EFFECTIVE SECONDARY MATHEMATICS TEACHERS AS WARM DEMANDERS: DESCRIPTIONS OF FOUR AFRICAN AMERICAN TEACHERS' PRACTICES

by

SHARREN MICHELLE THOMAS

(Under the Direction of Dorothy Y. White)

ABSTRACT

This study examined how four African American high school mathematics teachers described their instructional practices for African American students. This study also examined the role that race and culture played in their instructional decisions. Qualitative methods were used to collect data including semi-structured open-ended individual interviews, a group interview, and a lesson walk through. Two theoretical perspectives were helpful in guiding my data collection and analysis: culturally relevant pedagogy (Ladson-Billings, 1994, 1995) and the culturally sensitive framework (Tillman, 2002). The culturally sensitive research framework provided a framework for research design, data collection, and data interpretation. The theory of culturally relevant pedagogy and notions of warm demander pedagogy served as theoretical lens to evaluate the instructional practices as described by the participants. The analysis of data indicated three overarching themes to describe the four effective African American teachers' instructional practices: They could best be described as teachers who (1) provided a structured classroom environment, (2) demonstrated an ethic of caring, and (3)

implemented a culturally relevant pedagogy through culturally responsive teaching. Furthermore, the rationale for the instructional choices of these teachers revealed that knowing their students as learners of mathematics and knowing their students as African American were paramount to how they taught. It was found that African American students benefit from mathematics instruction that infused warm demander pedagogy, incorporated culturally relevant pedagogy through culturally responsive teaching, and included the principles and process standards outlined by the National Council of Teachers of Mathematics (2000).

INDEX WORDS: Mathematics education; African American teachers; African American students; warm demander pedagogy; culturally relevant pedagogy; culturally responsive teaching; culturally sensitive research; culture and mathematics; mathematics teaching and learning

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A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2011

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August 2011

DEDICATION

For Mommy, thanks for speaking this into existence as early as elementary school, I love you. Thanks for believing that I could accomplish this task before I even knew what a dissertation was (smile). I Love you with all my heart and soul, you are my refuge.

For my Dad, who makes me feel like the smartest little girl in the world! When you look at me and speak about my accomplishments I can see how proud you are, it empowers me to know that I can succeed at ANYTHING! You are the best Daddy a little girl could ever have.

Thank you Daddy Jim, your Shay Baby is not Ms. Thomas anymore; she is a Dr. Thomas now. I love you so much and appreciate the endless trips that removed so many burdens (rentals, 4th of July planning, and so much more) away from me allowing me to conquer this goal.

For my niece, Amaya Serenity Brooks. Your auntie has paved the way. FEMALES RULE! There is nothing you can't accomplish and don't you ever forget that.

For my nephews, Jaylen Michel Caple, Amaria Jocobi Brooks, and Michael Patton remember education is the most important path to success. I proclaim that you will not be a statistic. Our family legacy depends on you all. Love you boys!

ACKNOWLEDGEMENTS

First and foremost, I must give thanks to my Co-Author. Without YOU nothing is possible. YOU were loving, patient and kind, even when I seem to forget that you were always there for me. At night YOU were the only ONE who heard my screams and cries and witnessed the self-doubt and insecurity that continued to surface throughout this long enduring process. Sometimes it appeared that YOU had disappeared and left my side often in my most venerable times. But when I finally reached my lowest point, I came to realize that YOU were all I needed the whole time; YOU lifted me up, dusted me off and whispered in my ear, "Are you finally ready to let ME help." So, I finally came to realize that YOU were within me all the time, just waiting for me to call on YOU; listen for YOU; and believe in YOU. Not until I finally became still and listened daily, did I receive in my mind the spiritual food from YOUR mouth. The Perfect Power within was released and there was no turning back. The Power of the Universe was mine to use. The Infinite Intelligence within me began to guide and direct my every endeavor toward this certain success. As I planted each thought seed in the Creative Medium of the Universe, you reciprocated and all of the Power of the Universe went to work for me. I was led to the right people and resources and provided with the right ideas. So to YOU, I give thanks.

Through my tears and my fears
YOU were my comforter and my provided
I thank you Jehovah-Jireth
When I was down,
YOU provided my banner and lifted me up
I thank you Jehovah-Nissi

When I was confusion and overcome with despair,
YOU provided me a peace that passeth all understanding
I thank you Jehovah Shalom
Jehovah Sel'i you are my rock
And To YOU I dedicate my life.
I am grateful to be YOUR child.
YOU I owe the honor and the glory.
And it is so

To my advisor and committee members: Dr. Dorothy Y. White, Dr. Denise A. Spangler, and Dr. Talmadge Guy, your patience, knowledge, and advice will never be forgotten. Dorothy thank you for sharing the vision to tell the story of African American schooling that would honor the kind of teachers that we are "warm demanders." Your guidance, the lunch talks, the lectures, and more importantly your motivation to follow my passion will live in me forever. Denise, I know that this would never have been complete without you. I thank you for going beyond your role and pouring into my research as if it were your own. Words cannot express my gratitude. Dr. Guy your valuable input and knowledge really made a difference. Thank you.

Dr. Ivan L. Harrell, II, my brother from another mother. Without your love and support, and frankly those hard talks that got on my nerves but were always right "on time" I know I would still be ABD. Your love for me and our friendship will never die.

Thank you to my best girlfriends who loved me through this process; Kim Jordan, Saundra Forest, Sharon Ross, Sharon Evans, Dr. Rhonda Turner, Dr. Kanita Ducluox, Deneen McBean-Warner, Elizabeth Sampson, Towanda James, Tonja Simpson, Mae Sears, Dr. Pamela Seda, Shenequa Sellers, and Auntie Annette.

To my sister, Arrita Sue Brooks, thank you for always having my back, your motivation and empathy kept me going. I always knew I could call you crying and

venting and you would stop and listen, buy most importantly, remind me that I could accomplish anything. Love you Big Sis.

Dr. Natasha Brewley, I know that only you know what I had to endure to get this finished. I am so happy that we met and I know that what we have shared will bond us for life. I thank you for your continued motivation, support, and helping me get through this taunting task. Dr. Anthony Stinson, I love you and your endless support will never be forgotten, thanks for paving the way.

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Chapter 1: Introduction

The urgency to cultivate mathematically literate citizens who are critical thinkers is a sentiment shared by both the educational and political sectors across the nation. In 2009, President Barack Obama introduced the Race to the Top legislation, an educational program that provides competitive grants to support education reform and innovation in classrooms. Inclusive in this legislation is the need for effective teachers of mathematics and common core standards for K-12 mathematics.

The vision and intent of the National Council of Teachers of Mathematics [NCTM], with publications such as *Mathematics Teaching Today: Improving Practice, Improving Student Learning* (NCTM, 2007), is for all students to have the benefit of effective teachers who provide high-quality mathematics instruction that is centered on meaningful mathematics. The *Principles and Standards for School Mathematics* (2000) insists that effective teaching include instruction that addresses different learning styles, fosters critical thinking, engages problem-solving, and promotes logical reasoning. Furthermore, effective mathematics teaching provides multiple opportunities for students to communicate their mathematical ideas, to make connections among mathematical concepts and other disciplines, and to represent mathematical ideas in various ways.

Thus, NCTM documents have established a solid infrastructure to improve teacher quality, curriculum, assessment, and pedagogical strategies. The Council has recognized and it has been well documented that American students, as a whole, are not excelling academically in mathematics as compared to children of other countries

(Hilliard, 2003), but there are particular subsets of diverse learners who continue to perform poorly in mathematics in disproportionate numbers (Ikpa, 2004; Lee, 2004; Tate, 1997). As members of this subgroup of diverse learners, African Americans high school students are among those diverse learners who, despite reform efforts, still appear to struggle the most in school mathematics (Lubienski, 2002; NCES, 2005; U.S. Department of Education 2005). Therefore, this study focused on the effective instructional practices for high school African American students.

The Problem for Mathematics Education

African American students are more likely than White students to experience lower academic achievement from elementary school through high school. As African American students advance through school, the achievement gap continues to persist and has only shown a 1-point decline since 1990 (National Center for Educational Statistics [NCES], 2009). The National Assessment of Educational Progress (NAEP), a project of NCES that tracks the academic achievement of a random stratified sample of 4^{th}, 8^{th}, and 12^{th} grade students in the U.S. every four years, found that the achievement gap is most likely to widen between the 4th and 8th grades, and that more than 50 percent of African American 12^{th} grade students fail to meet minimum national standards for mathematics literacy while approximately 62 percent of White students meet or exceed these standards (NCES, 2005; U.S. Department of Education, 2005, 2008). Competence in mathematics has been identified as essential to the ongoing academic and eventual professional success of all students, and the mathematics achievement gap between African American and White students has been identified as a serious concern by educators and policymakers (Moon, 2007).

Explaining the Problem

There is an abundance of research devoted to examining the academic achievement gap between White and non-White students, particularly the achievement gap between White and African American students. Data provided by NAEP and by other sources reveals that the gap between White and African American students has been relatively the same for the past 12 years although there have been small incremental increases in reading and mathematics scores across the board (Clotfelter, Ladd, & Vigdor, 2009; Irvine, 2003; Strutchens & Silver, 2000). In the 2008-2009 academic year, findings from the NAEP show that although both Black and White student scores had increased slightly, the Black-White gap was not significantly different from corresponding gaps in 2001 or 1990. In 1990, the average mathematics scores for Whites and Blacks were 270 and 237, respectively, and in 2008 Whites had an average score of 293 while Blacks had an average score of 261. So although both groups have seen significant progress since 1990, achievement gaps persists (NCES, 2009). Recent research by Clotfelter et al. (2009) has shown that the more advanced the content of the mathematics curriculum, the wider the achievement gap between White students and African American students.

However, an approach to this problem has emerged which suggests that "gap gazing," or focusing on educational disparities as an explanation for poor student performance, creates a misleading context for understanding student achievement (Gutierrez, 2008; Lubienski, 2008). Gutierrez (2008) reflected that "achievement-gap studies offer little more than a static picture of inequities in schools" and "because these studies rely primarily upon one-time responses from teachers and students, they can

capture neither the history nor the context of learning that has produced such outcomes" (p. 358). Thus, in this study I sought not to explain the achievement gap but to demonstrate what successful teachers of African American students do in their classrooms. First, however, I situate this study in the predominant literature on the achievement gap.

The current research focus in mathematics education has been to explain the reason for the achievement disparities between African American and White students. Three of the most prominent theories offered regarding the academic underachievement of African Americans in mathematics include: low socioeconomic status (Oakes, 1990; Reyes & Stanic, 1988); culturally incongruent curriculum (Berry, 2003; Ladson-Billings, 1997; Martin, 2000; Tate, 1995); and the mismatch between African American learning styles and the culture of mathematics teaching and learning (Berry, 2003; Ladson-Billings, 1994; 1997).

Researchers point to the fact that students who are of low-SES often attend schools where teacher quality is lower and school resources are scarce, which in turn have grave effects on student performance. This claim has been supported by a report issued by the U.S. Department of Education (2003) entitled *Poverty and Student Mathematics Achievement.* This report indicated that students who have a low socioeconomic status continue to score significantly lower on the NAEP mathematics achievement tests for 4^{th}, 8^{th}, and 12^{th} grade students in the U.S. The data in the report describe the high correlation between poverty and poor academic performance of students in mathematics. However, this explanation is limited in its scope; some researchers have shown that even when controls are made for variables such as family

background and socioeconomic status, there are still persistent racial gaps on achievement tests (Fischer et al, 1996; Kao & Thompson, 2003). Furthermore, in an analysis of over a decade of NAEP data, Lubienski (2002) reported that in 1990 and 1996, White students in the lowest socioeconomic subgroup scored the same or higher than African American students in the highest socioeconomic subgroup. Additionally, a review of the 1996 NAEP mathematics assessment revealed African American students in the highest socioeconomic subgroup scored twenty-two points lower than White students in the lowest socioeconomic subgroup.

An additional explanation for the underachievement of African American students in mathematics education is the notion that the mathematics curriculum is so far divorced from African American students' culture and every day experiences. Researchers (Irvine, 1998, 2002, 2003; Ladson-Billings, 1994a, 1994b, 1997; Orr, 1987, Tate, 1995) argue that the absence of culture in the teaching and learning for African American students has directly contributed to their poor performance of African American students.

Irvine (2003) defined culture to be "a group's history, language, values, norms, rituals, and symbols" (p.6). She contended that African American students' culture is not included in their school experiences as is the culture of their White peers. It is more likely than not that mainstream White students' culture is compatible with the culture of the schools that they attend. African American students often experience a "lack of cultural synchronization" (Irvine, 1990, p. 26) because of the different cultural and personal characteristics of the African American community that are not in sync with that of their White teachers, administrator, and peers. Cultural variables that are often out of sync are "in matters concerning…verbal language (dialect, accents, argot, and

bilingualism); nonverbal language (interpersonal and social space, body language, touching, vocal characterizers, qualifiers, voice segregates, and vocal qualities such as pitch, tone, rate, and rhythm); and co-verbal behaviors (gestures, facial expressions, and eye contact)" (Irvine, 2003, p. 7). Further support for the theory of cultural-incongruence or cultural synchronization, particularly in mathematics teaching and learning, is noted in the work of Ladson-Billings (1997) and Tate (1997). Ladson-Billings argued that African American students' poor performance in mathematics "is the result of a discontinuity that exist between students' home language and the perceived precision of mathematics and mathematical language [and that the] content of school mathematics is so divorced from African American students' everyday experiences that it appears irrelevant" (p. 697). She suggested that we begin to examine the culture of U.S. mathematics to find answers to why several ethnic groups do not have the same success as White middle-class students. She argued that because, statistically, White middle-class male students typically do well in mathematics as do some groups of students of Asian descent, that we examine whether there is anything about the culture of mathematics and mathematics teaching that is compatible with White middle-class male and Asian students' culture and experiences.

The final explanation for why African American students continue to perform below their White peers in mathematics has been attributed to the belief that African American students receive mathematics instruction that is in opposition to their cultural styles and learning preferences (Berry, 2003). African American students have shown a preference toward a relational style of learning (Ladson-Billings, 1997; Shade, 1997a; Stiff & Harvey, 1988). A relational style of learning is the propensity for "freedom of

movement, variation, creativity, divergent thinking, inductive reasoning, and focus on people" (Berry, 2003, p. 246).

Kandarakis' (1996) study examined the self-reported learning styles of ethnic minority students and found that the majority of the students in the study believed that the teaching styles of their professors did not match their individual learning preferences. The results of this study reveal an apparent misalignment of teaching and learning styles that could potentially compromise the optimal learning and performance by minority students.

In addition to research focused on explaining "the problem" of why African American students are doing poorly in mathematics, some literature has centered on mathematics teaching and learning intended to improve learning for *all* students. The critical state of mathematics education for Americans has led to research and reform efforts that center around the effective instruction that will improve mathematics learning for *all* American students, in particular those populations of students who have traditionally performed poorly.

NCTM Addresses the Problem

The NCTM has recognized the existing disparities in mathematics understanding among Black students. The *Principles and Standards* state that "excellence in mathematics education requires equity. . .high expectations and strong support for all students" (NCTM, 2000, p. 12). Reform strategies recommended by the NCTM include changes in the teaching and learning of mathematics in public schools (NCTM, 2007). The NCTM advocates mathematics instruction centered on meaningful mathematics to promote conceptual understanding, student exploration, and problem solving. The

NCTM (2000) promotes effective mathematics teaching that "requires knowing and understanding mathematics, students as learners, and pedagogical strategies" (p. 17). Furthermore, the NCTM contends that students should be engaged in mathematics learning that requires problem-solving and reasoning and proof as well as opportunities to represent their thinking in various ways, make connections and communicate with their teacher and peers about mathematics ideas and justifications.

NCTM (2007) acknowledges the crucial need for effective mathematics teaching that will bring about the vision of high-quality mathematics teaching for *all* students. In fact, the NCTM (2000) teaching principle articulates four specific components for effective mathematics teaching:

1) Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.

2) Effective teaching requires knowing and understanding mathematics, students as learners, and pedagogical strategies.

3) Effective teaching requires a challenging and supportive classroom learning environment.

4) Effective teaching requires continually seeking improvement. (p.17 – 18)

This teaching principle articulates the kind of effective teaching envisioned for all students. However, the actual specifics to how teachers are to implement and manifest these practices are not made clear. The requirements outlined in the new reform documents continue to challenge teachers' present practices and require that they know, think, and teach in very different ways. Lubienski (2001) stated that the NAEP data suggest that more White students are experiencing standards-based instruction that is

consistent with the recommendations suggested by NCTM than Black students. Black students in grade eight reported that their teachers did not emphasize reasoning and problem-solving during instruction, and they spent more time completing worksheets on a daily basis (Strutchens & Silver, 2000).

Lee (2002) argued that standards-based reform efforts, which promote complex problem-solving skills, have resulted in greatest achievement gains among high achieving White students. Lubienski & Shelly (2003) argued that "White students disproportionately benefit from the fundamental shifts in instruction that are stressed by NCTM" (p. 3). Moreover, they suggested that researchers need to monitor and address inequities in instructional practices that result in differences in student outcomes, as reform strategies might benefit some students but might not benefit all students equally. If there is a persistent and consistent difference between students who benefit from mathematics reform and students who do not benefit, then the reform strategies recommended by the NCTM might not be enough to resolve the gap in mathematics achievement.

Statement of the Problem

There exist overwhelming statistics that draw much attention to the disparity in mathematics standardized test scores for African American students as compared to their White peers. This data highlight the significant issue of quality mathematics education and achievement for African American students. Research confirms that the achievement gaps among African American and White students have been relatively unchanged since 1990 (Lubienski, 2001, Lubienski & Shelley 2003; NCES, 2009). Moreover, The Education Trust affirmed that African American high school students have mathematics

and reading skills that are virtually the same as those of 8th grade White students by the end of their 12th grade year (The Education Trust, 2008). These statistics are unacceptable and quite disturbing, especially in a world that requires Americans to keep pace in a global economy where electronics reign and the most basic jobs require employees to be both technologically and scientifically savvy. American schools must do a better job to educate tomorrow's future leaders.

As policy makers, mathematicians, mathematics educators, and researchers look for answers about how to develop mathematically literate citizens, rather than concentrate on the existence or severity of an achievement gap between different populations of students, there needs to be a concentration on characteristics of education that play a substantial role in student achievement for all students, including those for students of color. Some researchers state that improved education for African American students must include the perspectives and examination of effective teachers (Gay, 2000; Irvine, 2003). Many teachers act as change agents and reverse the cycle of despair and school failure among African American students and other students of color. Among these characteristics that play a substantial role in student achievement are effective teachers who employ specific practices that incorporate culturally relevant pedagogy through culturally responsive teaching (Gay, 2000; Howard, 2001; Irvine, 2003; Irvine & Armento, 2000). Several of these teachers are African American teachers whose particular teaching strengths are often ignored in the literature.

Effective teachers are among the most significant and consistent elements in improving and sustaining student academic achievement (Howard, 2001; Irvine, 2003; Moon, 2007). In the classroom, the effective teacher has high expectations for all

students and is active in helping students learn through strategies that complement each student's individualized learning style Goe, Bell, & Litte, 2008). Effective teachers have been shown to enhance students' overall academic experience; in addition to improved grades, students have also shown improved attitudes toward school, such as on-time graduation, enhanced self-efficacy, regular attendance, increased classroom participation, and willingness to cooperate with peers, teachers, and administrators (Goe, et al., 2008).

Research on effective teachers in mathematics classrooms with high populations of African American students is growing but frequently fails to integrate personalized perspectives on teaching strategies that entail more than *Principles and Standards*. Literature outside the mathematics community has provided a multitude of strategies that have facilitate the academic achievement of some African American students. These strategies include providing learning environments for African American students that promote caring and authentic relationships with students and applying culturally relevant pedagogy by infusing culturally responsive teaching to support academic achievement (Howard, 2000; Irvine, 2003; Ladson-Billings, 1994; 1995a; 1995b, 1997).

Irvine (2003) noted that "The research on teacher quality variables has not included the perspectives of African American teachers" (p. 27). The author argued that one possible reason for this exclusion is the fact that African American teachers see things differently than researchers and thus there is incongruity between the data and the results the researcher wants to portray. "African American teachers seldom reference or validate researchers' perspectives that attempt to explain African American students' low achievement. Instead teachers look introspectively at how their ethnic identity, their classroom practices, and their beliefs are related to the achievement of their African

American students" (p. 28). The professional work experiences and personal opinions, attitudes, and beliefs of effective African American teachers should not be underrated, stated Irvine, as these teachers have helped students attain high standards of academic performance.

An examination of how African American teachers view culture can aid in learning how these teachers view their roles in the Black-White achievement gap. Irvine (2003) stated that:

> An obvious limitation of researchers' explanations of African American underachievement is their failure to acknowledge appropriately the influence of culture on the teaching and learning processes. This I refer to as the "cultural eye" of African American teachers. The cultural eye is associated with culturally specific ways in which African American teachers see themselves, not as the reason for the existence of the Black-White achievement gap, but rather, as one strategy for closing it. (p. 29)

Several researchers have studied the influences of African American teachers on the achievement of African American students (e.g., Ellington, 2006; Irvine, 1991; King, 1993; Klopfenstein, 2005). In her examination of the factors that high achieving African American mathematics students contribute to their success, Ellington (2006) found that these students tend to hold in high regard what their teachers say to them and the expectations they have for them. She reported that participants perceived teacher expectations as directives that they had "no choice" but to adhere to. Furthermore, some researchers who have studied successful mathematics students found that these students indicated that

African American mathematics teachers are role models and are most influential to their success and persistence in school mathematics (Klopfenstein, 2005; Moody, 1998; 2000). Klopfenstein (2005) asserted that "a less studied potential source of Black underachievement is the shortage of culturally similar teacher role models" (p. 427). Klopfenstein suggested that vital information can be gained from those teachers who are culturally similar to their students.

Analysis of the personal attitudes, opinions, and experiences of effective African American mathematics teachers in classrooms with high populations of African American students will help contribute to the literature on effective teachers. Findings from a research study where personalized data drawn from the professional experiences of effective African American mathematics teachers are assessed will help facilitate a deeper understanding of why these teachers are effective. While some researchers have argued that effective teachers are born and not made (Moon, 2007), it is widely accepted that the structure of the school can be modified to help support effective teaching and cultivate effective teachers as they work with students (Berry, Daughtrey, & Wieder, 2009a; Goe et al, 2008; Stronge, 2007).

Purpose of the Study

The purpose of this study was to examine how effective African American teachers who teach mathematics to African American students at the high school level describe their instructional practices. In this study I interviewed four effective educators and identified how these educators perceived African American students and how they structured their teaching styles and mathematics curriculum to have a positive effect on the mathematics performance of their African American students.

The research questions guiding this study were:

How do effective African American mathematics teachers describe their instructional practices for African American high school students?

What reasons do effective African American mathematics teachers give for their instructional choices? In particular, to what extent do effective African American teachers reference their students as learners of mathematics and the roles of race and culture in explaining their rationale for their instructional decisions and practices?

Significance of the Study

An important element of African American students' success is effective teachers who are able to facilitate students' understanding of mathematics. Thus, an examination of good mathematics teaching is essential to providing solutions to closing the academic gap and uncovering the multi-dimensional layers of student-teacher interactions that led to increased student achievement. According to Singham (2003),

> It is not hard to understand why good teaching reduces the [achievement] gap. What happens in the classroom – both in terms of what the teacher does and of the relationship that is created between the teacher and student – is extremely important. (p. 589)

There are significant reasons to focus on effective African American teachers of African American students. In particular, I believe that a study that includes the voices and perspectives of Black teachers and their practices contributes significantly to the research base in mathematics education. Black teachers are becoming a rare commodity in our public schools as currently only 7% of public school teachers are African American, and that has fallen from the 9% employed in 2007 (NCES, 2009). It is

important to capture what these teachers know about children of color, and there is a need for this vital information to be shared with other teachers and the mathematics education community. With the increasing number of students of color in our public schools and the limited presence of African American teachers, there is a need to learn about the roles and practices this group of teachers can share with the education community and teachers of different races and cultures who are more likely to teach African American students.

Researchers have documented the importance of the multifaceted roles that Black teachers play in the lives of Blacks students and the importance of these roles to the success of Black students (Foster, 1989; Irvine, 1998, 2003; King, 1993; Klopfenstein, 2005; Ladson-Billings, 1994; Moody, 2007 and Ware, 2002). Black teachers have been identified as advocates, surrogate parents, disciplinarians, and counselors, but how these roles manifest themselves in the high school mathematics classroom is virtually unknown. Much can be learned from how these roles contribute to the success of Black students in mathematics.

Finally, another significant contribution of this study is that it offers research findings generated from the perspective of an indigenous-insider (Black, female, and former public school educator in the same county as participants) employing a culturally sensitive research framework (Tillman, 2002). Banks (1998) describes an indigenous-insider as an individual who:

> …endorses the unique values, perspectives, behaviors, beliefs, and knowledge of his or her indigenous community and culture and is perceived by people within the community as a legitimate community member who can speak with authority about it. (p.8)

Linda Tillman defined a culturally sensitive research framework as a qualitative research approach used for conducting research in African American communities. It is a framework that makes use of the cultural standpoints of both the researchers and the research participants as framework for research design, data collection, and data interpretation. It positions culture at the center of the research process. Tillman contended that

> The use of culturally sensitive framework specifically intended to investigate and capture the lived experiences of African Americans (such as teachers, principals, and parents) provides opportunities for thinking about research [and mathematics education] from a specific position of color, an important and necessary distinction from traditional frameworks and [mathematics reform initiatives]. (Tillman, 2006, p. 282)

This study will contribute to research dedicated to improving the mathematics education of African American students by offering insights and experience from the cultural standpoints of an African American researcher and educator and African American teachers. I believe that much can be learned from African Americans who have achieved in mathematics themselves and who are currently successful teaching mathematics. There are virtually no studies that examine the interconnectedness of race, culture, and culturally relevant pedagogy in secondary mathematics teaching and learning. Thus, this study documents the unique and culturally specific pedagogical styles that Black mathematics teachers have found to be successful with Black students. Conducting mathematics education research using a culturally sensitive research approach points to the fact that "it is impossible to create a model for exceptional

mathematics teaching without taking issues of culture and community into account" (Bussey, 2007, p. 8).

