MIDDLE SCHOOL MATHEMATICS TEACHERS USING CULTURALLY RELEVANT PEDAGOGY TO IMPROVE LEARNING FOR HISTORICALLY MARGINALIZED STUDENTS

by

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ABSTRACT

Developing characteristics of culturally responsive teaching in mathematics is a complex endeavor. Although the field of research on culturally relevant pedagogy and culturally responsive teaching in mathematics is vast, few studies have specifically addressed the transformation of mathematics teachers as they strive to implement culturally relevant pedagogical practices to improve learning for historically marginalized students. Grounded in culturally relevant pedagogy, culturally responsive teaching, and culturally responsive mathematics teaching, this research study was designed to capture the experiences and instructional practices, through narrative inquiry, of five middle school mathematics teachers as they move towards integrating culturally relevant pedagogical practices into their classroom instruction. This study also aimed to understand teachers' perception of how professional development opportunities influence their teaching practices. Data were collected from multiple sources, namely, semi-structured interviews, member check, and relevant school districts' documents pertaining to equitable educational practices. I also maintained a personal research journal. The key findings from this study indicate that emerging culturally relevant and responsive teachers 1) set high expectations for their students to promote academic growth and development, and 2) desire to have meaningful and ongoing professional development opportunities that connects content knowledge with cultural knowledge. Some findings were consistent with the literature on culturally relevant pedagogy tenets and the dimensions of culturally responsive teaching. Implications and recommendations are provided in an effort to
strengthen teachers' practices and increase academic mathematics achievement and success for all students.
DEDICATION

This dissertation is dedicated to all first generation high school graduates. I hope that my accomplishments are your encouragement.
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADL</td>
<td>Anti-Defamation League</td>
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<tr>
<td>AECRS</td>
<td>Assessment of Effective and Culturally Responsive Strategies</td>
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<tr>
<td>AVID</td>
<td>Advancement Via Individual Determination</td>
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<tr>
<td>CRMT</td>
<td>Culturally Responsive Mathematics Teaching</td>
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<td>CRP</td>
<td>Culturally Responsive Pedagogy</td>
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<td>CRT</td>
<td>Culturally Responsive Teaching</td>
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<tr>
<td>CRT2</td>
<td>Critical Race Theory</td>
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<tr>
<td>ESEA</td>
<td>Elementary and Secondary Schools Act of 1965</td>
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<tr>
<td>IES</td>
<td>Institute of Education Sciences</td>
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<tr>
<td>IRB</td>
<td>Institutional Review Board</td>
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<tr>
<td>LEA</td>
<td>Local Educational Agency</td>
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<tr>
<td>MAC</td>
<td>Mathematics Accelerated Coordinator</td>
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<td>NAEP</td>
<td>National Assessment of Educational Progress</td>
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<td>NCEE</td>
<td>National Commission on Excellence in Education</td>
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<td>NCES</td>
<td>National Center for Educational Statistics</td>
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<td>NPC</td>
<td>National Poverty Center</td>
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<td>PTSA</td>
<td>Parents Teachers and Students Association</td>
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<td>SMP</td>
<td>Standards for Mathematical Practice</td>
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ACKNOWLEDGEMENTS

First and foremost, I thank God for giving me the desire, the courage, and the strength to finish what I started. I also want to thank my parents, Bishop Peter and Clara Tower, for their continued love, encouragement, and support throughout this journey. When I wanted to give up, I could hear my parents, in a small still voice, remind me “Do you not know that those who run in a race all run, but one receives the prize? Run in such a way that you may obtain it” (I Corinthians 9:24, King James Version). I thank my husband, Hosley Jackson, for being by my side every step of the way. I also want to thank my family and friends for being my cheerleaders.

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CHAPTER ONE: OVERVIEW OF THE STUDY

As the nation moves forward to answer the call of meeting the educational needs of culturally and linguistically diverse learners in mathematics (Aguirre et al., 2012), researchers argue that a comprehensive mathematics education reform program must include a curriculum that promotes equity and diversity (National Council of Teachers of Mathematics [NCTM], 2000, 2014a) to create a positive learning experience for all students. Rittle-Johnson and Jordan (2016) research on programs, practices, and policies designed to improve student achievement in mathematics shows that changes in teaching practices coupled with a rigorous, evidence-based professional development program showed the most promise for improving student outcomes (Gersten et al., 2014).

Specifically, Johnson (2017), Berry (2008), and Stinson’s (2006) seminal work on how school experiences contributed to the success of African-American boys also show great promise. Although Berry (2008) defined success in mathematics as African-American boys enrolling in Algebra 1 in middle school, Johnson (2017) expanded on this notion to include higher grade point averages, enrollment in higher tracked courses, standardized test scores, and college enrollment. Abdulrahim and Orosco (2020) posit educational researchers, practitioners, and reformer should focus on the context of learning mathematics by examining educational environments that provide equitable mathematics instruction and successful outcomes for all children.

As a practicing middle school mathematics teacher with over twenty years of experience, I agree with Nasir et al. (2008) assertion that all students will benefit and flourish when the
teaching of mathematics is reformed in creative, challenging, and affirming ways. Most scholars seem to agree that a comprehensive mathematics reform program is vital to provide equitable opportunities for academic achievement and success in and out of the classroom for historically marginalized students (Boaler & Staples, 2008; Nasir et al., 2008). However, there continues to be debate about the approach in which to carry out this feat. Moreover, Berry (2018) has voiced concerns about the direction of mathematics education reform. Berry (2018) uses Derrick Bell’s, a former attorney with the National Association for the Advancement of Colored People (NAACP) during the civil rights era, interest-convergence principle to underscore Bell’s idea that “policies and reforms in mathematics education were not designed to address the needs of marginalized learners; rather, these policies and reforms are often designed and enacted to protect the economic, technological, and social interests of those in power” (p. 5) as a springboard for advancing critical conversations addressing the needs of underrepresented children in mathematics (Bell, 1980; 2004).

Because there is a need to promote equitable mathematics instruction that optimizes student engagement and a “heightened demand for effective teachers knowledgeable of the affirming aspects of cultural differences and the role they play in the classroom” (Adams & Glass, 2018, p. 8), I was inspired to conduct this study and add to the conversation and literature pertaining to equitable mathematics instruction for historically marginalized students. Because previous research has largely overlooked the significance of understanding how mathematics teachers develop as culturally responsive teachers (Gay, 2000), this study addressed the issue of how middle school mathematics teachers mediate learning for underrepresented students in mathematics and contribute to their students’ academic achievement and success. I aimed to examine teachers’ narratives, attitudes, perceptions, and understanding of culturally relevant
pedagogy. I also wanted to know how these teachers disrupt learning mathematics in isolation by integrating students’ cultural background, funds of knowledge, and experiences into the mathematics classroom. Moreover, I also aimed to understand how teachers’ professional development experiences contributed to their growth and understanding of culturally relevant pedagogy.

Research in mathematics education has recognizes a need to reconsider the total school experience for historically marginalized students (Bishop, 1990; Stinson, 2006; Berry, 2008). One can argue that incorporating culturally relevant pedagogy and responsive mathematics instruction can provide a more equitable learning outcome for diverse students and increase achievement for all children (Inglis & Foster, 2018). However, finding mathematics classrooms where culturally relevant pedagogies are integrated into the daily classroom practices is still emerging (Sleeter, 2012; Johnson & Gonzalez, 2014; Khalifa et al, 2016). This is due in part to the misconception that mathematics curricula can be embedded in culture; the idea that mathematics can be culture-less; and the traditional standards-based teaching and learning continue to be the preferred methods of instruction (Ellis & Berry, 2005). However, Sleeter (2012) argues that implementing standard-based instructional practices without incorporating students’ cultural and linguistic background knowledge and strengths contribute to the disenfranchisement of historically marginalized students in the mathematics classrooms.

Although it is a challenge to find culturally relevant pedagogical practices in the mathematics classrooms, emerging culturally relevant and responsive mathematics teachers show great promise in providing equitable mathematics instruction for all learners (Celedon-Pattichis et al., 2018). For this study, I define emerging culturally relevant and responsive mathematics teachers as equity oriented teachers who have a desire to create learning environments where
students’ interests, cultural, and linguistic backgrounds are integrated in the teachers’ daily lesson plans and instructional practices. To that end, this qualitative study investigates the instructional practices of equity oriented middle school (grades 6-8) mathematics teachers as they develop culturally relevant pedagogical practices.

**Statement of the Problem**

The National Council of Teachers of Mathematics (2014a) acknowledges the importance of culture and learning as a socio-cultural process (Ukpokodu, 2011). The NCTM position on access and equity in mathematics is “creating, supporting, and sustaining a culture of access and equity requires being responsive to students’ backgrounds, experiences, cultural perspectives, traditions, and knowledge when designing and implementing a mathematics program” (NCTM 2014b, p. 1). Historically, however, mathematics was positioned as a culture-less subject (Ukopkodu, 2011; Bishop, 1990) which generally resulted in missed opportunities for mathematics teachers to make connections between the mathematics curriculum and their students’ daily lives.

Although recent scholarship shows a trend toward understanding the relationship between mathematics and culture, Davis (2018) reluctantly acknowledged that mathematics is generally viewed as completely objective, race-neutral, and culture-free. Davis argues along with Martin (2010) that mathematics education should push beyond the tenets of culturally relevant pedagogy. Davis (2018) and Martin (2010) contend that the goal for mathematics education is to achieve liberatory outcomes for Black students (Martin & McGee, 2009). Leonard et al. (2010) posits “mathematics is not a race-neutral subject” (p. 261). The scholars argue that culturally relevant and social justice instruction can provide students with opportunities to develop a positive mathematics identity. Davison (2007) researched on the conditions whereby it is true to
claim that mathematics is culture-free. Davison’s research with American Indian students led him to conclude that “mathematics is culture-free, but its contexts are not” (p. 143). He continues to argue that mathematics can exist independently of its applications; however, it is the applications that give meaning to the mathematics.

Numerous scholars grappled with understanding the role that culture and language play in mathematics education. Begle’s (1979) landmark work, *Critical Variables in Mathematics Education*, illuminated the need to study how cultural and linguistic factors are related to learning mathematics. Begle’s seminal work goes beyond the deficit views of previous studies that attempted to explain this phenomenon. Although researchers have written extensively about culture, language, and mathematics, I believe that scholars who suggest that mathematics is culture-neutral or culture-free are limiting students from fully engaging in the curriculum and depriving students access and opportunities to experience important mathematics (Leonard et al., 2010).

Scholars argue that a misconception is that the mathematics curricula can be embedded in culture; and not the idea that mathematics is culture-less. The notion that mathematics is culture-less is grounded in the idea that mathematics has universal validity where one can prove or dispute a mathematical statement or claim. For example, on a coordinate plane, it is commonly accepted in the mathematical community that the sum of the measures of the angles of a triangle is 180 degrees; and in K-12 curriculum, the result of a negative number multiplied by a negative number is a positive number. Because these are widely accepted mathematically in the K-12 curriculum, one can surmise that these truths are independent of culture. On the other hand, Walls (2004), Weissglass (2002), and Tate (1997) argue that viewing mathematics as culture-free or monocultural often contribute to the underachievement of historically marginalized children.
Moreover, Ukpokodu (2011) investigated why pre-service and in-service mathematics teachers do not engage in culturally responsive mathematics teaching practices. The researcher’s findings revealed four major themes: view of mathematics as culturally-neutral; convenience and dominance of textbook-based mathematics instruction; curriculum standardization and high-stakes testing; and lack of culturally responsive mathematics teaching models to emulate. The participants in Ukpokodu’s study collectively underscored the idea, “mathematics is an abstract subject, a ‘universal language,’ that numbers are the same across time, culture, and space, and therefore, mathematics instruction does not have anything to do with culture” (p. 50).

In Adams and Glass’ (2018) study, the goal was to examine the role that teacher educators play in teaching pre-service teachers about culturally relevant pedagogy. Their findings show a resistance of culturally relevant pedagogical practices met within their program. Two participants in this study revealed that the resistance to CRP came from other faculty members while one participant revealed that resistance came from the students. The researchers’ findings also uncovered that the “need for faculty to have experiences to help them understand the theory-to-practice gap as it relates to culturally relevant pedagogy” (p. 13). One participant noted that culturally relevant pedagogy is “antithetical” to what is mandated in schools, so teachers must work hard to find a balance.

However, research exists to support the need for culturally relevant and responsive mathematics teaching as an approach for mediating learning for historically marginalized students (Bonner, 2014; Abdulrahim & Orosco, 2019;). Culturally relevant pedagogy and responsive mathematics teaching provide teachers with a pedagogy where teachers use students’ cultural backgrounds and experiences as “points of references and motivational devices to evoke student interest and involvement in academic affairs” (Gay, 2000, p.1). To accomplish this goal,
teachers must recognize that cultural capital (the skills and knowledge that students can draw on to obtain new knowledge and skills) is a strength that all children bring to the classroom (Averill et al., 2009). The problem is, however, that mathematics is often perceived by pre-service and in-service teachers as either culture-neutral or they need help in understanding culturally relevant pedagogical practices.

Purpose of the Study

Because research on culturally relevant pedagogy and responsive teaching in mathematics has relied primarily on classrooms where culturally responsive mathematics teaching (CRMT) is implemented (Harding-DeKam, 2014); a limited number of studies have addressed the development of mathematics teachers as they strive to implement culturally relevant pedagogical practices. Hence, the purpose of this study is designed to tell the story and capture the experiences and instructional practices (through in-depth interviews) of five middle school mathematics teachers as they move towards to incorporate culturally relevant pedagogical practices into their classroom instruction while responding to the needs of their students.

This study aims to understand teachers’ perception of how professional development opportunities influence teaching practices. This study examines the teachers’ attitudes and beliefs as they transition to integrate culturally relevant pedagogies into their daily routines. Although literature on culturally relevant pedagogy has been ongoing since its inception, Fasching-Varner and Seriki (2012) argue that teachers continue to struggle with culturally relevant pedagogy because CRT is a dispositional commitment. Karges-Bone and Griffin (2009) described disposition as the values, commitments, and professional ethics that influence behaviors toward students, families, colleagues, and communities and affect student learning, motivation and development as well as the educators’ own professional growth (p. 27). I also positioned this
study to understand the barriers that teachers experience as they use culturally relevant pedagogy and responsive teaching to integrate high cognitive demand tasks in their mathematics classes that are meaningful and connected to their students lived experiences.

**Significance of the Study**

This study is significant in that it examines the attitudes and beliefs of teachers’ as they move towards culturally relevant pedagogical practices. Research shows that culturally relevant pedagogy and responsive teaching are effective methods for mediating learning for historically marginalized students (Ladson-Billings, 1995; Gay, 2000). Hence, the result from this study can offer insight into understanding teachers’ disposition in ensuring equitable learning opportunities, experiences, and outcomes for historically marginalized children by making every effort to democratize mathematics education by cultivating and sustaining a positive identity in students as doers of mathematics (Aguirre et al., 2012). This study can also shed light on the extent in which professional development opportunities influence their teaching practices. The results from this study will move the educational profession forward by offering a basis in which middle school mathematics teachers can provide intentional and meaningful social and cultural learning experiences in their daily routines so that all students can flourish.

**Statement of the Research Questions**

To ensure that all children have a high-quality mathematics education, the National Council of Teachers of Mathematics (2014b) describe five essential elements of effective school mathematics programs: a commitment to access and equity; a powerful curriculum; appropriate tools and technology; meaningful and aligned assessment; and a culture of professionalism. NCTM (2014a) contends, “An excellent mathematics program requires that all students have
access to a high-quality mathematics curriculum, effective teaching and learning, high expectations, and the support and resources needed to maximize their learning potential” (p. 59). Entrenched in the need to understand how mathematics teachers mediate learning for underrepresented students, the following questions guided this study.

1. How do middle school mathematics teachers develop as culturally responsive teachers?
2. What are the perceived challenges associated with culturally responsive teaching in a middle school mathematics classroom?
3. How do middle school mathematics teachers perceive the likely impact of culturally responsive professional development to potentially impact their practices?

**Theoretical Framework**

Integrating multiple frameworks provide various scopes and lens to describe teachers’ collective methods as they aim to teach mathematics using culturally relevant pedagogy and responsive teaching practices. As illustrated in Figure 1, the theoretical perspectives for this study draw from three bodies of knowledge: culturally relevant pedagogy, culturally responsive teaching, and culturally responsive mathematics teaching. These frameworks provide a foundation for answering the research questions that guide this study.

**Figure 1**

*Three Theoretical Frameworks.*
Culturally Relevant Pedagogy

An amplified interest in culturally relevant pedagogy (CRP) has emerged in recent years. This resurgence is due in part to an increasingly culturally and linguistically diverse student population in U.S. public schools; the ongoing inequities in public education; and the relentless gaps in access and opportunities for underrepresented students (Cochrane et al., 2017). These factors provide a unique space for critical discourse where educational researchers, practitioners, and policy makers can challenge the existing educational processes, structures, and standards (Brown-Jeffy & Cooper, 2011) to build an educational system that empowers historically marginalized children (Maloney & Matthews, 2020).

With this notion in mind, Ladson-Billings posits that CRP offers educators a framework to allow underrepresented students with an opportunity to build intellectual, emotional, social, and political capacity to navigate successfully in a challenging learning environment (Ladson-Billings, 1992; 1995; 2009). Garcia and Chun (2016) argue that CRP allows learning to become more meaningful for students by integrating their cultural experiences and knowledge in classroom routines. Current studies show that CRP is used to provide strategies for pedagogical and teaching practices (Chapman, 2007; Roberts, 2010; Maloney & Matthews, 2020). Culturally relevant pedagogy also provides a lens for one to critique the standards and curricula (Ladson-Billings, 2003; Vasquez et al., 2012; Maloney & Matthews, 2020). Ladson-Billings’ CRP model rests on three tenets: academic success, cultural competence, and critical consciousness (Ladson-Billings, 1995).
The first tenet of Ladson-Billings’ (1995) model focuses on student learning and academic achievement for all students compared to focusing on student behavior and classroom management (McCarther & Davis, 2017; Sciuchetti & Ysel, 2019). Ladson-Billings has written extensively about the notion that teachers must demand and reinforce academic excellence from their students by providing them with access to a challenging curriculum and attending to their academic needs. Timmons-Smith and Warner (2016) concur with Ladson-Billings (1995) assessment by asserting that CRP must entail not only setting high standards to empower students, but also stimulating students’ intellectual curiosity to develop new knowledge. Although Ladson-Billings did not explicitly define academic success in her study, she explained that students must obtain social and political skills as well as academic skills in literacy, numeracy, and technology to successfully participate in a democracy. Ladson-Billings posits that to produce academic excellence, teachers must inspire their students to choose academic success. This notion is highlighted in Irvine’s (1990) research on cultural synchronization which revealed that student achievement is directly linked to teacher’s expectations. Enyedy and Mukhopadhyay (2007) takes this notion one step further by adding that students must have access to learning opportunities so they can be successful in developing mathematical reasoning skills and learning key concepts.

