do not uniformly participate in many uniform culturally responsive strategies. The participants who made efforts to infuse culturally responsive methods into their instructional strategies did so on their own wishes. The

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teachers who embraced strategies of culturally responsive pedagogy shared with me they were able to connect with the students there because of a shared background between them and the students, which is consistent with Shandomo's (2010) argument that teachers have an easier time connecting with students who have backgrounds similar to theirs.

Peggy and Kathy informed me they plan together and utilize their curriculum to build awareness amongst their students. In an echo of Aguirre et al (2012) and Leonard et al's (2010) suggestion that culturally responsive math instruction should make connections between the math students must learn and their home communities, one of the teachers created a project in their class to help raise money for students to attend some sports summer camps. Additionally, I observed teachers utilizing visual representations of the lesson they were teaching, which was highlighted in an interview with Kathy when she stated:

> So then you gotta talk about a wheelchair ramp because a lot of kids have wheelchair ramps in the house or their grandparent's house. Real-life situations, something that I see in this town that these kids ought to see. So you try to bring those things out so the kids can identify with something when it taken the test or doing homework.

Student Backgrounds and Math Curriculum

As mentioned in the previous paragraph, student backgrounds are an essential part of how they perceive information. It also is one of the key components of culturally responsive pedagogy (Ladson-Billings, 1995; Leonard et al 2009; Tate, 1995). Many of

the subconscious beliefs about students that teachers may harbor can manifest themselves as lower expectations for their students (Morgan, 2010).   Teachers must understand that student's cultures have an impact on the way students understand and acts and the delivery of instruction can not be foreign and separate from the way students in their class room setting. I witnessed this separation of instructional delivery in an observation of one of James' class. He lectured for approximately 20 minutes without stopping or asking for feedback from the students in his class. Lecturing is consistent with practices such as asking low-level questions, giving information, monitoring and reviewing assignments, punishing noncompliance and giving grades. This was evident when James stated:

> I've been doing this for a while. This is my 20th year and I'm a firm believer in some of the old-school ways, I think when kids are always a certain way when they know dinner is at a certain time, that we don't have discipline problems that you have when there's uncertainty. So therefore I come in on day one and lay it down about how it's gonna be and then it is up to them to buy into what I'm selling. Some people take a week to buy in and I'm on week seven now and some people still haven't completely bought in. On the first day of school, obviously I don't know any of them, I don't look at any results, and I tell them is not about as much as what you don't know is more about what you want to know.

Conclusions

Research in Rural Areas

Research about the achievement levels of African America students outside of urban areas is lacking. Throughout my search for relevant literature to document the educational experiences of African American students in rural settings, I found it difficult to find research which documents the unique mathematical experiences of students attending these schools. The research indicates that rural schools face very stringent challenges such as a lack of resources and expertise and instructional expertise throughout all of the subject areas.

This was extremely evident in my observations at Memory High School, where some teachers were forced to adapt to the changing curricular expectations of the state of Texas, but did not have resources nor the expertise to master the challenges of more rigorous expectations on the standardized exams. This was very evident in both of my visits to Bryan's classes as he struggled preparing students for the new rigorous STAAR examination.

These factors, along with the prevalence of poverty, create an environment that establishes barriers to student success. According to Reeves (2012), reading practices are strongly influenced by family routines unlike math achievement where achievement discrepancies can be the result of the quality or types of learning opportunities within the school setting. Complex math concepts, such as trigonometry, calculus, and statistics, are learned at school and not at home. At Memory High School, a calculus teacher told me that he has a hard time teaching many of the advanced concepts associated with the

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subject matter and stated that approximately 15 students in his calculus class did not master their state assessment the previous year. During my tenure as a high school administrator in an urban, semi-rural, and suburban school, this researcher has never observed an advanced calculus class where students did not master the qualifying state assessment.

Attention to Cultural Preferences

What's more, there appears to be a lack of attention given to cultural differences amongst students. A few of the participants complained about students getting bored with their classes and using electronics in class, but did not believe the students were bored because of the way they deliver instruction. This was also evident in my observations of several of the classes where the participants lectured for hours without reflecting on how these instructional techniques impact student achievement.