My goal in conducting this study was to uncover the instructional practices that African American teachers have identified to be effective for their African American students. I wanted to understand what aspects of culture and race were instrumental to their instructional decisions. The poor mathematics achievement of African American students is a personal concern to me. As an African American educator, I believe that I have a responsibility to seek solutions to help Black children see the realities of success in mathematics. My passion came from my father and step-father as well as two African American mathematics teachers (one in elementary school and one in junior high school) who encourage me to pursue a career in mathematics. These role models, especially my two Black teachers, held high expectations, established classroom environments that were safe, fun, and exuded a family ethos. It is my desire to give voice to African American teachers and have this research provide a guide for teachers of African American students in hopes that African American students can experience mathematics learning with confidence, excitement, and competence.

Another factor that influenced my research is the lack of educational research studies in mathematics that include factors other than reform documents as a source to improve mathematics achievement for African American students. Despite reform efforts to improve mathematics achievement for American students, principles and standards alone have not proven to ensure success. Furthermore, reform strategies put into place to help African American students improve their mathematical literacy and academic performance in mathematics are conditionally successful; data indicate that

although there are increases in mathematics achievement among Black students, the slow rate at which there is progress indicates that other strategies may be needed in order to increase these students' understanding of mathematics at comparable levels to their White counterparts.

Lubienski (2000) warned mathematics educators that as we embrace the charge of reform documents (NCTM, 1989, 1991, 2000) that promote "mathematical literacy for all" and quality mathematics instruction that should benefit all students, "we need to disentangle various aspects of the instructional vision outlined by NCTM (1989, 1991, 2000) to consider which elements might be more or less effective in helping us reach this goal with [all]…students" (p. 479). Rather than continue this debate about standards and principles being effective for mathematics success for African American students, mathematics educators need to examine the practices of effective mathematics teachers of African American students who may or may not teach via reform. An inquiry that focuses on other components of mathematics teaching and learning such as culture, community, and student-teacher relationships is needed.

Furthermore, I wanted to provide research that focuses on African Americans that takes the stance that research that continues to document a deficit model and report the disparities and gaps among racial, ethnic, and social groups will only intensify the issues (Fine & Weis, 2003; Weissglass, 2004). I believe in the old adage that what you focus on the most becomes exacerbated. There is insufficient research that focuses on the effective practices for African American high school mathematics students as described by teachers, and even fewer studies share the perspectives from teachers of their same race and cultural affiliation. An inquiry that focuses on effective practices and most

importantly the *teachers* of African American students is important for two specific reasons. This research focused on the teachers and their interactions with African American students. This is important because Irvine (1991) found that minority students are more "teacher dependent" (p. 48) and more likely to hold their teachers in high status (Ellington, 2006). In addition, Johnson (1994) called for more investigation into the type of student-teacher interactions with African American students that influence performance.

A study that explores effective African American teachers is important because these teachers have been identified as being teachers who view their roles as essential to eliminating achievement gaps for African American students. Irvine (2003) urged educational researchers to examine the alternative explanations offered by African American teachers about African American school achievement. Their unique perspectives and personal experiences as African Americans can provide important knowledge about instructional practices for educating African American children and eliminating the existing mathematics achievement gap between Black and White students. The field is in danger of missing out on the plethora of knowledge about the culturally specific instructional practices and interactions of African teachers that can help other teachers and educational researchers gain insight and provide a foundation for academic success with Black students.

Definition of Terms

I used the following terms frequently, and they are defined for this study as follows:

- Achievement gap – Weissglass (2004) defined the achievement gap as:

> …an indicator of disparities between groups of students usually identified (accurately or not) by racial, ethnic, linguistic or socio economic class with regard to a variety of measures (attrition and enrollment rates, drug use, health, alienation from school and society, attitudes toward mathematics, as well as test scores). (p. 2)

- African American – descendants of persons brought to the Americas as slaves between the 17th and 19th centuries. "Black" will be used interchangeable for African American throughout the document.
- Annual Yearly Progress (AYP) – Adequate yearly progress is the measure by which schools, districts, and states are held accountable for student performance under Title I of the No Child Left Behind Act of 2001 (NCLB). For the state where my research took place, to meet AYP, each school and system must meet the following criteria: 95% Participation, Academic Performance (Annual Measurable Objective), and Second Indicator. For the two schools in this study, current juniors had to score more than 69.5% on the mathematics portion of the state standardized test, and the second indicator was the high school graduation rate, which had to be 60% or higher for a school to make AYP.
- Effective teachers: Efective teachers are teachers whose students have achievement gains. For this study these were mathematics teachers who were employed at schools that made AYP for three consecutive years.
- Instructional practices – the art and science of teaching, the activities of instructing, and the behaviors teachers use to facilitate learning (Burrell, 2005)

- Warm demander –Kleinfeld (1975) first coined the phrase "warm demander" to describe the type of teacher who communicated what he called "active demandingness" (p. 327). Later, Vasquez (1998) used this term to describe teachers who were successful with students of color and who were considered by their students to hold high standards and expectation and who were willing to help their students. Irvine and Fraser (1998) expanded the definition to refer to those teachers who "provide a tough-minded, no-nonsense, structured and disciplined classroom environment for kids who society had psychologically and physically abandoned" (p. 56).

Chapter 2: Literature Review

This literature review has three foundational purposes. First, I situate the current study in a larger context by examining the status of high school mathematics instruction. Second, I offer an overview of key works on the general topic of pedagogy in high school mathematics and of specific discussions of pedagogy used with African American students. Third, I weave together the two bodies of literature–the more general literature on the pedagogy and mathematics achievement and the more specific literature on culturally relevant and warm demander pedagogy. The literature review makes note of several important conclusions in the literature.

There is empirical evidence that culturally specific pedagogy works in the classroom and that such pedagogy is effective when employed in classrooms that include African American students and other students of color. The literature review also includes a few studies where culturally relevant teaching in mathematics classrooms has been shown to have a great impact on student achievement for African American students. Studies demonstrate that both White and African American teachers can increase the learning of African American students of mathematics (Ladson-Billings, 1994, 1997) when they create learning environments that infuse an ethic of caring, authority and structure, and curriculum that is culturally relevant to their students' lives.

The State of High School Mathematics Teaching

I begin this review with an overview of the status of high school mathematics teaching as characterized by the National Council of Teachers of Mathematics, the largest

professional organization in North America for mathematics teachers, and as characterized by the results of the National Assessment of Educational Progress, a widely accepted measure of student learning. The call for reform in mathematics education was made more than two decades ago. This call included a demand for mathematics teaching and learning to extend beyond the traditional mathematics instruction focused on basic skills, rote learning, and teacher centered lessons (NCTM, 2000). In response to this call, the National Council of Teachers of Mathematics [NCTM] published three landmark standards documents that provided frameworks for curriculum, instruction, and assessment and communicated NCTM's vision of school mathematics for all students. These documents were *Curriculum and Evaluation Standards for School Mathematics* (1989), *Professional Standards for Teaching Mathematics* (1991), and *Assessment Standards for School Mathematics* (1995). In addition, to this trio of documents, NCTM released its *Principles and Standards for School Mathematics* (2000) and most recently *Mathematics Teaching Today: Improving Practice, Improving Student Learning* (2007), which are updates of the 1989 and 1991 documents. These reform documents recommended changes in the teaching and learning of mathematics in schools by advocating mathematics instruction centered on meaningful mathematics and instruction that that promotes conceptual understanding, student exploration, and problem solving (NCTM, 1991, 2000, 2007). The Council also identified five process standards that should be woven throughout mathematics instruction: problem solving, reasoning and proof, communication, connections, and multiple representations (NCTM, 2000).

The vision of NCTM (2000) also includes an infrastructure to improve teacher quality. The Council advocated for all students to have access to effective teachers who

promote high quality mathematics teaching and learning that is engaging, rigorous, and relevant. *Mathematics Teaching Today* articulates NCTM's vision for effective mathematics teaching and describes support systems that are required to achieve this vision. This document includes standards for the teaching of mathematics related to the knowledge teachers should have, the means of implementing instruction, and the reflective analysis that is necessary for teachers to promote mathematics achievement for students (NCTM, 2007). NCTM (2007) specifically highlighted the important role of teachers by noting that "more than curriculum *Standards* documents are needed to improve student learning and achievement. Teaching matters. Therefore, exploring what goes on in the mathematics classroom is essential" (p. 3). Thus, in this study I sought to provide a glimpse into the practices and beliefs of effective teachers of African American students.

Furthermore, the authors of these standards documents addressed and acknowledged the existing disparities in mathematics achievement among various groups of students usually identified by racial, ethnic, linguistic, or socioeconomic status. African American high school students are one of the subgroups that is among those with disparities in mathematics achievement. NCTM (2005) has taken a position that supports cultural relevance in mathematics teaching:

> Every student should have equitable and optimal opportunities to learn mathematics free from bias—intentional or unintentional—based on race, gender, socioeconomic status, or language. In order to close the achievement gap, all students need the opportunity to learn challenging

mathematics from a well-qualified teacher who will make connections to the background, needs, and cultures of all learners.

NCTM's position supports the notion that the achievement gap is not the result of deficits in African American students themselves but rather derives from an inequitable and culturally irrelevant form of teaching mathematics to African American children. As the literature cited in the rest of this chapter demonstrates, the gap narrows and even vanishes when teachers do in fact adopt equitable positions grounded in cultural relevant teaching.

The National Assessment of Educational Progress (NAEP) is a project of the National Center for Education Statistics (NCES) that tracks the academic achievement of a random stratified sample of 4^{th}, 8^{th}, and 12^{th} grade students in the U.S. every four years. NAEP issues a document known as the Nation's Report Card, which details student achievement in a number of subject areas, including mathematics. In this section of the literature review I discuss NAEP's most recent National Report Card with the purpose of determining the state of mathematics education in the United States. This information both provides a helpful backdrop against which to consider the remainder of the literature review and constitutes an introduction to some of the major themes in the dissertation, including the gap in racial achievement and the status of mathematics pedagogy in the United States.

For the purposes of this literature review, I analyzed the results from the 2008 grade eight administration, as they are more pertinent to high school. These results paint a picture of the state of mathematics learning just before students enter high school.

In the eighth grade, African American students scored 32 points below white students in mathematics. The gap is virtually unchanged from 1990 when it was at 33 points. The gap was at its widest in the years from 1996 to 2001, reaching a high of 41 points in 1996 (NAEP, 2009; Vanneman, Hamilton, Anderson, & Rahman, 2009).

While the gap in mathematical achievement between African American and White students persists, this data must be understood in light of an overall improvement in the mathematics performance of all American schoolchildren in the elementary and secondary systems. Average scores have improved several points since 1990. In 1990 the average score for black students was 237 while in 2008 it was 261, a 34-point gain. In the same time period, White students' scores improved by 33 points. Thus, African American children today are statistically on par with their White peers of 1990. Because the achievement of white students has increased at the same rate as that of black students, the gap detected in 1990 remains in place today.

While the persistence of the achievement gap is troubling, these data suggest that high school mathematics teaching, like mathematics teaching in general, has achieved a number of successes since 1990. According to the NAEP data, teachers have done their part in improving the mathematical performance of all students, including African American students. Because I approach my work from a standpoint of cultural sensitivity, I refuse to pathologize Black students, and the NAEP data are useful in this regard.

Culturally Relevant Teaching

The purpose of this section of the literature review is to describe the concept of culturally relevant teaching by providing empirical evidence that culturally relevant

teaching is effective in high school mathematics teaching and why it is effective. The main empirical findings over the past two decades are that (1) African American students who are exposed to culturally relevant forms of teaching are often successful in making up the racial achievement gap measured on standardized mathematics tests and that (2) already-gifted African American students exposed to culturally relevant mathematics teaching become even more accomplished (Baldwin, 1987; Cline & Schwartz 1999). Specific pedagogical practices that promote the inclusion of culture in instruction and include "ways to develop a closer fit between students' home culture and the school" (Ladson-Billings, 1995, p. 474) are referred to as culturally relevant pedagogy, similarly named culturally responsive, culturally appropriate, culturally sensitive, culturally specific, culturally inclusive, and culturally congruent instruction (Foster, 1997, 1994, 1991; Gay, 2000; Irvine, 2000, 2002; King, 1993; Ladson-Billings, 1994; Stanford, 1997, 1998; Ware, 2002, 2006). Although, called by different names, the ideas espoused about the reasons for and the importance of using classroom instruction that is consistent with the cultural orientations of ethnically diverse students are virtually identical (Gay, 2000). For this reason, I use the following terms interchangeably: culturally relevant, culturally responsive, culturally appropriate, culturally sensitive, and culturally specific.

Ladson-Billings defined culturally relevant pedagogy as "a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impact knowledge, skills, and attitudes" (Ladson-Billings, 1994, p. 17). In particular, educational researchers of culturally relevant pedagogy (Gay, 2003; Ladson-Billings, 1994, 2003), culturally responsive teaching (Irvine, 1990b; Gay, 2003; Ladson-Billings, 1994, 2003), and emancipatory pedagogy (King, 1991) have included the experiences and accounts of African American teachers in their literature. These teacher

educators and researchers have provided evidence that African American teachers embody specific characteristics, pedagogical practices, and beliefs about their roles as African American teachers and their responsibility to their communities and their students.

In fact, these educational researchers showed that culturally responsive teachers or teachers who implement culturally relevant pedagogy are not only effective educators (Irvine, 1990b), but they demonstrated that these teachers "conceptualize the teaching act and give attention to the immediate needs and cultural experiences of the students they teach" (Irvine, 2003, p. 66). Irvine (2003) described eight teaching acts of culturally responsive teachers:

1. Spend more classroom and non-classroom time developing personal relationships with their students.
2. Listen patiently and in a nonjudgmental way to allow students to feel comfortable to share personal stories with them, as well as, share their own personal stories with their students.
3. Wait longer than their professional peers for students to respond. These teachers are known to probe, prompt, praise, and encourage their students.
4. Implement engaging teaching strategies that include accepting students' ideas, providing frequent feedback, demonstrations, questions, rephrasing, reviews, drills, recitations, monitoring, individualizing, summarizing, and reinforcing.
5. Seize the "teachable moments". They use their students current concerns and even tragic events, as opportunities to learn.

6. Understand the interplay of instructional context and culture. Therefore, they examine their own actions, instructional goals, methods and materials in reference to their students' cultural experiences and preferred learning environment. This often takes precedence over requirements of standardized tests.
7. Acquire information about their students' to better understand the whole child. They probe the school, community, other teachers, and parents to gain these insights.
8. Appreciate students' personal cultural knowledge and use their students' prior knowledge and culture to help construct and design relevant cultural metaphors and images to bridge the gap between what students know and the new knowledge they need to master. (p. 67-68)

In mathematics, culturally relevant teaching has been defined as the use of both culturally relevant materials and pedagogical strategies to reach out to students of a particular background. Martinez's work (2000) was particularly interesting in that it called attention to the "call-and-response" (p. 73) pattern often evinced in African American communication, entertainment and churches as a highly effective pedagogic strategy for teaching mathematics to young African American students. The call-and-response pedagogy has been describe by Martinez (2000) to be "one form of African American culture used successfully in reinforcing basic skills in mathematics with African American kindergartners" (p. 73). Martinez provides an example of the teachers (M) using the "call and response" method to teach the concept of zero and addition to a class or kindergartners.

M: Open your hand. Look at it. Do you have anything in your hand?

Class: No!

M: Your hand is empty!

Class: Yes.

M: When your hand is empty, you have nothing in your hand! What do you have in your hand?

Class: Nothing!

M: What do you have in your hand!

Class: Nothing!

M: Another way of saying nothing is zero! What do you have in your hand?

Class: Zero!

(Repeat a few times until all children are responding verbally.)

M: Now, let's put one finger in your hand. What do you have in your hand?

Class: One!

Martinez explains that the students begin to add 1 finger, 2 fingers etc. to zero in a way that allows them to build connections between the concrete use of one finger and the abstract symbol 1 or the number one. Students responded in a chorus "one and zero are one" and they repeated in a call-and-response format several times. At the Martinez School, the call-and-response method has shown to improve students' mathematic concepts and basic skills. One justification for its success is that call-and-response method is often used in African American culture, in particular in Black churches. Researchers (Albert, 2000; Jones, 2000; Ladson-Billings, 1994b) have shown that teachers who incorporate culturally relevant practices, such as honoring home cultures

and communicating the role of mathematics in society and in the African American culture, have success with African American children in mathematics. For example, Ms. Rossi, one of the culturally relevant teachers in Ladson-Billings (1994b) book called "Dreamkeepers," explained that when preparing to teach algebra to her students she would begin with discussions of the African origins of algebra. She taught her students that "the first definitive evidence of the use of algebra had appeared in the writings of Ahmes, an Egyptian mathematician who lived around 1700 B.C. or earlier" and it was "much later the Greeks had contributed to the early development of algebra" (p. 128). Rossi explained that this was her attempt to motivate her students to learn algebra by showing a clear relationship to their own heritage. While these descriptive studies provide examples of teachers who demonstrate an understanding of culture with African American students, there have been no studies of this nature conducted in a high school setting to date (Fulmore, 2005).

Albert (2000) provided empirical data from her experience of incorporating culturally relevant pedagogy into her mathematics instruction in seventh grade. She described an assignment in which she required students to write an essay about a famous mathematician. She initially provided a list of mathematicians that included only one African American mathematician, and she required students to submit their work in the form of an essay, but the African American seventh graders challenged the assignment. After considering her students' concerns, she included more African American mathematicians on the list, and she also allowed the students to communicate results via poetry and "rap." Albert reported that the process of expanding the assignment to include more African American mathematicians increased the emotional significance of the

assignment to the students. The NCTM (2000) challenges teachers to develop activities that engage students, and Albert realized that the original directions silenced the African American male students in her class. She cited the work of Frankenstein (1990), who promoted the infusion of culture in designing assignments (Albert, 2000) as an influence on her decision to expand the assignment. Albert concluded that when teachers design curricula that resonate with the students on an emotional level, it is more likely that students will be willing to participate in the classroom.

Tillman's Theory of Cultural Sensitivity

The previous section demonstrated empirical support for the hypothesis that culturally relevant teaching is pedagogically effective. In this section I provide a theoretical explanation for why culturally relevant teaching helps increase student learning. Several researchers (Foster, 1998; Gay, 2003; Irvine, 1990, 2002, 2003; Irvine and Armento, 2001, Ladson Billings, 1995, and Siddle Walker, 1996, 2001) have demonstrated "that there are unique and culturally specific teaching styles that contribute to the academic success of African American children and other children of color" (Ware, 2006, p. 428). These researchers contend that culture is often overlooked in the analysis of African American schooling, and it is often not considered in the success of students. Their conclusions are based on the theoretical and conceptual framework of the cultural context of teaching and learning (Ware, 2006). This theory contends that culture must be considered an important variable in the teaching and learning process. Students are not blank slates, and they bring to any classroom environment particular beliefs and values. The theory of a cultural context of teaching and learning is based on the foundation that a teacher who incorporates culturally responsive teaching not only has strong content

knowledge but must incorporate pedagogical skills that are flexible and fluid that support diverse backgrounds and address multiple learning styles of students. This framework maintains that the knowledge and inclusion of students' diverse cultural backgrounds in instruction is critical to improving the academic and social growth of minority students. Irvine (2003) defined culture to "mean a group's history, language, values, norms, rituals, and symbols. It is these shared behaviors and knowledge that represent the total ways of living and are important for any group's survival in a given environment" (p. 6). Several scholars believe if we are to improve the educational experiences and outcomes for African American children, issues as they relate to African American children's culture and community must be considered (Delpit, 1995; Irvine, 1995, 2003; Ladson-Billings, 1994). It is a fact that all students bring their cultural beliefs, values, and perceptions to school; but the difference between the school experiences and success of White students and African American students is that the culture of middle-class White students is more likely to be compatible with the culture of the school than is the culture of African American students (Irvine, 2003; Ladson-Billings, 1997). Scholars often refer to this as cultural-incongruence or as a "lack of cultural synchronization" (Irvine, 2003, p. x).

There are important reasons to connect culture with the mathematics for African American students. Because school mathematics curriculum, assessment, and pedagogy are often closely aligned with an idealized cultural experience of the White middle class, teachers need to be exposed to and become familiar with African American cultural style; this provides an avenue to interpret students' thoughts, feelings, and actions. Because of African American cultural differences, particular learning preferences are more successful than others (Berry, 2003). For example, Boykin (1983) explained that African

American students have shown learning preferences that incorporate movement, verve, affect, communalism, expressive individualism, social time, and oral tradition. However, these kinds of cultural expression are neither reinforced nor represented in school mathematics.

Ladson-Billings (1997) suggested that the language of mathematics and the content are not congruent to the everyday lives of African American students. Moreover, the culture of mathematics is more compatible to the culture of the White middle class. She contended that mathematics instruction is often taught through lecture-based instruction with an emphasis on repetition, drill, convergent, right answer thinking, and predictability. She asserted that this type of thinking and lecture based instruction is complementary to middle-class culture demands of efficiency, consensus, abstraction, and rationality and that these features of the culture reflect the experiences and understandings of one segment of our society, namely, the White middle class. Boykin and Toms (1985) suggested that some features of African American cultural expression include "rhythm, orality, communalism, spirituality, expressive individualism, social time perspective, verve, and movement" (Ladson-Billings, 1997, p. 700). In contrast, mainstream cultural expression includes materialism rather than spirituality; mastery over nature rather than harmony with nature; compressive orientation toward impulse control rather than an orientation toward expressive movement; an emphasis on separateness rather than interconnectedness; a clock orientation toward time rather than an event orientation toward time; one based on print rather than that which is orally based. Consequently, in African American culture, there is a relationship between expressive

individualism and communalism, so that possessions belong to the community at large and uniqueness is valued (Berry, 2003).

There exists a body of literature that has emerged outside the mathematics community which offers non-discipline specific viewpoints on effective teaching practices for African American students (Cooper, 2002; Delpit, 1995; Haberman, 1991; Foster, 1991, 1994; 1997; Gay, 2003; Irvine, 1990, 1991, 2000, 2002, 2003; Ladson-Billings, 1994). These scholars and researchers insist that curriculum and instructional activities that complement African Americans' lived experiences and culture help improve the academic success for these students.

Tillman's (2006) culturally sensitive framework also provides insight as to why culturally relevant pedagogy works for African American learners. Cultural sensitivity is a complex phenomenon and one that is not easily defined. It is not, at least in Tillman's theory, defined as being possible only between members of the same culture. Nor is it the case that a member of a specific culture will be an expert at reaching out to members of that culture and understanding all aspects of that culture. Rather, cultural sensitivity consists of a number of interlocking concepts, including knowledge of, and respect and affection for, a particular culture. And most importantly, Tillman contended that the Culturally Sensitive Research Framework, "not only recognizes race and ethnicity, but positions *culture* as central to the research process" (p.265). Cultural sensitivity is important because it is the glue of culturally relevant teaching. In other words, there is some qualitative evidence that culturally relevant teaching that is not grounded in cultural sensitivity is likely to fail, as students will either fail to be moved by such teaching or will consider it insincere. Howard (2001) conducted particularly relevant research on this

topic, profiling four teachers (including both White and African American teachers) who were able to impact the educational success of their African American students. Howard discovered that the key elements of cultural sensitivity that appealed to the students were respect, understanding, and affection, none of which can be convincingly faked over the long term.

Tillman herself has an idiosyncratic definition of cultural sensitivity, which she describes as consisting of *culturally congruent methods, culturally specific knowledge, cultural resistance to theoretical dominance, culturally sensitive data interpretation, and culturally-informed theory and practice.* While Tillman's theory was originally intended as a methodology for research design, data collection, and data interpretation, it also holds up well as a descriptor of what culturally relevant teachers actually do in the classroom. In other words, Tillman's five principles, modified slightly, are theoretical predictors of whether a culturally relevant classroom approach is likely to succeed. Similar to her stance that research conducted in a manner consistent with the Culturally Sensitive Research Framework, "not only recognizes race and ethnicity, but positions *culture* as central to the research process," (p. 265) a teacher who employs a culturally sensitive approach in the classroom not only recognizes race and ethnicity as factors to learning, but will position *culture* as central to the learning process.

