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## Teachers' Perceptions of Using Culturally Relevant Education Practices to Teach Middle-Grades Mathematics

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# Walden University

College of Education

This is to certify that the doctoral study by

Lorna B. Randle

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

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Walden University

2023

Abstract

Teachers' Perceptions of Using Culturally Relevant Education Practices to Teach

Middle-Grades Mathematics

by

Lorna B Randle

MS, Walden University, 2006

BA, University of Houston-Downtown, 2001

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

April 2023

## Abstract

African American students and other students of color are not experiencing equitable learning outcomes in mathematics classrooms. The problem this study investigated was if and how teachers used culturally relevant education to help increase learning opportunities for African American students. This basic qualitative study aimed to explore teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students. Further, teachers' perceptions of their preparedness to use culturally relevant education practices were explored. Aronson and Laughter's theory of culturally relevant education framed the study and guided data analysis. The research questions investigated if or how teachers used culturally relevant education to teach mathematics to African American students, how prepared they were to use the practices, and what support they needed. Data were collected from nine math teachers through semistructured interviews. The data were analyzed using a priori coding, developing categories, and emergent themes. The findings revealed teachers were unaware of culturally relevant education research, theory, and practices. Consequently, they were not prepared to use the practices. Most used personal experiences and student data to teach African American students. Finally, teachers desired training to learn and strengthen their culturally relevant knowledge and skills. Per the findings, a 3-day professional development was designed to provide opportunities for teachers to develop research-based knowledge about and how to use culturally relevant education practices in mathematics classrooms. Findings from this study may contribute to positive social change by equipping teachers with knowledge of how to use culturally relevant education practices to increase the learning outcomes for all students.

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## Dedication

I want to dedicate this study to my parents, my father, the Late Joseph Randle Jr. who always believe that African American students needed an advocate. Next, my mother, Myrtle Randle, loved teaching and will always be my role model who showed me how to be a loving teacher. Joseph Gipson-Randle, my son, always pushed me to be better in my professional and personal life. I would not be here in this stage of my life if it were not for their love and support of them. I love you all.

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## Section 1: The Problem

### **The Local Problem**

Today, African American students and other students of color are not experiencing equitable learning outcomes in the mathematics classrooms (Battey & Neal, 2018; Boston & Wilhelm, 2015; Davis & Martin, 2018; National Center for Education Statistics, 2015; Schenke et al., 2017). African American students consistently receive lower grades in mathematics classrooms and lower scores on standardized tests (Asempapa et al., 2017; National Center for Education Statistics, 2015; Seriki & Brown, 2017). Numerous scholars such as Ladson-Billings (1994a, 1995, 1997), Banks and Banks McGee (1989), and Gay (2000, 2010) constructed theories and models for teachers to use in their mathematics classrooms that would increase the possibility of creating equitable classrooms. These scholars purport that students' culture, home life, and background can enhance students learning. Using the students' cultural background, and prior experiences in the classroom and at home can engage the students in mathematics lessons and allow them to understand why mathematics content is relevant in the world around them (Bowens & Warren, 2016; Gay, 2018; Larnell et al., 2016). Culturally relevant pedagogy and culturally responsive teaching encompass teaching for social justice and equity to promote success among students who have been marginalized or considered at-risk. Aronson and Laughter (2016) developed a model of culturally relevant education (CRE). However, Harrison (2015) suggested that teachers struggle to understand culturally relevant education's construct and how to use it in the mathematics classroom.

African American students do not always experience equitable learning outcomes in mathematics. The problem at John M. Middle School (pseudonym) was that it was unknown if and how teachers used culturally relevant education to help increase learning opportunities for African American students. This was evidenced by the lower test scores for African American students than their White and Hispanic peers. The local setting, John M. Middle School in Southwest District (pseudonym), included in its campus improvement plan the addition of culturally relevant education instruction for the entire campus curriculum. According to the campus improvement plan, teachers were focusing on instructional practices to use with English language learners (ELLS) and English as second language (ESL) essentials training during professional learning communities. There was no clear plan to use culturally relevant education, as established by the campus administrators when teaching African American students. Teachers' perceptions of using culturally relevant education instructional practices to teach mathematics to middle-grade African American students were unknown. Moreover, there was no indication that culturally relevant education training on teaching African American students was integrated into the professional learning communities.

A gap in practice was that the district had focused attention on culturally relevant education for ELLs rather than all students experiencing difficulties in mathematics classrooms. Exploring teachers' perceptions of how they used culturally relevant education instructional practices to teach mathematics to middle-grade African American students and their perceptions of their preparedness to do so was critical to understanding

the achievement gap in mathematics in teaching African American students at John M. Middle School.

Researchers have investigated different methods to teach diverse students to ensure equity in the classroom (Ball, 2016; Coleman et al., 2017; Rosenquist et al., 2015). One theory that addresses teaching practices for diverse students is culturally relevant education. Culturally relevant education is a research-based theory and model that sets forth strategies for teaching students from various cultural backgrounds. The theory and model assert that teachers can use strategies that help all students learn. This study focused on how culturally relevant education strategies are used with historically marginalized students, specifically African American Students.

Nation Report Card (2019), which is also referred to as the National Assessment of Education Progress, reported that middle-grades African American students perform at lower levels than all student groups. Nation Report Card reported on a scale from 0-500. African American students were at 260 in both the 2017 and 2019 reporting years, respectively (Nation Report Card, 2019). White students on the same scale were at 293 and 292 in 2017 and 2019, respectively (Nation Report Card, 2019). The Hispanic students' scores were slightly better than the African American students, with 269 and 268 in 2017 and 2019, respectively (Nation Report Card, 2019). Those scores may indicate there was a need to examine instructional practices used to teach African American students. Teachers' actual instructional practices were identified by investigating how they used culturally relevant instructional practices to teach mathematics to middle-grades African American students. Also, I examined their



perceptions of their preparedness to teach African American students which informed district and campus administration of training needs.

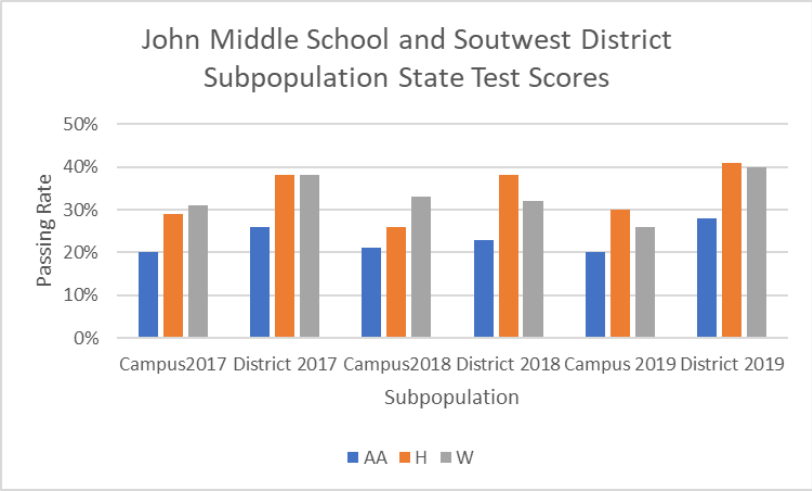
Even though culturally relevant education was well supported in the literature to improve outcomes for African American students (Arends et al., 2017; Averill et al., 2015; Mitchell, 2018), in literature review of 1,244 articles on CRP and CRT found only 12 related to use in mathematics classrooms (Thomas & Berry, 2019). Similarly, Adams and Glass (2018) purported that there was a lack of research on teachers' perceptions of CRP use. Adams and Glass asserted that there was not enough research that studies teachers' perceptions of CRP. There was limited research on teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students, and in the case of John M. Middle School, how well they believed they were prepared to do so.

### **Rationale**

Mathematics is essential because it provides skills to support students in making logical decisions regarding their world (Çetinkaya et al., 2018). The National Council of Teachers of Mathematics (NCTM, 2014) and the Southwest State Education Agency (SSEA) provided resources for teachers to promote academic progress and development in mathematics classrooms for all students. John M. Middle school administrators expressed African American students are one of the student population groups for whom instructional practices must be examined (personal communication, September 9, 2019). The campus administrators recognized the students' achievement on the state standardized assessment was low. The district and campus data illustrated African

American Students' performance on the 2018-2020 state standardized tests in Figure 1. Note in Figure 1 that African American students compared to the White and Hispanic students (Hispanic students in this study are students born in America of Central and South American descent) scored lower in the years 2018, 2019, and 2020 at John M.

**Figure 1**  
*John M. Middle School and Southwest District Subpopulation State Math Test Scores*



*Figure 1* displays the state standardized mathematics scores from the last three years of middle-grades African American students at John M. Middle School. Data are from the state report for the study site from 2018, 2019, 2020.

Middle School and the Southwest District (SSEA, 2018, 2019, 2020).

The campus considered how mathematics instruction was being implemented to ensure the students were thriving on the state assessment. In faculty meetings and professional learning communities (PLC), campus administrators and teachers acknowledged the need to address instructional practices used when teaching African American students (personal communication, October 15, 2019). Yet, there was no

district or campus plan for initiating and sustaining teachers' knowledge about best practices for teaching African American students in classrooms and for this study, in the mathematics classroom according to the campus improvement plan.

In the 2019 Campus Improvement Plan , the CIP committee wrote that the school needed to add culturally relevant education materials. Nevertheless, it does not explicate a plan, policies, or procedures for initiating or implementing culturally relevant education in classrooms. The 2019 Campus Improvement Plan does not set forth plans for addressing the stated need to promote equitable outcomes for African American students in mathematics or other content areas. The administration has not acknowledged one or more culturally relevant education theorists' frameworks to guide instruction in the classroom or trained teachers to implement culturally relevant education (personal communication, August 15, 2019).

The purpose of this basic qualitative study was to explore teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students. Further, teachers' perceptions of their preparedness in using culturally relevant education were explored. This study contributed to the research on teachers' perceptions of using culturally relevant education in teaching mathematics to middle-grades African American students. In addition, by investigating how teachers are implementing research-based culturally relevant education, I identified strengths and weaknesses in teachers' preparation and implementation of culturally relevant education in the classroom.

## **Definition of Terms**

*African American Student* – For this study African American student is defined as a person of African Descent or Ancestry (Logan et al., (2018).

*Campus Improvement Plan (CIP)* – Assesses the academic achievement of all students sets the campus performance objectives identifies how campus goals will be met determines the resources and identifies the staff needed to implement the plan sets timelines for reaching the goals measure progress provides for a program to encourage parental involvement”.

*Culturally Relevant Pedagogy (CRP)* – CRP is defined as one “that empowers students intellectually, socially, emotionally, and politically using cultural referents to impart knowledge, skills, and attitudes” (Ladson-Billings, 1994, pp. 16-17). This is one of the pillars of culturally relevant education that helped build the theory.

*Culturally Responsive Teaching (CRT)* – CRT is defined as” 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” (Gay, 2018, p. 36). This is one of the pillars of culturally relevant education that helps build the theory.

*Culturally Relevant Education (CRE)* – Culturally relevant education is a framework that focuses on social justice education and the classroom as a site for social change using culturally relevant pedagogy and culturally responsive teaching as foundational works (Aronson & Laughter, 2016).

*Culture* - Culture is defined as “deep-rooted values, beliefs, languages, customs, and standards shared among a group of people. Milner stated that culture determines how we think, believe, and behave and affects how we teach and learn” (Milner, 2016 pp. 8–9).

*National Center for Education Statistics (NCES)* - NCES is the primary federal entity for collecting and analyzing data related to education in the United States and other nations (National Center for Education Statistics, 2015).

### **Significance of the Study**

Mathematics empowers students to build critical thinking, and problem-solving skills and communicate effectively in an ever-evolving society (Larson, 2018). In the local setting, the scores of students at John M. Middle school on the state standardized assessments have been below the proficient level for a minimum of 3 years. The problem was it is unknown if and how teachers used culturally relevant education to help increase the learning opportunities for African American students. Studying teachers' current use of and perception of their preparedness to use culturally relevant educational instructional practices identified strengths and weaknesses in the way teachers use culturally relevant education. This study can also inform district and campus administrators on how many teachers, if any, used culturally relevant education as described by Aronson and Laughter (2016). The teachers who implemented culturally relevant education, district, and campus administrators now know how systematically it was implemented in their classrooms. Further, they learned to what extent how teachers were prepared to apply culturally

relevant education instructional practices. This information characterized the support that teachers need to implement culturally relevant education in the classroom.

### **Research Questions**

In this basic qualitative study, I explored John M. Middle School teachers' perceptions of how they used culturally relevant education instructional practices to teach mathematics to middle-grades African American students. Teachers' perceptions of their preparedness to do so were explored. Aronson and Laughter's (2016) theory of culturally relevant education are used as the conceptual framework that grounds this study and guided the study's data collection and analysis. I used the following research questions to guide the investigation of culturally relevant education instructional practices and the preparedness of mathematics teachers to teach using culturally relevant education instructional practices.

RQ1: What was John M. Middle School teachers' perceptions of how they use culturally relevant education to teach mathematics to middle-grade African American Students?

RQ2: How do teachers at John M. Middle School perceive their preparedness to teach mathematics to middle-grades African American students using culturally relevant education instructional practices?

RQ3: What supports do John M. Middle School teachers perceive they need to teach culturally relevant education instructional practices in mathematics to African American Students?