Systemic campus-wide reflection was not observed on this campus because the number of math teachers who currently work at this school made it difficult to schedule common planning time with peers to review student achievement and reflect on successful instructional strategies. Mandy was the only participant to acknowledge the effect that cultural affiliations have on learning preferences.

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Reflection

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Moreover, in my experience, teachers want to do what is best for all of their students. However, when they lack knowledge about which strategies are effective and successful with African American students, they often blame the students for their failures, a practice some of the participant's shared with me during the interviews. Their

statements are consistent with lower levels of reflections, discussed by Ward and McCotter (2004), where teachers rationalize their actions and blame student for their failure, but studies (Russell, 2005; Watts & Lawson, 2009) showed that reflection is possible with structured staff development. This researcher believes the teachers at Memory High School have good intentions, but a significantly more focused staff development effort could greatly improve these teachers' reflective qualities.

Findings also discovered that Mandy, Peggy and Kathy utilized reflection as a continuous part of practice, and participated in student centered reflection throughout their classes. The data collected through interview and classroom observation indicated that teachers at Memory High School utilized reflection throughout the entire lesson planning process while other teachers reflected, but they thought about their practice in class after students responded to their original instructional delivery.

The amount of culturally responsive pedagogical practices varied amongst participants. Kathy, Peggy and Mandy all u Many of the participants utilized portions of culturailized techniques such as communicating in culturally sensitive ways to students and modifying the curriculum to present it in contexts that are familiar with the students. This was shared with me during interviews and observed while doing classroom observations.

Lastly, it was found that rural high school math teachers of African American students utilize student backgrounds to plan their lessons on different levels. Utilizing student backgrounds to construct instructional delivery is a tremendous aspect of culturally responsive pedagogy. This became evident in my interviews with the

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participants, but was also observed during my observations. Teaching in culturally responsive ways that will engage students at Memory High School was not something each participant did. However, there were a few participants who consistently brought aspects of culturally responsive pedagogy into their teaching strategies. And so, I believe that campuses must create a culture of collegiality where innovation and problem solving are required and expected to help every student at their campus.

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Implications of the Results

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Strategic Campus Plan

One implication for the study is the need for a strategic campus plan that encourages teachers to reflect on their practice. Through observations and interviews, it became apparent that the participants in this study did not reflect on a consistent basis. After observing teachers who taught the same subject and different concepts at the same time, it became apparent that the need for strategic planning was a pressing need for the teachers at Memory High School.

Consistently analyzing student achievement and searching for solutions to increase student performances is something that could force the teachers there to intentionally reflect on their practices in the classroom. Teachers benefit from an environment where the campus maintains high standards for performance and sets high and achievable goals in which students and teachers can be persistent in reaching these objectives, therefore reflection should be a part of a campus culture. During conversations with the study participants, this researcher did not notice any cooperative goals or plans amongst the teachers at Memory High School to improve the achievement

levels of the students on their campus, a matter that must be given attention if the school wants to achieve a certain measure of success. Though the campus has a mission and vision statement, these aims were not apparent in conversations with all of the research participants.

Culturally Responsive Staff Development

A second implication of this study is the need for culturally responsive staff development. Mandy, Kathy and Peggy expressed they assumed responsibility for their student's achievement, however, they were not aware of the way in which cultural affiliations influence learning preferences. Mandy was the only participant to say that cultural differences could possibly affect learning preferences.

Struggles amongst rural teachers to meet the needs of growing diverse populations have been documented in several studies (Griffin et al, 2010; Irvin et al 2012; Jones et al, 2012;) and was also evident through classroom observations and interviews at Memory High School. Hence, rural schools need specialized training to make math meaningful to students they serve. Memory High school could benefit from structured embedded culturally responsive staff development in a rural setting.

Math Instruction in Rural Context

A third implication of this study is the need for training on ways to present math instruction in rural contexts. In order for teachers to effectively they must understand the context in which student's process knowledge (Aguirre et al, 2012; Leonard et al 2009). In my interviews Mandy was the only teacher that spoke specifically about the

curriculum and the way that is foreign to them. This was evident when she shared the following with me:

> Example is a few years ago I was using some curriculum that came from a predominantly white school and the situations they used, the word problems were things our students can't relate to and had no concept of so therefore I try to make it towards the experiences of our students I try to make the material what our kids deal with on a daily basis as opposed to what other kids doing on a daily basis.