Johnson and Elliott (2020) used CRP as a model for cultural transformation in the STEM department at a predominantly White university. Although Johnson and Elliott aim for this study was geared towards the STEM department at a university, the researchers offer a model to help all students achieve academic success. From this guide, mathematics teachers can glean valuable information to help their students experience academic success in an inclusive environment. For example, Johnson and Elliott (2020) contend that teachers should focus on students’ strengths
and not their deficits by positioning students as capable learners and doers of mathematics by allowing students to share power in the classroom. When sharing power in the classroom, the students participate in making decisions about classroom instruction, practices, curriculum, and assessment (Cornelius & Herrenkohl, 2004). I believe that power sharing practices encourage students to take ownership in their education and hold them partially responsive for their academic success. The Johnson and Elliot (2020) also recommend that teachers use group work strategically to avoid isolating underrepresented students. Moreover, teachers are encouraged to structure their lessons so that students can demonstrate mastery in multiple ways.

The second tenet in Ladson-Billings’ (1995; 2009) CRP model is cultural competence. Ladson-Billings’ viewed cultural competence as a vehicle for helping students make connections between their culture, the curriculum, and new knowledge and skills (National Education Association [NEA], 2011). Jett et al. (2015) contend that cultural competence in mathematics helps students construct positive cultural identity by incorporating mathematical discourse with familiar home-life scenarios to reflect the ways in which students experience and learn mathematics (Ortiz & Davis, 2020).

Gay (2010) points out that teachers must routinely integrate multicultural resources to support the curriculum and standards. Isaacs and Benjamin (1991) add that school leaders and teachers should know their students and understand how an individual’s beliefs and behaviors are influenced by their social and cultural backgrounds. Johnson and Elliott (2020) identified several characteristics to help ensure cultural competence in an inclusive STEM learning environment. The researchers contend that teachers should establish an environment where all students feel they belong without sacrificing their cultural identities; allow student to have buy-in and voice to prevent unintentional biases; combat the stereotypes of mathematicians and
scientists as White men; and stress that success in mathematics and science are derivatives from practice and collaboration. Johnson and Elliott’s (2020) recommendation resonate with me because cultural competence allow students to learn mathematics from their own cultural background but learn how other cultures influence the development and learning of mathematics.

Critical consciousness, or sociopolitical consciousness, the third tenet in Ladson-Billings’ (1995; 2009) CRP model, is a derivative of critical theory (Freire, 1970), social justice, and empowerment. This tenet allows students to critique the cultural norms, the values, systems, and the power relationships between dominant and non-dominant cultures and races (Giroux, 2003) while critiquing and reflecting on institutions and infrastructures that produce and perpetuate social inequalities (Ladson-Billings, 1995; 2009). In mathematics, Ortiz and Davis (2020) argue that the tasks teachers select must connect to their students’ sociopolitical realities. Cochran-Smith (1999) posits that teaching for social justice is a process that requires teachers to adapt to the context in which their students are immersed.

Ladson-Billings (1995) contends that culturally relevant pedagogy is what teachers do in their classroom to ensure that all students are academically successful. She emphasizes that CRP is not a bag of tricks or a list of strategies that support some students and not others. The power of culturally relevant pedagogy lies in what teachers believe about culturally and linguistically diverse children (Adams & Glass, 2018).

**Culturally Responsive Teaching**

Culturally responsive teaching (CRT) can be viewed as an umbrella encompassing successful pedagogical practices for African-American children. It is often referred to as culturally relevant teaching, culturally sensitive pedagogy, or culturally congruent pedagogy (Gay, 2000; Bonner & Adams, 2012). West-Olatunji et al. (2006) contend that CRT seeks to
recapture control of the education of African-American communities by valuing students’ cultural capital which is often negated with the context of Western ideology of teaching and learning. Bonner and Adams (2012) argue that culturally responsive teaching is a “framework where students are viewed as cultural beings with cultural filters (Gay 2000) through which all information is filtered” (p. 32).

In Gay’s earlier work, she defines CRT as a framework for “using the cultural knowledge, prior experiences, frames of references, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them. It teaches to and through the strengths of these student” (Gay, 2000, p. 29). Nieto (2004) and Gay (2010) contend that when teachers are responsive to the needs of their students, the students generally feel valued and more capable of learning. Because education is not static, Gay (2010) revised her original definition of CRT to “…using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them” (p. 31). Gay offers eight qualitative dimensions for culturally responsive teaching. She notes that culturally responsive teaching is validating and affirming, comprehensive and inclusive, multidimensional, empowering, transformative, and emancipatory (Gay, 2018). Research shows that the dimensions are designed to work together to increase student engagement and achievement (Abacioglu et al., 2020). However, the impact of CRT on teaching practices, specifically, mathematics is still unclear (Thomas & Berry, 2019).

Culturally responsive teaching is validating and affirming because “it acknowledges the legitimacy of the cultural heritages of different ethnic groups, both as legacies that affect students’ dispositions, attitudes, and approaches to learning and as worthy content to be taught in the formal curriculum” (Gay, 2018, p. 37). Hence, Gay contends that a positive self-concept, or
instilling pride in one’s own ethnic identity is paramount to improving academic achievement. Teaching practices that validating and affirming use multifaceted instructional strategies that are connected to different learning styles. Culturally responsive teaching is comprehensive and inclusive. Culturally responsive teachers teach the whole child by developing social, emotional, intellectual, and political comprehensive learning opportunities (Gay, 2000; 2010; 2018). Moreover, Gay offers three attributes of inclusiveness:

Addressing students across the entire educational spectrum, from preschool to graduate studies; targeting both minority and majority students, but for different reasons and in different ways; and developing cultural border-crossing skills for navigating different living and learning contexts for native and immigrant students. (Gay, 2018, p. 38)

That is, comprehensive and inclusive teaching practices where students are held partly responsible for their own education as well as hold their classmates accountable.

Culturally responsive teaching is multidimensional because it “encompasses curriculum content, learning context, classroom climate, student–teacher relationships, instructional techniques, classroom management, and performance assessments” (Gay, 2018, p. 39). Culturally responsive teaching is also empowering because it encourages students to believe that they can succeed. It encourages personal confidence, accountability, responsibility, and academic competence. In addition, culturally responsive teaching is transformative. That is, it defies traditional educational practices by making academic success a nonnegotiable mandate for all students (Gay, 2018). Transformative teaching practices help students navigate through racism, prejudice, and other forms of exploitation and oppression (Thomas & Berry, 2019). Culturally responsive pedagogy is liberating in that it “releases the intellect of students of color from the
constraining manacles of mainstream canons of knowledge and ways of knowing” (Gay, 2018, p. 42). That is, students are free to concentrate more thoroughly on academic learning tasks whereby increasing student learning and academic achievement. Overall, CRP and CRT two frameworks design to improve the educational learning experience for African American students. CRP, on the other hand, serves double duty because not only is it a framework, but it is also a pedagogy which implies it is a way of thinking, doing, and being.

**Culturally Responsive Mathematics Teaching for Historically Marginalized Students**

Bonner (2010), a pioneer in culturally responsive mathematics teaching (CRMT), points out that teacher beliefs are primary factors in CRMT. She contends that teacher’s true and unwavering beliefs that children can succeed in mathematics must be at the forefront. Bonner continues by stating that “personal assumptions must be examined, and the educator must truly believe that children can excel in mathematics without qualifiers” (p. 36). Bonner also points out that there are four cornerstones to CRMT: knowledge, relationships/trust, communication, and constant revision and reflection.

The first cornerstone, content knowledge and pedagogical knowledge include understanding and analyzing students’ errors and present the concepts in accessible ways to meet the needs of all learners. The second cornerstone, relationships and trust in mathematics refer to building a rapport with the students and their families and the community. By doing this, a bond if formed and a sense of trust is established where the families know that the teacher’s moral imperative is the students’ best interest. Relying on several modes of communication, the third cornerstone, with the students’ family and their families is paramount. Because there is still a digital divide, it is important to communicate with families whose may not have access to internet or other technology devices. Moreover, cultural communication is vital in an inclusive
classroom. The fourth cornerstone, constant revision and reflection. Bonner contends that reflection is a process and “teachers must be willing to change” (Bonner, 2011, p. 39). Bonner laid the groundwork for CRMT and scholars expanded this framework to discover new knowledge for the change society.

To meet the growing academic complexities and cultural diversities of today’s mathematics classrooms, researchers Aguirre et al. (2012) developed a framework for culturally responsive mathematics teaching (CRMT), see Figure 2, by pairing pedagogical content knowledge (PCK), (Shulman, 1986) with culturally responsive teaching (Gay, 2000; Ladson-Billings, 2001).

**Figure 2**

*A Framework for Culturally Responsive Mathematics Teaching (Aguirre et al., 2012).*

Aguirre et al. (2012) used culturally responsive mathematics teaching to shed light on the types of knowledge and experiences that teachers need to meet the needs of the diverse learners. These researchers found four focused themes in teaching mathematics: children’s mathematical
thinking, language, culture, and social justice (Grossman et al., 2005; Sowder, 2007). On the other hand, Hernandez et al. (2013) model of culturally responsive science and mathematics teaching was developed to fill the gap for a comprehensive and inclusive guide in preparing and assessing teacher’s readiness for culturally responsive teaching. These researchers noticed five reoccurring themes: content integration, facilitating knowledge construction, prejudice reduction, social justice, and academic development.

In a synthesis of scholarship that examined culturally relevant pedagogy and culturally responsive teaching in pre-kindergarten through 12th grade mathematics classes, Thomas and Berry (2019) found that teachers’ practices, classroom interactions, and students’ experiences yielded five focus areas: caring, contexts, cultural competency, high expectations, and mathematics instruction (Thomas & Berry, 2019). Figure 3 illustrates themes developed from each body of research. While examining the three perspectives on culturally relevant pedagogy and responsive teaching for mathematics, I noticed that children’s mathematical thinking (Aguirre et al., 2012) is not a principle of CRP or CRT. However, children’s mathematical thinking yields itself to academic development, facilitating knowledge construction (Hernandez et al., 2013) and high expectations (Thomas & Berry, 2019). Together, the themes assist children in fulfilling the culturally relevant pedagogy tenet – academic achievement (Ladson-Billings, 1994), while at the same time satisfying the culturally responsive teaching (Gay, 2010) notion that culturally responsive teachers provide students with opportunities to develop in learning important mathematics while maintaining their cultural identity. Social justice (Aguirre et al., 2012) and prejudice reduction (Hernandez et al., 2013) are imperative in understanding how mathematics fits in understanding sociopolitical consciousness (Ladson-Billings, 1994). According to Ladson-Billings, teachers can help underrepresented children “to understand the
world as it is and equip them to change it for the better” (p. 139). This notion can manifest itself through the activities and performance tasks where students use mathematics to critique social inequalities.

Moreover, Ellis (2019) offers a definition for culturally responsive mathematics teaching. He states that:

CRMT is premise on creating a learning environment focused on mathematical sense making in which each student feels valued for who they are, for their ways of engaging in mathematical reasoning, and for their contributions to the collective success of those within the classroom community. (Ladson-Billings, 1995; 2009; 2014; Aguirre & Zavala, 2013).

Figure 3

*Focused Elements and Themes in Culturally Responsive Teaching Mathematics*
Limitations, Delimitations and Assumptions

Limitations

The limitations are that the study conclusions and analyses are limited to five middle school mathematics teachers from the same school district. Further, there is a limitation of generalization. In addition, the primary data sources for this study were limited to interviews and public documents.

Delimitations

The data collected for this study is derived primarily from teacher interviews. Another potential delimitation is the participants could create their own definition of academic success.

Assumptions

The following assumptions were made prior to this study. This study assumes that all participants in this study answered truthfully to the best of their abilities. The researcher also assumed that all the data was entered correctly.

Definitions of Terms

- **Agency** refers to the strategic making and remaking of oneself through learning activities where the individual is given voice and choice to determine what they learn and how they learn it (Lewis et al., 2007; NCTM, 2020).

- **Cultural competence** refers to the understanding of an individual or a group of people standards and practices and using that knowledge to engage students and produce a better outcome (Isaacs & Benjamin, 1991, Davis, 1997, Dornoo, 2015).

- **Cultural Funds of Knowledge** refers to the academic and personal knowledge developed through one’s accumulated life experiences and cultural practices that he or she uses in their everyday lives (Esteban-Guitart et al., 2019).
• **Culturally Relevant Pedagogy** refers to a framework for teaching and learning that empowers students socially, emotionally, intellectually and politically by using one’s cultural and linguistic referents to improve academic achievement, raise social and political awareness, and increase cultural competence (Ladson-Billings, 1995; Gay, 2000).

• **Culturally Responsive Teaching** refers to the power that teachers have to support diverse learners by building on their cultural background and experiences, and frames of reference, to make learning more relevant to their daily lives by teaching through the strengths of students (Gay, 2000; Hiebert et al., 2007).

• **Culture** refers to the complex system of social values, cognitive codes, behavioral standards, and beliefs used to give meaning to one’s own life as well as the lives of others (Delgado-Gaitan & Trueba, 1991; Gay, 2000).

• **Deficit paradigm** refers to the belief that culturally and linguistically diverse students are unsuccessful in school because of their own shortcomings, or their families do not value education (Hammond, 2015).

• **Digital divide** refers to the gap between those students who do or do not have access to technology (Vogel et al., 2020).

• **Educational debt** refers to the foregone accumulation of educational resources that should have been allocated to educate low income children (Ladson-Billings, 2006).

• **Educational deficit (funding)** refers to when the amount of funding that is needed to effectively educate children exceeds the amount of funding the children receive over a period of time (Ladson-Billings, 2006).
• **Educational deficit** (academics) refers to when the amount of learning that is needed for children to meet the standards exceeds the amount of learning that should have been acquired over a period of time (Ladson-Billings, 2006).

• **Emerging Culturally Relevant and Responsive Mathematics Teacher** refers to equity oriented teachers who have a desire to create learning environments where students’ interests, cultural, and linguistic backgrounds are integrated in the teachers’ daily lesson plans and instructional practices (Boaler & Staples, 2008).

• **Professional Development** refers to providing faculty and staff with opportunities to grow professionally and personally (Schwartz & Bryan, 1998) by improving their skills, competencies, methodologies, and knowledge (Truitt, 1969; Hassel, 1999).

• **Unitary Status** refers to when a school district has eliminated the effects of past segregation to the extent practicable.

**Organization of the Following Chapters**

This chapter introduced the study by providing a rationale and a framework for understanding how emerging culturally relevant and responsive mathematics teachers mediate learning for culturally and linguistically diverse student. Chapter 2 is a review of the literature offering a historical perspective for the need for culturally relevant and responsive mathematics teaching. Chapter 3 includes the process for selecting participants for this study. It also includes an in-depth discussion of the methodological procedures and data collection processes for this study. Chapter 4 will present an analysis of the data collected. Chapter 5 will conclude the study with a discussion of the findings and the themes that emerged from this study. This chapter also addresses implications for practice and future research.
CHAPTER TWO: REVIEW OF THE LITERATURE

Dennis Van Roekel and John I. Wilson, the former president and executive director, respectively, of the National Education Association are credited with writing this statement:

Our nation can no longer be satisfied with success for some students. Instead, we must cultivate the strengths of all. An educational system designed to serve all students well will require educators with the skills, knowledge, and attitudes to value the diversity among students. (National Education Association [NEA], 2011, Forward).

This declaration prompts critical conversations pertaining to the challenges and the opportunities of ensuring the academic success for culturally and linguistically diverse students. The National Alliance of Black School Educators (NABSE) use their platform, “Education is a Civil Right,” to underscore the connection between academic and cultural excellence in education (NABSE, 1984; King et al., 2013). In the NABSE Task Force Report (1984), Hilliard and Sizemore argue that academic excellence is a derivative of cultural excellence:

African American children must be given the opportunity to experience an appropriate cultural education which gives them an intimate knowledge of and which honors and respects the history and culture of people… [This means] preparing students for self-knowledge and to become a contributing problem-solving member of his or her own community and in the wider world as well. (NABSE, 1984, p. 23).
Thus, the focus of this chapter is to understand the importance of culturally relevant pedagogy and responsive mathematics teaching practices to mediate learning and to improve academic achievement and success for historically underrepresented students. In the following sections, I begin with the educational debt versus the achievement gap, then I consider what the research reveals about the need for culturally relevant pedagogy and responsive teaching in U.S. Schools, a shared vision for mathematics education since 1989, and culturally responsive teaching in secondary mathematics. The chapter ends with a brief discussion pertaining to repurposing professional development to support sustainable educational reform.

**The Educational Debt versus the Achievement Gap**

Improving classroom instruction to increase student achievement in mathematics for historically marginalized children (Rittle-Johnson & Jordan, 2016; Gutiérrez & Dixon-Román, 2010) is imperative because research shows that culturally and linguistically diverse children “have not been achieving in school as well they should (and can)” (Gay, 2000, p. 1) on standardized tests, high school graduation rate, and college matriculation (Zuniga-Hill & Barnes, 1995; Haycock, 1998; National Center for Education Statistics [NCES], 2004, 2019; Ukpokodu, 2011). The 2019 National Assessment of Educational Progress, (NAEP), report card for 8th grade mathematics revealed that 31% of White students, 16% of Hispanic students and 11% percent of Black students, scored at the proficient level. At the same time, 13% of White students and 4% of Hispanic students scored advanced on the NAEP while 2% of Black students scored at the advanced level on the same assessment (National Assessment of Educational Progress [NAEP], 2019).

On the surface, one can surmise that these disparities in achievement are due in part to these children’s family’s socioeconomic status (SES) (Shields, 2003; Lacour & Tissington, 2011;
Hong & Ho, 2005; Shonkoff, 2017) or their families do not value education (Hammond, 2015). Waxman and Padron (1995) offer that teacher quality is the culprit (Phillips & Flashman, 2007). These deficit narratives have been entrenched in educational research psyche since the landmark study, *The Equality of Educational Opportunity Report*, which is often referred to as the Coleman’s Report. This report indicates that the students’ families educational background is one of the primary contributing factors of how well children learn and succeed in school (Coleman et al, 1966). This report also suggested that public education in America continued to be vastly segregated; therefore, the educational quality for Black and historically marginalized students were weakened because the lack of access to a rigorous curriculum and resources, highly trained and skilled teachers, and the overall substandard school facilities.