## Review of Literature

The literature review consists of an explanation of the conceptual framework and a review of the broader problem. The databases and websites used to gather research material included Academic Search Complete, Journal of Mathematics Education, EBSCO Open Access Journals, Education Source, ERIC, Journal of Research Initiatives, ProQuest Central, SAGE Premier, Walden University Dissertation Database, National Council of Teachers of Mathematics, and Google Scholar. Phrases used in Boolean searches included *middle school instruction practices*, *culturally relevant education*, *culturally responsive teaching*, *culturally relevant pedagogy*, *culturally sustaining pedagogy*, and *African American students*, and *teaching African American students*. Keywords and combinations of key terms used in Boolean searches included *Culture*, *culturally relevant*, *African American*, *achievement gap*, *educational practices*, *problem-based learning*, *instruction*, *instructional strategies*, *instructional practices*, *discourse*, *social justice*, *teachers' perception use teaching culturally relevant education practices*, and *cultural competence*, and *standardized test scores*, *critical reflection*, and *social justice*. The articles that addressed the study's focus on the conceptual framework, problem, and purpose were selected and reviewed with specific attention to the culturally relevant abstract, content, and findings. While searching current articles on culturally relevant education, there were three themes linked to this study: (a) the need for teachers to be culturally competent in the classroom when working with students (see Anderson et al., 2018; Keratithamkul et al., 2020; Kondor et al., 2019; Williams, 2018), (b) preservice education programs on culturally relevant education, and (c) in-service teacher training

on culturally relevant education (see Tanguay et al., 2018; Thomas et al., 2020; Toms et al., 2019).

### **Conceptual Framework**

The culturally relevant education (Aronson & Laughter, 2016) was used as the conceptual framework for this study. Culturally relevant education is comprised of research-based instructional practices that incorporated students' culture, history, heritage, knowledge background, and home life into instructional practices. I focused on culturally relevant education instructional practices used in mathematics classrooms. Aronson and Laughter (2016) conducted a meta-analysis of Ladson-Billings' (1995) CRP and Gay's (2000) CRT that provided a comprehensive framework that educators can use in different content areas. The theorists posit that CRP and CRT are frameworks that promote social justice teaching, promote social change in the classroom, and established meaningful and sustainable learning for African American students (Aronson & Laughter, 2016). Aronson and Laughter used Gay's CRT, which focuses on teaching practices, and Ladson-Billings' CRP, which focuses on professional responsibility and develops the theory of culturally relevant education.

The four tenets of Aronson and Laughter's (2016) culturally relevant education recommend that educators do the following:

- Used constructivist methods to develop bridges connecting students' cultural references to academic skills and concepts (p. 167).
- Engaged students in critical reflection about their own lives and society (p. 167).



- Facilitated students' cultural competence about their own and other students' cultures (p. 167).
- Unmasked and unmake oppressive systems through the critique of discourses of power" (p. 167).

These four tenets of culturally relevant education grounded my study. This conceptual framework is the lens through which research questions were analyzed. Constructivist methods, critical reflection, cultural competence, and critique of the discourses of power are tenets that engage students in the classroom and empowered them to control their learning. Aronson and Laughter purported the purpose of these culturally relevant education tenets is to provide equity to all students in the classroom and society.

### **Constructivist Methods**

Constructivism is a student-centered model (Clark, 2018) that involves students being active learners in their learning. In this method, students explore concepts, recognize themes, pose problems, and develop questions that help them sustain their learning and make sense of the math (Ampadu & Danso, 2018; Buell et al., 2017; Yilmaz, 2008). Teachers also use writing as a constructivist method (Teuscher et al., 2015). They teach students to organize their thoughts and communicate using journal writing, writing letters, and quick writes to explain their understanding of a mathematics concept.

Teachers are facilitators throughout the constructivist classroom. Facilitators guide students to create their learning by using probing questions to help guide them to

use their prior knowledge, school, and home experiences to construct new knowledge (Clark, 2018; Harlow et al., 2006; Yilmaz, 2008).

Mathematics discourse is a constructivist method that teachers incorporate to increase students' participation (Mullins, 2018). The teachers create math talk learning communities in the classroom. Math talks allow students to defend their processes and solutions through reasoning with other students and teachers (Saylor & Walton, 2018). Teachers also use math talks with cooperative learning. Cooperative learning establishes communication skills that are needed today (Erdogan, 2019). In cooperative learning, teachers are facilitating the students' active participation. The teachers encourage students to reflect and build on their prior knowledge and background by discussing each other's ideas and holding each other accountable for learning (Erdogan, 2019).

### **Critical Reflection**

According to Owen (2016), "Critical reflection is the process of analyzing, reconsidering, and questioning one's experiences within a broad context of issues and content knowledge" (p. 38). Felton and Koestler (2015) explained teachers use critical reflection to do more than just guide students in mathematics lessons. The teachers must understand the students' thinking: and design mathematics problems that will deepen their understanding of mathematics. Teachers must critically reflect on ways to challenge students to use mathematics processes to solve issues in society. To understand the students' thinking, culturally relevant teachers also use critical reflection to challenge themselves to reflect on their teaching practices (Felton & Koestler, 2015). Teachers must understand they need to be experts in mathematics to connect the concepts to the

students' lived experiences, academic success, and mathematical growth (Felton & Koestler, 2015).

### **Cultural Competence**

Culturally competent teachers gather knowledge about the students' home life and community, cultural background, and mathematics experiences and incorporate it to help students construct knowledge (Bennett, 2019; Thomas & Berry, 2019). According to Macqueen et al. (2020), the goal of cultural competence is to "reduce prejudice and discrimination against oppressed groups, to work toward an equitable distribution of power among the stakeholders in education, and to enrich equal opportunity and social justice for all" (p.115). Culturally competent teachers understand the nation in which their students live and how the nation, including its educational system, views the students. Also, culturally competent teachers use that knowledge to develop and implement an equitable learning environment. Culturally competent teachers demonstrate how to value, respect, and understand students coming from cultures different from their own. Furthermore, culturally competent teachers encourage students to learn about and honor their own culture while learning about and honoring other students' cultures (Carnes, 2019).

### **Critique of Discourses of Power**

Aronson and Laughter (2016) asserted critique discourses of power are for educators to bring the community to the classroom by addressing the needs of the community using mathematics content-area knowledge. The teachers must assist the students in critiquing the bias that is inherent in the development of content-area

knowledge and how it affects the students' learning. Aronson and Laughter (2016) also explained critique discourses of power are an opportunity for teachers to connect the awareness of the world around the students and the content-area knowledge. Students need to see themselves as social change agents in and out of the classroom. Harrell-Levy (2018) posited teachers must understand what type of instructional practices will engage students in the classroom. Instructional practices that would allow them to think about how to solve the students' societal issues around the students critically. Instructional practices such as critical analysis in the mathematics classroom use processes to solve problems in or out of the classroom (Hasan, 2019). Harrell-Levy (2018) maintained that teachers can use civic learning as a way for students to analyze the problems in their community critically. This type of instructional practice provides hands-on experience for students. However, Harrell-Levy explained that this type of teaching could hurt the students if teachers try to insert their personal views. Teachers must be nonbiased in culturally relevant teaching, particularly in critiques of discourses of power.

In this study, I explored the perception of how teachers are using culturally relevant education instructional practices to teach mathematics to middle-grades African American students. This qualitative study investigated using the research question of how teachers at John M. Middle School use instructional practices suggested by culturally relevant education theories to teach mathematics to middle-grade African American Students. Using Aronson and Laughter's (2016) culturally relevant education theory, interviews with the mathematics teachers provided an understanding of the perceptions of how the teachers use culturally relevant education instructional practices.

### **The Need for Teachers to be Culturally Competent in the Classroom**

National Center for Education Statistics (2015) reported that the diverse student population in the U. S. is now 49%, whereas the White population was 51%. The trend of the diverse student population is steadily increasing each year. Although student diversity is increasing, the teachers' population is holding steady where 80% are White teachers, African American teachers are 7%, and Hispanic teachers are 9% (National Center for Education Statistics, 2015). With these statistics, many teachers teach students who may not share the same culture or background as the teachers or other students in the classroom. Therefore, teachers need to be or become culturally competent. Gay (2018) posited that culture shapes the way we think, learn, and teach. However, studies show that teachers are not culturally competent when teaching a diverse population (Davis, 2018; Saphier, 2017; Spiess & Cooper, 2020).

Bonner et al. (2019) studied gifted African American students in a middle school setting and purport that teachers who lack the cultural competence to teach African American students provided an environment that was not conducive to learning. The students became disengaged from the teachers' lessons and did not want to participate in the classroom assignments and discussions. Teachers must be equipped to have those discussions without devaluing the students' culture while developing an equitable classroom (Milner, 2016; Saphier, 2017; Spiess & Cooper, 2020). Saphier (2017) maintained that teachers' cultural competence is essential; however, many teachers were not comfortable developing lessons or know what type of instructional practices increase math talks or discourse regarding race or culture. Teachers believe it can bring

uncomfortable classroom discussions to avoid any discussions regarding culture in mathematics lessons.

Some teachers believe being colorblind is a good pedagogy since subjects such as mathematics concepts are algorithms and number sense (Spiess & Cooper, 2020).

Teachers believe considering all the students the same will make mathematics lessons easier to create and teach (Spiess & Cooper, 2020). Spiess and Cooper (2020) posited that when teaching African American students with one size fits all lessons, equitable practices will not occur, and gaps become apparent. Flory and Wylie (2019) asserted teachers must use cultural competence in classes, or students will become disengaged. Teachers must get to know their students. Flory and Wylie found in their study that it was important for mutual respect to be a part of their classroom.

### **Pre-service Teacher Education Programs on Culturally Relevant Education**

Teachers must teach a more diverse population as the country becomes increasingly diverse (Brown et al., 2019; Charity & Mallinson, 2017). Alismail (2016) also explained that preservice teachers are not adequately prepared to teach a diverse population. Training for the preservice teachers must provide them with the necessary skills that include the knowledge, and awareness of the student's cultural background and experiences (Alismail, 2016; Cherng, & Davis, 2019). Ukpokodu (2017) maintained teacher education programs are not adequately preparing teachers to teach diverse populations whether the students share the same cultural background or not. Many teacher education program faculty members may not have enough exposure to culturally relevant education frameworks to provide them with a working knowledge of how to use

culturally relevant education when teaching minoritized students such as African American students (Ukpokodu, 2017). Preservice teachers may have a strong knowledge of mathematics content but do not understand how to use culturally relevant education instructional practices to increase classroom equity. Therefore, preservice teachers may revert to using teacher-centered instruction and one-size-fits-all instructional practices to teach diverse populations (Rubel, 2017).

Arsal (2019) asserted that teacher education programs should integrate culturally responsive teaching courses to train preservice teachers. Wilson et al. (2017) asserted if the preservice teachers fail to connect the students' cultural background and lived experiences, they may limit the student's chances of learning and create obstacles while trying to learn. Wilson et al. (2017) also explained that preservice teachers need more than one course throughout the teacher education programs. In addition, Wilson et al. (2017) stated teachers should have multiple opportunities to practice what they learned in the courses. It would be essential to have field experiences for the preservice teachers to practice what they have learned.

### **In-Service Teacher Training on Culturally Relevant Education**

Bottiani et al. (2018) stated teachers must learn how to teach the diverse population in the classroom. The theorists also stated that a limited number of teachers were prepared to teach in a diverse classroom. Therefore, many teachers are unable to create an equitable environment. Kotluk and Kocakaya (2019) examined teachers' overall view of students who had different cultural backgrounds from their own. The theorists explain that the teachers' views might affect the teaching-learning process. The theorists

asserted regardless of teachers' positive or negative views of culturally relevant education, their lack of knowledge about it left them with misconceptions about how it might be used in their classrooms. Thus, many teachers do not want to use culturally relevant education; some even felt it was unnecessary.

Neri et al. (2019) explained that many teachers might even resist using culturally relevant education in the mathematics classroom because of the lack of support or the understanding of how to use it to its fullest. Tannebaum (2020) found that math teachers do not understand how to incorporate culturally relevant education tenets in math classrooms, which leads to resistance. Bennett (2019) explained some teachers might focus on colorblindness as a strategy or teach students without acknowledging their cultural differences. She maintains teachers believe the students are all Americans, and the lessons should reflect that belief. However, this belief system leads to inequitable lessons in the classroom (Bennett, 2019).

Teachers need the resources and training that will allow them to learn how to use culturally relevant education instructional practices effectively to teach mathematics to African American students (Leonard & Evans, 2018). Teachers must know how to choose the instructional practices that will encompass the culture, life experiences, and societal, and community issues (Hodge & Cobb, 2019). They must receive and experience training to increase their knowledge of content and pedagogical disposition when learning about Cultural Relevant Education. In addition to culturally relevant education training, Anderson et al. (2018) suggested that adults who work with students must also receive cultural competence training. This training will provide critical



concepts for understanding the students who may or may not share the same cultural background (see Anderson et al., 2018). This type of training will lead to equity in the classroom since all students' cultural backgrounds, mathematics backgrounds, and lived experiences will be valued.

Teachers must have support in using culturally relevant education in the classroom with research that provides evidence-based instruction, insights into their understanding of culture, and how to develop knowledge of the students' background, home life, and mathematics experiences (Borrero et al., 2018; Carnes, 2019; Hale, 2016). Adams and Glass (2018) suggested that district and school administration allow teachers to visit campuses that use culturally relevant education in the classrooms to observe culturally relevant education in action. Teachers must have experiences to help them understand culturally relevant education (Adams & Glass, 2018; Carnes, 2019; Ellerbrock et al., 2016). District and campus administration should set expectations on how teachers use culturally relevant education in the classroom (Adams & Glass, 2018).

### **Implications**

Aronson and Laughter (2016) clarified that when teachers used culturally relevant education in the classroom, it positively impacted students' outcomes in mathematics classrooms. This study's findings led to the development of a support system that could assist mathematics teachers on how and when to use culturally relevant education instructional practices. One potential project, findings from the study supported the idea, of professional development. I anticipated one potential project of a series designed using the Aronson and Laughter (2016) theory of culturally relevant education. de Araujo et al.

(2018) explained effective professional development was ongoing. This project study began with three-day professional development training and continuous training throughout the school year.