Operationalizing the notion of cultural sensitivity as a component of culturally relevant teaching shows how each element of the approach can be manifested in the classroom. For example, a teacher who incorporates *culturally congruent methods* will employ a teaching style that is congruent to the learning styles of her students. Boykin and others have identified specific cultural preferences that are congruent to that of

African American students. These researchers (Boykin, 1983, 1994; Shade et al., 1997; Hale, 2001; Hale-Benson, 1986; Hilliard, 1992, Ford, 2002) suggest that there are specific dimensions of African American culture, which include oral tradition, communalism/fictive kinships, spirituality, harmony, movement, verve, affect, expressive individualism, and social time perspective, that have been found to be culturally congruent methods that support the African American learner. The next component of the cultural sensitivity that supports culturally relevant teaching is *culturally specific knowledge*. Tillman asserted that any culturally sensitive approach must take into account the unique self-defined experiences of African Americans. In the case of teachers who implement culturally relevant pedagogy, these teachers make it their goal to use the specific cultural knowledge and cultural beliefs of their students in a way that informs their teaching strategies. These teachers recognize that students have a wealth of skills and knowledge and use this to drive their instruction.

Cultural resistance to theoretical dominance and *culturally informed theory and practice* are two components of Tillman's research framework that support the idea that a participant's experiential knowledge is valid and must be considered as legitimate to the research process. Furthermore, this knowledge and experience should inform theory and practice. A teacher who incorporates culturally relevant teaching will address these two culturally sensitive approaches by honoring and incorporating students' existing cultural knowledge, experiences, and beliefs as a source to inform their own teaching theories and practices. Furthermore, a teacher who engages in culturally responsive teaching is challenging and resisting the existing traditional forms of teaching that are prevalent in U. S. schools today. Finally, *culturally sensitive data interpretations* recognize "the

experiential knowledge of African Americans as legitimate, appropriate and necessary for analyzing, understanding and reporting data" (p. 270). An important part of this component is that the individual or group under study is co-constructed. A culturally relevant teacher who uses "student data" interpretations would co-construct knowledge with and about a student by incorporating the students' existing knowledge (i.e., of the content, their culture, their beliefs, etc.) to assess what is best for the student and the community of learners in the classroom. The interpretations of a students' culture, beliefs, learning styles and actions must involve students, community, other teachers, and parents to avoid forming stereotypes of one particular culture or people. If all of Tillman's components are in place, then it is likely that what Tillman has called an 'endarkened' perspective (p. x) will emerge that allows a teacher to better engage with and reach African American students, regardless of their achievement level. These components of classroom practice send a signal to the students that the teacher cares, can relate, and is invested in helping the students succeed without insisting that their existing cultural references, beliefs, and values are somehow inferior.

African American Pedagogy

There are a number of themes that recur in narratives of successful African American teachers. One of these themes is the notion of teachers as warm demanders, which Bondy and Ross (2008) have described as a sort of tough love approach to classroom management, teacher mien, and pedagogy. Warm demander pedagogy was not originally identified to have orginated in the Black community, researchers have found that similar to Kleinfeld's (1975) participants this is a pedagogical practices used to increase student achievement. Kleinfeld first coined the phrase to describe the type of

teacher who communicated what he called "active demandingness" (p. 327) Kleinfeld described effective teachers of Athabaskan Indian and Eskimo 9th graders in Alaskan schools as warm demanders. Vasquez (1988) used the term "warm demanders" to describe successful teachers who used particular culturally specific pedagogies when teaching students of color. Fanita Ware (2002) was among the first researchers to attempt to operationalize warm demander pedagogy. In her empirical study in 2001, she examined the instructional practices of two African American teachers and determined that the primary finding of her study was that her participants were "warm demanders." Ware noted that her pilot study "operationalized and defined the term in the following contexts: (a) warm demanders as authority figures and disciplinarians; (b) warm demanders as care givers and (c) warm demanders as pedagogues" (p. 73).

The warm demander, as the name implies, is demanding of students, often refusing to put up with any nonsense and unafraid to seem to be an authoritarian. However, this demanding takes place within a warm context, typically the teacher's intense desire to see her students succeed. In fact, as Bondy and Ross (2008) have discussed, one of the recurrent themes in African American teachers' testimonies is the fact that they often want more for their African American students than these students even want for themselves. As such, the warm demander is able to bring about the self-fulfilling prophecy effect not merely because of her expectations but also because students understand that these expectations are coming from a place of love and the students therefore take them more seriously.

Irvine and Vasquez (2005) described warm demanders in a similar frame as teachers "who provide a tough-minded, no-nonsense, structured, and disciplined

classroom environment for kids whom society has psychologically and physically abandoned" (p. 2). When African American teachers and students are asked to describe the culturally specific practices and characteristics of warm demanders; they describe these teachers as caring, "other mothering," believing, demanding the best, people who have responded to teaching as a calling, and disciplining (Irvine, 2002, p. 142)). Irvine and Fraser (1998) stated that warm demanders:

1. Perceive themselves as caregivers, parental surrogates, and advocates for their African American students.
2. Teach with authority.
3. Employ a teaching style filled with rhythmic language and rapid intonation with many instances of repetition, call and response, high emotional involvement, creative analogies, figurative language, gestures and body movements, symbolism, aphorisms, and lively and often spontaneous discussions.
4. Spend classroom and non-classroom time developing a personal relationship with their children, and often tease and joke with their students using dialect or slang to establish this personal relationship.
5. Use students' every day and historical experiences in an effort to link new concepts to prior knowledge. (p. 3)

Another overarching theme found in the literature on African American pedagogy is the ethic of caring. Researchers who have examined the instructional practices of Black teachers reveal that at the very core of many of the actions of these teachers is a concept of care (Collins, 1990; Foster, 1993a, 1997; Henry, 1992; Irvine, 2003; Ladson-

Billings, 1994; Toilver, 1993). Irvine (2002) stated that she believes that teaching is synonymous with caring (p. 42). Black teachers who have been successful with Black students and other students of color list caring as the single most important element of their successes. Toliver (cited in Ware, 2002) argued that "Caring is the foundation of good teaching. In my classes, caring can and does take many forms" (p. 16). She enacted caring by giving time to her students outside of class, listening to their problems, and encouraging them to grow academically. The successful teachers in Ladson-Billings' "Dreamkeepers" displayed an ethic of caring as well.

Collins (1990) and Foster (1993a) situated the ethic of caring from Black teachers as a natural extension of accountability for and responsibility to all of the Black community's children. Collins described this sense of accountability and responsibility shown by Black women who used their education to improve their community as "lifting as we climb" (p. 149). Foster described the caring of Black teachers as "a kinship, connectedness and solidarity" (p. 376). Fictive kinships are common within the African American community (Ladson-Billings, 1992; Tierney & Venegas, 2006). The fictive kinship is a close personalized relationship that emerges between persons or community members who are not related but engage in social relationships that function in a manner emulating familial connections (Tierney & Venegas, 2006). Foster (1991) summarized the feelings of the African American teachers in her study as teachers who try to create a classroom atmosphere that is one of "family ethos [in which] their pedagogical styles include open affection to students and the collective encouragement and praise while fostering of the themes of social and personal responsibility…they view black children in their schools and in their communities as part of their own family" (p. 118). Collins

(1990) described African American woman who held strong fictive ties and personal attachments to their students as other mothers. Irvine (2002) explained that "other mothering is different from researchers' description of teacher identification and surrogate parenting…These African American teachers were attached both to the individual child as well as the race" (p. 142). Thus an ethic of caring for these teachers extended to the needs of students and the African American community as a whole.

The ethic of caring as described by Gilligan (1993) is a feminine response to moral dilemmas. She stated that caring was a "morality based on the recognition of needs, relation, and response" (p. 42). Noddings' (1988) provided an extension of Gilligan's ideas to include a morality applicable to educational contexts. Noddings argued that we should view caring as a moral orientation in teaching. Ayers (2001) made reference of Noddings' (1986) argument that teachers' pedagogical choices are really moral choices that can be made less difficult if they can adopt an "ethic of caring." Black teachers in the studies for this literature review demonstrated beliefs and practices that are characteristic of Gilligan's and Nodding's definitions of the ethic of caring. These teachers recognized and responded to the needs of their students and formed fictive kinships with their students that enhanced the learning environment. Ayers (1993), a White male teacher, offered a perspective that provides insight to the deeper connections between race, gender, and the ethic of caring. He argued that the ethic of caring must include more than just a concern for the student; it also means you must have a dedication to and concern for the *needs* of students. Ayers viewed the ethic of caring as embodying the needs of the whole person as a central concern (Ayers, 2001). And for him this meant

that what a teacher chooses to teach and how that teacher teaches are all intrinsically connected to their ethic of caring. Ayers stated:

> From the perspective of an ethic of caring it is the person before us who becomes our central concern. This is no way implies a lack of concern for academic rigor or excellence, or for teaching basic skills, but it does mean that skills are taught, for example, as a result of concern for the person, that is, that the one is undertaken in light of the other. I insist that my students learn algebra because of my love of them, not of it. (p. 23).

The African American teachers described in studies analyzed in this review corroborated Ayers' notion of caring for their students and were cognizant of the needs of their students and even what they would teach their students. For example, Foster (1997) described Everett Dawson's dedication to the needs of his students. He had been told by his principal that the set of students he had that year "weren't supposed to be good in academics" (p. 9). Mr. Dawson embraced an ethic of caring by adjusting the curriculum to meet the needs of his students. He described how he would supplement curriculum to include real-world applications and the interest of his students, which included teaching mathematics that related to masonry, carpentry, and computers. This example also demonstrated the notion that as a Black man he felt responsible to resist the dominant cultural educational theory that these students could not learn. Despite the outside oppressive forces, he remained committed to the educational needs of his students.

Irvine (2002) provided Walker's explanation of how African American teachers view caring. Walker is of the notion that African American teachers have a different

view of caring that is not often described in the research literature. She stated that African American teachers:

1. Focused on caring in all aspects of a child's life rather than in narrow interpersonal ways;
2. Cared for students by providing an honest and truthful feedback to students about their performance;
3. Cared for their students but never relinquished their authority or attempted to be friends of their students; and
4. Demonstrated that their caring is representative of a history of African American, culturally specific teaching behaviors. (p. 142)

African American pedagogy has also been described by King (1993), who uses the term emancipatory pedagogy. This pedagogy has similar characteristics to culturally relevant and warm demander pedagogy but includes "engaging students in critical reflection about realities such as social injustices" (King, 1993, p. 119). She detailed how African American teachers used their classrooms as places to equip their Black students with information about the injustices often inevitable in the lives of Black people. These teachers play an important and unique role by "reinforcing the community's cultural norms and encouraging black students to achieve beyond what society has expected of them" (Foster, 1991, p. 233). Other important elements which are interwoven in their pedagogical practices include: maintaining consistent discipline for class management; teaching students about values and character development as a part of their curriculum; implementing cooperative learning strategies and other instructional strategies that require active learning; and connecting with students by using community language and

dialect (Irvine, 1998, 2000, 2002; Ladson-Billings, 1994a, 1994b, 1997, 2005; Delpit, 1988; Foster, 1991, 1994, 1997; Henry 1996, 1998; King, 1993; Stanford, 1997).

MacPherson (2010) has argued that non-African American teachers can, and should, engage in collaborative discussions with their African American peers in order to obtain the kind of culturally sensitive knowledge and insights that Tillman (2002) recommends for cultural relevance, whether in the context of teaching or research. In this regard, the problem does not necessarily lie with non-African American teachers, many of whom have taken extraordinary steps to become more culturally sensitive and to enact culturally relevant mathematics teaching in the classroom. In fact, Ladson-Billings (1994) described non-African American teachers who employed culturally relevant pedagogy. The problem is that, from the students' perspective, more credence is given to the African American teacher; such a teacher is more easily credited with a desire to see her students succeed, while there appears to be some resistance and possible suspicion of the non-African American teacher, regardless of the strength of her intentions and success in achieving cultural relevance in the classroom (Ladson-Billings 1992). The problem is made worse by the fact that, in many cases, students' suspicions run so deep that these feelings may not be clear to the students themselves, making it all the more difficult to root out bias and treat the non-African American teacher in the same way as an African American teacher would be treated (Ladson-Billings 1992). In this regard, it does not help that the United States remains mired in an atmosphere of racial paranoia and mutual suspicion that has not, despite nearly five decades of conscious effort by ordinary people and policy-makers alike, been eroded.

Ladson-Billings (1994) coded the narratives of successful teachers as dream keeping and argued that African American teachers perceived themselves (and were perceived by their students) as being the torch bearers to future success. Of course, the key question to ask in such a context is why African American teachers in particular were able to achieve this status. One explanation comes from Tierney and Venegas (2006), who argued that same-race teachers have an easier time establishing what is known as fictive kinships with their students. In other words, because of not only physical similarities but also shared cultural characteristics and experiences, it is easier for an African American mathematics teacher to serve as a surrogate family figure for an African American student. This relationship might in fact be the key to understanding the self-fulfilling prophecy effect as it takes place in African American contexts, as successful African American mathematics teachers supply both the warmth and the demandingness that may have been missing from the lives of students, thus creating a very powerful incentive to achievement.

African American teachers are resilient in this regard not only because they often come from the same background as their students but also because, as educators, they have a communal memory of working with African American students in even the worst environments (Siddle Walker, 2001). African American teachers have a history of never giving up on their students, of trying to make the lowest achievers perform up to a higher standard, and of giving the gifted students opportunities for even more success on the path to college and career.

One of the lingering questions in teaching mathematics to African American students is how to bring cultural relevance to the table. To date, a great deal of effort has

been devoted to determining a race-blind vision of cultural relevance that can be adopted by teachers of all backgrounds (Wagner, Roy, Ecatoiu, & Rousseau, 2000). While efforts of this kind should be and have been praised in the literature, it is just as important to recognize that African American mathematics teachers have been systematically under-hired. A simple shortcut to cultural relevance, sensitivity, and the documented benefits that come from the self-fulfilling prophecy effect as enacted in the dynamic between African American students and teachers is to put more African American mathematics teachers in the classroom. Currently NAEP reports that 7% of our teaching force is African American (NCES, 2009). This policy conclusion has been reached and defended by a number of scholars, including Ladson-Billings (1997), Martin (2006), English and Bussi (2008), Nevergold and Brooks-Bertram, and Wassell and Stith (2007). It is a matter of both social equity and pedagogical effectiveness to recognize that African American mathematics teachers exist in insufficient numbers; therefore, there is a need to recruit more Blacks in teacher education programs and thus hire them more intensively than they have been.

Summary

The literature review has reached a number of important conclusions and, in so doing, paved the way for the remainder of the dissertation by generating a hypothesis against which the testimonies of African American teachers of high school mathematics can be measured. That hypothesis is as follows: African American teachers are able to generate higher achievement in their African American students because of the well documented research on the benefits of culturally relevant pedagogy and the self-fulfilling prophecy effect, in which students rise to the expectations of their teachers. If

this hypothesis is correct, as the various studies surveyed in the literature suggest, then a number of qualitative themes can be expected to emerge from the narratives of African American teachers. The most prominent of these themes can be characterized as warm demanding, which is a concept that is shared by the self-fulfilling prophecy effect and by culturally relevant/sensitive teaching. The warm demander expects excellence from students, while rooting that expectation in a framework of support, encouragement, and indeed love, rather than in a punitive or mechanistic framework. The emergence of this concept from the literature is of tremendous usefulness for the rest of the dissertation, which will examine how warm demanding and related manifestations of culturally relevant/sensitive pedagogy figure in the narratives of African American high school mathematics teachers.

Theoretical Framework

Two theoretical perspectives were helpful in guiding my data collection and analysis: culturally relevant pedagogy (Ladson-Billings, 1994, 1995) and the culturally sensitive framework (Tillman, 2002). I discuss each in turn below and describe how I used it in my study.

Culturally Relevant Pedagogy

Culturally relevant pedagogy has its roots in critical theory. It is a grounded theory borne out of the works of Gloria Ladson-Billings (1994, 1995). Similar to the ideas set forth by critical theorists, Ladson-Billings believes there are social forces that are potential barriers that students from diverse backgrounds contend with in their schooling and mathematical experiences (Moody, 2007).

The theoretical underpinnings of culturally relevant pedagogy are in accordance with critical theorists such as Peter McLaren (1998), Paulo Freire (2000), Henry Giroux (2001, and Michael Apple (1996). These critical theorists are concerned with the role of schools in maintaining the existing social structure – a social structure that sustains an idea that political and economic power is unequally and unjustly distributed in society (Seda, 2007; Stanic, 1991). They argue that "the poor educational performance of most students from diverse backgrounds comes from the existing curriculum and pedagogical practices that do not meet the needs of all students" (Seda, 2007, p. 10).

Ladson-Billings' scholarship has focused on existing pedagogical practices that have been shown to meet the needs of students of color. She used the term "culturally relevant" to describe the teaching practices of exemplary teachers of African American students. Although the term "culturally relevant" began to appear as early as the 1970s (Ladson-Billings, 1995), Ladson-Billings was the first progenitor to extend this construct beyond the simple notions of connecting students' culture to real world issues for just student achievement; her notion of culturally relevant pedagogy placed an emphasis on social justice. She defined culturally relevant teaching as "a pedagogy of opposition" (1995, p. 160), which is similar to ideas from critical pedagogy. However, she is specifically committed to collective empowerment rather than merely individual empowerment (1995). Culturally relevant pedagogy includes three essential criteria: "(a) students must experience academic success; (b) students must develop and/or maintain cultural competence; and (c) students must develop a critical consciousness through which they challenge the status quo of the current social order" (p. 160). For the purposes of this study the first of these criteria were of interest.

As a critical theorist inside the educational field, Ladson-Billings' culturally relevant pedagogy challenges the notion of assimilation. Assimilation is the idea that in order for ethnically diverse student populations to succeed in schools, they must put aside their own culturally identities and embrace European American, middle class values (Seda, 2007). According to Ladson-Billings, a culturally relevant teacher views her role, her students, and teaching and learning quite differently from that of an assimilationist teacher (see table 1). Assimilationist teachers view teaching as putting the right kind of knowledge in their students head; they ascribe to a banking paradigm of education. They pressure diverse learner to conform to the traditions of the dominant culture as a way to escape their communities, their families, and their ignorance. Culturally relevant teachers, however, view teaching as pulling knowledge out like mining and value the knowledge students bring to the learning environment. They embrace cultural differences as opportunities to help build a community of learners who all contribute to the learning process. In contrast to the assimilationist's deficit view of diverse students' cultures, culturally relevant teachers encourage cultural integrity.

Table 1

Attributes of the Culturally Relevant and Assimilationist Teacher (Ladson-Billings, 1994)

Culturally relevant teacher	Assimilationist teacher
Views teaching as "pulling knowledge out" like mining	Views teaching as "putting in" the right kind of knowledge like banking
Views herself as an artist	Views herself as a technician
Believes all students can succeed	Believes failure is inevitable for some
Encourages cultural integrity by using culture as a vehicle for learning, as well as for affirmation and celebration	Pressure diverse learners to confirm to dominant culture
Helps students make connections to their personal lives, families and communities	Views students only in terms of individual characteristics; views achievement as a means to escape community
Teacher-student relationships are fluid,	Teachers-student relationships are hierarchical,

humanely equitable with interactions extending beyond the classroom	authoritarian, and limited to classroom interactions
Encourages a "community of learners"	Encourages individual competition and learning in isolation
Knowledge is viewed critically and shared by both teachers and students	Knowledge is infallible and static
Values the knowledge students bring to the learning environment	Only values the knowledge that is passed in one direction from teacher to students
Facilitator of knowledge	Transmitter of knowledge

In a comprehensive review of literature on African American teachers, Howard (2001) provided a conceptual framework of culturally relevant teaching perspectives which include the communication styles, the use of culture and specific learning strategies, and the perceptions of knowledge he identified with African American teachers (See Table 2). Components of Howard's conceptual framework served as lens for analysis and provided a platform for presentation of findings for my study. Specifically, the elements under "culture and learning" and "perceptions of knowledge" were used to analyze my data. I did not observe the participants while teaching; therefore the category of "communication styles" was not initially used during the analysis. However, I later concluded, based on analysis of interviews, that the teachers' exemplified a communication style that included being straightforward and direct and that social interaction styles were exemplified during their instruction. I elaborate on this further in the analysis section in Chapter Three. In summary, culturally relevant teachers seek "to promote academic success centered in students' cultural and community identities and their potential to engage in the critical pursuit of social justice" (Matthews, 2003, p. 62).

Table 2

Conceptual Framework for Culturally Relevant Teaching Practices for African American Students (Howard, 2001)

Communication Styles	*Culture & Learning*	*Perceptions of Knowledge*
Expressive Individualism	Community Solidarity	Subjective View of Knowledge
Straightforward/Direct	Warm Demanders	Critical View of Knowledge
Signifying	Affirmation of Students' Cultural Identity	Emphasis on Skill Development
Use of Black English Vernacular	High Expectations for Students	Use of Students' Cultural Knowledge
Oral Expression	Emphasis on Collaboration and Collective Good	Universal Literacy
Spontaneity	Learning as a Social Process	Creating New Knowledge
Social Interaction Styles		
Non-Verbal Communication		

Culturally Sensitive Research Framework

Tillman's (2002) culturally sensitive research framework served as an additional theoretical perspective in guiding my research. Culture can be defined as the sum total of who we are. Tillman defined culture as "a group's individual and collective ways of thinking, believing and knowing, which includes their shared experiences, consciousness, skills, and values, forms of expression, social institutions, and behaviors" (p. 4). Embedded within the parameters of this definition is the notion that when research about African Americans is approached from a culturally sensitive perspective, varied aspects of their culture and their historical and contemporary experiences are acknowledged. The individual and collective knowledge of African Americans is then placed at the center of the inquiry.

Tillman (2002) made the point that the culturally sensitive research framework can be used as a lens for examining participants as well as a guide in the collection and interpretation of data. She asserted that culturally sensitive research approaches focusing on African Americans incorporate the cultural standpoints of both the researcher and the researched, and serves as a framework for research design, data collection, and data interpretation. Building on the perspectives of Dillard (2002) and Kershaw (1990, 1992), Tillman outlined a framework for culturally sensitive approaches for research with African Americans based on five tenets: 1) culturally congruent research methods; 2) culturally specific knowledge; 3) cultural resistance to theoretical dominance; 4) culturally sensitive data interpretation; and 5) culturally informed theory and practice. As the researcher, it was important for me to take this culturally sensitive perspective because it allowed me to interpret and validate the experiences of African Americans within the context of this study. These five tenets embody connectedness of the researcher to the research community. The tenets offered me possibilities for "endarkened" (p. 5) perspectives and helped me place African Americans at the center rather than on the margins of the inquiry. The tenets also provide a benchmark against which I could conduct and evaluate my research.

Culturally congruent research methods. Culturally congruent research methods encompass qualitative methods that may include interviews (individual or group), life histories, or participant observations. Based on this tenet I investigated this phenomenon of interest from the cultural standpoints of both the researcher and the researched. The use of interviews expanded my understanding of the participants' experiences because I gained insights about concepts related to African American high

school mathematics teachers and their instructional practices for African American students. The use of both the individual and group interview allowed me to learn about how ***these*** teachers (instead of people in general) thought, behaved, and solved problems. Thus, the interview data provided information about both commonalities among the participants and exceptions to the rule and helped in documenting historical idiosyncrasies as it relates to African American students and teachers.

Furthermore, the group and individual interviews were the most appropriate culturally congruent methods for collecting data from African American participants. Researchers posit that there are definite dimensions of African American culture, including oral tradition and communalism (Berry, 2003; Boykin, 1993, 1994; Ford, 2002; Hale, 2001; Hale-Benson, 1986; Hilliard, 1992). Oral tradition means that a group has a strong preference for oral modes of communication. Furthermore, these researchers contend that African Americans often speak frankly, directly, and honestly and often enjoy playing with language by using puns, jokes, innuendoes, and storytelling. This was quite evident in conversations with my participants, especially during the group interviews. The teachers would often provide data about their students and describe their instructional practices by telling funny stories. Throughout the interviews they provided very direct and honest statements about their issues, challenges, and triumphs. I often heard, "I am just going to keep it real…" or "I don't like it, but I must be perfectly honest with you on this…" or "Our kids can be bad as hell, but I have been successful with them because I…"

Sociologists define communalism as a loyalty to the interests of one's own ethnic group rather than to society as a whole. The participants' sense of communalism toward

each other, their students and me was evident throughout the research and was expressed during the group interview as they made evident their desire to improve education for "their babies" (African American students) as well as their dedication to work together to tell 'our' story of Black education as we had experienced it. Communalism in the African American culture is exhibited by a preference for a social or group assembly. Thus, the group interview method is congruent with this African American cultural characteristic. The group interview allowed the participants and me to gather and socialize in a way that was quite conversational, and it appeared to be most preferred by the participants. After the group interview, they commented that "We should do this again sometime: this was fun." They even talked more openly and elaborated much more intensively in the group interview than they did in their one-on-one interviews.

Culturally specific knowledge. A culturally sensitive research approach finds value in the ***culturally specific knowledge*** that both the researcher and participants bring to the study. Using the culturally specific knowledge and "the particular and unique self-defined (Black self-representation) experiences of African Americans" in the research process positions the experiential knowledge of African Americans as legitimate (Tillman, 2006, p. 6). The use of culturally sensitive research approaches in research focusing on African Americans allows the use of the cultural knowledge and experiences of researchers and their participants to inform the design of the research as well as in the collection and interpretation of data. Tillman noted that this argument raises the question of who should conduct research in African American communities; however, she does not suggest that a culturally sensitive research approach for African Americans is the exclusive domain of African American researchers.