However, more recent research and scholarship have rejected explanations that poverty, the number of parents in the home, and parent participation are the contributing factors for the low performance of these students (Delpit, 2012). Boykin and Noguera (2011) state that such explanations tend to “…blame students, their parents, and communities for failure and underachievement” (p. 32). Instead, Ladson-Billings (2006) challenges Coleman’s notion by offering a counternarrative to these claims made about the underachievement of historically marginalized students. Ladson-Billings has grappled with the issue of whether what we are encountering an achievement gap or something else (Carter & Welner, 2013). Ladson-Billings (2006) posits that these disparities in achievement are not because there is an “achievement gap” but because there is an “educational debt.” She emphasizes that these disparities are the result of historical, economic, political, and moral decisions that were made over time (Carter & Welner, 2013). The “educational debt” is the result from a deliberate infrastructure that has neglected and
failed to provide the necessary resources to educate indigenous, and historically marginalized children over multiple generations.

In Ladson-Billings’ 2006 Presidential Address to the American Educational Research Association (AERA), she stated, “We do not have an achievement gap; we have an education debt.” Ladson-Billings explained that since the birth of this nation, the educational system in the United States has been marred by court decisions, legislative actions, and public policies, that denied indigenous, culturally, and linguistically diverse children access to a high-quality education (Marshall & Gerstl-Pepin, 2005; Ladson-Billings, 2006; Burton, 2013). The education debt is the foregone accumulation of educational resources that should have been reserved to educate low income children (Ladson-Billings, 2006; English, Lambert, & Ialongo, 2016). Overall, Ladson-Billings argue that educational researchers should move beyond achievement discourse and address the debt owed to historically marginalized students in education.

Numerous educational scholars offer counternarratives to the Coleman’s report and the achievement gap. Irvine (2010) contends that attention should be place on closing gaps that shape our beliefs in the achievement gap. Irvine argues that achievement can improve by closing “the teacher quality gap; the teacher training gap; the challenging curriculum gap; the school funding gap; and the digital divide gap” (p. xii). Milner (2012) asserts that educational researchers, practitioners, and reformers should focus on the inequitable opportunity gaps that exists in educational practices underrepresented students. While scholars propose theories to explain the disparities in achievement between indigenous, culturally, and linguistically diverse learners and their White counterparts, Ladson-Billings (1995) offers culturally relevant pedagogy as a means for paying down the educational debt and increasing academic achievement and success for all students.
The Need for Culturally Relevant Pedagogy and Responsive Teaching in U.S. Schools

In the United States, 52% of children who attend public schools are from culturally or linguistically diverse backgrounds (McFarland et al., 2017); in contrast, 82% of the teacher workforce is White (Goldring et al., 2013; Wachira & Mburu, 2019). The cultural differences between the students and their teachers often create significant challenges that impact the quality of teaching and learning (Heitner & Jennings, 2016; Gay 2013; Gay 2010). This imbalance poses a need for preparing and supporting teachers to effectively teach students whose culture and backgrounds differs from their own (Gay, 2000; Gollnick & Chinn, 2004; Ladson-Billings, 1994; 2001; Brown-Jeffy & Cooper, 2011).

Research shows that cultural compatibility between the students and their teachers can provide children with a framework for understanding the importance of academics in their lives which generally leads to achievement and success (Colombo, 2005; Whaley & Noël, 2012). Although many U.S. classrooms show a cultural imbalance between the students and their teacher, extensive research shows that imbalanced cultural compatibility can be mitigated if the teachers understand their students’ cultural funds of knowledge (Delgado-Gaitan & Trueba, 1991; Ogbu, 2001; Colombo, 2005). This challenges teachers to know their students and their families in order effectively to meet their students’ individual needs and to improve learning (Colombo, 2005; Whaley & Noël, 2012; Johnson & Gonzalez, 2014; Esteban-Guitart, Lalueva, Zhang-Yu & Llopart, 2019).

Ladson-Billings (1995) and Gay (2000) seminal work on culturally relevant pedagogy and culturally responsive teaching respectively provide teachers with a blueprint for engaging and improving the academic performance of African-American students. However, Winn and Johnson (2011) suggest that culturally relevant pedagogy can extend beyond African-American
students. Winn and Johnson work shows that culturally relevant pedagogy is an effective approach to facilitate the learning of all students by “humanizing, respecting, and considering the histories, perspectives, and experiences of all students as it relates to their academic success, cultural competence, and critical consciousness” (Johnson & Gonzalez, 2014, p. 18). Culturally responsive teaching (CRT) recognizes the power that teachers must influence and support student learning while responding to the needs of their students to achieve excellence (Gay, 2000; Hiebert et al., 2007).

Understanding the role that culturally relevant pedagogy (CRP) plays in improving mathematics education is imperative. Culturally relevant pedagogy is a theory developed by Gloria Ladson-Billings (1995) after studying successful teachers of African-American students. Ladson-Billings builds on Shulman’s (1987) conceptualized pedagogy which emphasizes subject matter knowledge, pedagogical knowledge, and pedagogical content knowledge as well as Irvine’s (1990) research on cultural synchronization. Cultural synchronization emphasizes the need for teachers to build interpersonal relationships with African-American and underrepresented students for them to develop and demonstrate academic competencies while integrating in mainstream environments (Irvine, 1990). Ladson-Billings (1995) extends this notion into what she calls “culturally relevant pedagogy.”

In CRP, teachers help students develop necessary skills in academic settings. Ladson-Billings points out that CRP is not a prescribed list of strategies that is designed help students who have been historically undervalued or underrepresented to pass state tests, she proclaims that culturally relevant pedagogy and culturally relevant teaching is “just good teaching” (Ladson-Billings, 1995). Ladson-Billings adds that culturally relevant teaching empowers students to make connections between the classroom and the world around them by using
cultural references to stimulate students’ intellectual curiosity towards the social, emotional, and political landscape around them. Gutiérrez (2009) expands on this notion. She explains that mathematics education needs to be transformative where students can develop identity and agency as a mathematical learner. To that end, there is a strong need for culturally relevant teaching in the mathematics classroom because CRT and CRP empower teachers with the abilities to respond and incorporate students’ cultural experiences at home with their experiences in the classroom to ensure academic success for all.

A Shared Vision for Mathematics Education since 1989

The shared vision among equitable mathematics education in the U.S. is for all students to have access to a high-quality and engaging mathematical instruction and experiences. Unfortunately, there is overwhelming evidence that shows Black, Latinx, Indigenous, English language learners, and other historically marginalized learners do not have the same access to a high-quality mathematics program as their White counterparts (NCTM, 2020). Disadvantaged students often learn facts and procedures versus developing mathematical conceptual understanding which implies that these students are less likely to retain important information or reconstruct formulas that they may have forgotten (Stein et al., 1996; Lubienski, 2007).

In response to the disparities and lack of opportunities to learn important mathematics, NCTM proposes that school districts provide all students with competent and knowledgeable teachers coupled with a technology infused mathematics curricula (NCTM, 2000, 2014, 2018). The teachers develop clear and explicit learning goals of what mathematics students are to learn and understand after the implementation and discussion of the lesson. It is imperative that teachers promote students’ “positive mathematical identities and strong sense of agency” (NCTM, 2020, p. 6) by providing their students with opportunities to expand their learning
experiences outside of the classroom for them to acquire new and enriching knowledge (NCTM, 2000, 2017; Pugh et al., 2017).

To ensure that every student has a well-prepared mathematics teacher, Morris et al. (2009) explore the emergence of a new and promising specialized body of knowledge—“mathematical knowledge for teaching” (MKT) which is rooted in the notion that practicing teachers should acquire knowledge, skills, and temperament that will allow the teachers to reflect on their practices and improve overtime (Ball, 2003). The researchers contend that instead of equipping teachers with expert teaching strategies which may become obsolete over time, a new approach is needed to provide sustainable the transferable growth over time.

The researchers proposed that teacher preparation programs should focus on preparing teachers to learn how to analyze teaching in terms of student learning. Hiebert et al. (2007) identified two types of competencies that effective mathematics teachers must systemically and analytically practice: subject matter knowledge for teaching and develop and hypothesize a cause-effect relationship between teaching and learning. That is, understanding the relationship between what is taught, how it is taught, and to whom it is taught are critical components in ensuring that all students have access to a high-quality mathematics education. This includes being responsive to students’ interests and needs by building on students’ prior knowledge, intellectual strengths, and providing students with reasonable and appropriate accommodations to attain academic success (NCTM, 2000, 2017).

**Teachers’ Expectation and Students’ Achievement**

Gentrup et al. (2020) research on child development revealed that children’s educational achievements and outcomes are affected by their teacher expectations from the first days of schools. Research indicates that everyone has biases whether the biases are intentional or
unintentional (Rossett, 2008). As a result, teachers often bring these biases into the classroom and project them onto their students. Gentrup et al. (2020) grapple with teachers’ predisposition about their students. The researchers contend that the teachers create inaccurate assumptions and expectations about their students and create a classroom environment where the teachers’ initial assumptions are manifested. For instance, if the teacher has high regards for a certain student, then the expectations for that student will manifest in the teacher-student interactions and relationship. The teacher will generally provide the student with additional help and support to ensure the student meets the expectations and learning goals. It follows that the student will respond to meet the teacher’s original expectations that were generated for the individual students on the first day.

Researchers struggle with teacher biases in the classroom in terms of setting high expectations for one group of students and not all students. In mathematics classrooms, teachers’ expectations for their students are often manifested in the lesson designs, how much time and resources are spent to meet the needs of their students. Unfortunately, these gaps or inequities often leads to the miseducation of historically marginalized children (Haberman, 1991; Jussim et al., 1996; Ladson-Billings, 1997).

According to Tate (1997), teacher expectations and perceptions have a significant effect on eighth grade students and their performance in mathematics. Jussim et al. (1996) found that teacher expectations were almost three times greater for White children than for African American children. This was evident in the teachers’ instructional practices, the complexity of the assignments, and the depth of knowledge of the questions posed to the students. Lewis and Norton (2000) suggest that there is a strong correlation between expectations and academic achievement. They contend that schools with high levels of academic achievement consistently
demonstrate high expectations and goals supported by data-driven collaboration and ongoing assessment.

After pondering over the literature pertaining to the relationship between teachers’ expectations and student achievement, the positionality of this study is mathematics teachers must intentionally challenge any form of oppression and biases inside or outside the classroom. The National Council of Teachers of Mathematics advocates for purposefully using mathematics as an analytic tool to challenge power, privilege, and oppression (NCTM, 2014a). Ladson-Billings (1997) adds that effective teachers express high standards and expectations for their students’ achievement, responsibility, and accountability for striving to meet those expectations. Low academic expectations, however, often result in unprepared students for the next level of study or work. Moreover, Ladson-Billings (1997) explained that mathematical pedagogy is a viable instrument teacher can use to create high expectations for their students. She used the phrase, “the pedagogy of poverty” to include routine teaching acts giving information, asking questions, giving, and reviewing tests, punishing noncompliant students, and giving grades (Haberman, 1991). To move forward, mathematics teachers must focus on maximizing learning for all students by creating learning experiences and opportunities that will help the most vulnerable students develop a sense of identity and agency in the mathematics classroom.

The Role of Identity in a Mathematics Classroom

Sfard and Prusak (2005) argue that identity in mathematics is the “missing link” in the “complex dialectic between learning and its sociocultural context” (p. 15). Darragh (2016) posits that identity is a lens that allows one to articulate equity and access problems in mathematics for historical marginalized children. Darragh established this position by examining, synthesizing, and critiquing 188 articles that focused on the interactions of the individuals with mathematics
and mathematics education or their positionality within the wider socio-political context.

Darragh extends on Connelly and Clandinin (1990) narrative inquiry, an examination that makes use of the stories people tell, to help make sense of underrepresented students learning experiences while building identity in mathematics. Darragh notes that Martin’s (2000; 2012) defines identity as a set of beliefs that are negotiated while Kaasila (2007) points out that identity in mathematics is like a “mathematical biography.” Kaasial (2007) used narratives to find poignant stories concerning culturally and linguistically diverse children’s experiences while learning mathematics.

Allen and Schnell (2016) contend that middle school children who lack confidence in their abilities to learn mathematics well often succumb to a fixed mindset that generally stunts their mathematical growth and career trajectory. To oppose this notion, the NCTM (2020) recommends providing every study access to high-quality mathematics teaching and learning instruction that cultivate students’ positive mathematical identities so that students can “develop deep mathematical understanding; understand and critique the world through mathematics; and experience the wonder, joy, and beauty of mathematics” (p. 7). Lave (1996) and Gee (2001) made the claim that learning can be create shifts in one’s identity. The continue by explaining that new identities are formed with new knowledge. They believe that children can learn not only content but how to think and like mathematicians.

Heyd-Metzuyanim et al. (2016) explained that studying mathematical identity faced major pitfalls because it lacked a clear definition. Early definitions of mathematical identity included “collections of stories about persons” (Sfard & Prusak, 2005, p. 16). The narrative evolved to include “beliefs,” “perceptions of self,” and “perceptions of mathematics” (Bishop, 2012). Aguirre et al. (2013) define mathematical identity as “disposition and deeply held beliefs
that students develop about their ability to participate and perform effectively in mathematical contexts and to use mathematics in powerful ways” (p. 14). Allen and Schnell (2016) offer a more general definition of identity by stating, “it refers to how people see themselves and how other perceive them, taking into account personal histories, abilities, character, and culture” (p. 400).

It is imperative that teachers provide their students with authentic learning experiences and opportunities where students are encouraged to take risks, engage in productive struggle, and understand themselves as doers of mathematics (NCTM, 2020). Thelen (1949) contends that teachers should help their students make connections between the curriculum and the world beyond the classroom (Parkay et al., 2010). To achieve this goal, Heyd-Metzuyanim et al. (2016) contend that developing an inclusive mathematical community where students actively participate in their learning is the key in developing mathematical identity. That is, children are given space and time to make and remake their identities based on new ideas, discourses, and participation in various learning activities (Lewis et al., 2007).

The Role of Agency in a Mathematics Classroom

Critical consciousness, the third component in Ladson-Billings’ (1995; 2009) culturally relevant pedagogy model, allows students to critique and ask questions about their lives and utilize mathematics to challenge injustices (NCTM, 2020). Gutiérrez (2007) contends that “students need to have opportunities to see themselves in the curriculum (mirror) as well as have a view onto a broader world (window)” (p. 3). This concept allows teachers to provide students with space to develop a sense of mathematical agency where the students learn to make meaningful social and personal connections between mathematics and the world around them (Berry, 2018; NCTM, 2020). The development of agency is an integral part of learning (Holland
et al., 1998) which is often motivated by a need to understand something Kress (2003). However, Boaler and Greeno (2000) argued that students often lose mathematical agency because traditional learning environments that are dominated by procedural mathematics and fail to help students make connections with the world around them.

Bartell et al. (2017) grappled with this issue and offered ten guidelines as a focal point for critical conversations pertaining to sustainable and equitable mathematical practices. The researchers linked these ten guidelines to the eight Standards for Mathematical Practice (SMP) and provided situations in which these guidelines could be implemented. The researchers contend that teacher must provide students with meaningful and relevant learning opportunities and experiences that give students voice and choice. The guidelines represent reoccurring themes in Bartell et al. (2017) study: draw on students’ fund of knowledge; establish classroom norms for participation; position students as capable; monitor how students position each other; attend explicitly to race and culture; recognize multiple forms of discourse and language as a resource; press for academic success; attend to students mathematical thinking; support the development of sociopolitical disposition (Bartell et al., 2017, pp. 11-12).

To fully understand the relationship of disposition to agency, (Swafford & Findell, 2001), Bishop (2012) used discourse analysis to describe the importance of discursive patterns in the interactions of two 7th-grade mathematics students, Bonnie and Teri, using technology-based, curricular unit, SimCalc and MathWorlds. The results show that students’ peer-to-peer discourse patterns show the way people talk and interact are powerful influences on who they are, and who they can become, with respect to mathematics. The researcher notes that also notes that identities are important because they affect whether and how we engage in activities, both
mathematical and otherwise, and how one’s attitudes, dispositions, emotional development, and general sense of self-worth plays a major role in learning important mathematics.

Practicing educators can glean from this article that Bonnie and Terry’s classroom teacher was unaware that the two obtained inequitable identities that lead to the disproportionate student-to-student discourse. Therefore, monitoring student talk enables one to identify who participates and how, who does not participate and why, and what kinds of mathematics identities students are enacting which are using an authoritarian voice, making statements of inferiority or superiority, engaging in face-saving moves, building solidarity, and encouraging one another, and controlling problem-solving strategies.

Culturally Responsive Teaching in Secondary Mathematics

Culturally responsive teaching requires attention in secondary mathematics because mathematical competence is vital in being competitive in a dynamic and global economy. More importantly, mathematics is one of the two primary modes of intellectually engaging the world through words and numbers (Laidlow, 2004; Rattan et al., 2018; NCTM, 2018). It is argued that the greatest indicator of intellectual power is the ability of combining words with numbers (Laidlow, 2004).

To embrace the idea of combining words with numbers to intellectually engage the world, Cuoco et al. (1996) recommends the “habits of mind” curriculum where the focus is shifted from teaching students’ mathematical procedures in isolated mathematics courses to helping students adopt ways that mathematicians think about mathematics, algorithms, problems, and the world around them. They argue that students need to learn how to recognize and challenge ill-posed statements where either the solution does not exist, or the solution is not unique. This type of curriculum organization is designed to close the gap between what
mathematicians do and say by allowing students to create, invent, conjecture, and experiment with mathematics.

Because “habits of mind” focuses on thought processes and stimulating one’s curiosity by decomposing ideas, putting them back together, and observing what will happen if something is left out, one can argue that the habits of mind curriculum is a form of CRT and CRP in mathematics. Like CRT and CRP, the habits of minds curriculum help students achieve academically by providing them with a rigorous curriculum with culturally relevant instruction while allowing students to view themselves as mathematicians, problem solvers, and researchers. In CRT, teachers build learning capacity in all students (Gay, 2000; Hammond, 2015). To build mathematical capacity, students learn to effectively analyze and evaluate evidence, claims, and beliefs to make informed decisions to new problems. Moreover, in CRP, the teachers help their students experience academic success while developing a critical consciousness to challenge the current social order. That is, students learn to analyze how the parts of a whole interact with each other to produce the intended outcome in a complex system (Ladson-Billings, 1995; Cuoco et al., 1996; NCTM, 2018).