### **Summary**

Culturally Relevant Education has been explored by many researchers (Byrd, 2016; Green, 2018; Mahari de Silva et al., 2018). However, there was limited research on the teachers' perception of how they use culturally relevant education instructional practices to teach middle-grade African American students. Also, their preparedness to teach African American students has limited research. The local setting did not provide enough information on using culturally relevant education in teaching mathematics to African American students. However, district leaders mentioned and expected teachers to teach diverse populations using evidence-based practices to meet all students' needs on the district website in the district strategic plans. Although there are plans in place for teachers to teach diverse populations, there are no plans specifically for African American students. Therefore, in the past 3 years, African American students scored lower than their Hispanic and White counterparts on the state standardized assessments.

Section 2 will focus on the methodology used for this project study. It presented information regarding the study's basic qualitative case study design, the teachers, the data collection and analysis, and its limitations.

## Section 2: The Methodology

### **Research Design and Approach**

The purpose of this basic qualitative study was to explore teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students. Teachers' perceptions of their preparedness to teach using culturally relevant education instructional practices were also explored. The following research questions were addressed:

RQ1: What are John M. Middle School teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American Students?

RQ2: How do teachers at John M. Middle School perceive their preparedness to teach mathematics to middle-grades African American students using culturally relevant education instructional practices?

RQ3: What support do John M. Middle School teachers perceive they need to teach culturally relevant education instructional practices in mathematics to African American Students?

The choice of a qualitative rather than quantitative design was derived from the need to answer "how" and "what" questions about teacher perceptions. A basic qualitative design allowed the teachers to discuss their experiences and perceptions through interviews about how they taught using culturally relevant education instructional practices to middle-grades African American students and their preparedness to do so. Open-ended interviews were used to capture the teachers'

experiences and perspectives about their use of culturally relevant education (see Patton, 2015).

### **Qualitative Research Design and Approach**

There are two types of research methods, qualitative and quantitative, that I considered for this study. The quantitative research method tests theories compare multiple variables and ask closed-ended questions with limited responses to predetermined categories (Patton, 2015). In this project study, for the data to be authentic, teachers needed to share their experiences and beliefs to communicate their perceptions of how they used culturally relevant education instructional practices in the mathematics classroom and how they perceived they were prepared to do so. A quantitative research design was rejected as it would not yield findings that would be instructive for this project study. Therefore, a qualitative design was chosen.

According to Yin (2018), I must choose a research design that will identify critical information in the study using research questions "how" or "why." There are numerous qualitative inquiry approaches; however, six approaches were considered for use in this project study: (a) phenomenological research, (b) grounded theory research, (c) ethnographic research, (d) narrative research, (e) case study research, and (f) basic qualitative research (see Creswell, 2012; Creswell & Poth, 2018; Patton, 2015). Each is discussed below.

Phenomenological research focuses on a particular event or situation where the participant describes the event through their lived experiences (Patton, 2015). The grounded theory focuses on building a theory from large masses of raw data (Patton,

2015). Ethnographic research focuses on a single group of people's cultural aspects over a long period to develop norms for an individual group of people (Patton, 2015). Narrative research explores the lived experiences of cultural backgrounds and gathers data from stories of individuals or a group of people (Creswell, 2012). Case study research focuses on investigating an actual bounded case or multiple cases in a community or building over a period with multiple data sources (Yin, 2018). All the above research designs were not appropriate for this project study. This investigation focused on the experiences and perceptions of mathematics classroom teachers. A qualitative basic design allows the investigation of certain phenomena in great depth with careful attention to specifics, setting, and nuance (Patton, 2015). Therefore, using a basic qualitative design allowed me to identify common themes while understanding how teachers construct their knowledge of teaching, and their needed support when using culturally relevant education.

A basic qualitative research design was considered appropriate for this study because it permits an inquiry that brings attention to details using open-ended questions to gain insight into a problem (see Patton, 2015). A qualitative inquiry into the teachers' perceptions of how they use culturally relevant education instructional practices brings awareness of how teachers use education those practices. Their responses also describe the supports they need to strengthen their culturally relevant teaching practices. Patton (2015) explained that basic qualitative inquiry yields meaningful and detailed results when asking thought-provoking, open-ended questions. Moreover, Worthington (2013) asserted that the basic qualitative research method is appropriate to use when trying to gain an in-depth understanding of educational constructs or processes. For this project

study, using open-ended interviews through basic qualitative methodology allowed the researcher to collect meaningful, in-depth data from knowledgeable teachers.

## **Participants**

### **Criteria for Selecting Teachers**

Purposeful sampling is used when the researcher wants an in-depth understanding of a phenomenon and chooses participants with experience working in the local setting of interest (Patton, 2015). From the 68 core teachers at John M. Middle school, 14 certified mathematics teachers were purposefully sampled for this study. By choosing purposeful sampling, the teachers provided information that gave an in-depth understanding of the teachers' perceptions and experiences (see Creswell, 2012; Creswell & Poth, 2018).

### **Justification for the Number of Teachers**

For the basic qualitative study, Patton (2015) posited that there are no absolute rules for sample size in qualitative inquiry. He explained the sample size was contingent on what the researcher wanted to know or the purpose of the research. Further, experience and judgment in balancing breadth with depth must be applied (Sandelowski, 1995) since a sample that is too large may not allow the in-depth case-oriented analyses that are required in qualitative designs, yet a sample size too small may not support claims of theoretical saturation. Patton said the data from a smaller group could bring valuable, rich information. For this study, the ideal contributor pool included all fourteen teachers. Hence, I invited all 14 teachers at John M. Middle school to participate. However, only nine teachers agreed to participate. Nevertheless, Patton explained saturation could occur after seven interviews. In this study, I noticed that by the seventh

interview there was repeating information such as how they used the student's purchasing habits as unit rates and how they and the teachers, used their personal experiences to build relationships with the students. However, to make sure that no new information would be missed I continued to interview all participants.

### **Gaining Access to the Teachers**

Gaining access to the teachers began by applying to the Walden University Institutional Review Board (IRB). The research study was approved by the superintendent of schools to conduct research. I provided an invitational email (see Appendix C) through Walden email to all teachers with a consent form to explain the project study and the teachers' rights and responsibilities. Teachers replied to the email with the form and asked any questions they had at that time. All communications between teachers and myself went through the Walden email. If teachers preferred to ask questions via phone, I provided my cell phone number.

### **Establishing Researcher-Teacher Working Relationship**

It was essential to build a trusting researcher-teacher working relationship. I met with each teacher individually to discuss the research, the consent form, the teachers' privacy, and any ethical issues that may arise throughout the interviews. Teachers were informed that this study was strictly voluntary and was not a part of their teacher appraisal. At the time of the study, I was an employee of the same district and school. The teachers were informed that the project study was not to judge their teaching abilities and could end their participation without prejudice.

## **Ethical Protection of Teachers**

Human subject protection is an integral part of any research (Patton, 2015). Protecting John M. Middle school teachers was essential and was established in this study by adhering to the IRB requirements of Walden University and district policy as previously explained. In addition, the teachers were reassured that their participation was fully volunteered and was not associated with the district or school appraisal system. Teachers were reassured their demographics would not be collected. Collecting the demographics could present a privacy issue (Patton, 2015). The demographics could include the teacher's age, gender, grade level, and ethnicity. This project was not going to bring any physical harm to the teachers. All data collected was only for the project study and was not a part of an open discussion. Confidentiality was imperative. Saunders et al. (2015) explained it was imperative to keep anonymity or confidentiality as well as keep the integrity of the data. To keep the identity secured I kept the teacher's characteristics or key phrases out of the data set that might identify the teacher and I reiterated the teacher's information would not be shared with anyone. Each teacher received a unique code instead of their names being used to continue to protect their privacy. Teachers' information was not shared with anyone. The COVID-19 global pandemic made it difficult to have face-to-face meetings. Due to the COVID-19 pandemic teachers were given the option of using a virtual platform for interviews. The teachers logged in with a code and with no cameras. The Zoom interview was recorded. Two teachers preferred face-to-face interviews. Both interviews were recorded on a mini recorder, and masks were worn along with the 6-foot social distancing, which followed the Centers for



Disease Control (CDC) guidelines. The tape recording was only in my possession.

Teachers were reassured that their identities were protected and anonymous. All data was secured in a lockbox in my home and will be destroyed after 5 years. The virtual meeting recordings were saved on a CD, immediately deleted from the cloud, and will be destroyed after 5 years.

### **Data Collection**

The data collection instrument used in this study was a one-on-one semistructured interview. During the data collection, Yin (2018) stated it was crucial to ask quality open-ended questions that will provide an in-depth understanding of the teacher's perspective regarding the phenomenon. Using interviews helped address the research questions for the study (Creswell, 2012) by addressing the participants' perceptions of how they used culturally relevant education instructional practices to teach mathematics to middle-grades African American students and their preparedness to do so.

### **Interviews**

Open-ended interviews were conducted with the teachers who met the criteria and accepted the invitation. This open-ended format allowed the teachers to share their perspectives and experiences on using culturally relevant education instructional practices to teach mathematics to middle-grades African American students. These interviews also provided data on the teachers' preparedness to teach middle-grade African American students.

I designed the interview protocol (see Appendix B) and aligned with the research questions. The interview protocol was also framed by using the NCTM process standards

and themes from the literature review. For example, one of the process standards is student uses mathematical processes to acquire and demonstrate mathematical understanding to apply mathematics to problems arising in everyday life, society, and the workplace (National Council of Teachers of Mathematics 2017). In the literature review, this process standard was aligned with constructivist methods and critique of discourses of power. The interview protocol was also to give me some structure to gain knowledge and insight about specific aspects of teachers' use and preparedness to use culturally relevant education (see Creswell, 2012). The open-ended questions should allow the teachers to share their experiences about these constructs without constraints. At the beginning of the interview, I provided the purpose of the study, explained the measures to protect the confidentiality that would take place to secure the teachers' privacy and protection, the time limit which was 45 minutes to an hour, and the protection of the interview data.

Seven of the teachers decided to use the Zoom meeting platform and consented to the recording, and two decided to meet after school and agreed to be recorded. The interview took place using the password-protected Zoom platform. Each teacher received a unique code to protect their privacy. The teachers scheduled a meeting, and the link was not shared with anyone besides the interviewee. Both in-person interviews were in the interviewee's classroom after school following the CDC recommendations. The participant and I stayed 6 feet apart, and masks were worn. Permission for digital recording was asked before the interview began. All interviews were digitally recorded. These recordings and any field notes were taken during the interview were transcribed

into a Word document and uploaded to the computer with password protection. The file contained the teachers' code rather than their names to protect the teachers' identity. I am the only one that knows the codes.

Procedures for gaining access to the teachers began after IRB approval. Informal support was mentioned unofficially by the school administrators at John M. Middle School. The principal of the middle school asked for an email with detailed information regarding the study. She then sent the email to the district for permission to conduct the study. The official research was not conducted until the district approved and sent the approval email. Southwest District Research Department sent an email to both the researcher and John M. Middle approving the research. After receiving the approval email, the consent form and information regarding the study were sent to all the teachers that met the criteria.

### **Role of the Researcher**

I have been a mathematics interventionist in the local setting for the last 2 years. As the mathematics interventionist, I supported all eighth-grade mathematics teachers. I did not have any authority over the teachers. I, however, have collaborated with the teachers as a teacher in the professional learning community. One potential bias was that I taught mathematics to African American students for 20 years. Creswell and Poth (2018) explained the researcher must recognize their own bias by being reflective of what experiences they bring to the qualitative research study. I kept a reflexive journal. Nowell et al. (2017) stated that a "reflexive journal was documenting the process, methodological decisions, and to record the researcher's reflection of their values, interests, and insights

about self” (p. 3). I kept a reflexive journal to hold me accountable for presumptions and subjectivity that may arise throughout the process. Bogdan and Biklen (2007) explained that subjectivity can be a huge problem in qualitative research. However, the theorists further explained that reflecting on the researcher’s subjectivity can allow the researcher to be transparent and allow her to see past her own experiences and concentrate more on the teachers. I used the interview protocol to focus on what the teachers are sharing.

### **Data Analysis**

Thematic analysis using initial a priori codes from the theoretical framework was used to analyze teachers’ interview responses. I began data analysis immediately after the first interview to ensure appropriate data was being collected. I followed the five phases of a thematic analysis: (a) manage and organize the data, (b) read, and take memos on emergent ideas, (c) code, and classify data into themes, and (d) develop and assess interpretations, and (e) represent and visualize the data (see Creswell & Poth, 2018; Nowell et al., 2017).

In the first step in the data analysis process, I managed and organized data by preparing the files and storage system as suggested by Creswell and Poth (2018). This procedure entailed transcribing each interview using an online transcription website Transcribed Me (<https://www.transcribeme.com>) and preparing folders for each teacher with the name and privacy code. The transcript and recording were placed in the appropriate folder. The second step was to read and take memos on emerging ideas. Memos are short phrases, ideas, or key concepts that occur to the researcher (Creswell & Poth, 2018). This step entailed reading the transcript several times before taking such

notes (see Nowell et al., 2017). Reading the transcript several times, allowed me to have a better understanding of the teacher's viewpoint. I then begin taking memos (notes) as I read over the transcripts again. I highlighted phrases and keywords from the transcripts.