From my experience as a teacher and administrator, most of the curriculum is written towards the experience of middle class White students (Tate, 1995). Therefore, I believe teachers serving African American students in rural contexts need specialized training to modify the curriculum to align with their unique experiences.

Instructional Coaching Self-Reflection in Rural Settings

It became evident from my interviews that the teachers at Memory High School do not meet with their principal or other campus leaders to discuss their instructional practices. DiPaola (2008), argued that successful school leaders reflect with the teachers on their campus. The principal is responsible for setting campus expectations.

In my experience, in rural settings many administrators are former Athletic directors as was the leader at this campus. That does not mean that athletic directors can not be strong instructional leaders, but instructional leadership from an administrative level could benefit rural schools like Memory High School. Therefore, instructional coaching staff development in rural contexts is something that must be explored.

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Master Scheduling in Rural Settings

As mentioned earlier in this chapter, many teachers indicated they did not have ample time throughout the day to plan with their colleagues. Dufour et al (2005) and Waters and Marzano (2007) indicated that successful schools make time for teachers to plan during their work days.

In this school many teachers were the only person to teach their subject. I believe rural campuses could benefit from assistance with constructing master schedules which allow teachers valuable time within the school day to plan with colleagues. In my experience as a campus leader, planning the schedule is a tedious task and takes an extreme amount of time with the assistance of a big staff. Rural schools like Memory High School could use assistance modifying their schedules.

Math Learning Preferences of Rural Settings

Few studies measure the math performances of African American learners in rural areas. Therefore, I believe further research should be done in rural areas to observe how math is taught and constructed in these areas. African Americans in rural areas are more likely to be poor and experience difficulties in school (Irvin et al, 2012).

Thus, studies that explore the high school math instruction of African American learners in rural contexts. Learning in a rural setting is vastly different than an urban or suburban setting. Therefore, teachers need the skill-set to modify the instructional experiences to fit the ones of the students at Memory High School.

Teacher Self-Reflection and Rural Student Achievement

From my interviews, it became apparent that reflection was something teachers did individually, but was not part of the campus expectations. Some studies have shown that teacher self-reflection reflection has helped to increase student achievement (Tong et al, 2010) there have not been many studies that evaluate teacher self-reflection in rural areas.

I believe reflection in rural areas should receive more attention so teacher self-reflection could possibly become a practice in rural areas as well. It was also very apparent that the teachers at memory high school were not forced to analyze their student achievement data and make instructional modifications. That is something the students at this campus would drastically benefit from.

Culturally Responsive Pedagogy in Rural Settings

Through my interviews and observations, it became clear that race was something that was not discussed at Memory High School. Most of the participants were very hesitant to discuss race and were not sure about the impact cultural affiliations have on the way students perceive information. In fact, only Mandy mentioned race and was not hesitant to talk about that subject.

What's more is most of the studies involving culturally responsive pedagogy measure teacher behaviors in urban areas (Aguirre et al 2012; Ladson-Billings, 1995; Leonard et al 2009; Tate, 1995). Consequently, there should be more studies that evaluate culturally responsive pedagogy in rural settings. Studying culturally responsive pedagogy in rural areas could help schools such as Memory High School.

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Recommendations for Further Research

Because teacher self-reflection and the mathematic achievement of rural African American students is a topic that has not received much attention in the literature, it is integral to understand that teacher self-reflection has been shown to increase teacher capacity and improve student achievement (Darling-Hammond, 2010; DiPaola, 2008). I proposes six recommendations for future researchers who are interested in further analyzing the topic of this study.

Campus Structure

Additional studies should address the campus structure of rural schools and what aspects about the campus culture contribute to or hinder student success, namely that of African American students. As a result of the findings of this study, it became apparent that the restraints in time amongst the participants inhibited them from continuously reflecting on their practice as it relates to African American learners.

Those studies will add to the body of literature because they could possibly help educators in rural settings identify specific characteristics of their school culture that make teacher self-reflection possible and a part of the campus structure. By making self-reflection a part of the campus culture, it could help increase student achievement by modifying the way instruction is delivered.