Teachers can help students reach their maximum potential as learners by providing them with tasks that are within their zone of proximal development (ZPD) (Vygotsky, 1997). That is, the difference in what a learner can do with help and what the learner can do without help which Vygotsky refers to as student’s capacity for learning. Stein et al. (1996) also support building students’ capacity to learn important mathematics by emphasizing the importance of providing students with meaningful tasks to promote mathematical thinking and reasoning. Understanding students’ ZPD is important when designing culturally relevant lessons. Knowing students’ ZPD
in a mathematics class can help the teacher position the student for academic achievement by incorporating tasks where the student can be successful while learning important mathematics.

For students to develop interconnected understanding of mathematics, students need to engage in the process of mathematical thinking by looking for patterns, making conjectures, inventing, explaining and challenging one’s and other’s ideas. To accomplish these goals, the classroom must be an instructional environment that allows students to work as a community where the students can freely share their thoughts and ideas (Stein et al., 1996).

The classroom environment also provides students with meaningful and worthwhile tasks where productive struggle is encouraged. To evaluate student outcome, Stein et al., (1996) recommend the Student Mediation Model where the teacher primarily serves as a facilitator of knowledge and does not directly tell the students what they need to know but guide them to discover the results by activating students’ cognitive process or ways of thinking and ultimately increasing student’s engagement and learning (Lubienski, 2007; NCTM, 2014a).

Moreover, Stein et al. looked at enhanced instruction as a means of building student capacity to learn important mathematics. The notion of providing students with the opportunity and support for mathematical reasoning. The context of Stein and colleagues research is based on the classrooms that participated in the QUASAR Project which is an educational reform project designed to develop and implement enhanced mathematics instructional programs for disadvantage communities. The premise of the project is that poor minority students lack access to participate in challenging learning opportunities. The results from this study show that students preferred to work from innovative materials or from teacher-developed materials than from a textbook series. The findings show that students who engaged in high-level cognitive
demand tasks were better equipped to make connections to other mathematical ideas (Stein et al., 1996).

The Student Mediation Model and Culturally Responsive Teaching are connected as they both allow the teachers to support their students by providing them with encouragement, constructive feedback, and opportunities to engage in complex tasks that deepen their mathematical understanding. Because the focus of the student mediation model and culturally responsive teaching is on teaching and learning, the teacher scaffold the complexities of the tasks for students to work within their ZPD. Through time and practice, students gradually learn how to become independent thinkers and problem solvers. The scaffold assignments help students accept and respect differences and provide students with a choice where they can learn at a pace where they can experience success and confidence in their own abilities to learn mathematics.

**Essential Body of Knowledge to Effectively Teach Mathematics to All Students**

Peressini et al. (2004) state two assertions to support Learning to Teach Secondary Mathematics (LTSM). The first assertion is learning is situated. They continue by stating that the situation in which a person learns knew knowledge and skills has a direct impact on the how a person learns and what they learn (Greeno et al., 1996; Peressini et al., 2004). The second assertion states that teacher’s knowledge and beliefs is rooted in historical, social, and political contexts to create the environment in which learning to teach takes place. The researchers support their claims by debating three domains of professional knowledge. Like their contemporaries, these domains are mathematics, mathematics-specific pedagogy, and conception of self as teacher (Peressini et al., 2004).

The two assertions presented by Peressini et al. (2004) provide an opening to engage in culturally relevant and responsive teaching. Because culturally relevant and responsive teaching
are situational, the teachers must provide all students with a safe learning environment where the
students are free to take risks without being ridiculed. The second assertion suggests that
teachers may come to class with their own personal biases and beliefs systems. However, they
must still create a learning environment that is equitable and conducive to learning.

**Student Engagement and Motivation**

Students often struggle with mathematics as they progress through school. This
phenomenon is contributed to the shift in focus from learning basic procedural and conceptual
mathematical skills to developing adaptive reasoning, problem-solving skills, and productive
disposition skills (Swafford & Findell, 2001; NCTM, 2014; Lein et al., 2020). To help struggling
students in mathematics, one method is to determine what motivates them to learn. Williams and
Ivey (2001) describe motivation as the degree in students choose to actively participate in the
classroom activities available to them. Whereas student engagement is defined as the degree of
attention, curiosity, and interest that students display for what is being taught or learned.
Moreover, student engagement is a concept that learning increases when students are inspired to
learn versus when a student is bored or disengaged (Swafford & Findell, 2001). Motivation and
student engagement are often interchangeable in education. However, one must take into
consideration motivation may be intrinsic or extrinsic. That is, intrinsic motivation is a behavior
that provides internal rewards and satisfaction whereas extrinsic motivation is behavior that
receives external rewards or avoids a punishment or consequence (Williams & Ivey, 2001).

**The Impact of Lesson Design on Culturally Responsive Teaching and Student Achievement**

Research shows that teachers in the United States (U.S.) often view teaching through a
monolithic lens which entails implementing learning activities and experiences to help students
achieve the prescribed learning goals and objectives (Fernandez & Cannon, 2005; Hiebert et al.,
2007;). Although these are good teaching practices, Fernandez and Cannon (2005) contend that Japanese and U.S. teachers use different standards when developing, implementing, and assessing the quality of their lessons.

For example, Japanese teachers participate in lesson studies which is a form of professional development aimed at collaborating with peers to meticulously plan and design lessons. On the other hand, U.S. teachers tend to work in isolation when designing and planning lessons and do not view lesson planning as a critical process which often results in a less involved process and less complexed student tasks which generally do not meet the needs of all students and often perpetuates the growing achievement gap (Lewis & Tsuchida, 1997; Yoshida, 1999; Fernandez & Cannon, 2005).

This is significant because teachers’ disposition toward intentional lesson planning and lesson construction are critical aspects in determining the type of learning opportunities and experiences the students will encounter. While comparing the key issues that Japanese and U.S. teachers think about when constructing their lessons, Fernandez and Cannon (2005) noted that in Japan, the teachers collaborate on every aspect of the lesson regardless of teaching experience. The teachers plan, implement the lesson, collect, and analyze students’ work samples, and reflect on their practices to make adjustment for subsequent lessons. In contrast, the researchers noted that experienced U.S. teachers believe that it is not necessary to write detailed lesson plans because it will encumber flexibility and autonomy in the classroom.

Although Fernandez and Cannon (2005) findings suggest that teachers may prefer to work in isolation, one may argue that U.S. teachers are moving towards professional learning communities (PLC) where teachers use vertical and horizontal planning to discuss best practices for the students in their school (NCTM, 2014b). This shared vision yields nicely to Stein et al.
(1996) research on building students’ capacity to do math. These researchers laid the groundwork for their position by stating that most mathematical lessons consist of teachers presenting the lesson followed by guided and independent practice of algorithms. The researchers contend that this form of “doing mathematics” means following the rules and procedures which is a less effective method of teaching and learning because it does not build students’ capacity to think and reason mathematically. The expectation for students is to become a member of a learning community where the students have an opportunity to contribute to the class discussion about their solutions and ideas to build mathematical knowledge related to the learning goals. Likewise, it is imperative that teachers do not work in isolation to maximize the learning environment for their students. That is, teachers must engage in strategic lesson planning whether it is horizontal or vertical planning to maximize their students’ learning experience. Culturally responsive teaching encourages teachers to work and plan their lessons together for the betterment of their students.

**Professional Development to Support Sustainable Mathematics Education Reform**

The American Institutes for Research studied the performance of students in 12 countries who participated in the 2003 Trends in International Mathematical and Science Study (TIMMS) and Program for International Student Assessment (PISA). The results show that using cognitively demanding skills, such as reasoning skills, and the application of facts and procedures are areas of improvement for children in the United States (Boston & Smith, 2009.) Moreover, in a study of 100 eighth-grade mathematics classes from seven countries were analyzed and discovered that about 17% of the tasked used by teachers in the United States were high level (making connections); however, the tasks were not implemented correctly. That is, the making-connection tasks were altered into a procedural task (Boston & Smith, 2009.)
Moreover, Boaler and Staples’ (2008) longitudinal study of three high schools over a 5-year period span revealed that student achievement occurred at the highest-level in the school where students participated in learning activities that required high-level of thinking and reasoning. The researchers also noted that use of preplanned questions that elicited and supported students’ thinking contributed to the success of the students (Boaler & Staples, 2008; Boston & Smith, 2009). In addition, Boston and Smith (2009) suggest that teachers who create learning environments where students engage in reasoning strategies, ways of thinking, and making mathematical conjectures are prevalent in the higher performance students. Because these studies show that there is a strong correlation between higher student achievement and high-level of cognitive demands, professional development is imperative to help teachers engage in an inquiry-based, reformed-oriented mathematics instruction which will essentially help teachers in accurately and adequately conveying ideas and concepts.

This notion of using professional development as a tool to support systemic mathematical educational reform by challenging teachers’ beliefs, attitudes, and practices is supported by Shulman (1987). He argued that teachers must not only have a depth of knowledge with respect to their content area but also a broad education that serves as a facilitator for new understanding coupled with an enthusiasm for what is taught can influence student understanding and learning of the content material. Hence, in Shulman’s (1987) study, his goal is to identify those teachers’ behaviors and strategies that lead to gains in student achievement. Although Shulman focuses primarily on preservice teachers and teacher preparation programs, the concepts of creating and maintaining systemic change is at the forefront of his theme. That is, transformative rethinking is required to sustain change. One can argue that progress has been made in terms improving teachers’ learning and training, creating long-term change requires a vast amount of time,
energy, and aroused intelligence. Because there is more knowledge about the way students think and process information, systemic mathematical change is poised to meet the new challenges that teachers and students face when implementing the standards-based curriculum and innovative methods of implementation (Shulman, 1987).

Emerging research on professional development, teacher learning, and teacher change show great promise in supporting sustainable mathematics education reform (Chappuis et al., 2009). Ingvarson et al. (2005) argue that professional development is a crucial element in supporting and sustaining teaching and learning within the schools. While researchers contend that professional development should improve teachers’ competency and increase students’ achievement and outcomes (Hassel, 1999), Bonghanoy et al. (2019) suggests that the design and delivery of the current professional development model needs restructuring.

According to Bonghanoy et al. research, the traditional model of professional development. That is, professional development that does not empower teachers by addressing their needs and the needs of their students. Teachers often describe the trainings and workshops as routine and irrelevant (Bonghanoy, 2019). Hiebert (1999) argues that the core features of professional development opportunities should focus on: (a) ongoing collaboration of teachers for purposes of planning; (b) the explicit goal of improving students’ achievement; (c) focusing on students’ thinking, the curriculum, and pedagogy; and (d) access to alternative ideas and methods (p. 15). Garet et al. (2001) research on the relationship between features of professional development that caused the greatest change in teachers’ knowledge, skills, and classroom teaching revealed that the type of activity, the duration of the professional development, and collective participation are characteristics of highly-effective professional development.
Types of Activity

Workshops, which occur outside the teachers’ classroom, are the most common types of professional development. The general setting for the workshops includes an individual or individuals with expert knowledge in a field providing models, demonstrates, or lectures to the participants attend scheduled sessions either afterschool, on the weekends, or during the summer (Loucks-Horsley, 1998, pp. 42-43). Other forms of traditional professional development include institutes, conferences, and courses. The traditional forms of professional development are often deemed as ineffective because they fail to increase teachers’ knowledge and promote meaningful change in their classroom practices because the teachers provided with adequate time, activities, and content to make a change. As a counter to the traditional forms of professional development, study groups, mentoring, and coaching are popularized because they generally take place during the regular school day. Researchers argue that reform type activities are more responsive to the needs of the teachers (Garet et al., 2001).

Duration of the Professional Development

Recent literature on professional development suggest that it should be ongoing with coupled with opportunities for teachers to reflect and adjust their practices. Professional development that is ongoing and continues is preferred because it provides additional support and opportunities for in-depth discussion of content, students’ conceptions and misconceptions, and pedagogical strategies. In addition, ongoing professional development allows for teachers to implement the activities and provide feedback on areas of improvement (Garet et al., 2001).

Collective Participation

Garet et al. (2001) posit that collective participation is designed for individuals in the same school, department, or grade level. This growing body of knowledge has four important
advantages. First, teachers who are from the same school have more opportunities to discuss concepts, skills, and problems that are common to that site and students. Second, teachers from the same school, grade level, or content area are more likely to share resources and create common assessments. Third, teachers who teach the same students can have a more in-depth conversation about the needs of their students. Finally, collective participation may help sustain changes to teachers’ practices over time. For example, as teachers leave the workforce or move from one school district to another, there are teachers who can become mentors and coaches to incoming teachers. Although research on collective participation is emerging, there is evidence that it can be useful in changing teachers’ practices (Ball, 1996; Garet et al. 2001;). Because professional development is designed to change teachers’ behavior, attitudes, and beliefs, teachers must be given the opportunity, space, and time to reflect on their learning experiences (Joyce & Showers, 1998).

Professional Development to Improve Mathematics Teaching

As Shulman (1987) suggested, the development of knowledge, skills, and understanding provide a useful framework for the analysis where the goal of teacher education along with professional development is to indoctrinate or train teachers to behave in a particular where the teachers use their knowledge as a baseline for their choices and actions. Shulman pulls from Fenstermacher’s (1978; 1985) notion that effective mathematics teaching features pedagogy reasoning where teachers provoke the constructive processes of their students. These researchers note that comprehension is not sufficient as a stand alone. Hence, effective professional development is imperative to provide teachers with not only a deeper understanding of their content knowledge but also provide the teachers with opportunities to link judgment, decisions, and action to properly implement effective instruction and reasoning (Shulman, 1987.)
To capture the essence of effective mathematical instruction, Ball et al. (2008) suggest that understanding the work that mathematics teachers do as it relates to the mathematics knowledge for teaching. In the Knowledge Growth and Teaching Project, Ball et al. (2008) noted that a strong teacher preparation in mathematics is the baseline for professional knowledge of teaching which include content knowledge, curricular knowledge, and pedagogical content knowledge. As suggested by Shulman, “teaching” includes everything that a teacher does to provide equity and support for the learning of their students. That is, teachers must understand mathematical thinking of their students to help provide activities and tasks which may require a specific type of mathematical knowledge, skills, and habits of mind, and insight (Shulman, 1999; Ball et al., 2008.)

Chapter Summary

Because it is argued that the greatest indicator of intellectual power is the ability of combining words with numbers (Laidlow, 2004), it is imperative that all students are afforded opportunities to learn and do high levels of mathematics. Historically, however, culturally and linguistically diverse students were denied access to essential resources needed to educate their children over multiple generations (Ladson-Billings, 2006). To mitigate the infrastructure that deliberately failed to provide historically marginalized students with the necessary funds needed to educate them, culturally relevant pedagogy (Ladson-Billings, 1998) and culturally responsive teaching (Gay, 2000) were offered as scholarship for equitable teaching practices.

Bonner (2014) extended the scholarship and helped lay the foundation culturally responsive mathematics teaching. To that end, culturally responsive mathematics teachers ensure equitable mathematics instruction by helping their students build self-confidence to learn and do mathematics. Culturally responsive mathematics teachers engage in instructional practices that
cultivate their students’ mathematical identity (NCTM, 2014a), and help their students see
themselves as mathematical thinkers by providing them with the critical thinking and problem
solving skills that will help them be successful inside and outside the classroom (Cuoco et al.,
1996). The teachers also provide their students with authentic learning experiences and
opportunities that are reflective of the students’ culture and value systems (Ladson-Billings,
1995). In essence, culturally responsive mathematics teachers provide all students with access to
an equitable mathematics education.
CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

Research on culturally relevant pedagogy and culturally responsive teaching in mathematics has relied primarily on classrooms where culturally responsive mathematics teaching is implemented (Harding-DeKam, 2014). Few studies have addressed the transformation of mathematics teachers as they develop characteristics of culturally relevant and responsive teaching practices. There is, however, a growing consensus among scholars that the transformation of teachers into culturally relevant and responsive teachers deserves more research attention. Approximately, 52% of children who attend public schools in the United States are from culturally or linguistically diverse backgrounds (McFarland et al., 2017); while 82% of the teacher workforce is White (Goldring et al., 2013; Wachira & Mburu, 2019).

Research demonstrates that all students benefit from culturally relevant pedagogy and culturally responsive teaching; and CRP and CRT can mitigate cultural incompatibility between the students and their teachers (Colombo, 2005; Whaley & Noël, 2012).

Jenkins and Alfred’s (2018) research describes the transformational experiences of White professors as they strived to become culturally responsive and inclusive. Similarly, this qualitative study, which used a narrative approach to inquiry, was designed to capture the experiences and instructional practices of five diverse middle school mathematics teachers as they developed characteristics of culturally responsiveness. I examined how the participants integrate culturally relevant pedagogical and responsive teaching practices into their classroom instruction. I identified barriers that teachers experience as they attempted to integrate the tenets
of culturally relevant pedagogy and the dimensions of culturally responsive teaching in their practices. I also examined how professional development opportunities influence their teaching practices and how administrators can support their teachers within culturally relevant mathematics teaching. The following research questions guided to this inquiry.

1. **RQ1** How do middle school mathematics teachers develop as culturally responsive teachers?

2. **RQ2** What are the perceived challenges associated with culturally responsive teaching in a middle school mathematics classroom?

3. **RQ3** How do middle school mathematics teachers perceive the likely impact of culturally responsive professional development to potentially impact their practices?

In this chapter, the following sections are organized into seven parts: (a) the background of the researcher; (b) the research design; (c) the research site; (d) the participants; (e) data collection; (f) data analysis, and (g) the summary of the methodology.

**The Background of the Researcher**

After becoming a National Board Certified Teacher (NBCT), I was offered a Teacher on a Special Assignment (TOSA) position where my primary focus was to develop a sustainable curriculum and instructional program that provided support to all teachers in their instruction. As an instructional leader in the school district where I conducted this study, I used my expertise in mathematics education and pedagogy content knowledge to provide additional support to Pre-Kindergarten through 8th grade teachers. To support the growth and development of the students, teachers, and the school, the leadership team and I identified the needs of the school and students by reviewing the school’s data which included the attendance rate, tardy rate, disciplinary infractions, and academic achievement. Apart from this study, I interviewed teachers and
conducted observations to identify the needs of the teachers and students. During the classroom observations, I noticed that most of the teachers were asking Levels 1 and 2 questions on the Webb’s Depth of Knowledge Questions (Webb, 2002) which signaled that these teachers were not providing their students with an opportunity to engage in critical thinking and problem solving skills. For example, one 8th grade mathematics teacher asked recall questions or questions that required a one word response. For example, one teacher asked, “What did you get for problem number 5?” The teacher did not follow up with asking the student to explain her reasoning for the answer. In addition, to the interviews and classroom observations, the surveys and questionnaires revealed that the teachers needed additional support in culturally relevant pedagogy and responsive teaching practices as well as increasing and implementing higher order thinking and reasoning skills for their students.