This tenet provided license for me to use my own cultural knowledge, same-race perspectives, and insider and outsider knowledge and perspectives related to the research process to enhance data collection and analysis. Carefully considering the extent of my own cultural knowledge, I was committed to my responsibility as the researcher to maintaining the cultural integrity of the participants and other members of the community. Because I shared the same race and cultural affiliation as the participants in this study, I was able to invoke my indigenous-insider knowledge during this study. Banks (1998) described an indigenous-insider as an individual who:

> …endorses the unique values, perspective, behaviors, beliefs, and knowledge of his or her indigenous community and culture and is perceived by people within the community as a legitimate community member who can speak with authority about it. (p. 8)

Because I situated myself as an indigenous-insider researcher, my insider-knowledge enabled me to relate to and understand particular behaviors and attitudes of these teachers, their students, school norms, and district challenges. As an African American teacher who taught mathematics to African American high school students and as one who was previously employed in the same school district as the participants, my culturally specific knowledge and experiences helped to shape the study and influenced my relationship with the participants and the interactions we had over the course of the study. For example, when participants were asked to describe particular dynamics of their schools and their perspectives on new district changes, I could identify with specific school norms and current mathematics curriculum changes that were underway. I believe that this insider knowledge gave the participants a sense of my empathy and

understanding of their situations as well as telling them that I could relate to the new curriculum challenges and new pedagogical expectations now to be implemented. As a result, I believe that the participants were willing to be extraordinarily open and honest with me throughout the data collection phase of the study. This openness placed a particular burden on me as the research because I wanted to authentically portray participants' experiences in my data reporting, but I also felt an allegiance to these participants and an obligation to "protect" them in some way. For instance, these women were all highly educated, but in our conversations they would sometimes slip into using African American vernacular. Thus, I had to make a choice in my data reporting about whether to paraphrase what they had said or whether to quote them directly. Quoting them directly lent an air of authenticity to the data reporting but ran a risk of others seeing my participants as potentially less educated or professional because of the language they chose to use. In general, I chose to use direct quotes to report my participants' data because I believed that telling their stories in their words was most consistent with the aim of my study.

Cultural resistance to theoretical dominance. Cultural resistance to theoretical dominance**,** the third tenet of a culturally sensitive framework, points out the unequal power relations that may minimize, marginalize, subjugate or exclude the multiple realities and knowledge bases of African Americans (Tillman, 2002; Reed-Yeboa, 2007)). In culturally sensitive research the cultural standpoints of those persons who experience the social, political, economic, and educational consequences of unequal power relations are privileged over the assumed knowledge of those who are positioned outside of these experiences.

I operationalized this tenet by not going into data collection and analysis with an a priori framework. Rather, I read transcripts of the interviews and noted recurring themes in the participants' words. From there, I applied notions of warm demander pedagogy and culturally relevant pedagogy to describe what my participants said. Because I drew on the culturally specific knowledge of African American teachers rather than relying on dominant theories about effective teaching of African American students, the participants were able to articulate their own theories based on their particular circumstances and experiences. By presenting the perspectives of African American secondary mathematics teachers who have traditionally been excluded from mainstream research, I am challenging dominant theories and adding new ideas.

Culturally sensitive data interpretation. Culturally sensitive data interpretation as suggested by Tillman (2006), is a unique component of a culturally sensitive research approach that validates "African American experiential knowledge as legitimate, appropriate, and necessary for analyzing, understanding and reporting data" (p. 270). It identifies "analysis and presentation that is appropriate to the research topic, and the individual or group under study is co-constructed. Storytelling, family history, biographies and narratives, as well as other forms of data presentations may be used" (Tillman, 2006, pg. 270). This allows the research to be presented from the self-defined perspective of African Americans. For example, Bloom and Erlandson (2003) used extensive interviews to document the perspectives of African American female principals in urban schools, while Walker (2003) conducted interviews with an African American principal in the South and used a narrative format to tell his story. The knowledge of the participants was placed at the center of inquiry rather than on the margins, and their

interpretations drew on the cultural standpoints and the particular experiences of African American principals in particular circumstances.

In my study the use of interviews, individual and group helped to capture a true understanding of the teacher's viewpoints because the interviews allowed the participants to tell their individual and collective stories. I used storytelling as the initial format for reporting my data because I wanted to give voice to the African American teachers with whom I worked. Their testimonies will expand the narrow lens through which African American teachers and students have historically been viewed. Ultimately, I reframed my data presentation to be less story-like and more in the vein of traditional scholarly writing. However, I used the storytelling format to introduce my participants in Chapter 3 and I continued to include portions of transcript from the interviews to give readers a more direct sense of the participants' experiences and views.

Culturally informed theory and practice. Culturally informed theory and practice, the last of the five tenets relies suggest that the researcher must rely on participants' perspectives and cultural understandings of the phenomena under study. Doing so helps to establish connections between espoused theory and reality and allows the researcher to generate new theory based on participants' perspectives. This research method can also lead to the development of theories and practices that address the culturally specific circumstances of African Americans. Again, African Americans are placed at the center rather than on the margins of the inquiry, and this method allows researchers to situate themselves based on their own cultural knowledge. Researchers use culturally informed knowledge to propose educational change and help establish meaningful relationships between themselves and the non-academic community. For

example, Dunbar (2001), in a study of African American male adolescents in alternative educational settings, used his findings to conduct further research and generate new theories that would promote educational change and help establish meaningful relationships between himself as a researcher and school systems. The cultural knowledge of African American male adolescents enrolled in an alternative school informed Dunbar's understanding of how Black male youth are affected by social, political, and economic forces. The students understood their uneasy status in American society, and as a researcher, Dunbar used his particular knowledge of being Black and male to investigate the lives of students who had experienced academic and discipline problems in traditional school settings. Dunbar placed the students' knowledge at the center rather than on the margin of the inquiry in an attempt to understand issues that affect Black men in today's society. He also sought to understand the institutionalization of alternative schooling as a way to socially and racially isolate particular groups of students.

While building new theory was beyond the scope and aims of this study, the data that I gathered and my analyses could be used in the future to build theories about teaching African American students that are informed by practice. By sharing the experiences of African American teachers, their teaching practices, and their rationale for these practices, I am providing a window into a particular slice of mathematics teaching. The view afforded by this window, taken together with other research in similar settings, could be used in the future to inform the development of more detailed theories about how warm demanders use their pedagogical styles to foster student success and to advance the development of the theory of culturally relevant pedagogy.

Chapter 3: Methodology

This research study was designed to understand how effective African American high school mathematics teachers describe their instructional practices for African American students, the extent to which they reference their students as learners of mathematics, and the role race and culture play in influencing their instructional practices. Basic decisions were made concerning how the data were to be obtained, classified, and presented. These decisions were directed by specific criteria, the major ones being appropriateness, fit between the design and the theoretical frameworks, the nature of the research questions, and the context in which this particular investigation took place. The following sections provide an overview of the methodological foundation of this study. I describe qualitative research, a culturally sensitive research framework, and why this approach was most applicable to the study. Also provided is a detailed account of the site and selection of participants, instrumentation, how data were collected, coded and analyzed, and a summary of the research design.

Design

After considering the research questions and the nature and context of this study, I chose to employ a qualitative design and approach the research from a culturally sensitive research perspective. I used Linda C. Tillman's culturally sensitive research approaches and culturally relevant pedagogy to guide the development of the theoretical framework. Tillman's culturally sensitive research framework is a qualitative approach with five

basic tenets for conducting culturally sensitive research in African American communities as discussed in the previous chapter.

Qualitative Research

Shank and Villella (2004) describe qualitative research as a lantern used to illuminate dark areas so that we can see. It was my hope that this study would shed light on how effective African American high school mathematics teachers describe their instructional practices for African American students. "Qualitative inquiry deals with human lived experience. It is the *life-world* as it is lived, felt, undergone, made-sense of, and accomplished by the human beings that is the object of study" (Schwandt, 2001, p. 84). It is interpretative and provides an opportunity for people to talk about ideas and feelings in their own language or to be observed by the researcher for their meanings and relationships. Conrad, Grant and Lattuca (2001) view qualitative research as "a set of distinctive procedures for, and perspectives on, the collection, analysis and interpretation of descriptive data" (p. xi). It has a multifaceted analytical approach that places major emphasis on inductive rather than deductive analysis, and the findings are grounded in the participants' experiences and understandings (Conrad et.al., 2001).

Gall, Gall, and Berg (1999) support the generally agreed upon idea that qualitative research seeks to understand individuals in their natural state. It was the "natural" state that helped me construct a deeper understanding of the cultural dynamics occurring in the instructional practices of African American high school teachers of mathematics and African American students. Davis (1997) cited human experience as being important to a qualitative study. He related how in-depth reports by those having the experience are the best source of understanding and concluded that experiences cannot be removed from

their context. In a qualitative study, context helps to identify a deeper structure and the common elements in experiences, while also valuing the uniqueness of each person's experience.

In choosing a qualitative design, the nature and context of the study dictated the theoretical framework that supported both components. I wanted to fully capture the range of experiences of African American teachers, to connect with them and their setting, and to understand how certain things happened and how they interpret their experiences. To accomplish this, I used Tillman's culturally sensitive research framework based on culturally congruent research methods, culturally specific knowledge, cultural resistance to theoretical dominance, culturally sensitive data interpretations, and culturally informed theory and practice. Because qualitative research has many methods and no set recipe and culture was central to the research question and the context of this investigation, a qualitative design best fit the nature of the study.

Site of Research and Participant Selection

Site of Research

The research was conducted at two public high schools located in a large metropolitan school district in the southeastern portion of the United States. Using the state's Department of Education website as a source, I chose this district based on the following criteria:

- High schools where African Americans made up more than 90% of the student population and at least 60% of school faculty.
- High schools with 50% or fewer of their students coded as economically disadvantaged.

- High schools that had attained state AYP (adequate yearly progress) for three consecutive years (2003-2006).
- High schools with 90% of their students meeting or exceeding the standard on the mathematics graduation test.

There were two schools, Strathmore High School and Radcliff High School (pseudonyms), from the chosen district that met all of the above criteria. These criteria were chosen for a number of reasons, the primary one being that middle class and successful African American students are rarely studied. In particular, by situating my study in schools with small numbers of students living in poverty, I sought to examine effective instructional practices that eradicate differences in mathematics achievement between middle income minority students and their middle class peers.

Strathmore High School. Strathmore High School was the largest high school in its district located just outside a large metropolitan city in the southeastern part of the United States. The school opened in 1996 and consisted of a 5 acre facility located on 40 acres of land. The school population at the time of data collection was 2, 313 students and 116 teachers. The student population was 97% African American, 1% Hispanic, and 2% Multiracial. 43% of the student population was considered economically disadvantaged. The teacher population was 77% African American, 14% White, 3% Hispanic, 2% Asian, 1% Native American, and 3% Multiracial. At the time of data collection Strathmore High School had just acquired the distinguished status based on making AYP for three years in a row. The percentage of Strathmore students who met or exceeded standards for the state's mathematics standardized test was 92.81%.

Radcliff High School. Radcliff High School was considered to be one of the larger high schools in its district located in the same city as Strathmore High and only about 5 miles away. The school was built with a windowless construction in 1975. The idea was to build the school without any main windows on the exterior of the building (except for in the main common area) for energy saving purposes during the "energy crunch" of the mid-to-late 1970s. The school population at the time of data collection was 1,564 and 83 teachers. The student population was 97% African American, 1% Hispanic, 1% White, and 1% Multiracial with 48% of the student population considered economically disadvantaged. The teacher population was 79% African American, 19% White, 1% Hispanic, and 1% Multiracial. At the time of data collection Radcliff High School was also deemed a distinguished school based on making AYP for three years in a row. The percentage of Radcliff high school students who met or exceeded standards on the state's mathematics standardized test was 92.48%.

District's Mathematics Curriculum

It should be noted that at the time that the data collection began, the state was undergoing implementation of a new curriculum in mathematics. The district was moving from what was known as the Quality Core Curriculum (QCC) to a new mathematics curriculum based on performance standards. The new math curriculum was more closely aligned to the standards of the National Council of Teachers of Mathematics, the American Statistical Association, Achieve, and the College Board, including the New SAT. Implementation had not begun at the high school level at the time of data collection, but each of the teachers was participated in new curriculum training. In fact, two of the participants were responsible for attending all district

trainings on the new mathematics curriculum and re-delivering training to their respective departments.

Participant Selection

Four participants were selected using a variation of Foster's (1990) "community nomination" method. Rather than rely on community members to identity successful teachers of African American children, I solicited what I call "school community nominations." The school principals, assistant principals of curriculum and instruction, and the mathematics teachers from each participating school were asked to complete a nomination form identifying successful teachers during the fall semester of the school year. The teachers chosen to participate in this study were teachers considered to be successful or effective teachers because they were mathematics teachers who taught during the specific time that their schools met the following criteria:

- High schools that had attained state AYP (adequate yearly progress) for three consecutive years (2003-2006).
- High schools with 90% of their students meeting or exceeding the standard on the mathematics portion of the graduation test.

The school principals and assistant principals of curriculum and instruction were given the nomination and informed consent forms (Appendix B) in person. I arranged a meeting time with the mathematics department chairpersons to distribute consent forms (Appendix E) and nomination surveys to mathematics teachers during a department meeting.

The nomination forms were collected and examined to determine those teachers who appeared on all three lists. Two African American teachers whose names appeared

most often from each of the two participating schools were then asked to participate in the study. I sent an e-mail to each teacher and then placed an invitation letter in each of their school mailboxes (Appendix H) requesting their participation. Once the teachers agreed to participate in the interviews, they were given consent forms detailing the remaining research intentions (Appendix I). Four female participants, Dee Johnson, Camille Jones, Joy Love, and Louise Lee, agreed to participate in this study. Background and introductions for these four participants are given later in this chapter.

Data Sources

Having previously taught in the district for eight years, I was very familiar with this school district and the larger community. My familiarity with the district and community also helped to improve access, establish rapport, build trust with the participants, and enable more meaningful dialogue. Although there was some level of rapport with the participants due to my previous association with the district, I recognized that a level of trust had to be gained in order for the participants to be open and honest in expressing opinions and personal perspectives on teaching and learning.

The importance of establishing a positive relationship with the participants prior to the interview process has been well documented in the literature (Bogdan & Biklen, 1992; Glesne, 1999; Rossman and Rallis, 2003). Bussey (2007) echoed other scholars in the field noting that trust, rapport, and communication can more easily be built into the study when the researcher is viewed as an insider rather than an outsider. As an African American, and having had previous experience with the district, I brought to the research what Tillman referred to as *culturally specific knowledge* and was committed to maintaining the cultural integrity of the participants and other members of the

community. I believe this allowed me to be viewed as an insider and to establish the trust necessary to collect authentic data.

There were three sources of data collected for each of the four participants: (1) two individual interviews and one group interview, (2) a lesson walk through, which took place during the second interview, and (3) my field notes taken during the interviews. All interviews were audio taped and transcribed by me. Each data source is described below.

Interviews

Individual Interview. Two individual interviews were conducted with each of the four participants. These semi-structured interviews included open-ended questions and prompts designed to encourage the teachers to talk freely about mathematics, mathematics teaching and learning, and issues of race and culture (Appendix J). The first interview took place at the beginning of the study to collect background information about the teachers' educational experiences, mathematical beliefs, their students, and a description of a typical day in their mathematics classrooms. Data captured from the initial interview were used to formulate new questions for subsequent interviews. These subsequent interviews provided me with a better perspective of how the teachers described their roles as teachers of mathematics and reflected on their instructional practices. In particular, the second interview focused on ways in which the teachers related to their students, ways they linked mathematics to students' experiences, and the perceived constraints and pressures imposed by school and district curriculum requirements. Additionally, some interview questions focused on the teachers' views about their overall teaching experiences and how issues of culture and race influenced

their instructional decisions. All interviews were conducted in a distraction free environment. During this second interview, each teacher conducted a "walk through" of one lesson previously taught or one that would be taught.

Group Interview. A *group interview* was conducted with all the participants at the end of the study. The group interview provided teachers with opportunities to reflect together about their mathematics teaching experiences and their students. The intent of the group interview was "to encourage discussion and the expression of differing opinions and points of view" about mathematics teaching and learning for African American students (Rossman & Rallis, 2003, p. 193). Bogdan & Biklen (1992) noted that "when reflecting together on some topic[s], subjects often can stimulate each other to talk about topics" (p. 100) to which they would not otherwise contribute. The group interview "technique assumes that an individual's attitudes and beliefs do not form in a vacuum: People often need to listen to others' opinions and understandings to clarify their own" (Rossman & Rallis, 2003, p. 193). In particular, the group interview questions (Appendix K) focused on the teachers' views about their overall teaching experiences, how issues of culture and race influenced their instructional decisions, and their thoughts about the black-white achievement gap.

Lesson walk throughs. The lesson walk through took place during the second interview. It should be noted that the lesson walk through was not initially apart of my original data sources. But, I discovered during the first interview that when teachers described a typical day of their teaching, their descriptions were more about their general pedagogical practices. For instance, a teacher might say "I give a sponge, we may go over homework, we do a discovery activity or I lecture, I ask lots of higher level

questions." Thus, one day when I was in one of the teacher's rooms, I noticed she had her lesson plans with detailed notes (start with this question, don't forget to remind them of …) on her desk, and I realized that talking through a lesson plan would be a better data way to help the participants articulate their actual mathematics teaching. In addition, from my own experience when I worked in the district, lesson plans were required to be available for department chairs and any visiting administrators to view, and teachers were required to submit them weekly. I remember that I actually wrote quite detailed plans when I taught, and I remembered a lot of the mathematics teachers, whether novice or veteran, did similar versions themselves. Thus, I knew that the teachers would have lesson plans easily available and would not have to construct one for purposes of my interview. So, prior to the second interview I told the teachers that I would like them to walk me through a lesson that they had previously taught or that they were planning to teach that particular week. In addition, I asked them to bring a copy of their lesson plans or notes with them if possible as well as any other artifacts that wanted me to see. The lesson walk throughs provided a lens that helped me examine and detail the specific pedagogical choices that guided their actual teaching of the content. It can be described as participants using their lesson plan templates, planning notes, and/or other handouts to voice what, how, and why they were teaching a particular topic, component. The purpose of the walk through was to help the participants describe and formulate their thoughts of how and why they made specific mathematical pedagogical choices for particular topics and classes.

I did not use prescribed questions for the lesson walk throughs; instead, I asked teachers to first provide an overview of the lesson, including the objective(s) that would

be covered, materials and handouts that would be used, formative and summative assessments employed, and to describe why they chose to teach the lesson in this way. Next, I asked the teachers to "walk me through" the actual lesson. At first this proved to be difficult for the teachers because the teachers identified me as one that shared both a culturally specific knowledge as an African American teacher and one that shared mathematical knowledge. So often they would say "You know how our kids are;" or "You know what I mean; they always forget to multiply each term by the number in front of the parenthesis." So, I then asked the teachers to pretend I was the class or a student and "act out" the lesson as if I were the student. The lesson walk through, detailed planning notes, lesson plans, worksheets, and my field notes taken during the walk through were all analyzed and typed as a detailed account summarizing each participant's data sources and responses.

Field Notes

As part of the interview protocol, I developed a form to keep track of field notes from the interviews, the lesson walk throughs, and my personal thoughts throughout the study. I wrote down key words, phrases, and detailed notes documenting participant mannerisms (verbal and nonverbal), emerging themes, pedagogical concerns, etc. Glesne (1999) stressed the importance of using field notes to keep track of pertinent information of this kind, and she recommended that the researcher complete notes in a timely fashion after data collection has occurred, stressing the importance of using descriptive words and the importance of using field notes to keep track of important information related to the analysis of data. Therefore, after each interview, I typed detailed notes from the interviews and attempted to summarize participants' responses soon after data collection.

In addition, I enlisted invaluable assistance from friends and colleagues to interpret these field notes to check my perceptions. Lincoln and Guba (1985) suggest that enlisting an outsider to "audit" fieldwork notes augments the trustworthiness or validity of the research (as cited in Glensne, 1999). Thus this strategy assisted me in performing a robust and valid analysis of the collected data.

Analysis

A separate set of analyses was conducted for each of the four teachers in the study. I used the two theoretical frameworks described within Chapter Two to analyze my data. Tillman's culturally sensitive research approach and Ladson-Billings culturally relevant pedagogy were used for analysis, interpretation, and reporting of the data. Data analysis took place using the general inductive method of analysis (Thomas, 2003). First, the transcripts from the set of interviews were analyzed using the general inductive approach and visual inspection to determine particular themes and categories that met the specific objectives of the study. Second, the teacher's walk through was analyzed using general induction to determine particular themes and categories that met the specific objectives of the study as well as to provide a summary of the teacher's descriptions of her mathematical pedagogical choices. In addition, the teacher's lesson plan notes and any other artifacts provided during the lesson walk through were analyzed by visual inspection to document and summarize the teacher's choice of instruction (for example: teacher/student centered), assessment, materials, and/or activities. Third, the field notes were analyzed by the general inductive method and by visual inspection. In particular, the field notes from the lesson walk through were analyzed to document the teacher's thinking process when planning their daily lessons.

It should also be noted that throughout the entire study, all data sources were analyzed using Tillman's culturally sensitive research methods. In particular, my culturally specific knowledge assisted in the analysis and interpretation of the data by providing a backdrop to the similar cultural and logistical issues these teachers experienced. This included but was not limited to my familiarity with the school district, my own secondary teaching experiences, and my experience as an African American mathematics teacher who also taught African American students from the same district at Strathmore High School.

The task of analyzing the interviews were guided by what Thomas (2003) described as the general inductive approach. The general inductive approach is "a systematic procedure for analyzing qualitative data where the analysis is guided by specific objectives" (p. 2). There are 5 phases used for inductive analysis:

1. Prepare raw data files ("data cleansing")
2. Close reading of text
3. Creation of categories
4. Overlapping coding and uncoded text
5. Continuing revision and refinement of category systems

I began by "cleaning up" my raw data files by first transcribing and putting all data in a common format (employing the same font size, highlighting interview question, and the participants comments were highlighted in bold, and the interviewer comments were italicized). The next step was "inductive coding began with close readings of text and consideration of the multiple meanings that are inherent in the text" (Thomas, 2003, p. 4). Thus, after each interview, I read the raw text and field notes in detail several times. I listened to the audiotapes while reading through the transcripts of the interviews

to not only check for accuracy but also to fully immerse myself in the data's themes and content.

Next, I created upper-level and lower-level categories. Upper-level or more general categories were derived from the research aims or objectives. For example, starting with the first research question, I examined the interview data to create codes that categorized the ways in which the participants described their instructional practices. Initially five themes emerged: (1) employing strong classroom management (2) caring about and for their students, (3) culturally connected mathematics, (4) knowing their students as African Americans (specific cultural orientations), (5) varying the instructional strategies and curriculum (based on the needs of their students and knowing them as learners of mathematics). The lower level or specific categories are derived from the upper level categories, for example under the theme *employing strong classroom management* there were three lower level categories: 1) being strict/demanding, 2) providing discipline, and 3) establishing rituals and routines.

As suggested by Thomas, the final stage of analysis required continued revision and refinement of category systems by looking for overlapping coding as well as a review of literature. After revisiting the literature on African American teachers, effective mathematics teaching, effective teaching for African American students, and warm demander pedagogy, I applied the notions of warm demander pedagogy and culturally relevant pedagogy to describe my participants' teaching practices. In particular, the initial theme: *employing strong classroom management by being strict, providing discipline, and establishing rituals and routines* was collapsed as a warm demander category entitled: Structured classroom environment. Furthermore, this review of the

literature revealed that the teachers described an ethic of caring that was reminiscent of characteristics of warm demander pedagogy. Warm demanders display an ethic of caring in various ways, which includes *caring about and for their students* and *varying the instructional strategies and curriculum (based on the needs of their students and knowing them as learners of mathematics.* Therefore these two themes were collapsed under the category "ethic of caring."

The remaining initial themes as listed above spoke to the literature on culturally relevant and/or culturally responsive teaching. My participants reacted appropriately in the instructional context by being sensitive to the needs, interests, learning preferences, and abilities of their students. Therefore these teachers employed culturally responsive teaching (Irvine & Armento, 2001). Thus the final themes *culturally connected mathematics* and *knowing their students as African Americans (specific cultural orientations)* were collapsed under the category "culturally responsive teaching." This included the subthemes (a) cultural knowledge and interests of students, (b) prior learning experiences, (c) culture for learning: emphasizing process rather than answer and community. Each of these themes is discussed in the next chapter.

Trustworthiness

Researcher's Subjectivity and Biases

My subjectivity and biases were modeled into the study. In other words, according to Tillman (2002) a culturally sensitive research approach does not assume the position of an objective researcher. In fact, I was a cultural insider (e.g. I was Black, female, and previous district employee as the participants) with indigenous knowledge which was considered to be a benefit to the study. In the culturally sensitive framework

an indigenous-insider's closeness to the subject matter and/or the interviewees is not a threat to the validity of the study but rather a factor that establishes trustworthiness of the data. As an insider, I understood the authenticity of the themes under study—how they emerged from the experiences of the participants. My interaction with my participants—my ways of bonding with them, questioning them, and entering into a dialogue with them were all predicated on my insider's knowledge, which cannot be separated from my prejudices and biases. Thus, Tillman (2002) stated that the indigenous-insider component of the culturally sensitive framework turns what might ordinarily be methodological weaknesses into strengths. However, it was still important for me to make every attempt to minimize my biases and present a fair and accurate interpretation of the data. Therefore, the participants were encouraged to participate in the analysis and interpretation of earlier versions of my findings by reading their transcriptions, case descriptions, and theme categories.

The Special Role of the General Inductive Method

Furthermore, there are some objective methods of establishing trustworthiness within the general inductive method, which, along with the culturally sensitive framework, was part of my methodology.