The third step was coding and categorizing the data into themes. I used a priori codes for the first round of coding. Saldaña (2021) stated that a priori coding was a predetermined code aligned with the study's conceptual framework, which enabled the data analysis to begin to answer the research questions. The coding process began with developing a short list of tentative codes from the conceptual framework. The codes were constructivist methods, critical reflection, cultural competence, and critique discourses of power aligned with the conceptual framework. This step led to identifying differences and similarities in data. Each code was classified under categories that have matching patterns or common ideas. The fourth step was identifying emerging themes from the codes and categories. Themes are “broad units of information that consist of several codes aggregated to form a common idea” (Creswell & Poth, 2018, p. 193). The fifth step was to develop and assess the interpretations. Patton (2015) explained that this process requires researchers to be resourceful and analytical when trying to make sense of the findings. This process entailed reviewing the data to review to analyze the themes and patterns. The last step was to represent and visualize codes, categories, and themes and how they relate to the interpretations (see Table 1). This process represented the data in a tabular form that allowed for a clear representation of how these constructs emerged.

According to Waite (2011), discrepant cases are considered outlier cases, which need further investigation. These cases include data that may not fit in the codes or

themes but need to be examined to observe any misinterpretation or misunderstanding of the data collected and may need to be addressed with the teachers. Waite stated that although the data may not fit in, the current study may be reexamined for future studies. There were no discrepant cases in the study.

### **Trustworthiness**

Connelly (2016) posited that “trustworthiness or rigor of a study refers to the degree of confidence in data, interpretation, and methods used to ensure the quality of a study” (p. 435) so that the processes in the data collection and analysis must be established so that the readers would feel confident in the study findings. Nowell et al. (2017) stated that four constructs establish trustworthiness in qualitative research: credibility, transferability, dependability, and confirmability. In qualitative research, member checks are commonly used to establish credibility (Creswell, 2012; Merriam & Tisdell, 2016; Nowell et al., 2017) and were used in this study. To member check, I followed recommendation of Cope (2014) and provided participants with a summary of the analysis and asked for feedback. The teachers reviewed a summary of transcripts after the interview to check for accuracy. It allowed the teachers to provide feedback if there was any misleading or incorrect interpretation of the data. Confirmability ensures that the data collection, analysis, and findings are understandable and traceable (Cohen & Crabtree, 2006; Lincoln & Guba, 1985). For confirmability, an audit trail was used. I kept a reflective journal, which was called reflexivity. This activity documented all the study activities, including data collection, the interview process, coding, and data analysis, using literature review articles to keep updated information on culturally relevant

education to ensure the focus was on the teachers' responses using research. This activity allowed for a transparent investigation and detailed steps of the process. In dependability and transferability, I used thick descriptions to describe in detail the research process, which was transparent, observable, and rational (Nowell et al., 2017). The detail was in a narrative form to explain the background of the situation or perspective. These constructs allowed for rigor in trustworthiness to have a trustworthy thematic analysis.

### **Accuracy and Credibility**

I used member checking to ensure accuracy and credibility in the data collection process by allowing teachers to check for any misinterpretation of the data that may have occurred (see Creswell, 2012). I took each question, summarized it with my interpretation and the teacher's quotes, then sent the summary to the teachers to check for accuracy. The summary included the codes and categories that emerged (Cope, 2014, p. 90). After sending the summary, I gave the teachers 1 week to review it and return if they had any changes to the summary. Two teachers returned through email the summary confirming there were no changes needed. One teacher verbally stated that he agreed with the summary.

Discrepant cases may be considered outlier cases that need further investigation (Waite, 2011). These cases include data that may not fit in the codes or themes but need to be examined to observe any misinterpretation or misunderstanding of the data collected and may need to be addressed with the teachers. Waite (2011) stated that although the data may not fit, the current study may be examined for future studies. I reread Aronson and Laughter's conceptual framework to ensure the teachers' responses

were aligned to verify any discrepant cases. There were no discrepant cases found in the teachers' responses.

### **Data Analysis Results**

To investigate teachers' perceptions of their use of culturally relevant education instructional practices and their preparedness to teach using them, I collected data using one-on-one interviews with the nine teachers. Before each interview, I explained the importance of their privacy to the teachers. I used Walden's IRB guidelines to safeguard the teachers' privacy. All interviews were recorded, de-identified, and stored on a password-protected computer. Patton (2015) suggested establishing trust at the beginning of the interviews by explaining the interview expectations and its purpose. I provided each teacher with a brief description of culturally relevant education so they could understand what phenomena were under investigation in the study, and the questions that they would be asked. When the teachers were struggling with answering the questions or did not understand them, I asked prompting questions to help them understand and organize their thoughts (see Creswell & Poth, 2018). For example, I asked teachers to describe a mathematics lesson or asked "how you check for understanding after teaching a specific mathematics concept?" This process allowed the teachers to think about their lessons freely and share. Prompting these descriptions from teachers allowed opportunities for them to share their experiences and provided rich data on how they believed they were using CRE. It was essential to provide opportunities for the teachers to share their experiences and perceptions with fidelity.



Creswell and Poth (2018) explained that using thick descriptions in a qualitative study provides detailed information regarding the emotions, contexts, and beliefs the teachers' experienced in the classroom. In this section, the experiences, and perceptions of nine teachers provided a wealth of evidence from the interview responses. I placed the most repeated responses under each question, so I begin recognizing patterns. The data collected was organized from a priori codes which directed the data to emergent codes and then to categorizing the themes that emerged (see Table 1). Through data analysis, five themes were revealed: (a) student engagement and instructional strategies, (b) social classroom environment, (c) data-driven instruction with personal experiences, (d) lack of in-depth training, and (e) challenges. In the following section, a thick description of each theme is given below.

**Table 1***Sample Codes, Categories, and Themes*

A Priori Code	Categories	Themes	Research Questions
Constructivist Methods	Math Talk	Student Engagement and Instructional Strategies	RQ1
	Processes		
	Hands-on		
Cultural Competence	Social Interaction	Social Classroom Environment	RQ1
	Acceptance		
	Relationships		
Critical Reflection	Data-Driven Students' work or how they work.	Data-Driven Instruction  Personal experiences	RQ2
Critique of Discourses of Power	Challenges when trying to use current events. Training is needed to know to implement culturally relevant education. Lack of materials and resources	Lack of In-depth Training  Challenges	RQ3

## **Findings**

The themes tied to the research questions are described in detail below. Themes 1 and 2 address RQ1 regarding how participants perceive they are currently using culturally relevant education in their classrooms. Theme 3 addresses R 2 on how the teachers perceived how prepared they were to teach African American students. Themes 4 and 5 address RQ3 about what training and challenges participants have and what they feel they need to teach culturally relevant education.

### **Theme 1 - Student Engagement and Instructional Strategies**

When coding for constructivist methods, I found teachers' responses reflected students' activities focused on teacher and student-centered-instructional practices. Teachers must connect constructivist methods in culturally relevant education that bridge students' home life and cultural background to academic skills and concepts (Aronson & Laughter, 2016). All teachers believed that African American students needed activities that would keep them engaged. They believed students needed hands-on activities and repetitive instruction to learn skills better. Teacher 9 stated "Well, I believe that more manipulatives help them, believe it or not. When they can touch and feel manipulatives, it sticks in their heads". Teacher 6 added, "Using manipulatives like algebra tiles, being able to see it and put their hands on it, by being active, makes them understand it much better."

Another example of engagement from the findings was that teachers used competition as a student activity. Teachers perceived that if students were engaged in the classroom activity, the students were in student-centered activity and learning. Teacher 7

expressed that "The students like review games and things like that. We play basketball where they answer a question right, they get to shoot a basketball, and they work in groups. And that usually goes well".

Many teachers shared that using competition in different online games such as Kahoot-it and math jeopardy was also an effective way for students to be engaged with their classmates and encouraged math talks. These activities are considered teacher-led activities. One teacher explained that he liked activities like project-based learning because it helps students bring the community into the classroom. Teacher 4 stated:

I use project-based learning to teach African American students and others because it brings the community to the classroom, and students can relate to the project. That one project-based activity was learning if there are enough traffic lights in the city.

Teachers believed another constructivist method effective when teaching African American students was questioning. They believed it was essential to engage the students actively in the classroom. Teacher 8 stated "I asked many questions because you do not want to assume that they know the concept being taught."

Teachers also added that they believe African American students need to be able to articulate processes or steps to stay engaged. One of the strategies teachers used was to have students learn daily processes. According to Teacher 1:

The students do have math talks, and I try to get them to explain as a process how they find the unit rate when buying candy.

Teacher 2 stated, I try to relate it (mathematics lesson) to processes and steps they followed before in other daily things, whether playing sports or tying their shoelaces. You have processes or steps that go along with any activity you do in your life, especially with math. Math is procedural and following steps.

Other examples teachers use for student engagement teachers use drawing and journal writing. Teachers shared that they use drawing and journal writing as exit tickets to check students' understanding of the skill or concept.

After asking the research questions and interview protocol for constructivist methods, I create a code for student engagement and instructional strategies. Although teachers use engaging activities, they do not connect them to the students' cultural backgrounds and assets. Aronson and Laughter (2016) explained choosing constructivist methods, teachers must develop bridges connecting students' cultural references to academic skills and concepts. They must build on students' experiences and cultural assets in the classroom.

## **Theme 2 – Social Classroom Environment**

In culturally relevant education, cultural competence is one of the tenets where students learn about their own culture and others (Aronson & Laughter, 2016). When coding teachers' interview responses, one of the patterns that emerged was their perception of how they use cultural competence to create a safe and social classroom environment. Teachers believe a social classroom environment is an opportunity for students to learn about each other and learn how to respect their similarities and differences while engaging in instructional activities. Teachers explained that they

incorporate information such as different types of music, references to celebrations, food, and social media to help them understand the students' backgrounds. It also helped them build relationships in the mathematics classroom. In addition, teachers shared that learning about the students' life allows them to integrate that information into the mathematics lessons, so the students feel they are part of the classroom community. For instance: Teacher 5 stated:

I am a young teacher, so I try to incorporate things that interest them, like hip-hop artists. If I am teaching statistics, I pull statistics about Young Boy or Kanye West album sales. When I am teaching about rational numbers or when I am teaching about comparing and ordering rational numbers, I will use the same type of information.

Teacher 4 added by stating:

I referenced a rapper from the city name Lil Flip and played little snippets of his songs. The snippets can help them associate Lil Flip with when to flip the inequality symbol in a word problem. When they see the symbol, they associate the artist and the music, then change the sign after multiplying or dividing a negative number.

Teacher 1 also stated:

I used music when the students come in the classroom so they can feel comfortable when they enter, especially since it is a small number of African American students in my class. She also stated, I asked the students how their weekends went. If they did something interesting that I could use mathematically,

I would use it for a specific concept or skill. She did not want the students to feel slighted because they were the smaller group. The smaller group represented in the classroom did not mean they were insignificant. She wanted the students to know that they were welcome in the classroom.

Teacher 7 explained he did not know what culturally relevant education was. He said African American students must finish their assignments. That was important.

Teachers stated they use culturally relevant education in the classroom environment so it can be conducive to learning. Many of the teachers would lead conversations about respecting each other's cultures. Teachers allow students to talk about their origins and share some background knowledge of their families. They explained that it was essential to demonstrate what respect looked like.

To continue a positive social environment, teachers decided to build relationships with their students by making the content relatable to personal and mathematical experiences.

Teacher 9 stated, "I just ask questions, you know, get to know where they live, whom they live with, how many siblings they have." "I then tell them a little bit about me so they can tell me a little more about them." Teachers believe talking to the students is vital.

Teacher 5 added:

So, the other day, the students talked about how to read number lines when adding and subtracting integers. One of my boys (African American student) always asks for music. We moved to the left as I modeled how to subtract using the number line (I would say it with a beat). So, we move to

the right if we add (still saying it with a beat). So, the student that likes music started beating on the table, and he saw how we subtract, then we moved to the left with the beat. We added the phrase we move to the right. The class began to do the beat with the words, I could have stopped, but they all were learning at the moment. So, I kept going.

Teacher 5 explained that she wanted the students to feel comfortable and accepted in the classroom by encouraging students to be themselves while learning. Since the student felt comfortable creating the beat with the lesson, she could see the student's learning in action. Teacher 4 also explained that it was essential for African American students to believe they belong because a small percentage of them are in the classroom. Teachers also believed the students should be encouraged and feel confident. "...When he plans a lesson that he believes the students might struggle with, he will start prepping and instilling confidence that they can do it"! It was about building confidence, encouraging self-pride, and building trust when learning concepts or skills that might make the students doubt their understanding.

Based on Aronson and Laughter's cultural competence theory, teachers believe they use cultural competence strategies to teach mathematics when using social activities like social media and cultural celebrations. Aronson and Laughter (2016) view cultural competence strategies as ways for teachers to help students recognize and respect their own and others' heritage. Teachers' responses also revealed that they encourage and allow students to compare cultural celebrations and foods, noting their differences and similarities. The teachers believe they are encouraging and building students' confidence



and using cultural competence strategies. Sleeter (2012) explained that teachers develop a meaningful educational relationship with their students-and use what they learn to develop significant lessons to be culturally competent.

### **Theme 3 – Data-Driven Instruction with Personal Experiences**

When coding for critical reflection, teachers' responses focused on using personal experiences and data-driven instruction. As I reviewed the interview responses, I noticed the teachers struggled to explain how they use critical reflection when preparing for mathematics lessons. Teachers explained that they would use the data they gathered about the students to build mathematics lessons. Teachers shared that they try to use real-world scenarios, such as jail statistics among people of color. For example, Teacher 5 stated:

I pulled statistics on African American and Hispanic males in society in jail. I also pulled statistics about the jail rates of Hispanic and African American females and the death rates of those same populations. I asked students to determine how not to be a statistic.

When teachers gather information from the students, such as their likes and dislikes about hobbies, personal life, and food, they will use it to develop lessons. Teacher 3 shared that she is a person of color and thought that gathering information on all her students would help her understand their background, especially African American students. When she felt she did not know enough, she would talk to African American teachers to learn how to teach African American students. For example, Teacher 3 stated,

“I would collaborate with African American teachers to learn how to teach African American students.” Teacher 3 also stated:

Something happened in class one day. I did not understand why this child was reacting this way. So, I talked to my African American colleagues to get feedback about the child. My colleagues said the child's behavior may seem disrespectful in your culture; however, in this culture, it is okay.