My experiences as a TOSA led me to believe that teachers do not intentionally engage in teaching practices in what Haberman (1991) described as “pedagogy of poverty.” Haberman contends that teachers in urban schools engage in “the daily functions of giving information, asking questions, giving directions, making assignments, monitoring seatwork, reviewing assignments, giving tests, reviewing tests, assigning homework, reviewing homework, settling disputes, punishing non-compliance, marking papers, and giving grades” (pp. 290-291). Haberman underscores that these fourteen practices alone often lead to children making minimal gains in their education. I agree with Haberman’s (1991) assertion that teachers need to expand their repertoire to include teaching strategies and practices that will allow students to get involved in real-world experiences such as field trips and resource personnel who use mathematics in their daily lives.
While I believe that teachers generally want what is best for their students, my experiences along with Haberman’s (1991) “pedagogy of poverty” prompted me to inquire how emerging culturally relevant and responsive mathematics teachers use instructional practices to mediate learning for students who have been historically marginalized. I also want to gain insight on how teachers’ perceptions of professional development assisted them in the transformation of developing culturally responsive practices. To achieve these goals, I used narrative inquiries to shed light on these areas of investigation.

**Research Design**

Qualitative inquiry has undergone major paradigm shifts from social construction, to interpretivist, and on to social justice (Creswell, 2007). Each subsequent shift provides researchers and practitioners with a more comprehensive approach to generate new forms of meaning, understanding, and processes. To appreciate the construct of qualitative research, Denzin and Lincoln (2005) offer the following definition:

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including fieldnotes, interviews, conversation, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of meanings people bring to them. (Denzin & Lincoln, 2005, p. 3)

Using Denzin and Lincoln’s (2005) definition for qualitative research as a backdrop, I explored the approaches to conducting qualitative inquiry in the field of education. Merriam (2009) posits
that the focus of qualitative research is to establish meaning and understanding of the topic of inquiry by answering what is happening and why or how it is happening. Like Denzin and Lincoln (2005), Merriam continues by pressing that the researcher is the primary source for data collection; and the final product should contain a rich and descriptive narratives (Merriam, 2009). Narrative research allows me to capture teachers’ voices and perceptions. This methodology also allows me to use “multiple forms of evidence to document and inform the research problems” (Creswell & Plano Clark, 2011, p. 21) while providing me with the latitude to examine the research questions from multiple points of view.

I used Clandinin and Connelly’s (2000) five steps to narrative research procedural guide as a blueprint. Although the researchers suggests that the “methods of conducting a narrative study do not follow a lock-step approach” (Creswell, 2007, p. 55), Clandinin and Connelly’s guide to narrative inquiry include: determine if the research problem or question best fits narrative research; select one or more individuals who have stories or life experiences to tell; collect information about the context of the stories; analyze the participants’ stories, and then retell them into a framework to make sense; and collaborate with participants by actively involving them in the research (Clandinin & Connelly, 2000; Creswell, 2007).

The Research Site

The setting for this study is in a single and sizable public school district in the Southeastern Region of the United States. Southeastern School District (a pseudonym used to maintain confidentiality and anonymity) was selected because it is one of the most diverse school districts in the region. The school district is situated in a metropolitan city with an estimated population of 200,574 (U.S. Census, 2010). In this city, the median household income is $53,840; however, 17.7% of families live in poverty. The school district is working with the
United States Department of Justice to implement a Consent Order in its schools’ desegregation case. The Consent Order establishes a pathway for the school district to provide equitable educational opportunities for all students, regardless of race, and to eventually obtain “Unitary Status.”

Table 1 describes the demographics of the students and teachers for the Southeastern School District for the 2018-2019 school year. As Table 1 indicates, 54.1% of the students are from culturally diverse populations while 67.9% of the teachers are White. Moreover, Hispanic/Latino students compromise of 13.6% of the student population whereas 1.2% of the teachers share the same background.

Table 1

Southeastern School District Demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Student Population</th>
<th>Educators Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>23,788</td>
<td>1,804</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>1.98%</td>
<td>0.61%</td>
</tr>
<tr>
<td>Asian</td>
<td>2.07%</td>
<td>0.67%</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>40.3%</td>
<td>27.4%</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.50%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>13.6%</td>
<td>1.16%</td>
</tr>
<tr>
<td>White</td>
<td>45.9%</td>
<td>67.9%</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>9.23%</td>
<td>0.58%</td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>40.5%</td>
<td>NA</td>
</tr>
<tr>
<td>Students with Limited English Proficiency</td>
<td>5.97%</td>
<td>NA</td>
</tr>
<tr>
<td>Females</td>
<td>49.0%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Males</td>
<td>51.0%</td>
<td>17.8%</td>
</tr>
</tbody>
</table>

Note: Statistics for 2018-2019 school year. Middle School is defined as grades 6-8. NA means not applicable.

Southeast Middle School and Southwest Middle School

Southeast Middle School and Southwest Middle School were selected for this study because they had the most diverse student and teacher populations in terms of cultures and
ethnicities compared to the other middle schools in the same school district. In addition, based on the 2018-2019 state’s reporting indicators, historically marginalized students have at least a 65% growth rate at these two schools. The data from these two schools piqued my curiosity and motivation to study the instructional practices and strategies of the mathematics teachers as they developed characteristics of culturally responsive teaching practices that contribute to the success of all. The data from the state department of education indicated that on the 2018-2019 mathematics assessment, Southeast Middle School had an overall proficiency rate of 39.9% while Southwest Middle School had an overall proficiency rate of 37.5%. The state department of education defined proficiency in mathematics as the percentage of students with valid scores on the state assessment of math who scored within proficiency levels three or four. On the surface, the data may suggest that students are not performing as well as they should, that is why I decided to use additional indicators, specifically, academic achievement and academic growth to select the schools for this study.

Table 2 describes the demographics of the students’ population at Southwest Middle School and Southeast Middle School for the 2018-2019 school year. In addition, these schools were selected because the state accountability reporting system showed that Hispanic/Latino and Black/African American students had demonstrated significant academic growth. Table 3 references the accountability indicator for academic achievement. The state department of education defined the accountability indicator, specifically, the academic achievement indicator. It states that an accountability system indicator is determined based on the number of students in the areas of English Language Arts (ELA) (reading/English prior to the fall of 2021) and math in utilizing assessments in tested grades within the achievement levels. Although Table 3 shows that there are significant disparities in academic achievement between the White students and
their culturally and linguistically diverse counterparts, Table 4 shows great promise because at Southwest Middle School, 78.07% of all students attained at least one year’s growth. Similarly, 85.54% of all students attained at least one year’s growth at Southeast Middle School. In terms of the accountability indicators, specifically, the academic growth indicator, the state department of education defined this indicator as an accountability system indicator that is determined based on individuals who demonstrated improvement in English Language Arts (ELA) (reading/English prior to the fall of 2021) and math in utilizing assessments tested grades within the growth categories. For this study, I used the data from the 2018-2019 school year. Due to the impact of the 2019 Novel Coronavirus (COVID-19), the U.S. Department of Education (USDOE) waived the state’s requirements of reporting accountability results for the 2019-2020 school year. As a result, the students were exempt from participating in the state’s assessments.

Table 2

*Southwest and Southeast Middle Schools Students’ Demographics*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Southwest Middle School</th>
<th>Southeast Middle School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>581</td>
<td>591</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>2.24%</td>
<td>4.40%</td>
</tr>
<tr>
<td>Asian</td>
<td>2.07%</td>
<td>2.03%</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>53.0%</td>
<td>28.9%</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.34%</td>
<td>1.02%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>11.2%</td>
<td>31.3%</td>
</tr>
<tr>
<td>White</td>
<td>30.8%</td>
<td>50.8%</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>11.5%</td>
<td>12.9%</td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>30.8%</td>
<td>44.7%</td>
</tr>
<tr>
<td>Students with Limited English Proficiency</td>
<td>2.75%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Females</td>
<td>50.1%</td>
<td>47.9%</td>
</tr>
<tr>
<td>Males</td>
<td>49.9%</td>
<td>52.1%</td>
</tr>
</tbody>
</table>

Table 3

The State Department of Education Accountability Indicator for Academic Achievement

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Southwest Middle School</th>
<th>Southeast Middle School</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Subpopulations</td>
<td>63.1%</td>
<td>59.7%</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Asian</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>46.6%</td>
<td>44.6%</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>51.7%</td>
<td>39.7%</td>
</tr>
<tr>
<td>White</td>
<td>93.2%</td>
<td>77.0%</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>68.4%</td>
<td>78.5%</td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>44.8%</td>
<td>44.7%</td>
</tr>
<tr>
<td>Students with Limited English Proficiency</td>
<td>40.9%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Note: Statistics for 2018-2019 school year. No Data means that the subgroup did not meet the minimum n-count of 20 students required to be reported publicly. Academic Achievement data for school year 2018-2019 is obtained from Scantron (grades 3-8), the AAA (grades 3-8 & 10), and the ACT 11 (grade 11). Academic Achievement levels are Level I, Level II, Level III, and Level IV for reading/English and math. The Academic Achievement levels for the “All Students” group are used for calculating the indicator score.

Table 4

The State Department of Education Accountability Indicator for Academic Growth

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Southwest Middle School</th>
<th>Southeast Middle School</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Subpopulations</td>
<td>78.1%</td>
<td>85.5%</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Asian</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>75.1%</td>
<td>82.0%</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>68.8%</td>
<td>77.8%</td>
</tr>
<tr>
<td>White</td>
<td>87.0%</td>
<td>88.9%</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>73.8%</td>
<td>97.1%</td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>70.0%</td>
<td>81.7%</td>
</tr>
<tr>
<td>Students with Limited English Proficiency</td>
<td>71.0%</td>
<td>78.3%</td>
</tr>
</tbody>
</table>

Note: Statistics for 2018-2019 school year. No Data means that the subgroup did not meet the minimum n-count of 20 students required to be reported publicly. Academic Growth data for school year 2018-2019 is obtained from Scantron (grades 3-8), and the ACT 11 (grade 11). Academic Growth categories are Category 1, Category 2, Category 3, and Category 4 for reading/English and math. The Academic Growth categories for the “All Students” group are used for calculating the indicator score.
Selecting the Participants

For this study, a convenience sample was used to select the participants. I invited all ten middle school mathematics teachers (6 from Southwest Middle School and 4 Southeast Middle School) to participate in the study. All participants hold at least a bachelors’ degree in secondary mathematics education and a professional certification in secondary mathematics except for one participant. One participant holds a provisional certification in middle school mathematics.

For this study, I conducted one round of interviews with all ten potential participants. Because in-depth interviews were my primary data source, I wanted to observe the participants’ classroom instruction vicariously by conducting interviews that would allow me a peak into their instructional practices. Although I planned to interview the participants for an hour (60 minutes), the first round of interviews lasted between 90 minutes to 120 minutes. Because I underestimated the allotted time for the interviews, some potential participants opted not to continue with the study.

From the first round of interviews, all ten teachers shared valuable information with respect to mediating learning for children who have been historically marginalized. However, two teachers, Mr. Atkinson and Mrs. Jennings, decided not to finish the study, that is, participate in the second round of interviews while one participant, Mrs. Jacobson, decided not to share her data. Mrs. Yates, a 26-year veteran, retired and decided not to finish the study.

After the first round of interviews, six participants decided to continue with the study. Because of the demographic composition of Mrs. Dawson’s classes, she did not meet the 50% threshold of teaching students from culturally or linguistically diverse backgrounds. As a result, five teachers emerged to continue with the study. All five teachers show great promise for developing characteristics of culturally relevant and responsive mathematics teachers based on
their instructional practices, attitudes, and beliefs as they relate to children from diverse backgrounds.

In addition to teaching at the selected schools with a diverse student population and sharing in the first round of interviews how they mediate learning for culturally and linguistically diverse students, the following criteria were used to select participants for this study: 1) At least 50% of all the students taught by the teacher were from culturally and linguistically diverse backgrounds; 2) The teachers had to demonstrate their abilities to obtain at least a 67% growth rate (on the school district’s assessment) for students who have been historically marginalized in their mathematics classes as indicated on the school districts assessment. The growth rate represents the percent of students who grew at least one academic school by the end of the school year; and 3) The teachers must be involved in extracurricular and/or co-curricular school activities such as the cultural fair, mathematics fair, mathematics team, and Parent Teacher Student Association (PTSA). After implementing the selection strategy, I contacted the potential participants via telephone to schedule Round 2 of the interviewing process. I emailed the participants a video conferencing link to conduct the second round of interviews.

The Participants

Three teachers were selected from Southwest Middle School while two teachers were selected from Southeast Middle School. All names are pseudonyms. Table 5 describes additional demographic information pertaining to the participants. I provided additional background information about the five selected participants in order to give each participant a voice and paint a portrait so that the reader can visualize the teachers.
Table 5

*Demographics of Participants*

<table>
<thead>
<tr>
<th>Name</th>
<th>Highest Degree</th>
<th>Gender</th>
<th>Race</th>
<th>School</th>
<th>No. of Years of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ms. Boyd</em></td>
<td>Master</td>
<td>Female</td>
<td>Black/White</td>
<td>Southwest</td>
<td>4</td>
</tr>
<tr>
<td><em>Mrs. Sanders</em></td>
<td>Bachelor</td>
<td>Female</td>
<td>White</td>
<td>Southwest</td>
<td>7</td>
</tr>
<tr>
<td><em>Ms. Douglas</em></td>
<td>Bachelor</td>
<td>Female</td>
<td>White</td>
<td>Southwest</td>
<td>20</td>
</tr>
<tr>
<td><em>Mrs. Campbell</em></td>
<td>Master</td>
<td>Female</td>
<td>Black</td>
<td>Southeast</td>
<td>21</td>
</tr>
<tr>
<td><em>Mrs. Myers</em></td>
<td>Master</td>
<td>Female</td>
<td>White</td>
<td>Southeast</td>
<td>6</td>
</tr>
<tr>
<td>Mr. Atkinson</td>
<td>Bachelor</td>
<td>Male</td>
<td>White</td>
<td>Southwest</td>
<td>8</td>
</tr>
<tr>
<td>Mrs. Dawson</td>
<td>Bachelor</td>
<td>Female</td>
<td>White</td>
<td>Southwest</td>
<td>18</td>
</tr>
<tr>
<td>Ms. Yates</td>
<td>Master</td>
<td>Female</td>
<td>Black</td>
<td>Southwest</td>
<td>26</td>
</tr>
<tr>
<td>Mrs. Jennings</td>
<td>Bachelor</td>
<td>Female</td>
<td>White</td>
<td>Southeast</td>
<td>9</td>
</tr>
<tr>
<td>Mrs. Jacobson</td>
<td>Master</td>
<td>Female</td>
<td>White</td>
<td>Southeast</td>
<td>15</td>
</tr>
</tbody>
</table>

*The teachers selected to participate in Rounds 1 and 2 of the study.

**Ms. Boyd – Teaches Math 6, Accelerated Math 7, and Math 8**

Ms. Boyd, a Black/White biracial teacher at Southwest Middle School, was raised in a black household by her single mother. Ms. Boyd explained that her family was “definitely not well off,” and they lived in neighborhoods that were “not necessarily desirable.” Ms. Boyd’s mother pushed her to do well in school which resulted in an academic scholarship to a high school. When describing her high school experiences, Ms. Boyd stated, “I was able to go to private schools like an hour away and be with a totally different type of student and seeing a totally different way of living life. But every day, I go back to where I live and where I was
from.” Ms. Boyd’s experience had a profound impact on her as a teacher. As a result, she strives to help her students grow and flourish wherever they are planted.

Ms. Boyd taught middle school for four years. However, her journey to becoming a teacher was not a direct path. Ms. Boyd “contemplated being a teacher in college and then went a different route.” While in graduate school, Ms. Boyd realized that she “really did not like or want to do or want to pursue a career in business administration.” As a result, Ms. Boyd “went back to the original plan of teaching.” After completing her master’s degree sports medicine, Ms. Boyd received an emergency teaching certificate for collaborative special education. Her first teaching assignment was a “self-contained special education unit with 6th through 8th grade students.” Ms. Boyd taught students “with a wide-range of disabilities and those students with severe cognitive disabilities and some students may be violent or have other home issues as well.”

After Ms. Boyd’s stint as a collaborative teacher, she received a provisional teaching certificate to teach mathematics. Ms. Boyd recalled teaching “7th honors math to six graders at three different schools. I went to three elementary schools because a lot of the elementary teachers were not certified to teach those honors. So, they had me go to those different schools.” Ms. Boyd to a mathematics position with another school district where she taught “7th honors math and some inclusion classes.” Ms. Boyd’s experience as a collaborative teacher provided her with a unique opportunity to help students who were working below grade level. Ms. Boyd’s goal is to ensure that each student work at his or her highest potential and experience academic success regardless of their abilities.

**Mrs. Sanders – Teaches Math 7 and Accelerated Math 7**

Mrs. Sanders, a teacher at Southwest Middle School, is passionate about teaching mathematics. She sets high expectations for her students and hold them accountable and partly
responsible not only for their own academic success but the success of their peers. Mrs. Sanders dedication to her students and the education profession stems from her youth. Mrs. Sanders graduated from high school; however, she “couldn't read let alone do basic math.” After Mrs. Sanders’ oldest son entered kindergarten, Mrs. Sanders realized that she is “responsible of helping him learn how to read.” As a result, Mrs. Sanders enrolled in a community college to “get the basic education that [she] was entitled to in high school.” While attending the community college, Mrs. Sanders had “amazing teachers who encouraged her.” Mrs. Sanders stated that she went from thinking “I was unteachable to believing that I can do anything.”

Mrs. Sanders is a military wife, and she taught mathematics for seven years in three different Southeastern states. She comes from a humble background and empathizes with students whose families face economic hardships. Mrs. Sanders teaching experiences range from teaching in a Title I school to teaching in a more affluent school. She has had extensive Advancement Via Individual Determination (AVID) training from her previous schools. Mrs. Sanders teaches her students how to take Cornell notes and use them to study, ask questions, and reflect on their work.

**Ms. Douglas – Teaches Math 6**

Ms. Douglas, 20-year veteran teacher who has a passion for architectural design, revealed that teaching was not her original career choice. After high school, Ms. Douglas received a scholarship to a junior college where she earned an associate’s degree in drafting. By the time Ms. Douglas was 19-years-old, she designed and built her first house. Ms. Douglas became interested in education by volunteering at the local school.

Prior to teaching at Southwest Middle School, Ms. Douglas taught three years in two different schools. The first school was in an urban setting with “a very low socioeconomic
status.” Ms. Douglas explained, “although there is poverty in this city, it does not compare to how poor the families were in that neighborhood.” Ms. Douglas continued by stating that “It was hard there. There was no money in that neighborhood.” The second school that Ms. Douglas taught was in a more affluent school where “the student population was 100% white, and everybody’s mom and dad was a lawyer or a very successful CEO.”