Thomas (2003) listed the following methods of establishing trustworthiness in general induction: "independent replication of the research; comparison with findings from previous research; triangulation within a project; feedback from participants in the research; and feedbacks from users of the research finding" (p. 7). From this list, I employed comparisons with past findings in order to determine if the themes in my data recurred in similar research, and I shared early drafts of my analysis with participants in

order to determine if the work resonated with their experience. This was done through member checks "with interview transcripts as a method for eliciting further information" (Rossman & Rallis , 2003, p. 69). Initially, I took emerging findings back to the participants for verification and elaboration of my analysis. Thomas (2003) contended that soliciting these stakeholder checks is a procedure that can be used for assessing the trustworthiness of the data analysis.

I chose to solicit my stakeholders after completion of each interview by providing the data to each and requesting her verification of interpretations and data gathered in earlier interviews (Thomas, 2003). Furthermore, Tillman (2002) contended that member checks with stakeholders is a culturally sensitive research approach that positions African Americans' "experiential knowledge as legitimate, appropriate, and necessary for analyzing, understanding, and reporting data" (p. 6). This allows for the "analysis and presentation that is appropriate to the research topic and the individual or group under study [to be] co-constructed" (p. 6). In addition, several current doctoral students and colleagues provided peer reviews throughout the research process.

Ethical Considerations

As a researcher who employed a culturally sensitive research approach, I was "committed to and accepted the responsibility for maintain the cultural integrity of the participants and other members of the community" (Tillman, 2002, p. 6). The teachers' comments are not presented under their real names. However, the teachers were warned that insiders at their schools could deduce their identity, and that I could not guarantee their privacy. Each teacher made an informed decision to go forward with the study regardless of this consideration. However, in an effort to be as diligent as possible about

making it difficult for casual observers to deduce the identity of the teachers, I destroyed all taped audio materials after transcription and otherwise took care not to employ the real names of the teachers anywhere in my notes. Thus, given the existing privacy limitations of the study design, I took whatever steps I could to preserve the anonymity of the teachers.

Limitations to the Study

A limitation of the study is the fact that although I focused on the descriptions African American teachers gave of their teaching practices, I did not observe their teaching. Thus, I do not have a way of verifying that these teachers actually do what they say they do in the classroom. Nor do I have any independent judgment that these particular practices result in improved student learning. However, the purpose of this study was not to evaluate the fidelity of teachers' reported teaching practices with their classroom practice or to evaluate the effectiveness of their practices. Rather, my goal was to give voice to these teachers, to allow them to describe the practices in which they engage that they believe are effective for their African American students.

Participants

In this section I provide a vignette written in first person to introduce Dee Johnson, Joy Love, Louise Lee, and Camille Jones (all pseudonyms) to the reader and to provide an overview of these teachers' personal and professional backgrounds, as well as an overview of their teaching styles. Because I employed a culturally sensitive framework and because I am a researcher who was very much a part of the analysis and interpretation of the data, these vignettes are derived from the conversations with and personal statements given by each teacher during the individual and group interviews.

Dee's Voice

My name is Dee Johnson. I was born in Florida in 1978 and I completed all my schooling in Florida schools. I completed both my undergraduate and master's degree from Florida Universities in mathematics education. My parents divorced when I was in the fifth grade, but both parents were always active in my upbringing. Although, I lived in a predominately African American community, I only attended predominately white schools. I think this is one reason I chose to teach at a predominately Black school. I think it is important that students experience learning from their own race. I know that my students appreciate a teacher who shares some of their same cultural experiences, because I sure would have. Mathematics came easy to me, and I always had a joy for the subject, but I do recognize that most students do not enjoy mathematics, so I try to make it engaging and fun. Plus, I had the support of my parents to do well in school. Even though my parents divorced when I was five, they always invested time and provided resources and experiences to prepare me for success. I remember even in the summer I had a list of books to read and math workbooks to complete. I know that all students don't have this kind of support, so I try to provide extra help before, during, and after school to my students. My parents thought that it was very important for us to be able to do mathematics, because this knowledge could open doors to higher paying jobs like engineering and computer science. So, they were a little disappointed that I chose to be a teacher, but they appreciate my decision more now.

My teaching experience includes a total of eight years at the high school level; five of those have been here at Strathmore High School. Prior to teaching here, I taught at a predominately White school in Florida for three years. Right now, I teach Geometry

classes – two advanced and one repeater Algebra class. My district adopted the block scheduling two years ago, so I teach three 90 minute classes and I have one 90-minute planning period. In Florida we had seven period days, I really prefer block. It gives me more time to be creative and do a lot of discovery learning activities.

Well after leaving Florida, I really wanted to teach at a school serving a population of African American students. I prefer to teach the Black students, my own, I just feel that I can relate to them better and understand the situations that they go through. I think it is important, especially during those high school years to have people who believe in you and encourage you to do well. There are a lot of pressures these days that teens feel compelled to give into. So, I hope that I convey the importance of doing well and the importance of getting your education to my students. Also, it feels good to know that my students see me as an African American who is knowledgeable. At the high school in Florida, it was quite different; it was a surfer city, so the students were surfer dudes. I didn't relate to them and they didn't relate to me. The majority of them had never had a Black teacher before, and if they had it was definitely not a Black female teaching math. In fact, I always felt like I was proving to the students, especially the White males, that I knew my content.

My teaching style is focused on an open and accessible format where students are engaged in an exchange of ideas. I am not at school to be friends with the students; matter of fact I am somewhat unfriendly initially, but my students know that I care about their success and it is important that they know that I am their advocate. This is important to me because although I grew up in a predominately African American community, as a mentioned before my elementary, middle, high school, and collegiate

experiences were dominated by white teachers, and few images of African American mathematicians. That's why I am so proud that despite not having many black role models in the field of mathematics, I have earned my master's degree in mathematics education and I am currently pursuing my Doctor of Education degree in mathematics education as well. I make sure that I not only understand the mathematics content well, but I do what I can to stay abreast of the new teaching theories. Matter of fact, my district is currently adopting the new performance standards curriculum and I serve as a lead teacher who is responsible for re-delivering new strategies and other information as it relates to the new curriculum to their mathematics department.

Joy's Voice

My name is Joy Love. I was born in 1972. I first began teaching at a high school in a little country town in Georgia. At that school, the majority of students were White and the biggest issue on campus for males was hunting. Although, my students had a very different culture than I, I still seem to relate to them and related mathematics to their lives. I have been teaching at Radcliff for six years. Actually, this is my ninth year teaching, boy has time flown by. I currently teach two general level Geometry classes and Algebra I. I didn't think I would like this block scheduling thing, but it really does allow me to develop concepts in more depth and do more engaging activities. I am constantly searching for more innovative ways to teach math. I'm always searching the internet and I attend professional development training in my district all the time, in fact, I have been asked to present several of my lessons at district mathematics workshops. I am always trying to find fun and exciting ways to engage my babies, because most of them initially hate mathematics and they dread ninety minutes of it.

My students need to know how mathematics is relevant to their lives. Although, I have always done well in math, I never really got the connections until I went to graduate school. But, I think I excelled more so, because I was so competitive with my studies, in fact this was the only thing I could outperform my father in, and he was smart as a whip. Actually, he and my mom always reminded us that they were honor students and expected nothing less from me and my younger brother. So, I went on to attend one of the top prestigious historically black colleges and universities (HBCU). Later, I completed my masters in mathematics education at a predominately white university, and finished at the top of my class. This is what I try to tell my students here that it is important that they pay attention and apply themselves, so they can compete in this global technology society. Fortunately for me mathematics, well, it was always easy as one, two, three and I was fortunate enough to have good math teachers growing up and I have to be the same for my students. All my mathematics teachers, until college, were black and this was a great thing to see and experience, heck this is one reason I knew I could be a math teacher, because I saw black men and women doing it and doing it well.

Louise's Voice

My name is Louise Lee. I teach two Algebra II classes and one Algebra II class. I am in my twelfth year of teaching and I am very active in the development of mathematics curriculum. I was on one of the planning committees for our district when our state was deciding to adopt a new curriculum; one that requires the implementation of performance standards. In the past ten years, I have observed significant changes in the school curriculum, in how teachers are required to teach, and in the students themselves. But compared to my schooling, I think we are finally getting to the important components

to teaching mathematics, making the curriculum relevant and applicable to real world experiences. See, I had to work at doing well in mathematics until my senior year in high school. Before the twelfth grade, it was awful because I never participated in class. It was always the teacher giving me something, me remembering it for a test to pass the test and I couldn't…I didn't have good critical problem solving skills. Although, I'd make decent grades, I didn't enjoy my math classes and I surely didn't know why we were doing it, but I just did what I needed to do to try to pass the tests. But, once I got to calculus, my teacher just brought up ways that I could apply what I was learning to real life. We actually built kites. Even though, I can do better, I make a conscience effort to make what my students learn relevant to their lives. Since, I am the department chairperson here at Strathmore, I attend a lot of professional development workshops in our district, right now a lot of them are on standards based instruction and I am learning about performance standards. I must re-delivery to the mathematics department monthly. Even though these re-delivery sessions are after school, I love my colleagues, the mathematics department is predominately black and we always have a great time collaborating together. Actually, teaching at a predominately African American school took a lot for me to adjust to initially, see I grew up in Alabama and all my schooling from elementary to graduate school has been predominately white. I even taught at my high school for three years after graduating from Auburn University, so being around my people was exciting. So for me teaching African American students is what I am meant to do, it is my way of giving back to my community.

Camille's Voice

My name is Camille Jones. I was born in 1980, in Virginia. My earlier years of schooling were in Virginia at all predominately African American schools. I completed my undergraduate and master's degrees in Georgia, in computer science. I currently teach two general level Pre-Calculus classes and Geometry. I started off in the corporate world and I absolutely hated sitting in a cubicle every day, it was just horrible. I wanted to scratch my eyes out. Although, teaching was not my first career choice, I love my new career. I have now been teaching for six years, all of which have been here at Radcliff High. I have always wanted to work with African American students, as I myself came from a school that served African American students and I understand the challenges that we face when we participate in public education. One of the aspects of my own education that stands out is that neither school nor the curriculum was personalized for me. I did love the fact that we had both a predominately black faculty and student population, but it was similar to a factory. Everyone, pretty much learned the same thing: math, science, history and English. I feel that the curriculum reflects the views of the dominant culture, and often our students don't see themselves as relevant to their learning. I was always interested in math when in school, in fact, I obtained both my bachelors and masters degrees in computer science and while I was given the guidance to develop my skills in math, I have observed that many talented students currently enrolled in school are not given this guidance. I do not know whether I would have developed my academic strengths had it not been for placement in gifted programs, and I strive to ensure that all of my students have the guidance they require to develop their own academic talents. I believe that middle school should be the first step in

helping students discover their talents and nurture areas of interest that will benefit them in college and throughout their professional careers. This is why I am excited about the concept of Smaller Learning Communities (SLCs) that our county is trying to implement. So, now students like me who were interested in mathematics and stuff like that will have a place: STEM – the science, technology, engineering, and mathematics academy. One of the underlying principles to (SLCs) is to integrate the curriculum, so that students understand how what they learn in school relates to their career choices.

Chapter 4: Findings

Introduction

In this research study I gave voice to four African American teachers who were identified as effective teachers of African American high school students. Each teacher had a unique method of interaction with students and arranged her classroom in a personalized manner. The strategies that each of these four teachers used when working with students in the classroom demonstrates how she developed a personalized teaching strategy that allowed her to serve as an effective teacher. This chapter is devoted to reporting the four participants' stories of their instructional choices when teaching mathematics to African American students and the reasons given for these choices. The research questions that guided this study were:

1. How do effective African American mathematics teachers' describe their instructional practices for African American high school students?
2. What reasons do effective African American mathematics teachers give for their instructional choices?

The instructional practices described by the participants in my study were consistent with those found in much of the research conducted about African American teachers. Aspects of warm demander pedagogy were the specific teaching practices that each teacher employed. The term warm demander has been used to describe teachers who have been identified as being successful with students of color who communicate warmth and "active demandingness" (Kleinfeld, 1975, p. 327). These teachers believe

that all students should be held to high standards and insist that their students work to their full potential (Vasquez, 1989). Irvine and Fraser (1998) expanded the definition of warm demander to include an effective teacher who is sensitive to the different cultural, social, economic, intellectual, physical, and emotional differences students bring to the classroom. Additionally, warm demanders:

> 1. Perceive themselves as caregivers, parental surrogates, and advocates for their African American students.
> 2. Teach with authority.
> 3. Employ teaching style filled with rhythmic language and rapid intonation with many instances of repetition, call and response, high emotional involvement, creative analogies, figurative language, gestures and body movements, symbolism, aphorisms, and lively and often spontaneous discussions.
> 4. Spend classroom and non-classroom time developing a personal relationship with their children, and often tease and joke with their students using dialect or slang to establish this personal relationship.
> 5. Use students' every day and historical experiences in an effort to link new concepts to prior knowledge (p. 3).

The work from Fanita Ware (2002) expanded the warm demander description to include actual accounts of how two elementary teachers incorporated warm demander pedagogy in their classrooms. From observing these teachers Ware developed the characterization of warm demanders as authoritarians and disciplinarians; warm demanders as caregivers; and warm demanders as pedagogues. In this study, I provided further data that supports the notion that the warm demander pedagogy used by African

American teachers. My study provides specific and contextual examples of secondary mathematics teachers who were warm demanders.

Although I have presented my research questions as two distinct areas of inquiry and I present the results separately below, the questions and the responses are highly interconnected. My participants were very reflective, thoughtful, and intentional in their interviews, and thus their descriptions of what they do in the classroom and why they do it were intertwined. This consistency stands in contrast to many other studies that show a disconnect between what teachers say and what they do in the classroom. Because of the consistent and interconnected nature of the participants' responses, I present the bulk of my data in response to the first research question below. I then provide a brief response to the second research question by pulling out some of the implicit rationales provided in the section on the first research question.

Research Question 1

The first research question of this study was: *How do effective African American mathematics teachers' describe their instructional practices for African American high school students?* As the teachers shared their experiences, three themes emerged that provided descriptions of how they incorporated warm demander characteristics in their pedagogical practices for African America students: (a) they provided a structured classroom environment; (b) they displayed a caring ethic; and (c) they incorporated culturally responsive teaching strategies. It was also evident that there was substantial interconnectedness among these three themes, suggesting that warm demanders are able to blend multiple strategies to create an effective classroom environment.

The following sections provide detailed descriptions of the instructional practices described by the participants, organized around the three themes identified in the previous paragraph. The first two themes or categories coincide with existing literature on warm demander pedagogy. Much of the data in these two sections did not lend themselves to specific examples of mathematics instruction but were more related to general pedagogy. However, these findings offer a perspective on how these mathematics teachers used warm demander pedagogy as a prerequisite for the effective teaching and learning of mathematics. For these teachers a structured classroom environment, a strong ethic of caring with their students, and other warm demander characteristics provided the context for incorporating culturally responsive teaching strategies for enhanced mathematics achievement.

Structured Classroom Environment

All four of the participants acknowledged that in order for students to learn and learn effectively there had to be order in the classroom. In each teacher's description of how she managed the classroom, the teacher emphasized order, discipline, and structure. The methods used to implement and maintain order, discipline, and structure differed according to the teacher's relationship to the students, but these criteria were present in each classroom and established on day one of the school year. Each teacher had established routines that were followed each day in class. These rituals not only affected the classroom environment but often began and ended outside the classroom; they greeted their students at the door and welcomed them to class for the day and offered ongoing assistance after class ended. Louise, Joy, and Dee followed up the initial greeting with a little "small talk." Each teacher opened the class with a routine that familiarized the

students with material they had covered the prior day or a problem that would help diagnosis possible misconceptions for the upcoming lesson. This was often given as a warm-up exercise. During this time Dee and Joy stated that they would check for homework or have students display specific homework problems on the board.

Camille explained that the student's connection to the classroom was forged on the strength of routine; these routines and rituals helped students develop discipline and learn self-organization.

However, the structured classroom environment also incorporated punishment when required; all teachers concurred that infractions could not be ignored, as doing so undermined authority in the classroom. Each teacher explained that a structured classroom environment could only be established and maintained by providing discipline and teaching with authority. As Dee noted, "when students are provided discipline and see the teacher as the authoritarian few distractions are evident and learning can take place." It was important to her to establish a discipline plan and strong classroom management on the first day of school.

> At the beginning of the year [I am more strict], when my students first come in and that's just because I want to, you know, have structure in my classroom and let them know what I will put up with and what I won't and after that I start to ease up a little, then they start to see me smile and we have a good time in class…

As an authority figure, Louise expressed similar customs. She felt that a lot of problems could be avoided if she provided structure and routines early in the school year, but she also believed that when a teacher is prepared and incorporates instruction that engages students, discipline problems are minimal.

> I believe that a prepared teacher is ready to meet the needs of her students and must provide an example of control in the classroom. I also utilize multiple teaching strategies in the classroom to ensure that students are always active so I won't have idleness… I don't have a lot of disciplinary issues, because my students know my rules and they know that I will enforce them, I don't have any problems. Some teachers try to befriend students and everyone's roles get confused…I am not saying you can't be friendly, but I have rules...

This sentiment of not befriending students was also a concern for Dee. She had firsthand accounts of teachers who chose to be friends with students instead of providing the structure and discipline students needed.

> Sometimes, well, the negative is if they [teachers] are just trying to be their friend too much. Then the students don't really respect them as their teacher. So when they try to tell them to do something, you know, they want to talk back, or [the student wants to know] why you doing this [disciplining me] or something like that.

Irvine (2003) also found that the African American teachers in her study believed that the relationship between the teacher and the student needed to be established as one in which the teacher had authority. In fact, she found that the African American teachers believed that it is important that they "cared for their students but never relinquished their authority or attempted to be friends of their students" (Irvine, 2003, p. 142).

Louise believed that establishing a structured classroom environment through discipline was considered to be a normal part of her role as "other mother." The establishment of a classroom environment that promoted communalism and fictive

kinships contributed to Louise's students showing respect for her. She stated that they respectful her like a matriarch of the family.

> These students know I don't play, I am like "mama"…I am not going to keep asking you over and over again to be quiet and sit down…also they just respect me like family. I am the parent and they are the children… period point blank.

The teachers admitted that being a teacher who teaches with authority is often perceived as being "mean" to the outsider and even to some students initially. But they confirmed findings similar to Foster's (1991) research; students of warm demanders indicated that they were "proud of their teachers' meanness" (p. 51) and saw it as a way to control the classroom environment and push them to do better and be successful. Thus "meanness" as displayed by warm demanders was seen as a positive attribute to the success of their students. Camille talked about her reputation around her school as being mean and requiring students to work and be organized:

> They usually say… we heard you are cool but you're mean. They normally say that they heard I give a lot of work. I do give a lot of work but I help them and make sure that everybody understands the material. I'm very organized because they have calendars every month and I'll have it months in advance. And I am a stickler for the rules.

The teachers also required structure and routines with mathematics teaching and learning. For example, the teachers felt it was important for their students to show all steps and provide detailed explanations. Louise even required that her students complete board work. She explained that it was important for her and other students to see and assess each other's understanding, so this was not an option for students.

> At the beginning they all say "I'm shy", and I'm like, "No, go to the board. When I say go to the board, you need to go and you need to articulate back to me what you are doing at that board. Now, you go." And some of them, until this day, they will not get up and do anything. They had rather take a zero on an assignment. And do you know what I do? It's okay. I walk to their desk and I'm like, "C'mon, we're going to the board together because everybody is going to learn this today…so what if you make a mistake…you're not shy when you're out there in that hallway talking and you're not going to be shy in this classroom. This always works…other times they may take a partner to the board, but don't tell me no…

Wilson and Corbett (2001) call Louise's insistence a display of the "no excuses" philosophy, which is often a characteristic of a warm demander. Furthermore, "warm demanders care enough to relentlessly insist…that students complete the academic tasks necessary for successful futures" (Bondy and Ross, 2008, p. 55).

The participants in this study believed a structured classroom environment with established rituals and routines led to little or no disruptions to classroom instruction. Teaching strategies that guaranteed minimal disruptions were to teach with authority and provide expectations of behavior and classroom routines early in the year. In the group interview, the teachers talked about how they could just look at their students and bad behavior would end before it really had a chance to get started. Similar to descriptions noted in the literature on effective African American teachers (Foster, 1997; Ladson-Billing, 1994; Noblit, 1993) and descriptions of warm demanders (Irvine & Fraser, 1998),

Dee, Joy, Louise, and Camille were clearly in charge of their classrooms and facilitate classroom instruction with minimum disruptions.

Ethic of Caring

All four participants maintained that a strong positive relationship with their students was at the core of their teaching. A structured classroom environment could not be established or maintained, nor could effective mathematics teaching and learning take place without simultaneously cultivating caring relationships and demonstrating an ethic of caring. Ayers considers the ethic of caring to include more than just a concern for the student but it also means the teacher must have a dedication and concern for the *needs* of students. An ethic of caring is an act of embodying the needs of the whole person as a central concern (Ayers, 2001). The participants supported this notion of care for the whole child and were convinced that if students did not trust that their teachers believed in them and cared for them, any academic engagement, class order, or achievement would be limited. Virtue (2007) concurs that "warm demanders calibrate their expectation to meet the needs of each learner and cultivate interpersonal relationship so students will cooperate when necessary (Brozo & Flynt, 2009, p. 536). Joy expressed this sentiment by noting,

> I have students who do things for me in my class that they don't do for other teachers…they work for me, they study for me and they know that I expect them to behave and learn, because I love them and want the best for them.

The participants enacted the ethic of caring, by first cultivating meaningful relationships with their students. The teachers used various tactics to accomplish this goal. Louise and Joy talked about the importance of knowing each of their students'

names as soon as possible in the school year. They believed that this showed the students that they were important and "worth knowing." In addition, all participants stated the importance of engaging in conversations during, before, and after school to build trusting genuine relationships. For example, Camille, Joy, and Louise attended extracurricular activities that their students were a part of such as sports events and choir and band concerts. Dee spent time before and after school listening to the concerns and personal accounts of some of her students. She discussed how important it was to listen to teenagers during these critical years of their development.

> Teenagers have a lot of peer pressure these days. Some of them feel pressure from their peers and debate doing some crazy things they have shared with me. I mean they tell me stuff they are afraid to tell their parents, but I think if they can see the caring side of me and if they know I care enough to listen to their concerns, then they will begin to care about my concerns in mathematics. I think…the students are more likely to listen and participate because I do show them that I do care about them.

Louise felt that taking the time to listen and learn about her students could also aid in the teaching and learning of mathematics in her classroom:

> Just from having a good rapport with students, they feel more comfortable with me to ask questions in and outside of the classroom, so I know because of the relationship or the rapport that I have with students, I learn about the problems they're facing. Being an adolescent has its challenges…and knowing my students, their strengths and weakness…likes and dislikes helps …so when

> planning for instruction, I'm sitting down at home, okay, I know this person is not going to get this topic so I've got to approach them this way.

All of the teachers commented on the importance of talking with their students about topics other than mathematics, speaking their language and having fun. They often used the beginning of class to "shoot the breeze." Louise, Joy, and Camille followed up their initial greeting with a little "small talk." Often these conversations were about the school's latest basketball game or the current "pop culture" events of the week. Irvine and Fraser (1998) list this as one of the culturally responsive behaviors of warm demanders; these teachers "spend classroom and non-classroom time developing a personal relationship with their children, and often tease and joke with their students using dialect or slang to establish this personal relationship" (p.3).

One reason teachers gave for their successful relationships with their students was that they made it a point to create a sense of family in the classroom. Louise talked about how important it was to create a classroom environment where students felt safe.

> My role as a teacher is to come here every day and get these kids to learn and help them build their critical thinking [and] problem solving skills in spite of all the confusion and temptations that go on all around them, from the top down, from the things that happen in their neighborhood. My job is to come in and make sure that they're safe inside of my classroom and are comfortable in sharing their thoughts and problems about school or home. That it is a learning environment, where they are free to learn and they can speak back to me. Like I make all of my students say something back to me. We don't laugh or ridicule each other. Even for wrong answers.

Joy and Louise recognized that a family ethos in the classroom was something that was often a byproduct of their fictive roles. These two teachers seemed to embrace the role of "other mother" and felt a "mothering" responsibility toward their students. They recognized that their jobs as mathematics teachers reached far beyond the textbook definition of what the traditional role was supposed to be. When Joy was asked how she viewed her role as a teacher, she responded:

> Mother, father, sister, aunt, grocery store, facilitator, counselor, you name it, all the above, president, vice president. Most of all, caring. I can honestly say that my kids will tell you, "She cares about us." And I think because I care they listen. But the role that a teacher is supposed to play, I am far beyond just that role.

Joy further commented that often she needed to step into the parent role when she bought supplies, lunch, and whatever else "her babies" needed.

> One of my students needed a belt and I'm asking "Why don't you go get a belt? He said, "Ms. Love I don't know what size I wear." And I'm thinking. "You're in high school so just go measure; ask your parents." "Well, they work all the time." So, I went and got a belt that week. And last week when we had our end of course test, I called every student and asked their parents "Would you please make sure they are in the bed by nine 9:30?" [And some parents responded] "Oh, for real?" and I'm sitting here thinking, "You don't know what time to put your child to bed?" and that was kind of disturbing. One parent I called it was like a quarter to nine, "Um, wait a minute, let me go get him from outside." At quarter to nine? This child has school in the morning and so upon hearing that, I knew,

> well, Joy, you're going to have to buy breakfast in the morning for these jokers, too, because they're not going to eat.