Teacher Background and Reflection

A second recommendation is to conduct a case study in which the researcher evaluates the relationship between high school math teacher backgrounds and their reflection levels. One of the things I observed while conducting this study was that

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participants, who shared similar backgrounds either racially or socioeconomically, utilized and reflected such throughout their lesson planning.

This would be helpful to practitioners because if a study is able to determine teacher background characteristics that could possibly lead to a propensity of self-reflective behavior, school leaders can develop strategic staff development plans to help build that skill-set on a specific campus or throughout an entire district.

Standardized Test Scores and Reflection

A third recommendation would be to conduct a mix-method case study where the researcher utilizes standardized test scores and class failing percentages to determine if self-reflection is something that increases with teacher quality. Teacher quality has been shown to have the greatest impact on student achievement (Marzano &Pickering, 2011).

 This could be very useful in the area of African American mathematics achievement because it could possibly pinpoint reflective qualities of successful teachers of African American students. This could directly influence strategic staff development at both the district and campus level. Rural schools continue to struggle with achievement in mathematics education (Reeves, 2012) and reflecting on student achievement would help eradicate many of the disparities in education.

Culturally Responsive Pedagogy in a Rural Setting

A fourth recommendation would be to conduct a qualitative study where a researcher identifies a rural high school campus where math teachers are proficient at culturally responsive pedagogy and observe how they modify the math curriculum to meet the needs of rural students. Urban areas receive most of the academic attention

when documenting practices of culturally responsive pedagogy (Ladson-Billings, 1995; Leonard et al 2010; Tate, 1995).

As mentioned in the first chapter, over 40% of the school population is served in a rural areas (Reeves, 2012). Many of the textbooks do not present the experiences of African Americans in rural settings, therefore, educators must possess the skill-set to connect the curriculum with the experiences of their students. This could be very useful in expanding culturally responsive pedagogical practices in rural settings.

Factors of Gender Separation in Higher Level Math Classes in Rural Settings

In my observations of Memory High School, I noticed that African American males were less likely to take higher level classes such as calculus or pre-calculus. The higher level math cases. I observed were over 80% European American. I can only remember observing two or three African American males out of 30 or 40 students in the higher level math classes.

I believe this trend is an important one because as mentioned in the review of the literature, African American males are more likely to be suspended and receive disciplinary consequences than their European American counterparts (Skiba & Peterson, 2000). So, I believe that a researcher should do a study where they observe high achieving African American males in rural settings and note their similarities to see what casual factors contribute to their success and which systemic school factors possibly contribute to the failure of students.

Culturally Responsive Pedagogy and Hispanic Students

Rural areas such as Memory ISD are experiencing an increase in their Hispanic population. I think a researcher should do a study on a rural high school where Hispanic students are performing as well as their European American counterparts in their math assessments. The researcher should study how these educators modify their instruction to meet the needs of these students.

The study could be a qualitative case study to document the experiences of these successful teachers so educational leaders can train other rural teachers to duplicate their victories. The Hispanic population is growing faster than any other population in Texas and actually, in 10 years it is projected that population will be the largest one in Texas (Pew Hispanic Center, 2013).

Summary

Chapter V presented a discussion of the findings, overall conclusions, and implications for professional practice and recommendations for further research. The discussion of the findings and the total conclusions reached help one to understand how rural high school math teachers of African American students reflect on their instructional techniques throughout the lesson planning cycle. The discussion and the conclusions drawn from the results show that teachers at Memory High School applied a variety of motivators to reflect on their practice through their responses.

The strategies that this study determined that these rural math teachers of African American students employed prior knowledge, background knowledge and curriculum guides. This determination was made through interviews and classroom observations.

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The participants felt very comfortable expressing their thoughts with me and let me know how they selected their instructional strategies.

Findings also discovered that participants utilized reflection as a continuous part of their practice and participated in student-centered reflection throughout their classes. The data collected through interview and classroom observations indicated that while many teachers at Memory High School utilized reflection throughout the entire lesson planning process, other teachers reflected but did so in class after students responded to their original instructional delivery. The amount of culturally responsive pedagogical practice varied amongst research participants. Many of the participants utilized techniques such as communicating in culturally sensitive ways to students by playfully correcting them when they were off-task and modifying the curriculum to present it in contexts that are familiar with the students. This was also shared with me during interviews and observed while doing observations.