Teacher 4 stated, "because I am a Black man, I can relate to the African American students and understand the issues they may have encountered." Sometimes I need help understanding how to teach African American students.

All teachers emphasized using their personal experiences to teach African American students. Teachers expressed that using their personal experiences and background was one way they could meet the students where they are and help them understand the mathematics concept. Some teachers explained that since they shared African American students' culture, they connected with them on a foundational level. They also explained that they still found times they could not connect with the African American students. For example, Teacher 8 stated:

I think that with my own experience, I could not always connect with my African American students because of my biracial background. I had to remember that when I tried to reach out to them. I would ask questions about their home lives and hobbies.

Teacher 5 also added:

I use my background; I use my experiences. I worked at two different schools. My first school was a low-performing school with a high enrollment of African American students. John M. Middle School is my second school; I used my experience from the first school to determine what works and does not work with the students.

Other examples of teachers perceiving they are using critical reflection were Teacher 5 stated: “To be honest, I do not do that often. Teacher 5 expressed that she used data to drive her instruction as a reflection”. Teacher 8 stated: “When I used critical reflection, I use data to drive instruction and what research-based strategies would be helpful”.

Teachers use tasks and steps in the classroom when they use critical reflection with students. They gather information and embed the information in the mathematics lessons. I did not notice teachers sharing how they used critical reflection to connect mathematics to the students' community. They also did not discuss how the students could use mathematics to have a positive influence in their community.

#### **Theme 4 – Lack of In-depth Training**

As I coded for the critique of discourses of power, half of the teachers discussed societal issues such as purchasing a car or a home.

For instance, Teacher 2 stated, We need to teach African American students what it looks like when purchasing a car or home in the real world. For example, when African American person tries to finance a home and how that affects their interest rate. Teacher 2 also stated, They do not train you on those types of lessons.

Half of the teachers shared that they used some societal issues, but they struggled to connect it to the critique of discourses of power or how to determine what a critique of discourses of power is. The culturally relevant education tenet critique of discourses of power focuses on teachers understanding that the educational system was not developed for people of color. Teachers need to know how to use culturally relevant education to help students become social change agents in their community; this study teaches how to use mathematics to solve community issues.

When coding for the critique of discourses of power, teachers' responses also focused on the lack of training in culturally relevant education in the mathematics classroom. All teachers shared that there was no offering for training or professional development on using culturally relevant education when teaching mathematics to African American students.

Teacher 1 stated, Administration tells us to integrate things happening within the community to make the kids want to learn. So, I say the training I received, I am not sure of the exact name, but it was sometime last year. It was in a virtual setting and taught us how to engage with our students on different levels.

Nevertheless, it did not discuss the students' race or ethnic background. The presenter stated she did not want to get into that.

Teacher 2 stated, I do not know if I have ever really attended training that helped. I have some information, but I do not know if it worked.

All teachers shared that they have not received training that explicitly addresses African American students' needs in the mathematics classroom. Some teachers explained that the

presenters from other professional development would express what you do for one group, you can do for all groups.

Teacher 6 expressed,

I received an entire PD (Professional Development) about understanding the culture and relating to your students so you can build rapport. Moreover, that stuck with me. However, it did not specifically acknowledge how to teach African American students. We need that type of training, though.

Teacher 3 stated, I received training on mental health that includes how to teach at-risk students. Teacher 3 also shared that the at-risk students specifically mentioned African American students. Four teachers shared that they attended training last school year regarding culture; however, it was not based on race or ethnic group. It was a broad training building on the student's social-emotional learning background.

Teacher 9 shared, ... I have been teaching for over ten years, and I still have not received one [professional development] on how to teach African American students. Which is sad.

### **Theme 5 – Challenges**

As I continued to code for the critique of discourses of power, I also noticed teachers were stating many challenges when they tried to engage African American students in the mathematics classroom. One of the challenges teachers encountered was age-appropriate materials and resources.

Teacher 1 stated, One challenge was when discussing societal issues; the classes almost got out of hand. Some challenges I have faced would be that students tend to get overly excited or opinionated when discussing grade-appropriate societal issues in the classroom. The students sometimes get overheated, and I would have to incorporate the PBIS in the classroom, and I would have to stop the conversation. I need help managing my class when I try to incorporate those discussions in my room.

Teacher 4 voiced, One of the challenges for me was finding those real-world connections with the math we use in middle school.

Another challenge teachers discussed it was the support from Administration. Teachers expressed that the support was not substantial enough for them to try to use culturally relevant education effectively. They wanted to support such as inviting expert speakers to the school, support when discussing current events, and setting expectations with behavior.

Teacher 5 stated, I did not need administration. I use my own experiences to gather materials and resources. But they need to set expectations on what and how to talk about current events.

Teacher 2 stated, I just need the administration to set their expectations.

Teacher 6 stated, I used day-to-day living to use culturally relevant education in the classroom. I would talk to other teachers and students to learn what he needs to support them. I do need guidance on how they want us to use it for African American students."

However, teachers expressed that if an administration wants them to use culturally relevant education, the Administration should train them on how to use it and when to use it. They believed the support was insufficient since they only received social and emotional learning training. The Administration says each day that if a student has problems they may have at home or school, they can come to them to talk. However, they believe culturally relevant education is complex and needs support to effectively use it in the classroom.

### **Summary**

This basic qualitative study examined if and how teachers at John M. Middle School used culturally relevant education to teach mathematics to African American students, their preparedness to do so, and their professional needs to become culturally relevant teachers. I used the three research questions to gain insight into if and how teachers were using culturally relevant education to help increase learning opportunities for African American students. In addition, to how prepared they were to use it.

RQ1: What was John M. Middle School teachers' perceptions of how they use culturally relevant education to teach mathematics to middle-grade African American Students?

When asked questions related to research question one, theme one, student engagement and instructional strategies, and theme two, social classroom environment, were revealed from teachers' responses. Findings illustrated that teachers did not know if they were using culturally relevant practices in the classroom or not. Once teachers began describing their instructional practices, their practices reflected culturally relevant education instructional practices because they gathered information about students' home

life, cultural celebrations, and mathematics experiences and embedded that information in mathematics lessons. Teachers said they used math talks, processes, and hands-on activities that engaged the students in the classroom. They also used cultural celebrations and references to food while discussing similarities and differences, using social media to gather additional information on how students' behaviorism. In culturally relevant education, teachers are the facilitators, and the lessons are designed for students to be engaged by exploring, recognizing themes in the concept, and developing their questions (Aronson & Laughter, 2016). The findings demonstrated that the teachers did not know how to use culturally relevant education when teaching African American students because they lacked the knowledge and skills of culturally relevant education. It also revealed that teachers lack a thorough understanding of how to create culturally relevant classrooms.

RQ2: How do teachers at John M. Middle School perceive their preparedness to teach mathematics to middle-grade African American students using culturally relevant education instructional practices?

When posed the interview questions to address research question two, teachers' responses revealed one theme: theme three, data-driven instruction and personal experience. Their preparedness or lack of preparedness was illustrated in theme three. Findings illustrated that teachers used their school training, teaching experiences, and personal experiences to prepare to teach African American students and data to drive their instruction. Teachers explained that they use their personal experience, such as previous work experiences at schools with similar demographics or use their personal background to support students.



They also explained that they used data to determine what students should work on or focus on during mathematics lessons. While using practices such as data and personal experiences for their preparedness to teach lessons is acceptable, it is not increasing learning opportunities for African American students (Aronson & Laughter, 2016). When using critical reflection for preparedness to teach mathematical lessons, culturally relevant teachers design mathematical lessons that will deepen students' understanding of mathematics by using societal issues connected to the concepts (Aronson & Laughter, 2016). Critical reflection allows teachers to go beyond using mathematical concepts. They provide mathematical lessons that engage students in ways that will help the students place mathematics in action. When explicitly asked about critical reflection and critique of discourses of power, teachers could not explain how they use both tenets besides data, celebrations from their culture, voting statistics or jail presences, and their personal experiences to design lessons.

RQ3: What supports do John M. Middle School teachers perceive they need to teach using culturally relevant education instructional practices in mathematics to African American Students?

When posed the interview questions to address research question three, teachers' responses revealed two themes: theme four, lack of in-depth training, and theme five, challenges. Their responses focused on training and challenges on how to find societal issues that are age appropriate and to keep the students' behavior in control when discussing culture or race in current events. They expressed the need for training since they received training on social and emotional learning and how to teach at-risk students.

The finding's revealed teachers were unaware of culturally relevant education theory specifically that of Aronson and Laughter. Consequently, they were not prepared to use the practices. Most used personal experiences and data-driven instruction to teach African American students. The last finding was that teachers desired training to learn and strengthen their culturally relevant knowledge and skills. Their desire to receive support from the Administration was unanimous. They want the Administration to provide training on how to teach African American students. The teachers shared that they are experiencing challenges when trying to teach African American students. Findings also revealed that teachers mainly discussed how to use culture in the classroom. The literature review demonstrated that if there is a lack of support from the Administration, teachers may revert to a one-size-fits-all type of instruction that can lead to inequity in the classroom (Bennett, 2019; Tannebaum, 2020).

One salient aspect of the study was that teachers used practices that reflected aspects of culturally relevant education to teach mathematics. After reviewing the culturally relevant education information, they perceived that they were using culturally relevant education instructional practices. Analysis of the interview data showed that some teachers did use culturally relevant education practices, albeit, in a limited way. No tenet of culturally relevant education was fully explained by the teachers. Many aspects of culturally relevant education were missing, such as inquiry-based learning when choosing constructivist methods or allowing students to construct their learning using critical reflection. One teacher explained using traffic in a metropolitan city to understand the statistics on how many tickets were given in a certain time span. However, the teacher

did not link the traffic statistics to how the traffic affects the African American community (Aronson & Laughter, 2016) which would be a part of critique of discourses of power tenet.

The themes produced from this study also acknowledged the larger body of research, which confirmed that teachers struggle or do not know how to use culturally relevant education effectively to teach mathematics to African American students (Hodge & Cobb, 2019; Neri et al., 2019; Rubel, 2017; Ukpokodu, 2017). Since they are not connecting those instructional practices to culturally relevant education, a professional development series could provide teachers with a deeper knowledge that could develop deepened working knowledge of research based culturally relevant education (Hurrell, 2021; Sleeter, 2012). A professional development series based on current research regarding culturally relevant education theory and practices could promote cultural competence in teachers. After participating in discussions that deepen their knowledge of the historical and current research on culturally relevant education and participating in activities that illustrate how to use culturally relevant education, the teachers' preparedness will be improved and they will better able to use culturally relevant education in the mathematics classroom. Moreover, the series, which includes four professional learning communities that meet throughout the year will develop the teachers' abilities over a longer time (Sims et al., 2021) will help them deepen their knowledge and understanding of culturally relevant education research and instructional practices.

### Section 3: The Project

#### **Introduction**

The purpose of this basic qualitative study was to explore teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students. Further, teachers' perceptions of their preparedness in using culturally relevant education strategies were explored. The findings from the study indicated that teachers needed to develop a working knowledge of culturally relevant education literature and practice. I, therefore, created a 3-day professional development and four follow-up sessions to address the findings by focusing on assisting the teachers in developing a working knowledge of culturally relevant education, improving, and increasing strategies for preparing to teach culturally relevant education, and to also address the support the teachers desired from the administration. Culturally relevant education professional development is planned to deepen teachers' understanding of seminal and current research about culturally relevant education and how to use the principles of the theory in the mathematics classroom.

The purpose of this planned professional development is to disseminate the study findings, critically engage with the tenets of culturally relevant education, examine current research regarding the tenets of the theory, strategies for using the tenets when teaching, reviewing and reflecting on current teaching practices, and thoughtfully comparing their practices to research-based culturally relevant education practices. Haug and Mork (2021) explained that professional development is designed to engage teachers

in active learning of new knowledge that allows them to collaborate, focus on the newly content needed, modeling new strategies, and self-reflection. This professional development, using Haug and Mork's model, is designed to support teachers in developing their knowledge of culturally relevant education the model's elements of content focus, active learning, collective participation, and coherence.

By the end of the Day 1 session teachers will know why the study was conducted.

- Content focus: Disseminating study information and providing the seminal work of Aronson and Laughter as well current culturally relevant theorists works such as Bishara, (2021), Gresham & Burleigh, (2019), Keratithamkul et al., (2020), Kretchmar, 202, Kumar et al., (2018), Ladson-Billings (2021), Macqueen et al., (2020), and Vaishali and Misra, (2019) to help teachers understand how culturally relevant education supports student's learning.
- Active learning: Teachers will examine the purpose, problem, findings and answer guided questions that will help them in the discussion. For example: While analyzing the study's findings, how do you engage with African American students? (Knight-Manuel & Marciano, 2019)
- Collective participation: Teachers will discuss and analyze the study's findings with other teachers in their groups.
- Coherence: Teachers are aligning culturally relevant education tenets with the findings and current research.

By the end of the Day 2 session, the teachers will be able to recognize the different tenets of Aronson and Laughter framework and current culturally relevant education research.

- Content focus: Current research on each culturally relevant education tenet. Cultural competence (Shockley & Krakaur, 2021); Critical consciousness, which is the same principles as the principles of Aronson and Laughter's critique of discourses of power (Knight-Manuel & Maricano, 2019); Self-direct learning, which has the same principles of Aronson and Laughter's constructivist method (Bishara, 2021); Critical Reflection (Id-Deen et al., 2022); Cultural competence (Kretchmar, 2021; Vaishali & Misra, 2019).
- Active learning: Reading articles on each tenet and answering guided questions related to the tenet. For example, in Greenbook to Gradebook – (Id-Deen et al., 2022) teachers critically reflect on how they relate to African American students.
- Collective participation: Teachers will have discussions in round robin groups with guided questions for example how they teach African American students, (Leonard, 2020)
- Coherence: Teachers will compare the new knowledge of culturally relevant education, school curriculum and educational goals for alignment.