Louise explained that often the role of "other mother" was just bestowed upon her:

> Even at the predominately white school where I taught, all of the black students naturally ran to me and even here, where it's predominantly black, I am still everybody's mother… "Ms. Lee, do you have lotion? Do you have tissue? Do you have Band-Aids?" I am still everybody's nurturer and mother. And I don't mind, [because] all our students need someone looking out for them.

Although, Camille did not identify as an "other mother," she did think that it was important to be an advocate for her students and look out for their well-being. She remarked that:

> Sometimes I have to be more like a mentor or even guidance counselor, but you have to care enough to do what you have to do. I want to see them succeed. I want to give the students what they need in order to be successful so if I need to meet with you afterschool to give you a diagram of what classes you need to take, if I need to give you the topics that are on that SAT so that you can see how what we're doing in class does relate, if I need to print out the top college ranking so that you can see that there is a difference between places that you are applying I'm willing to do that.

The teachers identified caring as a form of discipline, a theme elaborated earlier in this chapter. They viewed discipline as necessary but also as a way that caring could be expressed. Louise stated, "Teachers who don't care about their students let them 'chill' and don't have expectations for their behavior or work ethic." Joy said, "Hell, if I didn't

care about my students, I would let them run amuck and chill all day with worksheets, but instead I keep an orderly class and I organize lessons that keep them engaged."

Embodying an ethic of care for these participants meant teaching and learning about the whole child. As caregivers, Dee, Joy, Louise, and Camille learned about and cared for their students. They established caring communities within their classrooms by establishing nurturing relationships during, before and after classroom time. They provided discipline through care and often viewed their roles as more than teacher, extending to counselor, advocate, and sometimes surrogate parent.

Ayers (2001) and Noddings (1988) believed that this type of ethic of caring guides instructional and moral decisions in the classroom. Teachers who exhibit an ethic of caring in the classroom are concerned with not only what their students need but also how their interests and culture can be used to create caring communities that can help facilitate learning. These participants were warm demanders who established caring communities within their classrooms and used this as a spring board for mathematics teaching and learning which is a component of culturally responsive teaching.

Culturally Responsive Pedagogy

Warm demanders are culturally responsive teachers (Ware, 2006). Geneva Gay (2000) defined culturally responsive teaching as "using the cultural knowledge, prior experiences, and performance styles of diverse students to make learning more appropriate and effective for them; it teaches to and through the strengths of these students" (p. 29). Teachers who are culturally responsive are "sensitive to the needs, interests, learning preferences, and abilities of their students" (Irvine & Amento, 2001, p. 4). As each teacher in this study described her instructional choices during her lesson

walk through, she demonstrated culturally responsive characteristics in various ways. Each teacher was very aware of her students' needs as learners of mathematics and sensitive to the learning preferences often identified as effective for the African American learner.

Cultural Knowledge and Interest of Students

Knowing their students as learners of mathematics was critical to the instructional decisions for these teachers. As noted above, they demonstrated a caring ethic and high expectations and used these as catalysts to jump start learning for many students who were often apprehensive and lacked confidence as mathematics learners. The teachers believed that one way to ease students' tension and make mathematics learning interesting was to link lessons to the interests and prior experiences of their students. Thus, the subtheme of mathematical *relevance* was prevalent in the interviews of all four teachers. The teachers believed that the core curriculum was separated from the students' lived experiences, and that the students could not relate to what they learned in school on an emotional level. To integrate students in the classrooms, all teachers felt that the lessons needed to touch on students' everyday experiences and interests.

Dee explained that making reference to the hobbies and interests of teenagers kept them engaged and made mathematics relevant. She stated, "I do try to make it [mathematics] relate to them or something that [they] will have some interest in when I am designing some things [lessons]." For example, she used the students' cell phone bills to teach a lesson on rate of change by having students determine the linear equation that represented the cost function for text messaging. Camille discussed a lesson she taught in geometry in which she talked about the diameter of the "DUBS" of a "PHAT"

BMW. She said she often hears the young men talking about "riding on "twenty-twos," but they didn't even know what it meant (DUBS refers to the diameter of rims. It is often referred to in rap songs and by rappers)."

In an example that Dee provided, she acknowledge her students' personal cultural knowledge and used a cultural construct that was more familiar to her students when she taught a lesson on probability. She said "I used to play Skunk, but my students, especially the boys didn't relate." SKUNK is a variation of a dice game also known in some communities as "pig" or "hold'em." The object of SKUNK is to accumulate points by rolling dice. Points are accumulated by making several "good" rolls in a row but choosing to stop before a "bad" roll wipes out all the points. It is a game that can be played by groups, by the whole class at once, or by individuals. Dee explained,

> When my students, especially the boys come to class and see dice most of them think about and ask "Are we playing craps?" They mentioned some game about rolling 4-5-6. So, when I do this lesson, we discuss SKUNK, "pig," and craps. We learn how to determine the probability of rolling 1-2-3 versus 4-5-6…this lesson really leads us to issues of gambling, the realities of the odds of winning the lottery and stuff like that.

Dee's example provides further insight to how she showed appreciation for students' personal cultural constructs and used this "to bridge the gap between what students know and the new knowledge they need to master" (Irvine, 2003, p. 68). In addition, she used this lesson as an opportunity to discuss with her students a real-life social issue that often plagues many Americans and often those from African American and poor communities—gambling.

All teachers talked about rewording problems in the textbook or creating problems that used a cultural construct that was common in the Black community. Joy referenced a lesson she planned and part of the lesson allowed her students to play spades, when teaching integers and probability lessons. Students were required to take score, which often involves negative numbers when a team does not make their "books." She describe another lesson where she used a deck of cards to discuss the probability of pulling various suits (hearts, clubs, diamonds, or spades).

Louise and Joy often employed the use of popular music to learn algorithms; they would have students create their own rap lyrics to show how their talents and interest in music could aid in their learning.

Joy used a popular song*, The Electric Slide,* which is a song often heard at family reunions and wedding receptions in the Black community, to help students connect the lyrics to the algorithm used for solving one step equations.

> The variable and the numbers on both sides of the equation, that's the Electric Slide..think about it. When you're trying to move the variable from one side of the equation to the other…*you ssllliiiddeee to the left* (she begins singing). When you've got to move the number to the other side, *you got to slide to the right* (she begins singing). And then you got to bring it down and that's when you go back…and the dip means to divide. So, that's one way. I love old school music, I love music period.

Camille went a step further in several of her lessons. She expanded lessons to include, what Ladson-Billings (1990) referred to as "connecting students' knowledge of self with broader social and political realities" (p. 335). Camille taught juniors and

seniors and felt that real world applications were opportunities to engage her students in discussions to help them think critically and make inferences using data. She gave an example of one lesson with her eleventh grade students about colleges, entrance exams, and grades.

> One example is a statistical analysis that I do and it is basically a chart that gives the data on the percentages and the population of every race in the United States and then it breaks it down by actual careers and most of these careers require a college degree. My students are always talking about which colleges they want to attend, so we used this data to help us analyze their choices and make predictions and inferences about their chances of getting in some of these top colleges. "What do you think needs to happen in order for these to be the same, looking at the percentages of growth?" And so, that way, they can actually analyze and develop ideas about the realities they face using actual data.

Camille seized "teachable moments" to use her students' current concerns as opportunities to learn (Irvine, 2003, p. 67). Conversations and lessons were tweaked to talk about the "real stuff" to help her students. "They need to be aware of the real obstacles they may face when they make uniformed decisions." She said lesson topics range from "college choices, entrance requirements, and percentages of Blacks accepted; home ownership versus apartment living; credit card bills and bad credit; grade point average and income levels."

Louise thought that it was very important to make her students aware of "how mathematics relates to their daily lives… and the African American culture." To

accomplish this goal she had one big project each year that would help expose her students to the contributions that African Americans are making in mathematics.

> They don't know mathematicians who are African American. "What's the importance of math? We're never going to use this", they don't even attempt to try just because of the term 'math'…each year I assign a report, the students had to research African American mathematicians of today. So they had to go online or go to college libraries to look up different dissertations and different things that …math professors who were African American were doing today and how it applies to what's being taught in algebra II or mathematics today… I think it is important to bring in their culture and even other cultures.

As warm demanders, the participants used the cultural knowledge and interest of their students to plan lessons that would motivate and reach their students at a personal level. Each teacher believed that mathematics students often come to the learning environment with anxiety and pre-conceived ideas about mathematics and the difficulty of mathematics learning. Therefore, they believed that it was imperative that they made the mathematics experience in their classrooms relevant and engaging.

Prior Learning Experiences

As warm demanders, the four participants' believed it was important to learn about students' prior experiences and abilities and use this information to aid in the learning process. This included investigating and addressing common misconceptions that students often bring to the classroom from previously taught lessons or from one year to the next.

Teachers address misconceptions anytime they expose, challenge, or discuss common mistakes and misunderstandings held by students. Each participant emphasized the importance of exposing and discussing common misconceptions when teaching mathematics. Dee and Louise discussed how they often used a warm up problem (typically given as students enter the classroom) to diagnosis any errors or common mistakes students may have about a previous concept. Discussions often revealed students' existing ways of thinking which they used as a springboard for the day's lesson.

Camille explained that she would often have students analyze problems that had deliberate errors in the steps or the solution. For example, Camille's lesson walk through was to have the students use right triangle trigonometry and the Pythagorean Theorem to develop the law of cosines formula. She explained some of the prerequisite information students needed to know included how to expand binomials, identify adjacent and opposite angles, and know when and why we use Pythagorean Theorem. One of her warm-up problems for that day attempted to expose the common error students make when squaring binomials of simply squaring each term. The warm-up problem asked students to state whether $(c-x)^2 = c^2 - x^2$ was true or false and to provide support for their answer.

One way that Joy challenged mathematical misconceptions was to have students' complete one task using more than one method if possible and share this information with the classmates. Joy believed that when students were able to see problems worked out using more than one method there was a great probability that some students would have an opportunity to see why their thinking or steps were not correct or justifiable. Therefore, modeled problems afforded an opportunity for students to observe

mathematical steps that would either conflict with how they worked a problem. She believed when students were provided with multiple ways to work problems that this would provide opportunities for discussions and justifications that could led students to understand their thinking and the underlying mathematical thinking required to understand the concept or algorithm. Joy explained,

> I often ask my students to work out a particular problem, but I want them to know if it can be worked out a different way, or if anyone attempted to work it in a different way. Or I have different cooperative groups attempt to do this. When students see on the board the different solving techniques, but the same answer this helps. Or better yet, when a student tries to complete a problem using more than one method and arrives at a conflicting answer this is when the learning begins.

Culturally responsive teachers value the knowledge that students bring to the classroom. They recognize that their students are not "blank slates" and they view teaching as "pulling knowledge out" (Ladson-Billings, 1994, p.). Each of the four teachers believed they could not assume students know nothing about the topic they were teaching. Dee expressed her thoughts by saying, "Hey, I at least use the little bit that they do know."

Building on students' prior knowledge refers to using students' previously constructed ideas and realities as valid building blocks for learning. Camille explained how she used the fact that her students knew that multiplication could be described as repeated addition as a springboard to understanding that exponents represent repeated multiplication. They explored the similarities and differences between what they already

knew about the concept of multiplication of whole numbers and their new knowledge of exponents.

As Louise explained her lesson walk through on trigonometric ratios, she talked about the importance of using the students' prior knowledge to teach this lesson and exposing misconceptions. In particular, she explained how she tested students' prior knowledge to help expose whether they had misconceptions about when to apply the Pythagorean Theorem.

> The previous sections the students had been solving 30-60-90 and 45-45-90 triangles; so they had been working with right triangles for the last couple of weeks. So, I gave a warm-up that would review finding missing sides using the rules for these two special triangles. But, I also included one that they could use Pythagoreans' Theorem, and one that they could not use anything that we learned. The problem will have all the sides of a right triangle, and I will ask students how we can find the missing angles. "Could the missing angles be 45 and 45 or 30 and 60 why or why not?" This will be a spring board to understanding another method for finding triangle measurements, called trigonometry.

In addition to building on prior knowledge and addressing misconceptions, the teachers also engaged their students in mathematical discourse that focused on evaluating their conceptual understanding of material. It was important to them to acquire knowledge about their students as learners of mathematics and having their students discuss their thinking in written and verbal form was important.

Culture for learning

Emphasizing Process Rather Than Answer. When each teacher was asked whether she believed she taught using traditional or non-tradition methods, each explained that she used a combination of teaching strategies. They felt that mathematics instruction often required lecturing, modeling, explaining, clarifying, exploration, and problem solving. But all teachers stressed the importance of having students explain their thinking to the teacher and each other.

In the group interview, the teachers emphasized that although correct answers are important for all the "politically" correct reasons (preparing for standardized test etc.), they cared about the process of how their students arrived at their answers and whether they could justify them. They believed this was more important than any answers could provide alone.

To emphasize process rather than answers means that one places importance on the how as well as the what; it helps to highlight comprehension rather than just completion. Each teacher discussed that even when students provided the correct answers to questions, they still require students to explain the process they used and justify their thinking. In fact, Louise described how she often left her teacher's guide on the table in front of the class so that students could use it more as a resource rather than seeing it as this "magical forbidden book" with all the answers that the only the teacher should have access to. For her, this signified to her students to stop focusing on obtaining correct answers and focus more on understanding the mathematical concepts.

Joy said that often her students worked fewer problems than in most conventional mathematics classrooms; this gave her students an opportunity to think about the

problems more deeply and allowed them time to use more than one method to solve the same problem. Joy stated:

> I have my students show their work…I am more concerned with how they got the answers then just getting the right answers all the time. Do they understand the mathematical concepts in a way that they can explain to me or a classmate that may not understand?

Not only did Joy's students work fewer problems, they were often required to work problems using various methods. Joy explained

> I often ask my students to work out a particular problem, but I want them to attempt to work it in a different way, or I have different cooperative groups attempt to do this. When students see on the board the different solving techniques, but the same answer this helps. Or better yet, when a student tries to complete a problem using more than one method and arrives at a conflicting answer this is when the learning begins.

Louise further supported this notion:

> It is important that my students be able to articulate what they are doing and why they are doing the problem a particular way; not only to me, but also to their fellow student. In fact, when they are re-delivering at the board, I ask the class to let that student know if not only the answer is correct, but that the steps make sense.

Community Solidarity. As mentioned earlier, the teachers admitted that they used tradition forms of instruction such as lecturing and modeling, but all emphasized the importance of engaging students in mathematics discourse that required reasoning,

representing solutions multiple ways, and communicating with both the teacher and fellow students. The teachers used cooperative learning groups to allow for these kinds of discussions to take place as well. Knowing their students as learners of mathematics, they believed it was important to establish a classroom environment where students felt comfortable collaborating and learning through social interactions with their peers. Furthermore, Camille stated, "Nobody wants to sit around and listen to me talk all the time."

Louise used cooperative learning strategies to emphasize collaboration and collective good. It was important that her students shared their thinking with each other and she used board work as a means to assess her students' knowledge. It was important that she cultivated a sense of communalism and interdependence within her classroom; she stated that her classroom was like a family and the students knew that "we are all in this together." So, her students were responsible for each other's learning and showing their support for each other could be demonstrated by working problems together at the board or during cooperative groups.

> The students know I don't play that…laughing and teasing a student about what they don't know is not an option. In fact, when I do group work the students understand if one person in the group doesn't understand, then none of us understands…I do this during peer tutoring also… I don't focus on grades…and they know this. The important thing is that everyone in the group, in the class understands and it is your responsibility to make sure that happens. And when students understand that, they take it personally when their follow classmates don't get it.

Camille and Dee challenged their students to defend and debate solutions presented by her or other classmates. Dee believed this made for lively discussions and challenged students' thinking. Camille explained:

> I like to get them riled up sometimes, especially someone who just knows that they have the answer right. I won't tell them "yey or nay", but instead, I ask the class, "Now based on what Lemar said, is that right, is that the best way to do it, is that the way you did it." They get to debating and learning at the same time.

Camille stressed the fact that her students were too "teacher dependent" and that they were always looking for her to provide the right answers. Cooperative learning served as a time that she required students to explore and work together to learn material.

> Well, certain questions that I know that they can answer and figure out, I don't answer for them. I give them hints and go all around the world, but they are going to have to give me that final answer or work with their group members. I think by just answering their questions out right all the time that is pacifying them and making them dependent on you. Whenever I can give them an opportunity to problem-solve and critically think I attempt to do that.

Summary

The participants described their instructional practices in ways that fit the literature on warm demanders and culturally responsive teaching. In addition, they emphasized specific strategies such as building on prior knowledge, addressing misconceptions, and focusing on process rather than answers as ways to elicit mathematics understanding.

Each of the participants believed that caring for her students was important to the learning process. Some exhibited caring by being an advocate and others as parental surrogates. All teachers manifested a caring ethic as a no-nonsense tough teacher who expressed high expectations and a sense of family. Overall the teachers believed that to show that they cared for their students was essential to the learning process.

Participants also believed that having authority provided structure to the learning environment, and as Joy stated this was also a way that students knew she cared. In other words, teachers do not discipline and reprimand students unless they care about the students. Also, having a disciplined and structured environment was necessary to learning. The teachers did not struggle with classroom management because often they implemented their rules and routines as early as the first day of school.

As these teachers described their instructional practices, it became evident to me that as pedagogues they implemented various instructional strategies that were culturally congruent to that of African American students. In the next section, I answer the second research question and I will elaborate on the teaching strategies that were culturally congruent learning preferences of their students.

As mentioned earlier, cooperative learning was one teaching strategy that was used to aid in the learning process, and it has been identified as a culturally congruent learning preference for students of color (Berry, 2003; Boykin, 1986, 1994; Boykin & Bailey, 2000; Johnson & Johnson, 1991; Slavin & Oickle, 1981). The teachers used it to help build a sense of communalism and interdependence among students. It was incorporated to teach responsibility and aid the class community in a social interaction that emphasized collaboration and collective good for all learners. All the teachers spoke

of incorporating cooperative groups, but Louise and Camille seemed to really establish the sense of interdependence among students. The teachers said that students relied on each other for support and took responsibility for each other's learning.

In addition, the teachers encouraged classroom discourse that was lively and student led. It was important to make mathematics learning relevant to the lives of their students and their students' prior experiences. As most verbalized, many students come to mathematics classrooms with low self-esteem and anxiety, so making mathematics concepts familiar and relevant was important. In addition, the teachers made sure to build on the prior knowledge of their students as a way to help bridge the gap of insecurities their students had about mathematics.

Although most of the teachers admitted to teaching using direct instruction, these warm demanders used teaching methods that employed a blend of warm demander pedagogy and mathematics teaching that required students to communicate, justify, and reason. Their students had to justify answers and the participants were very clear that students knew the importance of de-emphasizing correct answers and focusing on the processes they used to acquire answers.

Overall, the teachers' instructional practices could best be described as warm demanders who were seasoned pedagogues who provided a structured learning environment. They displayed a caring ethic and implemented culturally responsive teaching that included using their students' cultural and prior knowledge as well as their interests and experiences. The classroom was a forum for community solidarity that emphasized collaboration and collective good for all learners as well as mathematics learning that promoted reasoning, communication, and problem solving.

Research Question 2

As I explored the rationales that the participants gave for their instructional practices, my own culturally specific knowledge (Tillman, 2002) came into play. I am an indigenous insider who shared the same race and school cultural experiences as my participants and who understood particular preferences and characteristic of the African American community. I discovered that as African American teachers of African American students my participants and I were quite familiar with the cultural preferences that were congruent for African American students. The participants identified two broad influences that explained why the teachers employed specific instructional practices: (1) knowing their students as learners of mathematics and (2) knowing their students as African Americans. To a large extent, these rationales have already been described in response to the first research question. Here I briefly highlight and elaborate the two predominant rationales articulated by the teachers. In some sense, these rationales are a further articulation of what it means to these teachers to care about their students.

Knowing Students as Learners of Mathematics

All four teachers stated that the mathematics classroom differed from other classrooms. They noted that mathematics is often more challenging for students because the content is expressed numerically as well as linguistically, which means that the effective teacher needs to help students translate and conceptualize the information if students are to understand it. A common theme in the interviews was that teachers recognized that the students needed guidance and support to learn mathematics and that this guidance was different from those offered in other classrooms. For example, in the group interview teachers believed that mathematics learning required students to learn

essential vocabulary therefore often reading and comprehension are an added obstacle to overcome with students. Dee stated, "Not only do they have to be able to read, conceptualize, and learn the language of mathematics, but they also need to be able to problem solve and manipulate and learn algorithms."

All four teachers identified that the students learned better in classrooms where they experienced less stress and were able to approach mathematics as a familiar and accessible subject. The students' prior experiences with mathematics were often a barrier that needed to be overcome before progress could be made in the classroom. Students came to class with expectations of personal failure and needed to relearn mathematics in different ways than previously taught. The teachers noted that many students experienced math anxiety, which is the anxious feeling that students experience when they engage in mathematics.

While some students readily took to mathematics when it was introduced in a more accessible format, sadly, all four teachers agreed that the majority of students had prior experience with mathematics that had put them at a disadvantage in the classroom. Many students lacked the prerequisite skills necessary for the current class, and so the teachers needed to cover this previous material before they could progress to new information. Also, the teachers observed that students required additional assistance beyond what they received in the classroom. All four participants noted that the effective teacher does not confine her work within the walls of the classroom. They stated that effective teachers are engaged with the students beyond the limits of the classroom and let the students know that they can rely on the teacher when they require additional help. The additional help offered by the teachers in this study ranged from after-class

mentoring to communication with parents and letting parents know that their children required more than was offered in class. Camille ran a peer tutoring program after school. These peer coaches were used to help students in her classroom as well as those recommended by other mathematics teachers.

In addition, these effective teachers were well aware of their students' taboos about who could and could not do mathematics. They said that most of their math students believed that only a select few are expected to be "good" in mathematics, so these teachers knew that it was important to teach mathematics so that all their students could relate to the content. So, the instructional practices employed by the teachers, in most cases, were to make the mathematics relate to the culture of "this" generation, the culture of their particular student population, and the culture of their African American student body. Many of the examples and applications used in the classroom had contextual relevance to the specific student population they taught. For instance, teachers made comments that "this" generation of students were into texting, cell phones, video games, rap music, hip-hop etc. so using examples that incorporated these topics was interesting to "these" students.

Knowing the Cultural Preferences of African American Learners

These teachers were aware of particular cultural orientations of African American students and made these aspects central in their instruction. Several researchers (Boykin, 1983, 1994; Ford, 2002; Hale, 2001; Hale-Benson, 1986; Hilliard, 1992; Shade et al., 1997,) suggest that there are specific dimensions of African American Culture, which include oral tradition, communalism/fictive kinships, spirituality, harmony, movement, verve, affect, expressive individualism, and social time perspective. Consistent with this

research, the participants suggested that their students worked better in groups, preferred to discuss and debate, and preferred active participation and movement throughout class time.

Teachers explained many of their instructional choices by describing actions that served to establish a learning environment that supported the cultural orientations of African Americans, in particular, the dimensions of communalism/fictive kinships, oral tradition, movement and verve. For instance, all four teachers agreed that establishing a sense of community or a family ethos in the classroom was tantamount to establishing a sense of purpose. This sense of community was fostered with each student on a personal level and also included all students working together in the classroom to enhance the learning experience for all students. Each teacher identified her role as the head of a community (or family), and noted that each student assumed a personal role in the classroom. Community was also established by making information relevant to students. It is important to note, however, that the teachers did not explicitly say that they were striving to be responsive to the cultural orientations of African American students. Rather, they describe their actions as meeting students' needs and preferences without reference to race. Their explanations, however, closely mirror the literature on African American cultural orientations.

The teaching strategies that each effective educator used were relevant to how African American students communicate. The fictive kinships, for example, evolved because African American students identify with female role models and are more willing to listen to persons in authority when they are associated with persons deserving of respect (Foster, 1990). In this sense, fictive kinships not only foster feelings of

closeness and belonging, but the student thereafter identifies the teacher as a person deserving of respect.

The teachers also adapted their teaching structure to accommodate how African American students communicate, such as organizing classroom activities into groups, allowing more opportunities for mathematical discourse as assessments, and engaging in a less sedentary classroom environment. Joy stated that if a visitor or new administrator did not know her teaching style well enough, "When they passed by my classroom they would probably think [it was] chaos because I don't have the desks in nice little rows…. But if you listen in you would quickly realize learning is going on." She continued by saying "Girl, we might be putting on a play, and someone is dressed like Pythagoras; don't play with me, now" (laughing).

Furthermore, the participants stated often that their students needed to be stimulated to become engaged in mathematics. Dee explained,

> When I teach, I try to make it a conversation, not me always talking, you know telling everything and I try to get them to think. The students repeat things out loud and we really make it fun.

Ford (2002) described oral tradition as a cultural orientation which there are "strong preferences for oral modes of communication, students speak frankly, directly, and honestly, students enjoy playing with language (puns, jokes, innuendoes, storytelling etc.)" (p. 32). The oral tradition was quite evident in the descriptions the participating teachers gave of their classroom environments. For instance, Louise stated that she would do whatever it took to make her students learn, and if entertaining was required, she was game. Her classroom practices included "singing a song or something to get

them to remember. Whether it is a mnemonic device or what have you, I have them create them; some of them create really cool rap song."