Lastly, it was found that rural high school math teachers of African American students utilize student backgrounds to plan their lessons on different levels. Utilizing student backgrounds to construct instructional delivery is a tremendous aspect of culturally responsive pedagogy. This became evident in my interviews with the participants and during my observations. Teaching in culturally responsive ways to insure the engagement of students at Memory High School was not something each participant did, though a few did consistently bring aspects of culturally responsive pedagogy into their teaching strategies. Moreover, I observed that students taking more rigorous classes such as algebra I honors were more likely to have teachers who

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reflected on a consistent basis such as Mandy, Kathy or Peggy. What's more is that more resources were devoted to those same teachers who taught more rigorous classes. Thus, this researcher believes that campuses must create a culture of collegiality where innovation and problem solving are required and expected to help African American students at their campus. The literature review in the second chapter showed the link between education, health and incarceration. As an African American male who watched his father's health deteriorate and ultimately die from diabetes and a best friend who matriculated through the legal system, I see the importance that education has in the lives of African American students. Therefore, I believe education can help eradicate the disparate life standards between African American and their European American counterparts.

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APPENDIX A

INTERVIEW PROTOCOL

1. Please describe which factors influence the manner you deliver instructional content to your students.

2. Please describe the effect planning with your colleague has on your instructional practices.

3. What effects do you think student's backgrounds have on their learning preferences?

4. What about the campus structure, if anything encourages teachers to be reflective?

5. What happens when a student is not ready to move on to the next lesson or unit as prescribed by your curriculum guide?

6. What do you do if an academic intervention is not working?

7. Please tell me if or how you plan to modify your lesson after viewing the way your students responded to your instructional methods.

8. What did you observe during your lesson which would make you believe your

   students are not grasping the material?

9. Why do you think the students who were not successful were not able to grasp

   the content?

10. What is your process for remediating content when students are not successful?

OBSERVATION PROTOCOL

| Date:_____ |
| Time:_____ |
| Length of activity:_____ minutes |
| Site: |
| Participants: |
| _____ |
| _____ |
| |
| _____ |
| _____ |
| |

Descriptive Notes	Reflective Notes
Physical Setting: visual layout	[Reflective comments: questions to self, observations of nonverbal behavior, my interpretations]
Description of participants, activities and individuals engaged in the activity	[Reflective comments: questions to self, observations of nonverbal behavior, my interpretations]

Me: This is the interview with Ms. Armstrong Testing 12 testing 12

Do you like 90 minutes?

Peggy: No I think I like 55 minutes or almost an hour.

Me: I am a going to go-ahead to start.

Please describe what manner influences the way you deliver instructional content to students, what I mean by that is what determines if you want to a lecture, group work or what determines that?

Peggy: Actually probably the level the students are on and probably if I don't feel like they got it in the first time I taught it, the next time I might do something more hands-on and might allow them to work in groups if I feel like peer tutoring might helpthem and it depends on where I'm at in the lesson

Me: Can you describe what effect planning with your colleagues in any has on what you deliver instructional content?

Peggy: Of course secondary and there's not a lot of planning with colleagues

Me: like PLCs stuff like that?

Peggy: Yeah okay we will talk about stuff like when we want to give our test but we really don't do a lot of planning together I'm the only algebra one honors teacher, I'm the only algebra two honors teachers so there's not a lot of collaboration.

Me: What about the subject areas that are tested   like algebra one or do you always plan together?

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Peggy: We talk quite a bit about how we're going to teach things and that is Mrs. Brown and I, we're the only two algebra one teachers and we talk about a lot of things like how the information is tested and how we want to get the information to them, we do talk quite a bit about that.

Me: So I get the perspective that you all talk but that you do it on your own, but it's not part of a campus structure.

Peggy: The curriculum is very structured, but the delivery is completely up to us. My delivery might be different in one class than the other it depends on the students.

Me: How do you make sure you stay on the same pace like the same scope and sequence?