By the end of the Day 3 session, teachers will have gathered materials and researched resources how to create and maintain culturally relevant mathematics classroom.

- Content focus: Teachers are identifying characteristics of culturally relevant lessons from sample lessons. Research materials and resources that are provided from the researcher to compare their lesson plans with

researched-based lesson plans (Brown et al., 2019; Howard, 2021; Kondor et al., 2019)

- Active learning: Research (Teachers are asked to bring their district assigned laptops) on current practices and activities that teachers can use to support students in academics and be social agents in their communities (The presenter have many resources teachers can use to find culturally relevant lessons i.e., <https://why.org/articles/lessons-on-black-lives-matter/>; Malazonia et al., 2021).
- Collective participation: Discussions and comparing their current practices to the culturally relevant education conceptual framework and researching programs with emphasis on culturally relevant education.
- Coherence: Teachers using theorists such as Knight-Manuel et al., (2019), Liu and Ball (2019), and Malazonia et al., (2021) to align the lessons to the mathematics standards and culturally relevant education Tenets.

### **Rationale**

The problem at John M. Middle School was it was unknown if and how teachers were using culturally relevant education to help increase learning opportunities for African American students. When I interviewed the teachers, using the interview protocol developed from the research questions, I often had to ask them to describe a lesson so that I could identify if their teaching exercises included aspects of culturally relevant education. The findings demonstrated that the teachers did not know how to use culturally relevant education when teaching African American students. Findings also

revealed that teachers lacked a thorough understanding of how to create culturally relevant classrooms. They stated that they wanted to learn more about teaching African American students. Teachers explained that they used their personal experiences of teaching students and data-driven instructional strategies and practices to teach and reteach the mathematics standards to all students. Instruction was geared toward all students and not necessarily to meet the specific needs of African American students. In addition, the findings revealed that teachers expected the administration to support them by providing materials and resources with additional training that could help them teach African American students. These findings demonstrated that teachers need culturally relevant education professional development that will support teachers in constructing a solid working knowledge of the theory, as well as current research that provides a broad knowledge of what is known of the tenets of the theory.

Of the four genres for this project, I chose professional development (PD) because it is designed to develop and strengthen teachers' teaching ability to increase student achievement (see Sims et al., 2021). The PD will also be used to disseminate the problem, purpose, and findings of my study for teachers to have a good understanding of how and why it was conducted. The PD will also provide teachers an opportunity to collaborate with other teachers on meaningful ways to learn about culturally relevant education and how to use that knowledge to develop meaningful lessons that will increase learning opportunities for African American students. I rejected the evaluation report because this study did not investigate the effectiveness of current programs that measure goals and costs (see O'Brien et al., 2021). This basic qualitative study



investigated perceptions of teachers' instructional practices. Curriculum planning is one of the most critical aspects of the educational system (Esfandiyari & Nourabadi, 2020) and would support teachers. I investigated teachers' perceptions of middle-grades African American students so I rejected curriculum planning because I would have to write a curriculum plan for multiple grades. The purpose of policy recommendation (white paper) is to dispute a position or propose a solution to a problem by addressing an audience outside their school district (The Purdue Writing Lab, n.d.). This basic qualitative study explored teachers' perceptions and did not address a policy change. I rejected the policy recommendation (white paper).

The findings and teachers' requests for more support in teaching mathematics to African American students led me to create a 3-day PD series. The 3-day series will be followed up with four PLC training days during the school year that allow teachers to develop a deeper knowledge of creating and implementing culturally relevant classrooms (see Dixson, 2021). The PD will require teachers to examine the principles of culturally relevant education and the recommended use in the classroom. The teachers will also compare their perceptions of the theory culturally relevant education to current research regarding the tenets of the theory of culturally relevant education.

## **Review of Literature**

### **Literature Search Strategies**

The topics discussed in the literature review emerged from the themes that developed from the study in section two. I researched professional development aimed to identify current literature that would demonstrate effective ways to support teachers'

understanding, create a working knowledge of using culturally relevant education in the mathematics classroom, and increase culturally relevant teaching abilities. I researched the literature using Walden University Library databases, including SAGE, ERIC, EBSCO, and Google Scholar. My search keywords were *culturally relevant education professional development, professional development, equity, teaching Black students, constructivism, cultural competence, critical reflection, culturally relevant teaching, professional development on mathematics for middle grades students, professional development, and professional development for diverse populations.*

The planned culturally relevant education series is designed to educate teachers on culturally relevant education research and practices using Haug and Mork's (2021) professional development model that includes (a) content focus, (b) active learning, (c) collective participation, and (d) coherence activities. This model allows the teachers to explore current research, experience, discuss, and prepare to work with students representing diverse populations, African American students, in this case. (see Haug & Mork, 2021; Smith et al., 2020).

### **Culturally Relevant Education Practices**

Ladson-Billings (2021) purported that culturally relevant education is a framework to encourage the intellectual side of African American students in the mathematics classroom. It empowers students to take control and increase their learning opportunities. Aronson and Laughter (2016) suggested that when teachers know how to use culturally relevant education in the classroom, they recognized it will increase academic success and create social change agents in their students. Teachers in culturally

relevant classrooms understand that during instruction it is important to use students' cultural backgrounds and prior knowledge to understand the communities where the students live, and to build relationships (Aronson & Laughter, 2016; Rousseau Anderson, 2021).

One of the tenets of culturally relevant education is constructivist methods which could increase academic success in the classroom. As mentioned in Section 1 of this study, constructivism is a student-centered model (see Clark, 2018) that involves students being active learners in their learning. Researchers stated when teachers understand how to use constructivism, they have a better understanding of to use it to teach mathematics to African American students (Knight-Manuel & Marciano, 2019; Talbert et al., 2019; Wachira & Mburu, 2019). Wachira and Mburu (2019) also stated:

Once the teacher has acquired the knowledge of his/her students, he/she can scaffold learning in a way that is culturally relevant which may include questioning to promote a deeper understanding of the content using contributions of the students and making reference to their culture or language. (p. 6)

Vaishali and Misra (2019) explained it is important to provide teachers with the knowledge of what is (a) the concept, meaning, definitions and origin of constructivism; (b) different type of constructivist approaches; (c) significance of constructivist approaches in education; (d) role of a constructivist teacher; and (e) role of a constructivist learner and how it can be used to African American students.

Competent culturally relevant education teachers use hands-on activities and inquiry-based instruction that support students' formation or construction of their

understanding of mathematics concepts and skills. Culturally relevant teachers create challenging learning goals that increase learning opportunities for African American students by allowing students to collaborate with other classmates with problem solving and discovery skills during the mathematics lessons that relates to the students' cultural background and life's experience (see Knight-Manuel & Marciano, 2019; Talbert, et al., 2019; Wachira & Mburu, 2019).

Another tenet of culturally relevant education is cultural competence. Knight-Manuel and Marciano (2019) stated cultural competence is where teachers understand that students' cultural backgrounds are assets while building on students' knowledge that will support them as they learn new mathematics concepts. Teachers know how to support students learning of other students' differing perspectives in and out of the classroom. They allow students to participate in classroom discussions about culture, how the world sees them and how they see the world, developing web identities that allow students to examine their own cultural background, and participate in civic activities that allow students to have a better understanding of others' cultural background and communities (Knight-Manuel & Maricano, 2019; Malazonia et al., 2021). Holliday (2021) emphasized that culturally relevant teachers know how to self-reflect on their relationship with the students. Teachers who demonstrate culturally relevant education practices know how their students learn, and they learn about the culture of the students.

### **Connecting Culturally Relevant Education and Curriculum**

Aronson and Laughter (2016) emphasized that culturally relevant teachers know how to use curriculum and activities to engage students in analyzing the societal issues of

all cultures represented in society. As teachers begin to prepare to use culturally relevant education to teach mathematics to African American students, they must understand their own teaching practices. Stephens and Rock-Vanloo, (2022) explained that culturally relevant teachers know how to reflect on their biases when teaching African American students and how the African American students view the world when preparing to instruct students. Teachers know how to engage in reflection (a) of their perceptions on how they teach African American students; (b) examine any stereotypical views; and (c) determine how to use the knowledge of the students and connect their views, beliefs, and expectations to the curriculum and the classroom environment. In a culturally competent classroom, culturally relevant teachers invite context in which teachers do not shy away from talking about culture in the classroom (Boutte, 2016; Cormier, 2021; Pang et al., 2021).

In culturally relevant education, culturally relevant teachers know the importance of teaching students to become social change agents in and out of the classroom (Howard, 2021). Howard (2021) stated that teachers may not want to discuss different areas of critique of discourses of power because it may be uncomfortable, but it is essential to have difficult conversations about societal issues and why it is happening to African American students. Culturally relevant teachers understand those caring relationships that they are building what African American students need (Brown, 2021). Brown (2021) explained that culturally relevant teachers know how the educational system treats African American students in the classroom and tries to use the mathematics lessons to be effective in the students' lives. Leonard (2020) purported that

it is important for teachers to know their own identity and to use that to support students learning about their identity both in their lives and the classroom.

Culturally relevant teachers know how to use societal issues in the classrooms by first building relationships with the students as well as building trust. The teachers learn about the students' background and what is going on within the students' community (Clark et al., 2016; Howard, 2021; Johnson et al., 2021). They then begin to discuss different societal issues because the students trust and know they are in a safe environment (Aronson & Laughter, 2016). The teachers know how to use the cultural background and mathematics experience to place different mathematics concepts in context so students can make the math meaningful. Culturally relevant teachers know how to analyze math lessons focusing on issues such as mathematical thinking, language, culture, and social justice while promoting purposeful academic discourse (Aronson & Laughter, 2016; Godfrey et al., 2019; Kondo, 2022). Culturally relevant teachers use project-based learning to connect mathematics to the students' prior mathematics knowledge, community life, and life experiences (Bowen & Peterson, 2019; Kafele, 2021; Wurdinger et al., 2020). The theorists explained that culturally relevant teachers know how to bring the community in and out of the classroom by using that knowledge they have acquired.

### **Professional Development**

The findings revealed that the need for professional development would address teachers' lack of working knowledge of culturally relevant education. This professional development (PD) design includes content focus, active learning, collective participation,

and coherence. John M. Middle school teachers expect effective professional development to be relevant, collaborative, and well-organized, and the information can be used immediately in the classroom (Nguyen, 2019; Smith & Robinson, 2020; Sztajn et al., 2020). It will be used to disseminate study's information and create opportunities for teachers to improve their teaching abilities using culturally relevant education to teach mathematics to African American students (Chung Kwan Lo, 2021; Haug & Mork, 2021). John M. Middle school teachers with working knowledge of culturally relevant education, a positive attitude, and perspective may engage more with the students and build relationships that encourage academic growth (Abacioglu et al., 2020; Tate, 2021). Although teachers should have several months and even years of support and feedback to successfully use culturally relevant education in the mathematics classroom (Smith et al., 2020), this professional development is an excellent beginning to support teachers in becoming culturally relevant.

### **Content Focus**

The teachers will analyze culturally relevant education tenets, examining their practices and determine how to apply the newly acquired knowledge to the mathematics content (Darling-Hammond et al., 2017; Freidus, 2020; Moore et al., 2021; Parker et al., 2017). The content focus will provoke discussions on teachers teaching practices, their lesson planning, stereotypical beliefs they may carry, and how to choose strategies that will support students learning (O'Leary et al., 2020; Talbert et al., 2019; Vintere, 2018; Wernet, 2017). Teachers will also have meaningful dialog regarding how culturally relevant education can support and improve their teaching abilities (Brion, 2020).

Throughout the professional development, teachers will examine models of culturally relevant education lessons and compare those lessons with their own and be able to identify any barriers that might stop them from using culturally relevant education in their classrooms consistently (Eun, 2019; Pharis et al., 2019; Shirrell et al., 2019).

### **Active Learners**

In active learning, John M. Middle school teachers are to reflect by examining their own biases; they also to reflect on the critique of discourses of power by researching issues students encounter daily (Botshabeng, 2021; Knight-Manuel & Marciano, 2019). The teachers will receive valuable information from different theorists on developing their knowledge of culturally relevant education (Olsen et al., 2021). John M. Middle school teachers will receive time to examine their practices further and dig deeper into the culturally relevant education tenets to observe ways to strengthen their instructional practices to support African American students in academics (Baxter et al., 2021; Hixon, 2020; Liu & Ball, 2019). In addition, the teachers will examine appropriate strategies for students (Ford, 2019; Jackson et al., 2020; Kibler & Chapman, 2019; Kul, 2018; Turan & Matteson, 2021). Throughout the professional development, teachers will have learning opportunities to analyze the students' community through collaborative discussions on their analytical viewpoint toward inequities in the school systems (Knight-Manuel & Marciano, 2019; Seider et al., 2020).

### **Collective Participation**

Findings revealed that John M. Middle school teachers went to each other to discuss ways to instruct African American students, especially those teachers who did not



share the culture or ethnicity of the students. Throughout the PD, John M. Middle school teachers will collaborate with other teachers regarding African American students learning outcomes (Kumar et al., 2018). The teachers will collaborate with other teachers on their interpretations of how African American students learn and gain insight into different methods or find additional strategies to support their instructional practices (see Horn et al., 2020; Vargas & Gutiérrez, 2018; Young et al., 2021).

Johnson et al. (2021) conducted professional development on how teachers should collaborate with other teachers on the culturally relevant education tenets, especially if they do not share the same cultural background as the students they are teaching. The theorists suggested that this type of professional development will allow teachers to have an open dialog on African American students' culture that they may not know. John M. Middle school teachers may feel uncomfortable discussing African American students' learning and how their practices and beliefs affect them. However, they must have them to ensure that African American students learn (see Toms et al., 2019).