In summary, these teachers' instructional choices reflected the unique needs of the African American students, rather than presenting a "one size fits all" approach to teaching. None of the teachers referenced race as a factor in her instructional decisions, although they all said that they preferred to teach "their own." Louise explained, "I love all kids, but teaching 'my own' is rewarding, and it makes me feel a sense of belonging." For these teachers it was important to give back to the Black community and use teaching as an opportunity to be change agents for their people. They knew their students as learners of mathematics, and they knew their students as a part of the African American culture. Therefore, the instructional choices that they employed had little to do with race but had everything to do with caring enough to teach and teach well, using cultural constructs that would relate to their students' experiences, and making mathematics engaging, relevant, and rigorous.

Chapter 5: Discussion and Implications

Summary of the Study

The focus on the achievement gap between White and Black students continues to consume the educational research literature in mathematics education. This ongoing achievement gap continues to be an aching pain to the heart of American public education. As educators and policymakers search for answers, Irvine (2003) suggested that we examine the achievement gap problem through a lens with a different view, seeing with the third eye. The third eye is located at the center of one's forehead and represents an Asian philosophy that references a symbol of transcendent wisdom and extraordinary insight. She argues that "Educational researchers should learn to look through the third eye to see a different picture and examine alternative explanations offered by African American teachers about African American school achievement" (p. 34). Important knowledge about instructional practices for educating African American children that could provide valuable insights and solutions to eliminating the existing mathematics achievement gap between Black and white students is being overlooked and excluded from educational research.

Providing the self-reported descriptions through the eyes of effective African American teachers, this qualitative study was conducted for the purpose of answering two questions:

1. How do effective African American mathematics teachers' describe their instructional practices for African American high school students?

2. What reasons do effective African American mathematics teachers give for their instructional choices? In particular, to what extent do effective African American teachers reference their students as learners of mathematics and the roles of race and culture in explaining their rationale for their instructional decisions and practices?

Because I approached the study from a culturally sensitive framework, it was important to select a site and select a participant pool that would yield African American teachers who had culturally specific knowledge and experiences at schools with predominately African American student populations. Four participants were selected using a variation of Foster's (1997) "community nomination" (p. xx) method. I solicited what I call "school community nominations." I chose this district and high schools based on the following criteria:

- High schools where African Americans made up more than 90% of the student population and at least 60% of school faculty.
- High schools with 50% or fewer of their students coded as economically disadvantaged.
- High schools that had attained state AYP (adequate yearly progress) for three consecutive years (2003-2006).
- High schools with 90% of their students meeting or exceeding the standard on the mathematics graduation test.

The culturally sensitive research framework provided a framework for research design, data collection, and data interpretation (Tillman, 2002). For example, I used culturally congruent qualitative methods (interviews) to collect data, the culturally

specific knowledge of African American teachers to understand their self-defined perspectives, and culturally sensitive data interpretations to analyze the data. Coding and analysis were ongoing throughout the study and after multiple readings and revisiting the review of literature on African American teachers, effective mathematics teaching, effective pedagogical practices for African American students, and warm demander pedagogy, I applied the notions of culturally relevant pedagogy and warm demander pedagogy to describe what my participants reported as their instructional practices. Viewing data through a culturally sensitive lens and considering the theory of culturally relevant pedagogy the two research questions were answered.

Summary of Findings

The analysis of data and the review of literature indicated three overarching themes to describe the four effective African American teachers' instructional practices: They could best be described as teachers who (1) provided a structured classroom environment, (2) demonstrated an ethic of caring, and (3) implemented a culturally relevant pedagogy through culturally responsive teaching. Furthermore, the rationale for the instructional choices of these teachers revealed that knowing their students as learners of mathematics and knowing their students as African American were paramount to how they taught.

Conclusions

The purpose of this study was to ascertain the instructional practices of effective African American mathematics teachers who taught African American high school students. The teachers revealed three instructional practices that were used. Further, I sought to discover the rationale teachers gave for their instructional choices, and two

overarching themes were revealed. Analyses of the data lead to the following four conclusions:

Effective African American Mathematics Teachers of African American Students are Warm Demanders

Kleinfield's (1975) foundational work on warm demander pedagogy established the basic characteristics to describe effective teachers of students of color. Observations of the teachers of Athabaskan Indian and Eskimo 9th graders in Alaskan schools revealed a kind of instructional style Kleinfield called "active demandingness" (p. 327). The teachers communicated personal warmth and insisted that students perform to a high level. Irvine and Fraser (1998) provided an example of how a teacher who uses active demandingness might speak to a student who is slacking off: "That's enough of your nonsense, Darius. Your story does not make sense. I told you time and time again that you must stick to the theme I gave you. Now sit down" (p.56). There were several instances described by the participants that reflected this communication style.

Irvine & Fraser (1998) assert that this kind of communication is seldom described in the effective teaching literature. But some scholars who have investigated the warm demander stance have concluded that although this style of communication may appear harsh to the uninformed observer, it is often an effective teaching style with many students (Bondy, Ross, Gallingane, & Hambacher, 2007; Irvine & Fraser, 1998; Ware, 2006). Delpit (1988, 1995, & 2006) suggested that this style of communication is often effective with African American students because it is closer to their home language. In the Black family active demandingness is a form of reprimanding and expecting the best. The voices of these teachers mimic that of these students' mothers, grandmothers, and

other important figures in their lives. This tough no-nonsense approach and active demandingness is effective for students because it is predicated on the fact that warm demanders first establish caring relationships that convince students that they believe in them.

The teachers in this study were warm demanders who were well aware of the importance of establishing caring relationships with their students. It became very clear that an ethic of caring drove their instructional decisions. They established classroom environments that provided structure and routines. They maintained high expectations for their students, often demanding more than students thought they could give. These warm demanders knew the importance of showing students that they cared and established bonds in and outside the classroom to show support and unity. Some referred to their classroom as homes and their students as family.

As mathematics warm demanders the teachers cared about and were concerned about the prior knowledge that their students brought to the classroom. They believed that this knowledge could bridge the gap and provided stepping stones to new knowledge. Participants believed that only caring teachers took the time to figure out what their students already knew, and caring teachers also tried to figure out the ways of thinking of their students. Thus, addressing and exposing mathematical misconceptions was important to the teachers. They used their past teaching experiences and their own mathematical experiences to predict common errors and misunderstandings their students held. In addition, these mathematics warm demanders insisted that their students be mathematical thinkers. Just providing answers was not enough. They held expectations that their students should and could provide valid arguments and justifications for their

learning. It was important to the teachers that the students be able to communicate their thinking to the teacher and their classmates. Therefore, they promoted problem solving, student and teacher modeling, and reasoning throughout instruction.

In light of Ayers (1992) suggestion that when teachers really care and are concerned about the needs of their students, their instructional decisions are guided by this notion, I coined the term "mathematics warm demanders" to describe my participants. I realized that as these teachers described how they taught mathematics to their students and why they chose these specific instructional practices, their pedagogical choices were influenced by the extent to which they cared about their students, and their authority and disciplining styles were avenues to accomplish this success. For example, as warm demanders who were authoritarians and disciplinarians who also cared about what their students knew and did not understand, it was important to these teachers that their students go to the board and show their work by providing detailed explanations in front of the class. These teachers did not intend for this to be a chance to embarrass a student but as a way of assessment. If they did not care about what their students knew, the sentiment was that they would just lecture, model, and give the kids bookwork. But for these teachers, being a mathematics warm demander meant requiring students to think critically and communicate their thoughts and ideas. Often this was in the form of questioning or completing board work in front of their classmates, and they very rarely let this be an option for students to choose.

Discipline and authority as viewed by these participants was seen as implicit. Students were assumed to know that respect for an adult was required with no exceptions, and if a student happened to forget this fact, these teachers were not shy in going "toe to

toe." But disciplining for these teachers was also seen as necessary for students to learn and as a way to provide structure and parameters. Teachers spoke about how all students needed discipline to help them realize that they live in a world that has rules or laws that they must abide, so the classroom is just a rehearsal for the real life stage. So at the center of these mathematics teachers' warm demanding behaviors was an ethic of care that was manifested in the ways they showed concern for the needs of students, established relationships in and outside of the classroom with students, and demanded achievement often beyond the comfort zones of students. As a result their students attained academic success.

In summary, Irvine and Fraser (1998) used the term warm demander to describe teachers who provided a "tough minded, no-nonsense, structured and disciplined classroom environment for kids who society had psychologically and physically abandoned" (p. 56). Ware (2002) first operationalized the term to describe two African American teachers from two generations. She provided examples of her participants' practices and how the warm demander literature corroborated her findings. This research expanded Ware's (2002) research to the mathematics warm demanders and offered examples of four highly effective African American Teachers.

One could conclude that this finding corroborates the literature on warm demander pedagogy and its effect on the learning of African American students. This study is significant because it adds to the literature base an account of unique culturally specific pedagogy of warm demanders who teach high school mathematics. Through an ethic of care, high expectations, and skilled effective mathematics teaching strategies, these teachers were successful with African American students.

Effective African American Mathematics Teachers of African American Students Incorporate Culturally Responsive Pedagogy

Ladson-Billings (1994, 1995) has dedicated her works to communicating the importance of incorporating culturally relevant pedagogy in America schools. Teachers who implement a culturally relevant pedagogy are teachers who are *responsive* to the needs, interests, learning preferences, and abilities of their students (Irvine, 2003; Irvine & Armento, 2002). Irvine (2003) stated, "Being responsive means to be aware of and capable of responding to the ways that culture influences the behavioral and mental ecology of the classroom" (p. 67). She provided several examples of teaching acts that teachers implement when using a culturally relevant pedagogy through culturally responsive teaching. The purpose of this section is to illustrate and corroborate the compatibility of warm demanders with culturally responsive pedagogy through the findings of this study.

The first teaching act identified by Irvine is that culturally responsive teachers "spend more classroom and non-classroom time developing personal relationships with their students of color; these relationship-building exchanges are recurrent and spontaneous daily events" (p. 67). All four of the participants took the time during warm-ups and outside class time to get to know their students. The participants thought it was important to attend athletic games and let students know that they cared about what their interests were outside of the classroom walls. These teachers were interested in knowing the latest "pop culture" news that was relevant to the lives of theirs students. One participant even committed that it made her "cool." As stated in the previous section, the participants believed that establishing meaningful relationships with their

students aided in their ability to reach them academically. Other studies (Ayers, 1992, 2001; Cousins-Cooper, 2000; Irvine, 1991; and Moody, 2000) have determined similar findings. These studies found student mathematics performance was influenced by strong student-teacher relationships, where teachers were willing to help and were approachable.

Second, culturally responsive teachers "listen nonjudgmentally and patiently to their students and allow them to share personal stories and anecdotes during classroom time" (p. 67). Similarly, the teachers often share stories about their personal lives. Although the participants all stressed the importance of maintaining a personal relationship with their students that did not blur the lines of teacher-student roles, they all thought that it was important that students knew that they could talk to them and share their problems with them. Although the teachers usually set aside the beginning of class to "chit chat" with students, they did express that sometimes students were encouraged to share real life experiences that could be tied to the lesson.

Third, culturally responsive teachers "wait longer than their professional peers for students to respond. These teachers are known to probe, prompt, praise, and encourage their students" (p. 67). One of the participants in this study was notorious for this style of teaching; she thought that it was important to allow students time to collaborate and think critically. All the teachers discussed the importance of have classroom discourse that included high level questioning and probing.

Fourth, culturally responsive teachers "use an abundance of interactive techniques, such as acceptance of students' ideas, frequent feedback, demonstrations, explanations, questions, rephrases, reviews drills, recitations, monitoring, individualizing,

summarizing, and reinforcing. The pace is brisk and the activities varied" (p. 67-68). The participants all thought that mathematics should be engaging, and their instructional strategies varied, include group work, creating rap songs, and modeling. One teacher spoke of how her students were not required to even sit in rows; they were often all over the classroom depending on the activity for the day. But the teachers did believe drilling, choral responses, and direct instruction had its place in mathematics teaching. These highly engaging classrooms, according to Foster (1990) made "learning a social event, not as an individual endeavor" (p. 25).

Fifth, culturally responsive teachers "understand the interplay of instructional context and culture. Therefore, they examine their own actions, instructional goals, methods and materials in reference to their students' cultural experiences and preferred learning environment. This often takes precedence over requirements of standardized tests" (p. 68). The participants were cognizant of the preferred learning styles of their students. They knew that the students loved to engage with each other and the mathematics; therefore, cooperative groups and hands-on activities were important to implement. They also made a point to include students' interest to make mathematics learning relevant.

Finally, culturally responsive teachers, "understand and appreciate students' personal cultural knowledge and use their students' prior knowledge and culture to help construct and design relevant cultural metaphors and images to bridge the gap between what students know and the new knowledge they need to master" (p.68). It was important to the teachers to teach mathematics in a way that culturally connected to their students' lived experiences. They recognized and knew that using students' prior

knowledge and cultural references could make new material more accessible to learn. They made reference to the interests of their students, including music, basketball, cell phones, and even holidays and events common to the students. All of these were used to adjust and supplement curriculum materials.

Effective African American Mathematics Teachers Teach using the Cultural Styles and Learning Preferences Preferred by African American Students

Using his research on African American communities and African American children's socialization as well as his comprehensive review on works from other scholars, Boykin (1986) identified nine dimensions of the African American culture. These nine dimensions are: spirituality, harmony, movement, verve, affect, communalism, expressive individualism, social time, and oral tradition. Several of these dimensions were evident in the instructional decisions as described by the participants. Two out of the four participants referenced spirituality as a reason for their instructional decisions. These two participants believed that God was instrumental in providing the creative lessons that their students loved. One spoke about how ideas for lessons come to her in her dreams at night. She attributed these ideas to God speaking to her.

Verve and movement are characteristics defined as having a strong need to be active and mobile as well as a preference for the psychomotor (Ford, 2002). The participants in the study discussed the importance of engaging students in lively activities with high levels of stimulation. They accomplished this by engaging students in activities that were hands on, such as playing games with die, implementing music in lessons, and varying activities throughout one class period.

The characteristic of affect is the focus on emotions, feelings, and nurturing (Ford, 2002). Not only did the teachers express themselves as African Americans who displayed affect through their ethic of care for their students, they were aware that their students could do the same for each other. The establishment of caring relationships and a family ethos contributed to a classroom where expressing feelings as well as displaying nurturing behavior were encouraged and welcomed.

All teachers incorporated the characteristics of communalism and oral tradition as well. The dimension of communalism refers to "interdependence or a preference to social or group learning, a dislike for individual competitiveness" (King, p. 32). The participants stressed the importance of social bonds with their students, and cooperative learning was a preferred method of instruction.

Oral tradition in the African American community refers to a "strong preference for oral modes of communication [where] students speak frankly, directly, and honestly; students enjoy playing with language puns, jokes, innuendoes, and storytelling" (Ford, 2002, p. 4). The participants encouraged students to communicate with the teacher and other students. For example, students and teachers would share stories about their lives and experiences. Furthermore, the participants themselves used jokes and innuendoes and Black English vernacular in our interviews and discussions.

Finally students' expressive individualism was supported and encouraged by their teachers. Expressive individualism is a "preference for novelty, freedom, and personal distinctiveness; the development of improvisations in music and styles of clothing show this distinctiveness" (Berry, 2003, p. 246). One way two of the participants encouraged expressive individualism was to allow their students to express themselves through music

and by creating lyrics for remembering algorithms. As described in research carried out by Berry (2003) and Boykin (1986), the teacher participants in this study were acutely aware of and implemented culturally responsive teaching that included using the cultural styles and learning preferences of African American students. These specific cultural preferences of African Americans can influence the teaching environment and increase student achievement (Berry, 2003; Ladson-Billings, 1997).

Effective African American Mathematics Teachers of African American Students Teach in ways that are Consistent with the Principles and Process Standards Outlined by NCTM (2000)

The *Principles and Standards* document (NCTM, 2000) outlines six principles intended to influence decisions related to mathematics curriculum and pedagogy and five process standards intended to "highlight ways of acquiring and using content knowledge" (NCTM, 2007, p. 29). I found that particular NCTM principles and process standards were implemented by the participants, namely, the equity, teaching, learning, and assessment principles and the problem-solving, communication, reasoning, and connection process standards. While the teachers in this study never referenced NCTM by name or the process standards specifically, they were aware of the effective strategies that have worked for their African American learners that prove to be effective in improving mathematical success with their students.

NCTM (2000) advocates that "excellence in mathematics education requires equity – high expectations and strong support for all students" (p. 12). As teachers who incorporated culturally responsive teaching, my participants enacted an equitable teaching style that provided the accommodations needed to promote access and

attainment for their students (NCTM, 2000). Equity was enacted when these teachers used cultural referents to enhance instruction for their students' learning. Furthermore, in alignment with the *Equity Principle*, these warm demanders held high expectations and provided strong support for their students. They provided extra help outside of class to accommodate students who came to them lacking prerequisite skills. Additionally, these teachers provided instruction that included hands-on activities, modeling, and cooperative learning, which "accommodated differences to help everyone learn mathematics" (p. 13).

NCTM (2000) states that "effective teaching requires knowing and understanding mathematics, students as learners, and pedagogical strategies" (p. 17). As mentioned in Chapter 4, one instructional strategy employed by the participants was to address and expose student misconceptions as a way to enhance student learning. According to the Council, teachers who have "knowledge about the challenges students are likely to encounter in their learning…and ideas" (p. 17) are effective teachers who understand mathematics in deep and complex ways. Participants were teachers who possessed pedagogical knowledge that helped them understand their students as learners of mathematics. By focusing on process rather just answers, the teachers were able to learn about their students' understandings and thinking processes.

The *Learning Principle* states, "Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge" (NCTM, 2000, p. 20). The culturally responsive teachers in this study believed it was important to build on the prior knowledge as well as the personal and cultural experiences of their students. They believed that by building lessons around the interests and experiences of their students, mathematics learning became relevant and engaging.

The *Assessment Principle* promotes the idea that "assessment should become a routine part of the ongoing classroom activity rather than an interruption" (p. 23). The participants were well aware of the demands to prepare and the requirements for summative assessments, but these teachers were more aware of the importance of formative assessment to assist them with what their students were learning *throughout* the instructional period. Techniques such as "think-pair-share" and questioning were strategies the teachers believed to be of most importance in the learning process. NCTM states that effective mathematics teachers know "how to ask questions" (p. 18) and engage students in mathematical discourse that encourages all to ask questions. The teachers in this study stressed that questioning their students' thinking was important in helping them reason and problem-solve.

In addition to incorporating the principles which are intended to provide the framework for mathematics teaching, the participants taught using the NCTM process standards which provided the "hows" to the ways students should learn and use mathematics. According to Berry (2003) the process standards, problem solving, reasoning and proof, communication, connections, and representation, complement the learning preferences of African American students. The problem solving standard recommends that students reflect on their thinking processes, solve problems in context, and apply and adapt a variety of problem solving strategies (Berry, 2003; NCTM, 2000). When African American students are allowed opportunities to experience mathematical problem solving in social context and are allowed to use creativity and experimentation to solve problems, this is complementary to their learning styles. The participants were well aware that their students should be challenged to think about the process as well as

the answers and should be able to apply what they were learning to real-world experiences. In addition, NCTM (2000) defined problem solving as "engaging in a task for which the solution method is not known in advance" (p. 52).

The reasoning and proof process standard recommends that students develop and evaluate mathematical arguments and make and investigate conjectures (NCTM, 2000). According to the Council, "Being able to reason is essential to understanding mathematics" (p. 56), and the teachers in this study promoted this by requiring students to justify results, make conjectures, and compare problem solutions with each other. Because African American learners have a propensity for experimentation, expressive individualism, divergent thinking, and a holistic perspective, the suggestions outlined in the reasoning and proof standard are compatible with the African American cultural orientation. Berry (2003) concurred noting that

> Expressive individualism refers to cultivating a distinctive personality. By employing expressive individualism, African American learners can use their preference toward divergent thinking to develop mathematical arguments. In addition, by having a holistic perspective, they can investigate mathematical conjectures as they relate to content tied to a larger whole. (p. 247)

Communication is an instructional strategy that all the teachers in the study implemented. Effective mathematics teaching requires students to "communicate their mathematical thinking coherently and clearly to peers, teachers, and others" (NCTM, 2000, p. 61). Because "African American learners have a person-to-person orientation, preference toward oral expression, social and affective emphasis, and are attuned to nonverbal communication, the communication standard corresponds well with their

cultural styles and learning preferences" (Berry, 2003, p. 247). Each teacher in the study gave students opportunities to discuss and share their mathematical thinking. They were expected to use oral reasoning and justifications as well as provide solutions and steps on the board and in cooperative groups.

NCTM (2000) advocated that mathematics students should be able to make connections among mathematical ideas and they should have "the opportunity…to experience mathematics in …context" (p. 66). The teachers in the study made sure to connect mathematics to their students' culture, prior knowledge, and lived experiences. This was very important to them, and a lot of preparation and planning were done to ensure that this happened. When teachers required students to make connections, this allowed a "holistic view of mathematics that contextualizes mathematical ideas and concepts" (Berry, 2003, p. 248). Furthermore, in her study, Shade (1997a) observed that African American learners reached their optimal learning when they understood the interconnectedness and interdependence among ideas and experiences (as cited in Berry, 2003). At least three of the participants also made connections using music and movement, which are both a part of the African American cultural experience.

Finally, it is important that mathematics is represented in multiple ways. When the participants required their students to focus on process over answers, students were required to represent their mathematical thinking by talking about problems, listening to and observing problems that were modeled, and representing problems in written and graphical form. The participants taught mathematics in stimulating and interesting ways by promoting hands-on experiences and lively discussions and debates. African American learners have preferences for concrete imagery, creativity, verve, and divergent

thinking. The representation standard offers an opportunity for African American learners to have mathematical experiences that cater to their creativity and preference for high levels of simulation and energetic and lively instruction.

Implications

Establishing Authentic Teacher-Student Relationships

I found that combinations of instructional strategies were employed to effectively teach African American students. The participants incorporated a teaching style that made use of important NCTM principles and process standards; however principles and standards alone may not ensure academic success for all African American students. As previously shared data shows, although all American students are showing progress in mathematics achievement since implementation of standards based instruction, African American students continue to lag behind their White counterparts. I found that specific warm demander and culturally responsive teaching strategies are also needed to provide a classroom environment from which mathematics understanding can begin to develop.

Therefore one implication resulting from this study is that an important companion to effective mathematics teaching for African American students is the establishment of authentic relationships. In other words, it is important for African American students to experience a caring and supportive relationship with their teachers because this relationship provides a basis for students to trust and respect their teachers which is an important prerequisite for mathematics understanding (Bussey, 2008). Although NCTM's recommendations include suggestions for including students' interest in instruction, we need to expand our teaching practices to include vital connections to moral education, such as the ethic of care (Noddings, 1993). Caring about the whole

student and developing relationships while implementing warm demanding behaviors is important for African American students' success. This finding is more consistent with literature written outside of the mathematics education community than by literature supporting NCTM's principles and standards (Delpit, 1997; Fulmore, 2005; Jones, 2004; Strutchens, 2000). Ideas as they relate to relationships and caring are notions often discussed at the elementary and middle school levels, but the development of relationships and a caring ethic may be ever more vital for young adults whose high school decisions have lasting effects on the rest of their lives.

Irvine (1991) contended that African American students tend to be more "teacher dependent" than other ethnic groups; therefore, relationships with their teachers have a greater influence on their achievement. Delpit (1995) stated that "Children of color value the social aspects of an environment…and tend to put an emphasis on feelings, acceptance, and emotional closeness" (p. 140). Therefore, the mathematics education community, through preservice and inservice teacher education, must recognize the importance of relationships as a major focus to increase mathematics achievement for African American students. Children of color thrive in environments where teachers value and incorporate the social aspects of an environment, are approachable and caring, and stress interpersonal relationships with their students. So, "One could conclude that African American students feel more comfortable within a classroom environment where the quality and nature of student-teacher relationships reflect an understanding of their needs" (Fulmore, 2005, p. 98).

Educating Teachers to Understand and Appreciate Culture

If the call for the mathematics community, mathematics educators, and researchers is to include issues of caring and culturally relevant teaching for African American students, then a vital implication for teacher education is that mathematics teachers need to understand the cultural orientations of African American students. There are researchers (Ladson-Billings, 1995; Martin, 2000; Tate, 1995) that contend that including the cultural experiences of African American students is a matter of equity.

Equity in school mathematics has been given significant attention in the last two decades. The notion of "mathematics for all" is to include effective mathematics teaching for "students who are African American, Hispanic, American Indian, and other minorities as well as those who are considered to be a part of the majority" (NCTM, 1991, p. 4). NCTM's vision for a comprehensive mathematics education includes teachers who are qualified and hold high expectations for all students, while offering worthwhile opportunities for all students. In addition, teachers are asked to accommodate student differences and provide strong support for all students. "However, the document does not provide specifics for the types of accommodations necessary to support diverse learners, nor does it provide instruction for how to turn inequitable mathematics classrooms into more equitable ones" (Seda, 2007, p. 2). Tate (1995) contended that there must be rethinking and reconstructing of mathematics education that would be equitable for African American students. In order to provide mathematics education equitable for African American students, teaching and learning of mathematics for these students must "consider the use of dynamic strategies for understanding the thinking and experiences of African American students" (Berry, 2003, p. 245).

Moody (1998) suggested that if we are to understand the perspectives of African Americans we must consider studying cultural orientations identified with this group of people. Professional development must include opportunities for teachers to learn and understand the African American cultural style and specific learning preferences. However, Berry (2003) warned that educators must be careful of ethnic stereotyping. Not all African Americans share the exact cultural, historical, and social experiences, nor are all cultural characteristics uniformly applicable. But Shade, Kelly, and Oberg (1997) contended that expressive behaviors such as thinking, relating, speaking, writing, and learning associated with various ethnic groups and cultures, although multi-dimensional and continually changing, are shared by members of the same ethnic group, whether consciously or not. They refer to these as the "modal personality, which means cultural characteristics most likely to be found in a sample of an ethnic population" (as cited in Gay, 2000, p. 10). So when used properly, knowledge about the cultural orientations of African American students can provide educators a means for interpreting students' thoughts feelings, and actions (Berry, 2003).