Peggy: It depends on where we are, sometimes when I'm doing the same thing if I feel I must do more work on something, sometimes I backup and sometimes I do something a little bit different than she (Kathy) might. Sometimes were not exactly at the same place, but at the end of the six weeks we always end up back where we need to be

Me: What effects do you think student's backgrounds have on their learning preferences?

Like on the preferences like how they prefer to learn? Like if they are visual or kinesthetic learner?

Peggy: I think it depends, I think honors students, a lot of those students that come from families where education is important, a lot of those kids prefer that I just give them an example and give them the work I think students where education is not as important at

home, they like more hands-on activities, they need a lot of the more slow pace and more repetition and stuff like that, it depends on if education is important in the family.

Me: So what about the campus structure if anything encourages teachers to be reflective?

Peggy: Okay tell me what you mean by reflective.

Me: What I mean by that is if you have common planning times are you encouraged to meet and reflect with your colleagues? I mean are you encouraged to talk about students and how they did on their test I mean is there a structure set up to where you have time to meet and talk about those the things? Do you have time to reflect with your colleagues on where you might need to make changes in regards to if you might need or not need to make changes to instructional content or is that time not provided?

Peggy: It's not. I don't mean that in a negative way is just with small schools there are not a lot of teachers, I mean there are 5 math teachers, 5 social studies teachers and my planning time is not aligned with anybody else who teaches the same thing I do.

Me: What happens when a student is not ready to move on to the next lesson as prescribed by your curriculum guide?

Peggy: Do you mean individual student or the whole class?

Me: Okay let's differentiate between 5% in your class for 15 to 20% of class.

Peggy: If it is 5% of my class, I bring the students in for tutorials. Or I will use my inclusion teacher to review things with them.

Me: Do you use the inclusion teacher for all students?

Peggy: Yes I use them for all students. If it is 15-20% of the whole class looking at the unit tests and quizzes I feel I need to go back over that. At that point, I will chose some activity for whole day and do a different kind of a lesson or activity to address those needs.

Me: But what you do with an academic intervention is a working?

Peggy: Define what you mean by academic intervention.

Me: Let's say you analyze the data and 15% you students were not grasping material and you teach a different way and is still not working what he do next?

Peggy: At that point, I start talking to other colleagues, or if it is a freshman, I might even speak to an 8th grade math teacher to see what exactly works with a student. I would like to see maybe if they delivered it away that the students grasped easier or the students are missing a brick in their foundation. Sometimes the 8th grade teacher will say the student didn't grasp it in there, at that point I back up and teach the foundation skill that the student needs. Usually we can build on that. The foundation might not be there**.**

Me: So if students are grasping material you figure out why students are not getting it and go from there?

Peggy: If students miss something in seventh or eighth grade I try to go back to reteach that.

Me: So the second set of questions are questions that are asked with the mindset that I have already observed your class, but due to the time constraints I'm not able to observe your class and then ask the second set of questions, so with that mindset, the second set

of questions are with the mindset that you already taught a lesson. The first set of questions were made to measure how you think before you taught a lesson and these questions are meant to measure how you think after you taught a lesson.

Me: So think about your first-period class how would you modify that lesson based on how your students responded to that class?

Peggy: That's difficult because first-period is an honors class and just took off, they knew what they were doing. What I have noticed is they can't do literal equations so I had to back it up and noticed some other classes can't do literal equations. A literal equation is taking a formula and moving things around and solving for something different. Well, what I've done is we've gone back and we started something very similar to that. I worked it into my lesson plan to the point where it is all we working on for the next three days I noticed that this is something that is a really big problem and something they need in chemistry, physics and algebra 2 not only for the test, but just for everything.

Me: Okay what ways did you teach it differently?

Peggy: So then we went back and we did a hands-on activity, we used pictures of different things and we moved them around so we decided how we were going to move them around and subtracted or whatever. Yesterday we took the math chart into actual formulas that they would use all the time. Today each of the classes on each row will get a folder and now choose the activity that they wanted to do and compare with someone who chose the same activity. That is working by yourself but, feeling confident when

you turn it in you've got the right choices using hands-on activities and things that they are familiar with.