### **Coherence**

Haug and Mork (2021) suggested that when creating professional development, it is essential to acknowledge the attitudes and beliefs of the teachers. In their interviews, John M. Middle teachers stated that they received social and emotional learning training that was not aimed at a specific group. It was mainly aimed at working with at-risk students and how to make the lessons relevant to the students. African American students are considered at-risk in the local setting. However, the teachers stated that there was nothing specifically aimed at how to teach African American students. A few teachers

stated they received training on how culture is important, but it focused on all students and did not provide specifics on African American students. John M. Middle School teachers will review the educational goals of the campus, understand the mathematics standards of the school curriculum, and blend them with the new knowledge and skills being presented (Maboya et al., 2022; Martin et al., 2019).

### **Project Description**

The purpose of the 3-day professional development is to train teachers to use research-based culturally relevant education to teach mathematics to African American students. I will discuss an appropriate time to present the professional development with the superintendent of curriculum and the math curriculum coordinator. After the time has been set, I will request a room with a projector and laptop with internet access. The room will need to accommodate the teachers and administrators from all middle schools, approximately forty participants. Large posters would be beneficial for teachers to write their ideas during small group discussions and map out the lesson plans. The role of all participants is that they are expected to be active daily. Each participant will receive data sheets, folders, and paper to use throughout the professional development. In addition, all participants will need to bring their technology. Each professional development day will be six hours. The agenda is in Appendix A, with the timetable of each activity and breakout session times.

This 3-day professional development series has two goals. Goal one is to begin developing a working knowledge of culturally relevant education through the lens of Aronson and Laughter's theory of and current research on the principles of culturally

relevant education. Day one is foundational where teachers will be able to begin to receive seminal and current knowledge about culturally relevant education. Goal two is for teachers to reflect on the theory and discuss personal strengths and weaknesses regarding their previous practices and how they relate or not relate to seminal and current knowledge about culturally relevant education. They will discuss how they will strengthen, revise, and add practices to be culturally relevant. In addition, teachers will use the newly acquired knowledge to design lessons incorporating culturally relevant education into their instructional practices.

Day 1 activities will provide the teachers with the problem, purpose, and conceptual framework with the findings of the study. The teachers will have table discussions of the study's problem, purpose, and conceptual framework in the first half of the session. In addition, the teachers will have the conceptual framework with hands-out to better understand why it was chosen for the study. Next, teachers will come together as a whole group to discuss and create one working definition of culture for professional development. teachers identifying what culture is (Milner, 2017) and how it relates to culturally relevant education. Teachers will receive the definition of culture as defined by the study (Milner, 2017). Teachers then will collaborate on a working definition of culture for professional development. In the second session, there will be table discussions on the findings and listening to the participants' interview segments during the second half. Table discussions will have guiding questions from Gloria Swindler Boutte (2016), Johnson et al., (2021), and Knight-Manuel and Marciano (2019). Day one

hands-out will also include Dr. Gloria Ladson-Billings and Dr. Geneva Gay seminal works. Videos of Dr. Ladson-Billings and Dr. Gay will support their seminal works.

Day 2 activities include having teachers analyzing culturally relevant education theory in-depth by discussing each tenet with hand-outs (current literature) and videos (Foster et al., 2020; Knight-Manuel et al., 2019) that supports the seminal work and current literature. After analyzing culturally relevant education theory in-depth by discussing each tenet with current literature (see Keratithamkul et al., 2020; Kondor et al., 2019; Kondo, 2022; Kumar et al., 2018; Macqueen et al., 2020), teachers will come back for whole group discussion on what they learned and how they can use culturally relevant education in the classroom.

During Day 3 activities, teachers will gather materials and resources to design lessons focused on culturally relevant education (see Kafele, 2021; National Council of Teachers of Mathematics (NCTM); Kibler & Chapman, 2019; Malazonia, 2021; Pang et al., 2021). Teachers reflect on the past two days and listen to interviews from teachers who participated in the study (teachers who replied yes will be the interview segments used during the professional development). Teachers will collaborate and discuss how they currently use culturally relevant education practices referencing Aronson and Laughter's theory. Teachers will critique four lessons and analyze if the lessons were culturally relevant. If they are not, teachers can discuss how to make it relevant using the culturally relevant education tenets. Teachers will have access to resources such as Dr. Tyrone Howard (2020) and Kafele (2021) with questions that will guide teachers on how African American students learn, National Council of Teachers Mathematics (NCTM)

lessons and articles, and Dr. Tonya Clark on the project Widening Options through Knowledge and Empowerment (W. O. K. E.) culturally relevant lessons, among other resources (see Kibler & Chapman, 2019; Malazonia, 2021; NCTM; Pang et al., 2021). Teachers will also be required to bring lesson plans to compare with culturally relevant tenets. Teachers will be grouped by grade level.

When developing professional development, there are barriers. The main barriers are buy-in, time, and money. Barrier one is that teachers may not want to participate in culturally relevant education professional development. Since many teachers believe in color-blindness instruction, the teachers may have to be required to participate. The description of professional development will include why it is crucial to know how to use constructivist methods, critical reflection, critique of the discourses of powers, and cultural competence when designing instruction and lesson plans. In addition, teachers need professional development that will educate them to develop new knowledge and skills for improving African American students learning.

Barrier two is time. The district and campus administration will determine if this PD benefits teachers and students. Summer professional developments are optional, and teachers may not believe they need to attend, which means attendance may be small. However, this PD focuses on increasing students' achievement and improving instruction; the Administration can consider scheduling the professional development during the required professional development at the beginning of the school year. In addition, using four of the twelve PLC days for follow-up PDs will help eliminate time limitation barriers. Barrier three is cost. District and school personnel develop the school budgets

for professional development during the current year for the upcoming school year.

District and school administration will consider the cost for presenters, room, equipment, materials, continental breakfast, and custodial staff. The Administration will have to determine if professional development is essential and cost-effective.

### **Evaluation Plan**

This project will use a formative assessment and summative evaluation platform (see Appendix A) to identify if the professional development goals helped teachers develop conceptual knowledge of using culturally relevant education. It will also support them in developing lessons to improve African American learning outcomes. Formative assessment is a way to receive ongoing daily checkpoints on the effectiveness of professional development (Forrest, 2018). Each day teachers will complete an open-ended question exit ticket to explain what specific area of the day's activities was effective from their perspective and why. The feedback will allow me to evaluate the daily activities and make necessary changes. The summative evaluation is more formal and provides feedback from the 3-day professional development (Forrest, 2018). At the end of the 3-day professional development, five evaluative questions are purposefully adapted to professional development goals. The evaluation will determine if the professional development is practical, provide the strengths and weaknesses of the professional development, and did it change the teachers' mindset, knowledge, and skills, from their perspective.

I will share the evaluation results with the superintendents, campus administrators, curriculum specialists, and teachers during the four whole-day PLCs

throughout the school year. Hopefully, the evaluation feedback will lead to meaningful discussions on improving culturally relevant education instruction and continuing professional development.

### **Project Implications**

This project could be a catalyst for social change in the local setting. Professional development is often one of the tools used to support teachers' teaching abilities. Most importantly, effective professional development allows teachers to collaborate, practice, and reflect on their teaching practices. Teachers must develop collegial relationships to know what culturally relevant education strategies support African American students learning. It is vital that all students, especially African American students, believe they are essential to society and make a positive difference in their community. When teachers recognize their intelligence and brilliance, students work harder, strengthening their mathematics abilities. The implications of this project can help district and campus administrators and teachers understand that they must recognize that "what works for one could work for others" is not always applicable. This project will empower teachers with a research-based conceptual framework that guides them in gathering materials and resources to design mathematics lessons to engage African American students. Stakeholders (teachers, administrators, parents, school board members, and others involved with the student's learning) may also see African American students being more receptive to their learning and respecting cultures different from their own in and out of the classroom. Therefore, this will result in students choosing academic success. If organized and presented effectively, the professional development could also be shared

with other content areas in the school and the district to increase African American students learning opportunities cross-content.



## Section 4: Reflections and Conclusions

### **Project Strengths and Limitations**

John M. Middle school teachers shared that they needed more age-appropriate materials and resources about African American students. According to Meyer and Aikenhead (2021), teachers can understand African American students' world and transform that information into classroom lessons and discussions through PD. This project deliverable can be the first step in providing teachers an opportunity to learn about African American students' cultural backgrounds, beliefs system within the community, and prior knowledge (see Compton-Lilly, 2020; Wilmore, 2020). The project deliverable had many strengths and limitations. One of the strengths of the project deliverable is that it provides the teachers with the foundation of Aronson and Laughter's (2016) culturally relevant education. Teachers also can view videos from well-known theorists such as Ladson-Billings (1994; 1995; 2021), Gay (2010; 2018), and Howard (2021) for follow-ups when working throughout the school years. The theorists' videos support their research. In addition, teachers will understand why it is essential to integrate culturally relevant education in the mathematics classroom from the different current research (see Jackson & Knight-Manuel, 2019; Knight-Manuel & Marciano, 2019; Leonard, 2020). The theorists can provide examples of the different tenets so teachers can compare what they do in the classroom to the theorists' suggestions. Another strength once teachers create working knowledge of culturally relevant education, according to Pang et al., (2021) is teachers will observe students gain from significant curriculum and instruction that bridge their personal lives and support students in developing critical

thinking skills for participation in a society that may or may not be for them. This project allows teachers to have structured collaboration that intentionally focuses on using what is currently known about using culturally relevant education to African American students in the mathematics classroom. In using this knowledge, they will incorporate issues in the students' communities and society while increasing their mathematics identity (see Cormier, 2021; Olsen et al., 2021). Another strength of the project deliverable is the opportunity for teachers to gather materials and resources that are reinforced by Aronson and Laughter's theory of culturally relevant education and current research that has expanded the theory such as Downing and McCoy (2021). They explained teachers should teach children about the importance of African culture (cultural competence), advocating discourse in the classroom (constructivist methods), engaging in frequent self-affirmation activities with students (cultural competence), and constantly and vigorously resisting and challenging authorities who advocate practices that continuously oppressed the education of the African American students (critique of discourses of power and critical reflection).

The project deliverable does have some limitations. One limitation is a 3-day PD when there are four PLC days in one school year. Haug and Mork (2021) explained that teachers must have an extended period to implement new knowledge and skills effectively. Teachers must use culturally relevant education for longer than one school year because change is gradual and challenging (Nguyen, 2019). Further, Martin et al. (2019) and Adams et al. (2017) stated that professional development requires time for teachers to reflect on their teaching to transform their beliefs and instructional practices

to facilitate students' success. Another limitation was that I conducted a basic qualitative study that included nine participants (see Patton, 2015). Therefore, the data collected does not reflect all teachers' perceptions of using culturally relevant education instructional practices. Another limitation of this project study is the negative beliefs about addressing students' culture in the classroom. The district may believe this type of professional development may be too controversial.

### **Recommendations for Alternative Approaches**

There are alternative research approaches to improve African American students' learning outcomes. One approach is to develop a focus group to discuss the learning opportunity for African American students. The focus group will include administrators from the different surrounding campuses and districts and other community leaders in the city (see Howard, 2016; Knight-Manuel et al., 2019) and produce solutions to help increase learning opportunities for African American students.

Another approach is to have semistructured interviews with the students. The students can provide their perceptions of equitable learning environments and teacher effectiveness (see Akram, 2019; Munter & Haines, 2019). Students can recognize inequities in the classroom and how the teachers address inequities in the classroom. Semistructured interviews with the students can provide insight into how teachers bring cultural competence to the classroom. The student's perceptions of the teacher's instructional practices can inform their learning needs for teachers to integrate their cultural background, home life, and community. When knowing the students'

perceptions, teachers can change their instructional practices to meet the needs of the students as they use culturally relevant education in the mathematics classroom.

### **Scholarship, Project Development, Leadership, and Change**

I did not know how to start my investigation on how to help African American students, as evidence from the school showed they were struggling. So, I decided to further my education and obtain my doctorate. I was somewhat perplexed about what I wanted exactly besides supporting African American students. After attending the residency, I had some direction. However, it was not until I began meeting with my chairperson that I knew which direction I wanted to follow. My chairperson was my lifeline. She guided me to research Ladson-Billings, Gay, Hilliard, Banks, and many other theorists who focused on supporting teachers to facilitate African American students' learning in the mathematics classroom. In my research, I found that Ladson-Billings' (1994a, 1995) seminal works and Gay's (2000, 2010) aligned more with what I wanted. The theorists' seminal works on CRP and CRT focused on the empowerment of students intellectually, emotionally, and politically and how to use cultural referents when instructing African American students. As I continued to research CRP and CRT, I found Aronson and Laughter's culturally relevant education which embodied both frameworks and provided me with a deeper understanding of the frameworks.

I read the importance of building relationships with students, reflecting on my teaching practices, and using my culture and home life to understand mathematics. I struggled with understanding culture and how it relates to culturally relevant education. Learning about culturally relevant education allowed me to understand that it takes more

than just knowing the kids and acknowledging their historical references, such as Michelle Obama and Barrack Obama. Richard Milner (2017) explained what the students experience every day and how it is essential to understand that their identities are positive and that the students are essential to society.

When I finally conducted interviews, I recognized that the teachers were like me and used practices that reflected culturally relevant education but could not connect it. As I needed to research how to use culturally relevant education, the teachers needed professional development driven by theorists' research-based strategies to develop their working knowledge of culturally relevant education. The theorists' seminal works can provide a wealth of knowledge to support teachers in developing a working knowledge of using culturally relevant education in the mathematics classroom.