Ms. Douglas learned early in her career that teachers play a major role in the success of their students. However, in the more affluent school, Ms. Douglas served more as a facilitator of learning whereas in the less affluent middle school, she was not only the teacher, but the counselor, and sometimes friend. Ms. Douglas explained that sometimes, she had to put away the textbooks and address the social and emotional needs of her students. In addition, Ms. Douglas was named “Teacher of the Week” by the local news station for her outstanding dedication to her students and their families.

**Mrs. Campbell – Teaches Math 7 and Accelerated Math 7**

Mrs. Campbell, a 21-year veteran teacher, taught mathematics at two Title 1 middle schools before teaching at Southeast Middle School. Mrs. Campbell and her siblings were raised by their single mother. Mrs. Campbell empathizes with children who receive free and/or reduced lunch because she “was that student growing up.” Mrs. Campbell also recalls growing up in a social and economically depressed neighborhood and the embarrassment that she felt when her mother paid the groceries with food stamps. Mrs. Campbell’s humble beginnings did not deter her from going to college. Mrs. Campbell received her bachelor’s degree in computer science and participated in the 5th-year master’s program in secondary mathematics education. Mrs. Campbell explained that she never dreamed about becoming a mathematics teacher. She contributes her to becoming an educator was through “Divine intervention.” She contends that
“everybody has a purpose in life and sometimes we think we’re going to travel down one road and end up down another road.” Mrs. Campbell believes that teaching is her calling and her passion.

Mrs. Campbell contributes her love for teaching and doing mathematics to Dr. Blanchard, her college professor. Mrs. Campbell emulates Dr. Blanchard teaching style in her own classroom. Mrs. Campbell explained that every student must participate in his or her education. Mrs. Campbell believes in integrating soft skills into her mathematics classes because “students must learn how to work with each other if they want to be successful in this world.” As a result, Mrs. Campbell incorporate cooperative learning groups into her classroom repertoire where her students must work together in making decision and communicate effectively with their peers and their teacher.

**Mrs. Myers – Teaches Math 6, Math 7, and Accelerated Math 7**

Mrs. Myers had a great love for mathematics in middle and high school. She often dreamt about becoming a mathematics teacher. However, after Mrs. Myers’ became a teenage mom in the tenth grade, her dreams of going to college were deferred. After high school graduation, Mrs. Myers worked at Home Depot and Walmart. While working at Walmart, Mrs. Myers became a certified nursing assistant and worked in multiple nursing homes. Mrs. Myers enjoyed working at the nursing home. She expressed, “I really thought that I would end up being a nurse. I enjoyed working at the nursing home. There were a lot of people who didn't have family; and I became their family.”

Mrs. Myers enrolled in college and fulfilled her lifelong dream of becoming a teacher. Mrs. Myers completed her sixth-year of teaching mathematics. Mrs. Myers’ love and passion for teaching and learning resonates through her teaching style. Mrs. Myers argues that “if someone
Data Collection

Narrative inquiry was utilized to gather data from novice and veteran teachers through interviews, member check, and additional follow-up sessions for clarification and consensus. The researcher developed the interview protocols (see Appendices C and D). The interview protocols provided the participants with an opportunity to offer in-depth responses to understand how emerging culturally relevant and responsive mathematics teachers mediate learning for historically marginalized children to ensure academic success for all students.

Although teacher interviews were the primary source for data collection, I also collected data from school districts’ documents pertaining to equitable educational practices for all students within the school district. In addition, I used journaling to help capture the essence of the responses of the participants during the interviewing process.

Round 1 Interviews

I began the data collection process after receiving approval from The University of Alabama’s Institutional Review Board. Next, I received permission from the district leaders and the school principals to conduct the study at Southwest and Southeast Middle Schools. After receiving permission to conduct the study, I invited, via email, all middle school mathematics teachers from Southwest and Southeast Middle Schools to participate in the study. All ten mathematics teachers agreed to participate in the study. After the participants emailed me a signed inform consent, I scheduled the 1st round of interviews.

The primary goals of the first round of teacher interviews were to obtain background information about the participants, their instructional practices, and their attitudes and beliefs.
towards their own practices as it relates to teaching historically marginalized students. The interviews were semi-structured with open-ended questions to allow the participants to provide in-depth responses to the questions. All interviews were digital. I used a video conferencing platform to video and audio record interviews. After completing the 1st Round of interviews, five teachers met the criteria to participate in the study. I notified each teacher pertaining to his or her status moving forward in the study.

**Round 2 Interviews**

Similarly, the goals of the second round of teacher interviews were to obtain information pertaining to the teachers’ instructional and professional practices and teachers’ perceptions about their students’ educational experiences in the classrooms. Because I wanted to use storytelling to capture the experiences of the participants as they developed characteristics of culturally relevant and responsive mathematics teaching, I conducted semi-structured interviews. However, the line of inquiry was more fluid (Yin, 2014) to allow the participants an opportunity to provide their own narratives and give voice to the participants pertaining to their encounters when working with historically marginalized students in the mathematics classroom. Each interview lasted for 60-90 minutes.

After each interview, I transcribed the audio recordings in their entirety and saved them as a part of an audit trail. I contacted each participant and discussed my interpretation of the interview to ensure that I accurately described their story. Each follow-up or member’s check lasted 7-10 minutes. After I compiled the data collected, I secured the paper copies in a secured and locked file in my home. To ensure that no one can access the video and audio recordings of the saved digital interviews, I secured all digital interviews on my personal desktop computer with security settings to prevent individuals from accessing the stored data.
**District Documents**

To help answer my research questions, I visited Southeastern School District website to seek documents pertaining to the district’s policies, practices, and procedures as they relate to providing equitable educational opportunities, specifically in mathematics, for all students. From the documents posted on the district’s website, two documents specifically met the criterion for this study. The documents analyzed for this study were 1) the School District’s Strategic Plan, and 2) The Consent Order: 7 Key Areas in Education: Student Assignment, Equitable Access to Course Offerings and Programs, Extracurricular Activities, Faculty, Transportation, Facilities, and Student Discipline.

**Research Journal**

After the interviews, I journaled my thoughts and feelings as the participants responded to the questions. I also journaled notes relating to the facial expressions, the inflection in the participants’ voice when responding to questions. I also noted the excitement and or the hesitation when discussing various topics throughout the conversation.

**Data Analysis**

To analyze the data for this study, in Vivo coding was selected because in Vivo Codes allows me to “preserve participants’ meanings of their views and actions in the coding itself” (Charmaz, 2006, p.55). In essence, this method of data analysis allowed me to use the participants’ own words and voice to capture key elements of their experiences. I transcribed the interviews in its entirety by using Microsoft Word Voice Dictate. I assigned initial meaning to each interview and journal entry. I manually coded the data. I then categorized and synthesized the raw data to determine major themes (Saldaña, 2013; Creswell, 2007).
Next, I used Axial Coding, a Second Cycle coding method. By using axial coding, the I identified major codes that emerged from the study. I placed the themes in context to Ladson-Billings (1995) culturally relevant pedagogy tenets and Gay’s (2000) essential components of culturally responsive teaching. Document analyses of the school district’s policies and procedures were used to determine the structural factors that influence teacher’s implementing culturally relevant and responsive practices in their classrooms. I triangulated the data between, the interviews, journals, and the school district’s document to help validate the findings.

The goal of document analysis of the school district’s policies, practices, and procedures was to determine what structural factors, if any, influenced teachers’ implementation of culturally relevant and responsive practices in their classrooms. I analyzed relevant districts’ documents as they relate to the interview responses given from the five selected teachers. When analyzing and reporting the findings of the School District’s documents, I used the language written on the documents to ensure the intent of the message conveyed by the School District is not lost in translation and interpretation by the researcher.

**Summary**

In this chapter, data was collected from multiple sources: teacher interviews, member checks, journal entries, and Southeastern School District’s documents. The data collected in this study will help answer the research questions by providing viable answers and ways forward for understanding how mathematics teachers develop as culturally responsive teachers, and how they implement culturally relevant pedagogy in mathematics classroom. Triangulation between the data sources were used to ensure the validity and reliability of the study. This chapter included an in-depth discussion of the methodological procedures and the data collection process for this study. In the next chapter, I present the findings of the data collected.
CHAPTER FOUR: FINDINGS

The purpose of this study was to answer the research question, how do mathematics teachers develop as culturally responsive teachers? The two subsequent questions are embedded in narrative form of this chapter. This chapter presents an analysis and interpretation of the data. The findings for each research questions are reported and explained in narrative form for clarity and comprehension. Each participant described multiple accounts of their experiences as they perceived themselves develop characteristics of culturally responsive mathematics teaching. The findings revealed five themes: (a) each student can be reached, (b) you care about them as a person, (c) students will level up on their own, (d) somebody will get offended, and (f) not anything special. In this chapter, the findings were organized into three sections: 1) establishing characteristics of culturally response mathematics teachers, 2) culturally responsive practices, and 3) emerging culturally responsive mathematics teachers.

Establishing Characteristics of Culturally Responsive Mathematics Teachers

Three themes emerged from the first round of the teacher interviews. While investigating the first research question: \textit{How do middle school mathematics teachers develop as culturally responsive teachers}, the three themes “each student can be reached,” “you care about them as a person,” and “students will level up on their own” captured the essence of the participants’ beliefs and attitudes toward teaching students from diverse background.
“Each Student Can Be Reached”: Establish High Expectations for All Students

While exploring how mathematics teachers develop as culturally responsive teachers, the data revealed that all participants set high standards and established high expectations for themselves and their students. The expectations for the students are articulated in the teachers’ course syllabus and webpage. The participants concurred that when students were provided with the appropriate tools (calculators, graphic organizers, and computers) and/or additional support, (tiered Response to Intervention [RtI], or before and after school tutoring), most of their students met or exceeded the teachers’ expectations. A compilation of the interviews revealed that when the participants planned their lesson, they reflected on their own teaching practices and the various learning styles of their students. Another commonality indicated that all participants worked in partnership with the school districts’ English Language Learner liaison for additional support in reaching their students whose home language is other than English. The participants considered their students’ abilities and provided multiple entry points and activities to ensure the lessons were inclusive for all students. In fact, providing strong support for their students speak to the teachers’ personal convictions in ensuring an equitable education for all students. To illustrate this point, the participants tell the following stories. Ms. Boyd explained the following:

Every student can be reached but it may be in a different way so building relationships with the student is key. The relations that you build with your students may not necessarily equal but equitable.” Ms. Boyd continued by articulating that “unfortunately, some students still have trouble adding, subtracting, multiplying, and dividing; but that doesn't mean that they're just set to fail. Some of those students excel in other areas that require a greater depth of mathematical knowledge.
Mrs. Sanders and agrees with Ms. Boyd’s assessment. In fact, Mrs. Sanders builds on notion that “each student can be reached.” Mrs. Sanders added:

I believe that everyone has a right to a fair education. I believe that everybody is teachable, and that people need to get out of the mindset of lowering the expectation on our kids because once you set that expectation even though you must teach them how to reach it. They will go way beyond what we expect them. I've really seen that especially with the Hispanic population.

Mrs. Sanders continued by recalling a moment when she first accepted a teaching position at Southwest Middle School. Mrs. Sanders taught 8th grade students who were struggling with 4th grade mathematical content. Mrs. Sanders was elated when her students started to express a sense of self-confidence to learn and do mathematics. Mrs. Sanders shared with me:

I had to take it slowly so they could grasp the material. It wasn’t that they couldn’t do or learn the math, the students learned early on that there were no real expectations to learn how to do the math well.

Mrs. Sanders worked with her students to help them build self-confidence and a love for learning mathematics.

Ms. Douglas added unique insight to the dialogue by stating “All students have the capability to learn. The students may not all learn the same way and at the rate that we want them to learn. It's like the students learn in their own way at their own time.” The next participant, Mrs. Campbell, contributed the conversation by stating, “Every student can learn. They just learn in their own way. Some students are visual learners, and some are auditory learners. You just have so many different learning styles.” The next participant, Mrs. Myers, tried to motivate her students to learn mathematics by making learning fun. Mrs. Myers stated:
Children should enjoy mathematics. Most students view school as something they have to do but they don't want to do it; and they don't want to do it because it's not fun and so I make school worthwhile. I set high expectations for my students but make class enjoyable so that the students want to learn math and they want to come to class.

To support the participant’s effort of setting high standards and expectations for students, and providing all students with an equitable education, the school district developed a Strategic Plan with the hopes of setting the standards and modeling an effective public education system in the United States.

The strategic plan notes that the school district is committed to ensuring that all students graduate with the capacity to compete and contribute responsibly as citizens in a globally connected society. The school district’s action plan for the Learning Outcome Pillar is to provide rigorous, engaging instruction to all students that facilitates problem solving and creativity, aligned to grade-level standards using innovative resources and tools. The division priorities are 1) to ensure that all students, regardless of level of achievement, show academic growth each year; 2) to increase the number of students who are mastering the academic standards that are appropriate for their grade level and increase the number of students performing at and above proficiency for their grade level; and 3) to ensure students graduate on-time and are college and career ready. The School District proposes to accomplish these goals by focusing on reading and mathematics for all students with intention and integrity, ensuring that all students are on-track for on-time graduation by the end of 9th grade, and expanding career technical programs to align with workforce demands.

In this excerpt, the school district’s document coupled with the teacher interviews are significant because it underscores the concept of academic success as a nonnegotiable mandate
for all students (Gay, 2018). All participants embraced the fundamental elements of the equity principle which are providing high expectations and strong support for all students (NCTM, 2014a, 2000). Each participant has an advisory/homeroom time where they provide students with mathematical support. The advisory/homeroom time is design to help shore up the mathematical skills that the students are missing and ultimately increase student growth and achievement. In addition, the school district provided funding for an afterschool tutoring program. As a result, Ms. Boyd and Ms. Douglas provided afterschool tutoring for those students who desire additional support in mathematics. This signals that the teachers and the school district are committed to making appropriate adjustments to increase academic growth, development, and achievement for all students.

“You Care about Them as a Person”: Build Strong Relationships with Students and their Families

Based on the responses of the five participants who emerged as showing great promise of becoming culturally responsive mathematics teachers, this study revealed that the participants established a strong relationship with their students and their families as a vehicle for increasing students’ academic performance and success. To support building teacher-student relationships, the school district allowed for each teacher to have a daily 45-minutes advisory time/homeroom with their students. During this time, the teachers built a caring and trusting relationships with their students. The advisory time allowed the teachers to spend one-on-one time with their students and provide additional support to those students who were struggling behaviorally and/or academically. All participants in this study communicated with their students and their families by contributing to the grade level weekly newsletter. The participants emailed or called their students’ parents or guardians if the students’ grades fell below 70%.
Although it was a challenge for most participants to stay in constant communication with their students’ families, Ms. Boyd and the other participants explained how essential it is to show your students that you care about them as an individual. In Ms. Boyd interview, she shared:

It is important for the students to know that you care about them as a person. It is very difficult to teach students challenging mathematical concepts when you don’t know who they are or what makes them laugh or smile.

Mrs. Sanders contends that she makes use of personal conversations with students as a means of building a relationship with them. Mrs. Sanders intentionally engages in a conversation with her students to identify their interests, needs, and what motivates them to learn. Mrs. Sanders explained, “I just want to know what makes them want to learn math?” Mrs. Sanders integrated students’ personal interests and cultural background into her instruction to help her students make meaning of mathematical concepts.

Ms. Douglas contends that “students know if you care or not. They know if you’re passionate about the subject that you teach because they can see through that very quickly.” Ms. Douglas adds that “you are not going to give them the joy of math if you are not going to have fun. Mrs. Campbell extended the discussion by stating, “I work hard to learn the names of every student. I want them to know that they are important to me. I want my students to feel connected to me. I want them to feel connected to math. Once students feel like they belong, then they will work hard to fulfill their maximum potential.” Mrs. Myers builds relationships with her students by sharing her story of how she had to overcome obstacles and making good choices and decisions. Mrs. Myers added that “I think of my students as my own children. I get to know their personalities, their learning styles, and hobbies, and interests. I use everything that I know about them and relate to math. I try to help my students make connections between math and what they
do every day. The only way I can help them is by building a relationship with the students and their families where they trust that I will work hard to make sure they have the best education possible.”

To support the participants’ efforts in caring for the whole child, the school district’s action plan for the Whole Student Development Pillar was designed to provide holistic services that meet the academic, social, and emotional needs of the students. The division priorities are 1) create a positive school climate for all students that encourages achievement and growth; 2) set expectations of high attendance and high engagement for all students; and 3) ensure students are supported mentally and emotionally and have appropriate guidance throughout their academic career. The School District proposes to accomplish the goals by ensuring a positive school climate, increasing attendance rates for all students, and implementing a comprehensive guidance curriculum.

In this passage, the interviews along with the school district’s documents illustrated another effort in the participants becoming culturally responsive teachers. The school district’s documents indicated that guidance will be available for social and emotional support of the students. All participants indicated that building a caring relationship is imperative for the student to experience success. Moreover, the notion of providing a caring environment is supported in research. For example, in Thomas and Berry’s (2019) study, the researchers identified caring as one of the teaching practices that support culturally relevant pedagogy and culturally responsive teaching. Moreover, Mrs. Myers discussed talking with her students about obstacles that she overcame, this signals that Mrs. Myers fosters a sense of transparency where she adds her story and background to help build connections with her students. This signals that
the participants experienced some level of fostering culturally responsive philosophies in their practices.

“Students Will Level-up on their Own”: Teachers as Facilitators of Learning

When discussing instructional practices, all five participants suggested that they plan their lessons with their students’ academic and cultural backgrounds in mind. The teachers create activities where the students are given a choice on how they want to learn the concept. Ms. Boyd explained “students have to learn how to take responsibilities for their learning. I give them a choice of activities as a way of motivating my students to learn.” Mrs. Sanders explained that she scaffolded her lessons and provide multiple entry points so that all students can experience a level of success. Mrs. Sanders also noted that “when given a choice, the students tend to gravitate towards the less challenging tasks. After realizing that the lower leveled tasks do not give them the satisfaction and the sense of accomplishment, then the students will level up on their own. I see this all the time. Students want to be challenged.” Ms. Douglas extended the conversation by adding “I give my students a choice to help build their capacity to do math but to build their character. I believe that students will find the activities that give them a sense of achievement. Some students thrive when it comes to productive struggle and some students do not want to struggle at all. I allow my students the opportunity to use that time to build their character.”