Me: Okay so it appears that if you present the material in a way that a visual kinesthetic learner might not grasp it at first, you go back and present it in that way. Okay so maybe you're not thinking intentionally that I'm doing this for my visual or kinesthetic learners but you're thinking they didn't grasp it this way I taught it so let me teach it differently.

Peggy: For most lessons I try to include all the different learning styles of all the different kids.

Me: When you are teaching a lesson what do you observe that makes you think you students are grasping or are not resting the material?

Peggy: I use questioning and you know the kids around here let me know if they don't get it. At the beginning of the year I build social contracts and talk about how in Math, you have to be sure about everything, so we talk about norms and asking for help so the kids will very comfortable in my class letting me know if they don't understand something.

Me: Is that all of your classes?

Peggy: Yes they feel comfortable with that because once they ask for help and nobody makes fun of them, someone will say out that I need help with this too, so they are really comfortable to say they need help.

Me: So you are saying that because of the way you present your lessons students will come right out and let you know when you need assistance.

Peggy: Yes because they know nobody is going to make fun of them if they don't know the answers that's something I spent a lot of time working on and at beginning of the year we build social contracts.

Me: So why do you think when kids are not able to grasp the material that they are not able to get it what it what is the reason behind it?

Peggy: I think there's a lot of different reasons I think there's some kid not ready for abstract material. I've done a lot of studying on that in the abstract things in algebra some students are just not ready for that. They just are not there yet so helping them bringing them to that point is my job. I think attitudes about math, you know some people think math is hard and some of the parents think the same thing I hear parents say at conferences all the time" I'm horrible at math, so no wonder they are". It gives them that excuse and then they are off the hook then. I think a lot of things like that.

Me: Do you have a process or wherever a reflecting on your content when students are unsuccessful or is it just something that you just do?

Peggy: This is something I do class by class I mean there's some things I present to the first class that I say I need to do something different. My first algebra one class is fourth period and I might do some things and look at my students and say well need to change that.

Me: What triggers your reflection about that?

Peggy: Questioning, observation, walking around, just from doing that I can see that they are not getting it and I might need to backup. In fourth period, if I see they don't remember this from 8th grade I'll go ahead and change it for fifth period.

Me: So is something you consistently do?

Peggy: Yes I go class by class and I remediate as needed.

Me: With that being said I'm getting how you reflect during the class. Do you have a time when you sit after the class and where you reflect on how things went?

Peggy: At the end of the day I reflect and look at how things went to see if I need to make any changes for the next day I review over things to make sure everything is good and always do that at the end of the day also

Me: okay that's pretty much it all right thank you.

Peggy: Alright thank you.

COMPLETED PROTOCOL

Date:__3-4-2014_____

Time:____10:41AM_____

Length of activity:_15_____ minutes

Site:

Participants:

_____Peggy_____

_____

_____

Descriptive Notes	Reflective Notes
Physical Setting: visual layout The room is very colorful and lively -	[Reflective comments: questions to self, observations of nonverbal behavior, my interpretations] 12EA, 4AA, 6h students. This was an upper level class. The students were doing independent practice. Students were talking a little bit and she re-directed them and had them get back on task and finish their assignments . The class is extremely colorful. The teacher displayed a tremendous amount of energy in all of the observations. Appeared to be upbeat and supportive of students in her class. The teacher was rarely in one spot, she acted very informal, but stern with students in her class. The teacher has a wall dedicated in her class where students post personal messages and goals.b

APPENDIX E

FOLLOW-UP QUESTIONS

1. How has the teaching of math been going this school year? Has anything

    changed since we last met?

    Everything is going well

2. If you could change anything about your teaching environment or situation what

    would that be and why?

    I would not change for the sake of change. Modifications based on student's

    needs are ongoing.

3. Do you have any new understandings about the work that you do with AA

    students?

    Any new understanding I may have concerns about all of my students. I make no

    difference in any of my students by race, gender, any handicapping condition or

    socioeconomic standing

4. On the reflection cycle, where do you think you fall and why (do a table for them

    on the cycle and let them know you have been looking at your time with them

    using the model).

    These are seniors…. We are moving into preparation for further mathematical

    studies

5. How could your principal be supportive of you as you teach math this year?

    My principal is supportive of me and all of our department and of the entire staff.

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6. See if they have any questions of you.

   N/A