Providing professional development that prepares teachers to teach culturally diverse students is ever more critical given the current teacher and student populations in American schools. The typical pre-service teacher is a white female from the suburbs of America who intends to return to her local town to teach students with very a similar background as her own (Irvine & Armento, 2001). The reality is that most teachers of students of color are and will continue to be white females. Not enough African American students are choosing education as a field, but more importantly not enough are graduating from high school to pursue a career in education. Thus, pre-service teachers

must be given the opportunities to experience cross-cultural experiences and develop culturally responsive teaching strategies in order to meet the needs of American public school students of color. Educational field experiences must include opportunities that help these teachers gain knowledge about and opportunities to be immersed in the cultural experiences of their students.

The daunting task for novice teachers of any race and ethnicity to become culturally responsive is complex and time-consuming. Schools of education must sort out the kind of cross-cultural competence they will require. Will their teacher training be a culture-general approach that will expose teachers to a broad spectrum of cultural differences or a culture-specific approach which requires teachers to acquire training for the interaction with one culture only (York, 1993)? Irvine and Armento (2001) offered this suggestion:

> It appears that a more developmentally sound approach involves the creation of long-term and continuing internships that incorporate in-school and out-of-school cultural immersion experiences where prospective teachers can acquire the necessary pedagogical and anthropological skills to make reasonable instructional decisions. These classroom decisions are based not on stereotyped cultural profiles of ethnic groups but rather on how one may or may not contribute to an understanding of an individual student's behavior. (p. 14)

Incorporating instruction that considers the cultural orientations and learning preferences of African American students has been shown to increase student achievement (Ladson-Billings, 1994; Tate, 2000). Therefore, it is critical that professional development for current and future teachers in public school include

opportunities to learn about culturally responsive teaching of mathematics that includes knowledge of African American students' cultural styles.

Increasing the Number of African American Mathematics Teachers

African American teachers bring a unique perspective to the issues of educating African American students. Their important knowledge, instructional practices, and experiences as African Americans provide valuable insights into how to best educate African American children. As stated early, Irvine (2003) believes the "third eye" perspective of African American teachers provides solutions for increasing success for African American students. Therefore, it is vital that there is a national effort to bring African American teachers into traditional public education. Currently only 7% of the teacher workforce in American public schools is African American, while the percentages of Black students and students of color are on the rise (National Center for Education Statistics, 2010).

Research indicates that African American teachers often act as social agents for African American students. Their presence and historical roles contribute to the success of African American students. In her study, La Verne (2010) identified, described, and compared the historical roles of African American teachers played before and after segregation. African American teachers were identified by five historical roles–teachers as counselors, advocates, disciplinarian, parent surrogates, and role models. Furthermore, La Verne concluded that the findings in her study "were in alignment with the literature that stated that African American students needed African American teachers because African American teachers' life experiences, attitudes, and desire to serve contributed to their development of their pedagogical practices" (p. 314). Therefore, an implication of

this study is that African American teachers and other teachers of color must be recruited to teach in America's public schools. These teachers will provide real life, culturally relevant role models and also reflect a more diverse workforce.

However, this research does not suggest that African American students can only be taught by African American teachers; nor does this research suggest that all African American and teachers of color are effective teachers who are culturally responsive and warm demanders. Ware (2002) and Ladson-Billings offered examples of White teachers who were sensitive to the needs of African American students and who were warm demanders and culturally responsive pedagogues. Instead, this study supports the notion of the modal personality theory as stated in the previous section. Regardless of mitigating variables such as gender, affiliation, age, social class, or education, the idea is that individuals within the same ethnic group do share cultural features to varying degrees. Therefore, African American teachers may be better at identifying racial discriminations in the mathematics curriculum and identifying cultural styles that are compatible for African American students. Irvine (1990), citing Banks (1988), noted that even when Blacks do not share the same social class, common cultural characteristics, still exist.

> Even though Blacks may be considered middle-class, their ethnicity influences their behavior...Blacks who are first generation middle class are very different from whites who have been middle class for several generations. Middle class Blacks tend to be very intimate with lower-class relatives and attend activities with lower class Blacks such as church and clubs; hence some of these cultural

characteristics are often found in both Black middle and lower classes" (Irvine, 1990, p. 24).

This does not suggest that all Black students and teachers prefer a learning and teaching style purely described by the specific culturally behaviors as described in this study. Instead, "Descriptions of culture [and cultural behaviors] are approximations of reality —templates, if you will through which actual behaviors of individuals can be filtered in search of alternative explanations and deeper meanings" (Gay, 2000, p. 12).

I have suggested that we increase the number of African American mathematics teachers in our U.S. schools to increase the chances that African American youth will be taught by warm demanders who employ culturally responsive teaching. But there will never be enough Black teachers to correspond to the number of Black students in the public school system (Irvine, 2001) and not all Black teachers will be effective teachers. Thus, schools of education must begin to prepare *all* teachers to teach students of culturally and economically diverse populations. I believe that all teachers of any race and any ethnicity are capable of teaching all students. Professional development that includes enhancing the *degree of cultural identification* among teachers will help improve schooling for students of color. I define the *degree of cultural identification* as the ability of an individual to identify and empathize with the cultural behaviors within a specific group's culture. If teachers are willing to increase their degree of cultural identification by exploring the cultural behaviors, learning styles, music, language, values, and beliefs of their students, I believe this will offer them opportunities to better understand their students' thoughts, feelings, and actions. By better understanding their students, teachers can adapt and modify curriculum and instruction in mathematics to

better engage students in learning. A teacher's success with students of other cultures and ethnicities is directly proportional to that teacher's degree of cultural identification with her students.

Questions for Future Research

I limited the participants in this study to African American teachers who taught African American teachers because I wanted to capture the practices of these teachers. However, if we are to gain a more comprehensive picture of what it takes to effectively teach all students, future studies should expand both the population of teachers and students studied. For instance, a future study might focus on African American male mathematics teachers to compare and contrast the personal and pedagogical styles of male and female teachers. Similarly, this study was conducted in middle class schools, but a similar study could be conducted in schools serving children living in poverty to ascertain if there are differences in teachers' interactions with students in this setting. In addition, although my personal interest is in the education of African American students, as the population of our country becomes more multicultural, replicating this study in schools with a substantial percentage of students of color from different racial and ethnic groups and with teachers of different racial and ethnic groups would be useful because such a study could uncover similarities and differences in teachers' styles when compared with the results of this study.

Given the implications noted above for both pre-service and in-service teacher education, a number of studies are possible in this arena. For instance, studying various professional education programs to see which elements are most effective in assisting Black and White pre-service teachers to become warm demanders and culturally

responsive teachers would provide insight to the question raised by York (1993) about culture-general or culture-specific professional development. Such a study could also shed light on whether the professional development needs of Black and White teachers are different. Adding class to the mix of variables would help shed light on whether the professional development needs of Black teachers from lower income backgrounds are different from those of Black teachers from middle or higher income backgrounds, for instance. It might be the case that the professional development needs of lower income Black and White teachers are similar, for example. Similarly, investigating the professional development needs of male teachers would also provide information about how best to help them develop into warm demanders and culturally responsive pedagogues.

Final Remarks

Given the dire state of mathematics education for African American students, our nation cannot continue to focus on reform efforts that simply address standards and principles. A reform movement that ensures increased achievement for African American students must consist of schooling experiences that include students' culture as an essential part of their mathematics curriculum and instructional experiences. African American students need culturally responsive teachers who exhibit warm demanding characteristics and who push students to excel and believe in themselves.

African American students need effective teachers who make mathematics rigorous and relevant while building authentic relationships. Thus, mathematics teaching that includes the intersections of warm demander behaviors, culturally relevant pedagogy through culturally responsive teaching, and effective mathematics teaching as identified

by NCTM has potential to create mathematics success for all students, but specifically for African American students and other children of color.

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Appendices

Appendix A

Effective Teacher Nomination Survey

1) You are employed at which of the following schools? **(Place an 'X' next to your choice)**

___ Radcliff High School
___ Strathmore High School

2) How long have you been employed at this particular school? **(Place an 'X' next to your choice)**

___ This coming year will be my first year
___ 1 to 3 years
___ 3 to 5 years
___ more than 5 years

Please indicate below the three mathematics teachers you believe are the most effective (number 1 being the most effective).

1. _____

I nominated this teacher to be the most effective teacher because:

2. _____

I nominated this teacher to be an effective teacher because:

3. _____

I nominated this teacher to be an effective teacher because:

Appendix B
(Principal & Principal of Curriculum & Instruction Consent Form)

October 12, 2007

Dear Principal:

I am Sharren M. Thomas, a graduate student under the direction of Dr. Dorothy Y. White, in the Department of Mathematics & Science Education. I am conducting research to examine effective African American high school mathematics teachers. The research project is entitled "Effective African American Mathematics Teachers' Descriptions of Their Instructional Practices for African American High School Students." The purpose of this study is to discuss effective African American mathematics teachers' descriptions of their instructional practices for African American high school students.

I am requesting your participation, which will involve the completion of a nomination survey form that will take approximately 10 minutes to complete. The form requests your opinion about which teachers are the most effective mathematics teachers at your school. Those teachers nominated by their principal, principal of curriculum & instruction, and their mathematics colleagues will be asked to participate in two semi-structured interviews and one group interview.

There are no direct benefits to you for participation, but the findings from this project may provide information on the characteristics an administrator identifies effective teachers' to exhibit. There are no known or foreseeable risks associated with this research. Your participation is voluntary and refusal to participate will involve no penalty or loss of benefits to which you are entitled. You may discontinue participation at any time without penalty.

Once I receive your completed survey, any information that is obtained in connection with this study that can be identified with you will remain confidential except as required by law. Immediately after the questionnaires are collected, the researcher will remove any identifying information pertaining to you and the results will be aggregated. All records pertaining to your participation will be stored in the home office of the researcher, and can only be accessed by the researcher and by the University of Georgia professors who are a part of the researcher's doctoral committee. The data will be destroyed on October 1, 2008. The results of the research study may be published; however, I will not use your name or the name of your school in the final report.

If you have any questions concerning the research study, please contact me at: 770-918–8884 or sthomas5@uga.edu or Dr. Dorothy White, 706–542–4096; dywhite@uga.edu.

I will make arrangements to pick up the signed consent form and completed nomination survey at your convenience. Thank you for your participation in this study.

_____	_____	_____
Participant's Name (print)	Participant' Signature	Date

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199;
E-Mail Address: IRB@uga.edu

Appendix C
(Mathematics Teacher Consent Form)

October 12, 2007

Dear Mathematics Teacher:

I am Sharren M. Thomas, a graduate student under the direction of Dr. Dorothy Y. White, in the Department of Mathematics & Science Education. I am conducting research to examine effective African American high school mathematics teachers. The research project is entitled "Effective African American Mathematics Teachers' Descriptions of Their Instructional Practices for African American High School Students." The purpose of this study is to discuss effective African American mathematics teachers' descriptions of their instructional practices for African American high school students.

I am requesting your participation, which will involve the completion of a nomination survey form that will take approximately 10 minutes to complete. The form requests your opinion about which teachers are the most effective mathematics teachers at your school. Those teachers nominated by their principal, principal of curriculum & instruction, and their mathematics colleagues will be asked to participate in two semi-structured interviews and one group interview.

There are no direct benefits to you for participation but the findings from this project may provide information on the characteristics mathematics teachers identify effective teachers' to exhibit. There are no known or foreseeable risks associated with this research. Your participation is voluntary and refusal to participate will involve no penalty or loss of benefits to which you are entitled. You may discontinue participation at any time without penalty.

Once I receive your completed survey, any information that is obtained in connection with this study and that can be identified with you will remain confidential except as required by law. Immediately after the nomination forms are collected, the researcher will remove any identifying information pertaining to you and the results will be aggregated. All records pertaining to your participation will be stored in the home office of the researcher, and will only be accessed by the researcher and by the University of Georgia professors that are a part of the researcher's doctoral committee. The data will be destroyed on August 1, 2008. The results of the research study may be published; however, I will not use your name or the name of your school in the final report.

If you have any questions concerning the research study, please contact me at: 770-918–8884 or sthomas5@uga.edu or Dr. Dorothy White, 706–542–4096; dywhite@uga.edu.

I will make arrangements to pick up the signed consent form and completed nomination survey at your convenience. Thank you for your participation in this study.

Sharren M. Thomas

_____	_____	_____
Print Name	Participant' Signature	Date

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail AddressIRB@uga.edu

Appendix D
(Invitation Letter)
October 1, 2007

Dear Colleague,

Congratulations!! You have been identified by your principal, colleagues, and principal of curriculum & instruction to be an effective teacher. My name is Sharren M. Thomas, I am a doctoral student in the department of mathematics & science education at the University of Georgia.

You are invited to participate in a research study of effective African American teachers instructional practices. You were selected as a possible participant because, as an African American mathematics teacher at [insert high school name], you have unique experiences and views about mathematics instruction and African American students. You will be one of six teachers who will be invited to participate in this research project and share your views in two to three semi-structured interviews and one group interview. The interviews will be audiotaped and will address both your descriptions of your instructional practices and the African American mathematics learners you teach. The interview will take place at your convenience early fall or early winter. Your name, any biographical information, and school name will remain completely confidential in the study.

There is no known risk or foreseeable risks to you personally or professionally to participate in this study. All comments are confidential and any direct quotes or generalizations will be under a fictitious name. You will have an opportunity to clarify your interview transcripts at any time. Your participation and that of other teachers will assist in developing themes of effective teaching practices for African American high school students. If interested, please respond before October 19, 2007, and I will forward the consent form and set up a time to discuss any concerns you may have.

Thanks for all considerations.

If you are interested please contact me at:
770-918-8884
770-918-0899
or
Email me at: sthomas5@uga.edu

Sincerely,

Sharren M. Thomas

Appendix E

October 12, 2007

Teacher Consent Form

Effective African American Mathematics Teachers' Descriptions of Their Instructional Practices for African American High School Students

Thank you for agreeing to participate in my research project. The University requires that you give your signed agreement to participate in this project.

This letter will explain to you in detail: (a) the purpose of the project, (b) the procedures or protocols to be used, (c) how your personal information will be kept confidential, and (d) the potential benefits and possible risks of participation.

Purpose of the project:

The purpose of this study is to discuss effective African American mathematics teachers' descriptions of their instructional practices for African American high school students. Through, the study, the researcher hopes to illuminate some of the many instructional decisions you make when teaching to African American mathematics learners.

Procedures:

If you decide to take part in the study, you will be asked to:
Meet for a least three, one hour to one hour and thirty minutes interviews; the third interview will be a focus group interview in which you will be asked to participate with three to five other mathematics teachers.

a. The first interview you will be asked a series of questions related to your teaching, curriculum, and your African American students.
b. The second interview will be a follow up interview. You will be given a copy of the transcription from the first interview. You will be asked some follow-up questions for clarification and to add any additional comments.
c. In addition, you will be asked to participate in one focus group interview. The series of questions will be asked to a group of three to five mathematics teachers about issues of Black schooling, new curriculum standards, and teaching experiences.

These interviews will be conducted the late fall and early winter semesters. The interviews will be audiotaped and transcribed. At any time you may request copies of transcripts and the final project. In each interview you will be asked to share the particular instructional practices and decisions you employ as they relate to mathematics curriculum; culture and race; and your African American students.

Confidentiality:

Information that is obtained in connection with this study that can be identified with you will remain confidential unless required by law. Any data containing individually identifying information, including the audio tapes, will be securely kept in a locked filing

cabinet or password protected computer in the researcher's office. All data collected from the interview sessions will be communicated through themes and categories and not by individual participants. Any direct quotes used in produced materials will be under fictitious names. After analysis is complete, the researcher will erase any individually identifying information from the data, remove any links between your name and results and will erase and destroy the audio recordings.

Benefits:
There are no direct benefits to you but the findings from this project may provide information that may benefit mathematics teachers, administrators, parents and others concerned with helping African Americans perform better in mathematics. In addition, you will be given a chance to examine and articulate personal beliefs, successes, and challenges involved in teaching mathematics to African American students. Participants will simply have a chance to share insights and opinions and reflect on their practice.

Risks/Discomfort/Stresses:
The researcher does not expect any risks to you from participating in this study. It is possible that you may feel uncomfortable answering some of the interview questions. You can skip any questions that you do not wish to answer. In addition, you may stop answering questions or discontinue participation at any time. There are no apparent risks to you personally or professionally to participate in the interviews. It is not intended as a judgment or an evaluation of mathematics teaching, simply a chance to share insights and opinions. There will be no identifiers to link the data directly to you or your school.

Voluntary Nature of the Study:
Your decision will not affect your current or future relations with the University or your school district. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions:
Sharren Thomas is the primary researcher conducting this study. Please feel free to contact me with any questions or concerns at 770-918-8884 or sthomas5@uga.edu. You may also contact: Dorothy Y. White 706-542-9046 or dywhite@uga.edu

Statement of Consent:
I have read the above information. I have asked questions and have received answers. I consent to participate in the study, and give my permission to be audiotaped.

I will make arrangements to pick up the signed consent form at your convenience. Thank you for your participation in this study.

_____
Print Name

_____ _____
Signature of Participant Date

_____ _____
Signature of Researcher Date

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Appendix F
Interview Questions

I will begin asking participants general questions[1] about their personal lives, their own schooling experiences, and their cultural and racial experiences.

Personal and school experiences

The following questions will focus on your childhood experiences.

1. What year were you born?
2. Have you always lived in the state of Georgia?
3. What was the make-up of your family (mother, father, brother, etc.) at the time of your birth?
4. How would you describe a typical day when you were growing up?
5. Were there daily family rituals or a daily routine you or your family followed?
6. How did you celebrate special occasions (holidays, birthdays, etc.)?
7. What is your definition of culture?
8. What are your earliest memories of persons from racial and cultural groups other than your own?
9. Describe instances in which you interacted with persons from different racial and cultural groups.
10. How did/do you form opinions about other racial and cultural groups?
11. Have persons from other racial and cultural groups impacted your life? If so, in what way(s)?
12. How would your describe the neighborhood where you were raised?
13. Did you live among people from different racial and cultural groups?

[1] Some interview questions have been adapted from Fulmore (2005), Mathews (2005), Sims (2003).

14. Do you currently live in a neighborhood among different racial and cultural groups?
15. If so, what did your teachers(s) do to adapt the curriculum to reflect the races and cultures of the students?
16. How do you define the dominant culture?
17. In what ways do you identify with the dominant culture?
18. In what ways have you assimilated to, or taken on customs of, the dominant culture?

These questions will focus on the teachers' own schooling, in particular their mathematics learning.

19. Describe your schooling experiences – elementary, high school, undergraduate, teacher preparation programs, graduate.
20. Describe the demographics (faculty and student populations) of your various schooling experiences.
21. Were these classrooms made up different gendered, racial, and cultural groups? Was this the same in your mathematics classes?
22. Who were the best mathematics students in your classes? Why do you think they were so good in mathematics?
23. Did you always do well in mathematics? When did you know that you had a "knack" for mathematics?
24. What do you think was influential in your success with mathematics?

25. What was mathematics learning like for you? Describe your favorite mathematics teachers (their personality, teaching styles, and classroom environment)? How would you say this influenced you, if at all?
26. Describe some of your least favorite mathematics teachers (their personality, teaching styles, and classroom environment)? How would you say this influenced you, if at all?

The next set of questions is about your role as a teacher.

27. How do you see yourself, your role as a teacher?
28. If given two choices, artist or technician, which would your choose to describe your role as teacher?
29. If the participant responds that they describe themselves as both, ask the following: If you view yourself as both, in what ways are you an artist, and in what ways are you a technician?
30. How would you describe your relationships with your students?
31. Educational researchers claim that often teachers, particularly African American teachers who teach African American students, inherit the role of mentor, surrogate mother, or role-model. In what ways, have you experienced this?

If the participants state that they have inherited the aforementioned roles then I will ask the following:

32. Do you think this is true of teachers in general, regardless of race, grade-level etc?
33. In what ways do you think these roles influence your instructional practices and decisions?
34. Do you believe this is a positive or negative teacher-student relationship?

The following questions will be about the participants' teaching experiences.

35. Have you always taught at the high school level?

36. Have you always taught at a predominately African American school?

If a participant states that they have taught at a school that was not predominately African American, I will ask the following questions:

37. How was this teaching experience similar to or different from your current school?

38. What challenges did you experience teaching at this school?

39. Are there any racial and cultural groups that you prefer to teach? If so, which ones, and why?

If the participant states that they taught at a school with diverse races and cultures, I will ask the following:

40. How did you relate to these students? How do you think that these students related to you?

41. There are well documented generalizations and stereo-types of particular racial and cultural groups. Did you find any generalizations or stereotypes about these students to be true?

42. How do race and culture impact your perceptions about students?

43. How do race and culture impact your practice?

44. Some researchers believe that African American students learn better from teachers of their same race and similar cultural backgrounds. Would you agree or disagree with this statement?

Mathematics and mathematics teaching

45. When did you decide to become a mathematics teacher?
46. Describe your philosophy of teaching mathematics.
47. What is mathematics?
48. How should mathematics be taught?
49. What mathematics subjects have you taught? Which do you prefer to teach and why?
50. What are some of the challenges in teaching mathematics?
51. What do you consider to be the mathematics curriculum?
52. How much freedom do you have in developing your curriculum?
53. Do you work with other teachers to adapt curricula and lesson plans?
54. How do race and culture impact the curriculum?
55. What role should culture play in adapting curricula?
56. Should race and culture impact teacher perceptions, practices, philosophies, the learning environment, and/or the curriculum? Why or why not?
57. Does your curriculum reflect the racial and cultural groups to which your students belong?
58. If so, in what ways does your curriculum reflect the racial and cultural groups to which your students belong?
59. Is it important for a student to see his/her race and/or culture reflected in the mathematics curriculum?
60. As you may be aware, more mathematics classes are required for students to graduate from high school. What do you think about these changes?

61. What other changes have you observed in the mathematics curriculum during your career?
62. What are some teaching strategies that you employ to promote successful learning in mathematics?
63. How would you describe your teaching style? Would you consider your choice of instruction to be "traditional?"
64. Why do you think you teach in this way? Have you ever attempted to change methods of teaching? How was it received by your students?
65. What concepts or skills do you feel are important for your students to learn? Choose one and think of how you went about teaching it. What did you notice? Did you feel you accomplished your goal?[2]
66. If a teacher visited your classroom, what would they see? What might they say? What would a student say? A parent? An administrator?[3]
67. How would you describe your philosophy of education, the purpose of schools, and your responsibility to create mathematically literate students?[4]
68. During instruction, what methods do you use to determine if your students have an understanding of the concept being taught?
69. Why do you think you were chosen as one of the most effective mathematics teachers?
70. I know we talked a little earlier about the students that you have taught and teach now. Help me understand the students as mathematics learners. How would you describe them as mathematicians, critical thinkers, and problem solvers? Have

[2] Adapted from Sims (2003)
[3] Adapted from Sims (2003)
[4] Adapted from Sims (2003)

they changed in any way from the students you had three years ago? 10 years ago? At the beginning of your career? [5]

71. Imagine it is 15 years from now. Describe three students you would say were successful mathematics learners. What are they doing? What would they say to you? What would they say to their own children?[6]
72. Some researchers describe African American students as being students who are more teacher dependent than their peers. In what ways have you found this statement to be true or false?
73. If you taught children of a different race, have you found that these students are similar to African American students that you taught?
74. In a study on African American high achievers, it was found that these students are influenced by what their teachers think and say about them. Will you describe a time in your teaching career in which something that you said about or to a student had a significant impact on their performance or behavior?

[5] Adapted from Sims (2003)
[6] Adapted from Sims(2003)

Appendix G

Focus Group Interview Questions

The group interview will provide teachers with opportunities to reflect together about their mathematics teaching experiences and their students. In particular, these interview questions[7] will focus on the teachers' views about their overall teaching experiences (e.g., challenges and concerns), how issues of culture and race influence their instructional decisions and impact the schooling environment, and their thoughts about the Black-White achievement gap.

1. What are some of the challenges that you have teaching in your particular district and/or school? Do you think you would face these same challenges if you were employed in a different district or another school?
2. Have you ever encountered conflict in teaching in a way that aligned with district, state, and national policies?
3. If you were asked to give policy makers advice on the mathematics curriculum, what would you suggest? For example, what courses should be offered or eliminated?
4. What would you tell those in the district to do to increase African American students' mathematics achievement?
5. What are your thoughts on the Black-White achievement gap?
6. What types of mathematics pedagogy, curriculum and assessment practices are more appropriate for African American students in order to close the achievement gap?
7. What are some specific changes teachers can make in how they organize classroom life and teach that will result in quality mathematics education for African American students?

[7] Some questions adapted from Bussey, 2007; Fulmore (2005, and Sims (2003)

8. Discuss the role of "community" in the classroom and how race and culture impact "community."
9. How can universities better prepare teachers to teach mathematics to African American student?
10. Do you agree or disagree (and why?) with the following statement, "Schools are institutions that reproduce structures of inequality."
11. How do you think the new Georgia Performance Standards (GPS) will affect the mathematics education for African American students?