Mrs. Campbell expressed that she scaffolded her lessons so that her students can build self-confidence. Mrs. Campbell recalled teaching at a Title I school where her students did not believe in their own abilities to learn and do mathematics. Mrs. Campbell explained that her classroom became a “weight room” and students were encouraged to become “heavy weight” in mathematics. Mrs. Campbell still considers her classroom as a “weight room.” Mrs. Campbell
recalled, “when I was giving whole group instruction, my students would say, ‘Mrs. Campbell, put some weight on that problem.’ I add more and more weight to strengthen them mathematically and to build their self-confidence to learn and do whatever they set their minds to do.” Mrs. Myers added to the conversation by emphasizing that before she presents students with a choice of activities, she explained to her students that the choice activities are like a menu. Mrs. Myers encourages her students to “sample” every item on the menu. Mrs. Myers explained “all students need to sample all the items on the menu. The students may find that they like ‘calamari’ but if they don’t try it, then they will never know. I want my students to be exposed to as many representations of the mathematical concept as possible. I encourage them to work through as many menu items as possible.”

This section demonstrated that teachers fostered a sense of mathematical identity and agency. According to the NCTM (2018), in general, students are passively engaged in mathematics. That is, the students are not involved in mathematical discourse where reasoning and sense making are supported. However, the participants in this study encouraged their students to take ownership in their learning by providing them with choice and multiple representations of the content. These concepts work in tandem with culturally responsive teaching by helping students make connection between their choices and outcomes for their preference. By offering students a choice, this signals that the participants provide the students with a conducive classroom environment where the students are partly responsible for their learning. Moreover, by “sampling” every item on the menu, the students are encouraged to engage in productive struggle which is the building block for developing mathematical agency. The students also learned decision making skills that can be transferred from the school culture to their home environment and beyond. When Mrs. Campbell’s students encouraged her to “put
some weight on the problem,” this signals that the students are developing a positive mathematical identity where they see themselves as capable learners and doers of mathematics.

**Culturally Responsive Practices**

One theme emerged from the second round of teacher interviews as they relate to the second research question, *What are the perceived challenges associated with culturally responsive teaching in a middle school mathematics classroom?* The theme that characterized the sentiments of the participants was “somebody will get offended”.

The primary focus of the second round of teacher interviews were to discuss the participants’ instructional and professional practices. The second round of teacher interviews were also designed to gain insight on how the teachers’ mediated learning mathematics for students from diverse backgrounds.

**“Someone Will Get Offended”: Teachers’ Attitudes Towards the Critical/Sociopolitical Consciousness Tenet**

When discussing the tenets of culturally relevant pedagogy, all participants overwhelmingly supported the academic success and cultural competence tenets. Equally important is to note that all five participants were apprehensive when discussing the critical/sociopolitical consciousness tenet with their students. During the interviews, I found interesting that Mrs. Sanders and Mrs. Myers equated the third tenet, critical/sociopolitical consciousness, with Critical Race Theory (CRT2). Because these two participants do not believe in the premises of CRT2, they contend that they will not engage in critical/sociopolitical consciousness discussions with their students. Both participants believed that Critical Race Theory is divisive and goes against their Christian values. I am sure that Mrs. Sanders and Mrs. Myers were not trained in or studied Critical Race Theory which would explain their
unfamiliarity with the CRT2 premises and their hesitancy to engage in discussions with their students. Moreover, because the participants were not trained in CRT2, it would be counterproductive to expect mathematics teachers, who did not study such advanced graduate topics, to integrate CRT2 ideas into their teaching of mathematics practices. These findings suggest that a comprehensive professional development program is crucial in order to initiate critical conversations pertaining to how to integrate the critical/sociopolitical consciousness tenet in middle school mathematics instruction. This is important because the critical/sociopolitical consciousness tenet was designed to help students critique the world and challenge the status quo in order to have a transformative and liberatory outcome for themselves and their communities.

From the interviews, however, all five participants demonstrated a form of critical/sociopolitical engagement when they watched the historic 2020 Presidential Inauguration with their students. Ms. Boyd, Ms. Douglas, and Mrs. Campbell expressed there is a need to engage in all three aspects of culturally relevant pedagogy because the tenets have been proven to help engage and motivate students to learn important mathematics. However, the teachers were concerned that integrating critical/sociopolitical topics could create unnecessary scrutiny into their class lessons and daily routines. Ms. Boyd explained in her statement:

Well, there is pretty much a month for everything. That is how I bring in the sociopolitical aspect of culturally relevant pedagogy. Other than that, I build relationships with the students to get to know them so I can incorporate their background into my daily lessons and plan lesson where all students’ backgrounds are acknowledged at some point in time.

To add to the conversation, Ms. Douglas revealed that “I make time and space if the students bring it up. Other than that, I do not really discuss current events because somebody will get
offended.” Ms. Douglas recalled a scenario when she made time and space for her students to discuss the passing of Kobe Bryant. Ms. Douglas explained that some of her students had a difficult time with his passing, so she allowed the students to express their feelings. Ms. Douglas believes that this allowed students to show empathy for their classmates while some students mourned the passing of their basketball hero. Ms. Douglas also recalled watching the 2020 Presidential Inauguration with her students. Ms. Douglas stated “the students were more concerned about what Michelle Obama was wearing and the entertainment performances than the historic event. Six graders care about six-grade appropriate things. They care about pizza and basketball.” Ms. Douglas also recalled during March Madness, she gave her students probability, ratios, and statistics assignments. Ms. Douglas explained that the students were really engaged and motivated to learn the concepts because the assignment was attached to something they care about.

While discussing critical/sociopolitical consciousness tenet, Mrs. Campbell also recalled watching the historic 2020 Presidential Inauguration. Mrs. Campbell explained that one of her students asked, “Are they holding the Inauguration outside because they tore up the Capital Building?” Mrs. Campbell used this opportunity as a teaching moment to explain to her students that holding the Inauguration on the steps of the Capital Building is a long tradition in the United States. Mrs. Campbell showed her students pictures of past Inaugurations so that the students would not associate the January 6th Capital riot as the reason for holding the Inauguration outside. Mrs. Campbell also explained “I would love to take a deep dive into mathematical concepts as they relate to sociopolitical consciousness…I just don’t want to get anything started. I can see how the students might be interested in it. I probably will start off using the 2020 Census report but even that has caused an uproar.”
Moreover, the participants provided insight as to how they used culturally responsive teaching practices to mediate learning not only for students who have been historically marginalized but for all students. When discussing specific practices, Ms. Boyd stated that she writes the content objectives on the board so that her students know exactly what they are expected to learn. Ms. Boyd provides them with immediate and descriptive feedback she constantly informed the students about their duties and responsibilities to learn and be successful. Similarly, Ms. Sanders taught her students how to take Cornell notes. She also used the strategy, what do I know, what do I want to learn, and what I learn, or the KWL, strategy. She explained her students that “in the corporate world, it is important to know how to ask the right questions.” Moreover, Ms. Douglas encouraged her students to work in cooperative groups where each student has a role. She explained:

One student may be the facilitator, or the presenter, or materials manager, or timekeeper.

I allow them to work in groups because 6th grade students speak 6th grade language. I can tell a student, that the sky is blue, and the student may not understand it. Another student tells him that the sky is blue and suddenly, it makes sense.

The cooperative groups provide the students with a shared sense of responsibility and develop a sense of community. When discussing the lesson design, Mrs. Campbell explained that she changed from teacher centered lessons where she lectured, and the students take notes to where it is more hands-on. Mrs. Campbell explained, “sometimes I think the students like it better when they teach themselves and others.” Mrs. Myers also used a hand-on – minds-on approach to inquiry based learning.

This question unearthed a plethora of emotions and concerns. This signals to me that an initiative is needed so that teachers can understand how their personal beliefs impact students. I
believe that it is imperative that teachers are provided a safe space in which they can have a better understanding and appreciation for ideas that may conflict with their own personal beliefs because teacher practices have a direct impact on the success of their students.

Moreover, the first and second rounds of interviews yielded one theme as it relates to the final research question, How do middle school mathematics teachers perceive the likely impact of culturally responsive professional development to potentially impact their practices? “Not anything special” characterized the consensus among the participants.

“Not Anything Special”: Meaningful and Ongoing Professional Development Opportunities

When discussing professional development opportunities, the participants indicated that they would prefer professional development that tie culturally relevant and responsive teaching to mathematics. Ms. Boyd starts the conversation by explaining how essential culturally responsive training would be useful to her practice. Ms. Boyd states:

I think that if we had culturally responsive training in the content area once a month or at least once every other month then it would be greatly beneficial. The training that I received has not been anything special. I believe that the biggest help for me is just a reminder that I should be more cognizant and sensitive to the needs of the students and not just racially but to all the demographics.

Mrs. Sanders added to the conversation by explaining that “I'm glad that we're going AVID because it allows techniques and strategies it doesn't matter what your race is honestly, they last forever in a student's academic career.” Ms. Douglas added to the conversation. She stated:

The anti-defamation and microaggression trainings were the little of bit of training and professional development that I had. I can see how culturally responsiveness fits in social
studies like talking about African Americans history…but I would like more training on how it fits in math, specifically, when I am talking about fractions and percent and 6th grade.

Mrs. Campbell continues the conversation by adding, “I really do not remember taking any diversity classes in undergraduate school and the professional development that I have received through the school district has not been very powerful.”

Mrs. Myers also told her experience pertaining to the anti-defamation professional development. Mrs. Myers explained that:

I feel that the anti-defamation training was important because it allowed me to acknowledge me own personal biases. I would love to have professional development or visit some classes where all parts of culturally relevant pedagogy are used without offending other students.

**The Consent Order**

The United States District Court approved a Consent Order in the school desegregation case that provides the School District with a pathway for providing equitable educational opportunities for all students, regardless of race, and to reach “Unitary Status.” Implementation of this Consent Order will provide benefits to all students in many areas: Math acceleration, AP and honors programs, Career Academy programs, Magnet programs, School facilities, Access to quality and diverse teachers and faculty, Guidance programs to assist students with college applications, Performing arts, Extracurricular activities, Positive school climate with an updated Code of Conduct, and Majority-to-Minority transfers. The Consent Order is multifaceted. It contains seven key areas in education: Student Assignment, Equitable Access to Course Offerings and Programs, Extracurricular Activities, Faculty, Transportation, Facilities, and
Student Discipline. For this study, I examined the section labeled Faculty under the Consent Order.

_Professional Development that is Ongoing and Associated Content Area_

The participants expressed a need to have professional development opportunities that tie content knowledge to culturally relevant and responsive mathematics teaching practices. The teachers also expressed a need to have continuous support throughout the year whether it is from the district office or the curriculum suppliers. When pairing the Consent Order with the Strategic Plan, the School District pledges to continuously empower all employees with modern strategies and skills that will, in turn, equip students for success. The School District pledges to recruit and retain the highest quality teachers, administrators, and staff to provide all students with the highest quality education. The district also promises to support, grow, and develop, teachers, administrators, and staff to have the tools necessary to be successful. The School District plans to implement these promises by ensuring that all teachers have a positive and supportive work environment and provide purposeful professional development that directly supports classroom instruction.

_Rising to the Occasion_

Although the School Districts’ Consent Order and Strategic Plan do not explicitly provide professional development opportunities for culturally relevant and responsive teaching practices, the school district adopted the in-school academic support program, Advancement Via Individual Determination (AVID). All 8th grade teachers received a three-day professional development training on the program. The program also provides online support throughout the year. However, the teachers must engage in participating in asynchronous and self-directed professional development. Moreover, all participants attended at least one year of content
specific professional development through the state department initiative and assessment trainings. Through these two initiatives, the participants have access to researched-based teaching and learning strategies. Implementing equitable instruction is one of the fundamental building blocks of culturally relevant pedagogy and culturally responsive teaching. This is significant because teachers and their practices set the tone for the success of their students.

**Emerging Culturally Responsive Mathematics Teachers**

After this investigation, I learned that culturally relevant pedagogy is as a way of being. As a teacher, it is way of life. Similarly, culturally responsive teaching is not a list of strategies where one size fits all or most. I liken CPR and CRT as living organisms that grow, adapt, and evolve to meet the needs, the opportunities, and the challenges of the current educational environment. Moreover, while examining the participants responses (to the interview questions) through the lens of culturally relevant pedagogy, I learned that all participants created an equitable learning environment so that all students can experience academic success and achievement. This was illustrated in the participants responses revealing that they set high standards and expectations for their students. That is, being successful is nonnegotiable. The participants held their students partly responsible for their own academic achievement. This is imperative because teachers and their instructional practices have a great impact on the academic success of their students (NCTM, 2018). The participants provided their students with learning opportunities so that the students can see themselves as doers of mathematics. This is important because students’ achievement in mathematics is predicated on students who see themselves as doers of mathematics (Boaler, 2015, 2020).

While developing as culturally responsive mathematics teachers, I noticed that the cultural competency tenet was addressed when the participants provided their students with
learning opportunities that integrated their students’ cultural funds of knowledge. The teachers informed me that they designed their lessons with their students’ cultural background in mind. For example, Mrs. Campbell explained that when teaching fractions and decimals, she gave her students an assignment called, “My Family’s Favorite Feast.” Mrs. Campbell integrated her students’ cultural background to motivate and engage her students in actively participating in the lesson. Mrs. Campbell asked her students to bring in a recipe from their favorite family dish. The students were given a series of instructions for making the dish for various number of individuals. Mrs. Campbell explained that this project allowed her students to learn about one another’s cultures as well as make connections between mathematics and the real world.

While planning for complex learning outcomes for her students, Mrs. Campbell used her students’ cultural funds of knowledge while as a means for developing into a culturally competent teacher. This is vital because research shows that when teachers incorporate their students cultural background and experiences in the lesson, then all students benefit (Johnson & Gonzalez, 2014). One aspect of cultural competence is that the teachers help their students acknowledge and appreciate their own culture and background. The teachers also provide their students from diverse background with strong support and the tools to help them understand and maneuver through the dominant culture in order to achieve academic success (Thomas & Berry, 2019; Ladson-Billings, 1994).

Developing characteristics of culturally responsive teaching in mathematics is a complex endeavor. This study shed light on the risks that teachers must take in order to fully engage in culturally relevant pedagogical practices. Thomas and Berry (2019) capture the essence of culturally responsive teaching in mathematics by offering the five characteristics: caring, context, cultural competency, high expectations, and mathematics instruction. The participants in
this study showed various degrees of each characteristic. Each participant looked for opportunities to reflect and refine their instructional practices. The participants engaged in self-directed professional development experiences for their own personal growth and development. Moreover, the participants engaged in constant specific professional development opportunities offered by the state and school district. By participating in the content specific offerings, the participants were able to deepen and strengthen their own practices by adding to their repertoire additional instructional practices to reach and all students. Based on the data, the participants were in fact engaging in culturally responsive teaching in mathematics. Overall, the participants developed characteristics of culturally responsive mathematics teaching by implementing equitable teaching practices so that all students.

Summary

Because I did not conduct classroom observations, I must include a caveat that the findings are based on participants’ perception. Because the assumption is that the participants’ responses are true and honest, I was able to conclude the following findings. The findings indicated that when teachers hold high expectations for their students, the students tend to not only meet but to exceed the teachers’ expectations. When teachers build strong relationships with the students and their families, the students’ academic performance increased. When teachers become facilitators of learning and provide students with opportunities to monitor their own academic development, the students gain a greater sense of self-confidence in their own abilities to learn and do mathematics. In addition, teachers encounter structural barriers that may appear inequitable. The sociopolitical competence tenet was overshadowed by the political climate of the United States. Finally, the teachers preferred professional development opportunities that were ongoing and associated with their content area. The two overarching themes that emerged
from the study: 1) setting high expectations for students to promote academic growth and
development and 2) providing professional development opportunities that support culturally
relevant and responsive teaching practices as they relate to the research questions will be
discussed in the next chapter.
CHAPTER FIVE: DISCUSSION

The purpose of this study was designed to capture the experiences and instructional practices of ten middle school mathematics teachers as they developed characteristics of culturally responsive mathematics teachers. For this study, however, five out of the ten participants emerged as showing great promise in becoming culturally responsive mathematics teachers. Because culturally relevant pedagogy and culturally responsive teaching are dispositional commitment, I aimed to understand the teachers’ attitudes and beliefs as they transitioned to integrate culturally relevant pedagogies into their daily routines. This study also aimed to understand teachers’ perception of how professional development opportunities could potentially impact their instructional practices.

Entrenched in the need to understand how mathematics teachers mediate learning for underrepresented students, this study was guided by three research questions that were initially stated in Chapter One and revisited in Chapters Three and Four. The research questions were:

1. How do middle school mathematics teachers develop as culturally responsive teachers?
2. What are the perceived challenges associated with culturally responsive teaching in a middle school mathematics classroom?
3. How do middle school mathematics teachers perceive the likely impact of culturally responsive professional development to potentially impact their practices?

The participants selected for this study were from two middle schools, namely, Southwest Middle School and Southeast Middle School, in the same school district. The school district is
position in the Southeastern region of the United States. At each middle school, more than 50% of the student population was from a culturally and linguistically diverse background. To help orientate the reader, I divided this chapter into four sections: 1) equitable mathematics instruction 2) the limitations of the study, 3) the implications for future research, 4) the conclusion of the study.

**Equitable Mathematics Instruction**

In reference to the first research question, *How do middle school mathematics teachers develop as culturally responsive teachers?*, providing an equitable mathematics education resonated throughout the data. Based on the interview responses, I believe that the participants set high standards, expectations, and challenging learning goals for all students. I also gathered that the participants provided their students with strong support by providing extra time on task, tutoring, and making the necessary accommodations to meet the needs of students who have an Individualized Education Plan (IEP) or an Individual English Learner Plan (I-ELP) so they can experience success. The participants indicated when they develop lesson plans, they considered their students abilities and provided multiple entry points and activities to ensure the lessons are inclusive for all students. The findings also show that the participants provide their student with opportunities to build self-confidence in mathematics.

Moreover, the school district’s document, The Strategic Plan, also supports the idea that establishing and maintaining high expectations and standards for all students are cultural norms. This notion is exemplified in the school district’s action plan for the Learning Outcome Pillar. One component of the Learning Outcome Pillar is that all students will show academic growth each year. To show their commitment to this learning outcome, the school district provided all
students with a digital device (Ipads or laptop computers) which allows all students access to an equitable education.

Although setting high expectations and providing the students with strong support to meet the goals, Gutiérrez (2009) expands on this notion. She explains that mathematics education needs to be transformative where students can develop identity and agency as a mathematical learner. To that end, there is a strong need for culturally relevant teaching in the mathematics classroom because CRT and CRP empower teachers with the abilities to respond and incorporate students’ cultural experiences at home with their experiences in the classroom to ensure academic success for all.

From the interviews, I learned that at Southeast and Southwest Middle Schools, the participants established classroom norms and routines. This is important because the participants were building a community of learners and leaders. When the participants serve as facilitators of learning, they provide their students with opportunities to develop positive identities and agency in the mathematics classroom. This allows students to see themselves as doers of mathematics where the students are partly responsible for their own academic success. Moreover, the participants provided their students with ample opportunities to engage in cooperative learning activities. Cooperative learning also allows students to critique, challenge, and form consensus among their peers.

In reference to the second research question, *What are the perceived challenges associated with culturally responsive teaching in a middle school mathematics classroom?*, offending one another seemed to be a consensus among the participants. I believe that this is due in part to the civil unrest and demonstrations that erupted in the United States and around the world. In my study, I found that all five participants unequivocally embraced the academic
success and cultural competence tenets of culturally relevant pedagogy. However, all five participants expressed some degree of hesitancy pertaining to the critical/sociopolitical consciousness tenet. Although the reasons for this hesitancy varied from two participants equating the tenet to critical race theory while another participant did not want to offend anyone, I believe that unearthing this two-fold challenge provides the participants with a unique space to initiate a critical dialogue.

First, the study revealed that the participants would need training on how to integrate sociopolitical consciousness in the mathematics classroom in such a way that is respectful and inclusive. Second, the study revealed that more work is needed to raise awareness in terms of explaining the principles of critical race theory. Because critical race theory is generally discussed when pursuing advanced degrees, it is imperative that scholars and researchers provide a clear narrative to the public to help the citizens make informed opinions and decisions. Because the critical/sociopolitical consciousness tenet was designed to raise awareness and to help students make connections between mathematics and the world around them, it is imperative that students are afforded the opportunities to engage in the critical conversations to the extend in which it is appropriate for their developmental stage.

**Professional Development Opportunities**

In reference to the third researcher question, *How do middle school mathematics teachers perceive the likely impact of culturally responsive professional development to potentially impact their practices?* The study found that meaningful and ongoing professional development opportunities that connect content knowledge with culturally relevant pedagogy and culturally responsive teaching practices were a desire for all the participants. Garet et al. (2001) suggest that ongoing professional development allows for teachers to implement the activities and
provide feedback on areas of improvement. To help with this concern, I recommend that the teachers provide in-house professional development. That is, once a month, a faculty meeting is designated for in-house professional development (PD) where the PD address the specific needs of the school and teachers. The PD would be performed by teachers within the schools because they should know the school’s culture and the norms of the school.

**Transformation of Emerging Culturally Responsive Mathematics Teachers**

During the investigation process, I noticed that the participants stated that they wanted to learn how to become culturally responsive mathematics teachers. The teachers wanted to form connections with their students from diverse backgrounds. The participants heard about culturally responsive teaching and culturally relevant pedagogy but did not really grasp the nature of the theoretical frameworks. As I continued to investigate, I also noticed that the participants were already practicing the tenets of CRP and most of the dimensions of CRT. For example, the participants served as a facilitator of knowledge. The participants allowed their students the opportunity to interact with mathematics and construct knowledge in a way that was meaningful to them in their everyday lives. Content integration and facilitating knowledge constructions were thematic categories found in Hernandez et al. (2013) assertion of culturally responsive mathematics teaching. The participants also demonstrated throughout the interviews acts of caring and setting high expectations for themselves as teachers and their students. The teachers also believed in their own abilities to develop coherent and challenging mathematical lessons that promote academic success for all students. These three aspects, caring, high expectations, and teacher efficacy and beliefs are components of Thomas and Berry (2019) research on CRP and CRT within the mathematics classroom. However, there was little to no
evidence of teaching mathematics for sociopolitical/critical consciousness (Ladson-Billings, 1995), social justice (Aguirre et al., 2012), or prejudice reduction (Hernandez et al., 2013).

In reference to the participants’ perception of the impact of professional development on their practices, I was also concerned with the idea that participants perceived that the professional development opportunities that were afforded to them were not related to CRP and CRT practices. I believe that this is a problem because there is a gap in the participants ways of knowing and doing. The participants were not aware that they are in fact culturally responsive mathematics teachers. In CRP, teachers help students develop necessary skills in academic settings. Ladson-Billings points out that CRP is not a prescribed list of strategies that is designed to help students who have been historically undervalued or underrepresented to pass state tests. She proclaims that culturally relevant pedagogy and culturally relevant teaching is “just good teaching” (Ladson-Billings, 1995).

The data showed that the participants were in fact culturally responsive mathematics teachers. Because there are no established metrics or scale to determine the level a teacher is considered a culturally responsive mathematics teacher, I believe that this is an area of concern that may require further investigation. This is significant because growth, development, and improvement are predicated on one’s understanding when he or she should move from one level to the next.

**Limitations of the Study**

There were three limitations of this study. The first limitation was the study consisted of five middle school mathematics teachers from the same school district. I believe that if I were to include teachers from surrounding school districts, then I would be able to make a more generalization and transferable recommendation. The inclusion of participants from other school
districts within the Southeastern region of the United States could increase the number of participants and potentially offer different results and themes. The second limitation of the study is the lack of generalization. Data were collected from two middle schools within the same school district. As a result, the findings from the study cannot be generalized to all school districts across the United States. The third limitation was my inability to gather data that included classroom observations and student interviews. During the 2019 Coronavirus pandemic (COVID-19), the Center for Disease Control and Prevention (CDC) recommended that school systems put in place protocols to mitigate the COVID-19 spread. One of the protocols were to limit the number of individuals in a classroom. As a result, Southeast School District, where I conducted my study, only allowed for adult interviews. Classroom observations and student interviews were not permitted during this time. However, I was able to collect data from teacher interviews and public documents. The study would have benefitted from additional data sources such as classroom observations, student interviews, and students’ grades.

**Implications for Future Research**

Research on culturally relevant pedagogy and responsive teaching in mathematics has relied primarily on classrooms where culturally responsive mathematics teaching (CRMT) is implemented (Harding-DeKam, 2014). As a result, this study attempted to address the transformation of mathematics teachers as they strive to implement culturally relevant pedagogical practices.

Based on the findings from this study, implications for future research include investigating the results of the participants were not from the same school district and/or from the same school. A future study may include a comparison of teachers’ responses to the research questions from various regions of the United States. Because I was intrigued by the response to
the participants regarding the sociopolitical tenet of culturally relevant pedagogy, I am also curious to understand if teachers in urban, suburban, and rural communities engage in a similar response to the participants in this study. I believe that by extending this research to include more than five participants and eliciting responses from teachers throughout the United States will help move mathematics education forward because more current data will help practitioners understand where the gains and losses are the field.

Conclusion

This research study developed in part due to an increasingly culturally and linguistically diverse student population in U.S. public schools; the ongoing inequities in public education; and the relentless gaps in access and opportunities for underrepresented students (Cochrane et al., 2017). These factors provide a unique space for critical discourse where educational researchers, practitioners, and policy makers can challenge the existing educational processes, structures, and standards (Brown-Jeffy & Cooper, 2011) to build an educational system that empowers historically marginalized children (Maloney & Matthews, 2020).

Research shows that culturally relevant pedagogy and responsive teaching are effective methods for mediating learning for historically marginalized students (Gay, 2000; Ladson-Billings, 1995). The literature also suggests that mathematics education is a benefactor of the CRP and CRT tenets (Thomas and Berry, 2019). The findings from this study were supported by the culturally relevant pedagogy tenets academic success and cultural competence. However, this study revealed that more work is needed in the areas of understanding how sociopolitical consciousness can be beneficial in the mathematics classroom. As a result, professional development opportunities that are both meaningful and connected to the needs of the teachers may be a potential remedy for helping teachers embrace the sociopolitical tenet. Moreover, the
findings suggests that professional development opportunities pertaining to culturally responsiveness should include workshops that bridge together mathematical content knowledge with cultural knowledge to promote academic success for all learners. Finally, the findings of this study indicate that more work is needed in understanding how emerging and culturally responsive mathematics teacher provide students with access to opportunities that will ultimately lead to a liberatory education for all students.
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APPENDICES
APPENDIX A: IRB APPROVAL
June 9, 2021

Carol Jackson
Department of Curriculum & Instruction
College of Education
The University of Alabama
Box 870232

Re: IRB # 19-OR-050-R2 "Middle School Mathematics Teachers Using Culturally Relevant Pedagogy to Improve Learning for Historically Marginalized Students"

Dear Ms. Jackson:

The University of Alabama Institutional Review Board has granted approval for your renewal application. Your renewal application has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

The approval for your application will lapse on June 8, 2022. If your research will continue beyond this date, please submit a continuing review to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the IRB approved informed consent form to obtain consent from your participants.

Good luck with your research.

Sincerely,

[Signature]

Director & Research Compliance Officer
APPENDIX B: INFORMED CONSENT STATEMENT
Consent for Participation in a Social and Behavioral Research

Middle School Mathematics Teachers Using Culturally Relevant Pedagogy to Improve Learning for Historically Marginalized Students

Dear Middle School Mathematics Teacher:

My name is Carol Jackson, and I am a doctoral student at the University of Alabama in Tuscaloosa, Alabama where I am working under the direction of Dr. Latrise Johnson. This letter is to invite you to participate in a qualitative research study.

I would like to request your participation in this study that investigates middle school mathematics teachers transitioning to become culturally relevant and responsive teachers. The purpose of this study is to obtain your perceptions, insights, and experiences of teaching mathematics in a diverse environment and the instructional practices that you use to obtain and maintain equity in mathematics.

This study is conducted in two rounds. Round 1 is in the initial interview where Round 2 is the follow-up interview. Based on the themes and categories that emerge from Round 1, you may be asked to participate in Round 2.

You are being asked to participate in Round 1, the initial interview, which should take about 60 minutes. The interview may be face-to-face or digital (for example Skype, Zoom, or Google Meet, etc.). During the interview, the researcher may take notes, and audio/video recorded the interview to ensure accuracy when transcribing the data. Please note that the audio/video devices will be stored to 24 months in a locked safe. After which, the audio tapes and video recordings will be erased, and any written documents and data collected will be shredded.

To ensure, minimal risk, I will adhere to the highest standard of care and all information will be held in strict confidence by assigning a participant ID number along with a pseudonym that will substitute for your name on all materials. If you agree to participate, please sign this form. Your participation in this study is voluntary, and you are free to withdraw from participation at any time. Participants who participate in Round 1 and Round 2 of the interviews will receive a $25.00 honorarium. Participants who complete Round 1 of the interviews will receive a $10.00 honorarium.

If you have any questions related to this study, you can contact me at (256) 321-2626 or sjackson2@crimson.ua.edu. If you have any questions concerning your rights as a participant in this study, you may contact at the Office of Research and Compliance, The University of Alabama at (205) 348-8461. You may also contact Ms. Myles to ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at http://ovprop.ua.edu/research-compliance/pro/ or email the Research Compliance Office at rscompliance@research.ua.edu.

Sincerely,

Carol Jackson, Ed. S., NBCT

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I agree to participate in the research study entitled: Middle School Mathematics Teachers Using Culturally Relevant Pedagogy to Improve Learning for Historically Marginalized Student. Carol Jackson has explained the purpose of the study and the procedures to be followed. I acknowledge that I have had the opportunity to obtain additional information regarding the study and all questions I have were answered to my satisfaction. I also understand that I am free to withdraw from the study at any time and discontinue participation in the study without prejudice. Finally, I acknowledge that I have read and fully understand this form. I voluntarily sign this form. A copy of this form has been given to me.

Please mark the box to the right indicating whether you agree to have the interview audio recorded. ☐ Yes ☐ No

Signature: ___________________________ Date: ___________________________

Participant

Signature: ___________________________ Date: ___________________________

Principal Investigator
APPENDIX C: TEACHER INTERVIEW PROTOCOL – ROUND 1
Project Title: Middle School Mathematics Teachers Using Culturally Relevant Pedagogy to Improve Learning for Historically Marginalized Students

Researcher: Carol J. Jackson

Sponsor: Dr. Latrise Johnson

Introduction: As a part of this study, you will be asked to participate in an in-depth interview lasting approximately 60 minutes in length, in which you will be asked a series of questions related to your teaching background, experience(s) and teaching style. The questions are open-ended and may lead to further questions. At any time, you may request to stop. The interview session is totally voluntary, and all information given or shared will be kept confidentially.

Please know that you are being asked to participate in this study because you have been deemed as a highly effective teacher by your principal. According to your principal, you are a professional, reflective, effective practitioner that endeavors to meet the needs of all students within your classroom.

Pre & Background Information

1. Please describe your journey to becoming a teacher. Was this your original career choice? What motivated you to become a teacher?

2. How and why did you choose to teach in an urban setting?

3. How many years have you taught? Briefly describe your teaching experience(s).

4. What is your philosophy of teaching?

5. Have you had interactions with other races or individuals from different racial backgrounds other than your own? If so, how often, and to what extent?

6. How does your race and or cultural background differ from the students that you teach? In your opinion, does it really matter?

7. Did you receive any diversity or multicultural training in your pre-service teaching program? If so, please describe the experience(s).

8. Describe the students at this school. Tell me a story to illustrate your description.

9. Describe the parents of this school. Tell me a story to illustrate your description.
Instructional Practice

10. How are instructional materials selected for your classroom? How much input or autonomy do you have in curriculum choice- what gets taught? When? How?

11. What beliefs, if any do you hold about your students that guide your instructional practices?

12. Explain how you plan a lesson for your students?

13. What are concepts or skills you feel are vital for the academic success of your students? Why are these so important?

14. How do you incorporate instructional strategies that promote students’ ownership of mathematics?

15. How do you build upon students’ prior knowledge, experiences and or cultural backgrounds in your teaching?

16. Please describe the culture of your classroom environment? How much of it is your influence? Students? Administration?

17. Please describe parental support of the students in your class. How open are parents to your recommended suggestions?

18. What kinds of knowledge or skills should a teacher develop or possess for teaching mathematics African American students?

Beliefs & Attitudes

19. What are some things that you really like about teaching? What do you dislike?

20. How do you describe yourself as a teacher?

21. How do you describe your teaching practices?

22. I am sure your students have learned a lot from you thus far. But what knowledge, if any, have you gained from teaching them?

23. What professional development, classes or training did you receive to help you teach/work with urban African American students? Please describe.

24. How do you address issues/concerns of your immediate and greater African American community in your classroom? Please explain how you do this.
25. Do you feel any special responsibilities/obligations to the African American community because of your career choice? If so, why?

26. What challenges, if any, have you faced in working with African American students? Parents and or families?

27. How do you motivate your students to learn and or achieve?

28. When creating a lesson or project, how much of it is influenced by student interest? Engagement? Rigor?

29. How much can you do to improve the understanding of a student who is failing?

30. How much can you do get students to believe that they can do well in schoolwork?
APPENDIX D: TEACHER INTERVIEW PROTOCOL – ROUND 2
**Project Title:** Middle School Mathematics Teachers Using Culturally Relevant Pedagogy to Improve Learning for Historically Marginalized Students

**Researcher:** Carol J. Jackson

**Sponsor:** Dr. Latrise Johnson

**Introduction:** As a part of this study, you will be asked to participate in an in-depth interview lasting approximately 60 minutes in length, in which you will be asked a series of questions related to your teaching background, experience(s) and teaching style. The questions are open-ended and may lead to further questions. At any time, you may request to stop. The interview session is totally voluntary, and all information given or shared will be kept confidentially.

Please know that you are being asked to participate in this study because you have been deemed as a highly effective teacher by your principal. According to your principal, you are a professional, reflective, effective practitioner that endeavors to meet the needs of all students within your classroom.

**Instructional and Professional Practices**

1. What is your teaching philosophy as it relates to culturally and linguistically diverse students?

2. What are your goals and expectations for your students in the classroom, at school, and beyond? Why? Do these differ between students? How so?

3. What is your working definition of culturally relevant pedagogy?

4. What is your working definition of culturally responsive teaching?

5. How do you integrate CRP and CRT in your daily routines?

6. What type of professional development have you participated in as it relates to culturally responsiveness?

7. How has the professional development changed your attitude, beliefs, and practices?

8. What are some ideas that you learned from the professional development that you will or plan to implement? Why?

9. What are some ideas from the professional development that you will not or plan not to implement? Why not?
10. How well do you know your students?

11. Does your classroom reflect your student body?

12. Do you invite and involve families?

13. Do you help students develop a positive racial and cultural identity? If so, how? If not, why not?

14. What kinds of knowledge or skills should a teacher develop or possess for teaching mathematics African American students?

15. Do you create space for sometimes difficult conversations about current events and culture?

16. Do you embrace students’ native languages?

17. Walk me through your lesson planning process.
   a. Do you follow a curriculum? Tell me about it. Do you ever make changes to the curriculum? Does this happen frequently? Could you give me an example?
   b. How do you arrange your classroom and your students and how does this relate to your teaching styles?
   c. How do you select materials for your lesson?
   d. Do you plan with your students’ identities in mind? How? Ask for examples.
      i. How does race play into your planning decisions?
      ii. Walk me through the process of how you take students with disabilities into account in designing your classroom? Your lessons? (planning/delivery)
      iii. What do you look for to know that your lesson is accessible to your students with different abilities and language backgrounds?
      iv. In what ways do you consider the lived experiences of your students as you plan?

18. How do you track your students’ progress on mastery?
   a. How do you determine whether a student is ready to move forward?
   b. How do you determine how to move forward?

19. How do you work with other teachers to plan lessons?
   a. Do you work across subjects and grade levels?
b. How do you reflect on your teaching individually and in collaboration with other teachers? Ask for examples of areas of individual and group reflection.

**On Students**
20. How do you think your students perceive their educational experience in your classroom?

21. How do your students exemplify identity and agency in your mathematics classroom?

22. How do the students interact with your teaching?

23. How do you respond to your students? interact with your teaching.

24. How do you think your students’ identities interact with their learning and their experience in the classroom?
   a. Are there types of students that are more successful in your classroom than others? What do you think makes them more successful?
   b. What about students with disabilities?

25. How do historical or current issues come up in your classroom?
   a. How do you feel about engaging with historical or current issues into your classroom? b. How do your students interact with these events?

26. What is your relationship with your students like?
   a. Do you feel you have gotten to know them? Ask for examples of how. (If needed, prompt for: staying after school, through classroom assignments, etc).
   What about your relationship with your students’ families? What are your interactions like?
   b. Are there opportunities for families to advocate for their students, to make decisions with you and your classroom, etc.? Ask for examples.

**Conclusion**

Ask your interviewee if there is anything else they would like to tell you related to the research that they did not have the opportunity to say.

Thank them for their time.