Professional development was indeed a rewarding and challenging process. I first had to identify an effective professional development (Martin et al., 2019; Nguyen, 2019). Effective professional development allows teachers to collaborate, increase their knowledge and skills, learn how to facilitate students' learning, and reflect on their teaching practices (see Haug & Mork, 2021). I read many articles about effective professional development and what characteristics should be present in a PD. Teachers need to have a working definition of culture and how to connect culture with culturally relevant education (see Jackson & Knight-Manuel, 2019). The teachers needed that time to identify different strategies to support students in becoming social change agents in their community. As I considered activities for professional development, I was a little apprehensive about inserting videos on culture and race (see Milner, 2016) in the PD

because people currently feel uncomfortable discussing culture and race in mathematics since some teachers believe it is divisive. To address this concern, teachers can refer to the videos after the professional development series is complete as a reference when designing lesson plans throughout the school year.

As I continued to design a professional development that would be effective and efficient for teachers, I remembered that some teachers believe that color blindness is a better teaching strategy. Many teachers do not believe there is a problem in the mathematics classroom since mathematics is about numbers (Weinzimmer & Bergdahl, 2018). Mathematics is about logic and problem-solving. I want teachers to have discussions and activities that will provide open dialogue (see Appendix A) to encourage teachers to discuss their belief systems and why they should continue reflecting on their practices while using culturally relevant education in the mathematics classroom.

As a scholar, a practitioner, and a project developer, I know I will make mistakes. I know there will be challenges along the way. However, if I can bring awareness to the inequity and injustice of African American students in the education system, I know I can make a difference in the teachers' and students' lives in my local setting and hopefully beyond. African American students and other students of color need to know how important they are to society. They can learn, and they can make a difference in society.

### **Reflection on the Importance of the Work**

Although teachers are taught to be data-driven and use strategies to support students in the classroom, these strategies are not strictly connected to cultural backgrounds, home life, and lived experiences. It may seem that way, but it is not. It is

vital to know that designing lessons incorporating all aspects of students' lives, especially African American students, can make a difference in society. It is essential to develop learning opportunities for African American students to increase their success opportunities. It is critical to provide teachers with professional development to learn about themselves, how they teach, and how their teaching affects African American students.

### **Implications, Applications, and Directions for Future Research**

Having teachers reflect on their practices and how they affect African American students' learning is beneficial for their success. Teachers recognize that African American students need support in the classroom. However, teachers like me did not know precisely how to do it. This study can potentially help teachers develop their action plan for supporting African American students in the mathematics classroom when using research-based strategies for culturally relevant education. Teachers can potentially have an open dialogue that focuses on developing students' mathematics identities and creating an equitable environment with colleagues. Another implication of this study is that teachers benefit from having more than a one-time 3-day professional development with four follow-up sessions. This study illustrated that teachers must have more than one school year to apply new knowledge and skills. This type of knowledge and skills need to be successfully implemented over more than one year for authentic learning to occur.

The methodological process of this study allows teachers to be interviewed in a respectful and safe environment. Teachers could share their teaching strategies and thoughts about teaching African American students. All teachers expressed the need for

age-appropriate materials and resources to help teach African American students. Their perceptions directed me to develop professional development that potentially supports the teachers in designing lessons to increase learning opportunities for African American students and supports teachers in gathering materials and resources.

Social Change is why I wanted to study how to support African American students. Developing culturally relevant education instructional practices can develop social change agents in the classroom. When students understand why they need to learn unit rates, the Pythagorean Theorem, linear equations, and how to use them in their everyday lives, it could make a difference (see Silva et al., 2019). African American students must understand other cultures and know they are a positive part of their community. Once African American students know their self-worth, they will make a positive difference in their community.

When I conducted the research, I observed limited literature on culturally relevant education and African Americans. In addition, I also noticed that if there was literature on culturally relevant education, it focused on discipline, English Language Learners, and the prison pipeline. Additional research should be conducted to support educators and parents to help increase cultural awareness. As diversity in the country continues to increase, it is crucial to have research that will encourage educators to understand how to increase equity in the classroom.

### **Conclusion**

Inequity resonates daily as our African American students experience it throughout the classrooms (Muhammad, 2020; Shah et al., 2020). Therefore, using



culturally relevant education can provide the equity needed in the classroom. culturally relevant education in the mathematics classroom can provide students with learning opportunities that can open doors to advance mathematics and STEM Careers that struggle to employ people of color. However, culturally relevant education is not just about careers and jobs. It is about providing African American students an opportunity to recognize themselves as productive citizens. Students should know they are brilliant, intelligent, and social change agents. Barack Obama shared, "Change will not come if we wait for some other person or if we wait for some other time. We are the ones we have been waiting for. We are the change that we seek" (Times, 2008). African American students must believe they are the change and can make a difference. As educators, we must encourage and teach in a culturally appropriate way for the students to believe they can.

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## Appendix A: The Project

## Culturally Relevant Education Professional Development

## Presenter's Notes Day One – Day's Goal – Review Findings of the Study and Aronson and Laughter's Theory of Culturally Relevant Education

8:30 – 8:45 a.m.	Check-In/Breakfast/Establish Norms/
8:45 – 9:00 a.m.	Padlet – Provide one thing about your culture you believe no one knows about/Objectives
9:00 – 10:00 a.m.	Think-Pair-Share – After you answer the question on Padlet pair up with someone and share your thoughts. Discuss Problem, Purpose, and Review data of African American students over three years that is associated with the problem. Whole Group/Table Group discussions – Teachers prepare to share opinions/questions/answers
10:00 – 10:10 a.m.	Break
10:10 – 11:30 a.m.	Define the study's definition of culture. Table discussion on culture. Using the Milner definition and developing a definition of culture. Teachers will come back to the whole group and develop a definition for the professional development. Culture definition with Milner (2017). Discussion on Aronson and Laughter's Theory of Culturally Relevant Education – Synthesis of Dr. Gloria Ladson-Billings – Culturally Relevant Pedagogy and Dr. Geneva Gay – Culturally Responsive Teaching. Teachers will have both key points from both Theorists and discuss the similarities and differences. Activity – Teachers discussing what teachers know using CRE -
11:30 – 12:30 p.m.	Lunch
1:00 – 1:10 p.m.	Recap morning activities
1:10 – 3:15 p.m.	Table discussions on Research Questions and Findings. Interview audio from participants' interviews (participants gave permission to use their

interview audio). Activity: After discussing previously what Culturally Relevant Education Teachers know. With synthesis sheet, what teacher didn't know. Teachers will write on a standard piece of grid paper, fill in each square with a symbol (sentence, picture, drawing, poem, etc.) that relates the statement to your own life experience. Then each group will have an article to read and summarize. Teachers will present to whole group. This activity will expand Aronson and Laughter Theory with current research – Pang et al., 2021, Ladson-Billings (2020), Downing and McCoy (2021) Parker et al., (2017), Rousseau Anderson (2021).

3:15 – 3:30 p.m.

Exit Ticket Google form – Formative Evaluation

Culturally Relevant Education Professional Development  
 Presenter's Notes - Day Two – Day's Goal – Developing a working knowledge of  
 CULTURALLY RELEVANT EDUCATION with hands-on Activities

8:30 – 8:45 a.m.	Sign-In/Breakfast/Objectives
8:45 – 9:45 a.m.	Teachers will take a survey on Culturally Relevant Education Survey before thorough discussion on culturally relevant education using Aronson and Laughter's Conceptual Framework Theory (Survey Questions from Knight-Manuel and Marciano, 2019). After teachers complete the survey, teachers will discuss their answers and what do they perceive of their teaching practices.
9:45 – 10:00 a.m.	Break
10:00 – 10:05 a.m.	Instructions for round robin. Presenter, Instructional Specialists will be assigned to a group. Each group will have articles from current research. They will read the articles then summarize the key points to bring to whole group for whole group discussions. Each CULTURALLY RELEVANT EDUCATION Tenet will have one hour for article discussion and guided questions.
10:05 - 12:05 p.m.	Cultural Competence – Teachers will have guided questions when discussing the tenet key points. Discussion will include teachers collaborating with each other discussing what they are doing in the classroom. Keratithamkul et al., (2020), Macqueen et al., (2020)
	Critical Reflection – Focus on self-reflection by discussing stereotypical behavior, and personal and professional practices Teachers answer questions that will help with critical reflection Kumar et al., (2018) Kondor et al., (2019).
	Critique of Discourses of Power – Define Critique of Discourses of Power –what are ways we can help students become social change agents. Create a list. Ladson-Billings (2021) Malazonia et al., (2021) Knight-Manuel et al., (2019) Liu and Ball (2019).

	Constructivist methods – “How do understanding cultural competence, critical reflection, and critique of discourses of power help choose constructivist methods that will increase learning opportunities for African American students”? Bishara, 2021; Gresham & Burleigh, 2019; Kretchmar, 2021; Vaishali and Misra, 2019
12:05 – 1:05 p.m.	Lunch
1:00 – 3:00 p.m.	Round Robin Continued
3:00 – 3:30 p.m.	Whole group presentations-Teachers present what they learned about the tenets.
3:30 – 3:45 p.m.	Exit Ticket Google Form Evaluation

Culturally Relevant Education Professional Development  
 Presenter's Notes - Day Three – Day's Goal – CULTURALLY RELEVANT  
 EDUCATION Knowledge in gathering materials and resources and developing lesson  
 plans

8:30 – 8:40 a.m.	Sign-in/Breakfast/Padlet – Teachers watch video from TED Talk. After watching the video teachers will describe the culturally relevant education in their words. They will place their answers on Padlet.
8:45 – 11:45 a.m.	<p>Preparing to use Culturally relevant education by writing examples of the different examples of the tenets, then begin working on sample lessons. Brown et al., 2019.</p> <p>CRE Lesson Examples – First Example: Why would creating a garden at the school for vegetables to identify the area and perimeter would be culturally relevant. Teachers will discuss why this would be a culturally relevant lesson. If they don't think it is, how can a teacher make it a culturally relevant education lesson using CULTURALLY RELEVANT EDUCATION Tenets. (45 minutes)</p> <p>Next Sample Mathematics Lesson on Functions. Teachers are analyzing if this sample lesson is culturally relevant or not. Teachers using current literature will analyze the lessons and make edits to the lessons. (45 minutes)</p> <p>Next Sample Mathematics Lesson on Pythagorean Theorem – Lesson on distance between a liquor store, motel, and a school. Is the liquor store and motel too close to the school? How can teachers design this lesson to be culturally relevant? (45 minutes)</p> <p>Next Sample Mathematics Lessons on buying a car for 20% interest rate. Teachers will take this lesson and make it a culturally relevant lesson. (45 minutes)</p>
11:45 – 12:45 p.m.	Lunch
12:45 -3:15 p.m.	Teachers will examine their lesson plans and determine if the lessons are culturally relevant by

examining current research and the culturally relevant tenets from Aronson and Laughter, 2016.

Teachers will examine resources from W.O.K.E.

Dr. Tonya Clark – Culturally Relevant Lessons

NCTM – Culturally Relevant Lessons from Illumination lessons.

AMLE- Culturally Relevant Lessons

Lessons from Educating African American Students and How are the children? (Boutte, 2016; Brown et al., 2019)

Social Justice in the classroom (Leonard, 2020)

50 Critical questions for Improving Opportunities and out comes for Black Students (Kafele, 2021)

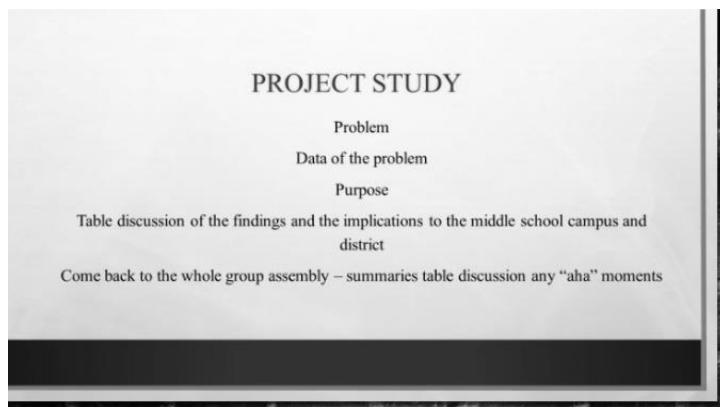
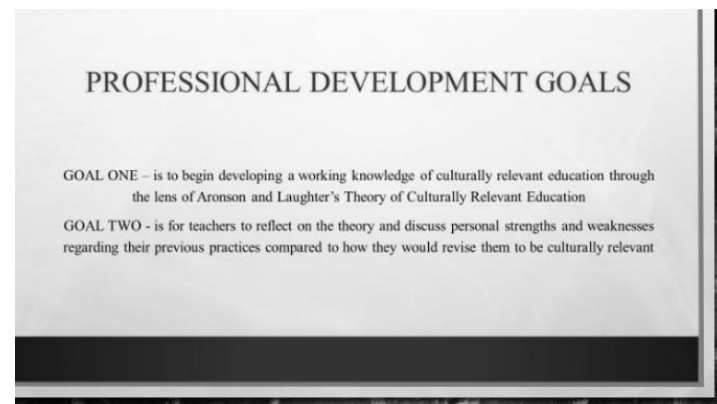
National Education Association (2020) Social Justice Lessons

Alignment with both Mathematics Standard and culturally relevant education Tenets.

Review activities for the three days and complete summative evaluation.

3:15 – 3:30 p.m.





## DAY ONE MORNING ACTIVITIES SIGN - IN

- Breakfast and introductions
- Padlet – tell us one thing about your culture that we may not know? (Introductions)
  - Think pair share
- Find a partner and share something about your culture
  - Discussion of Padlet

## DAY ONE GOAL

Teachers will know why the study was conducted by the end of the session. Through discussions, this will be done by presenting the teachers with the study problem, purpose, and findings.

## PROBLEM

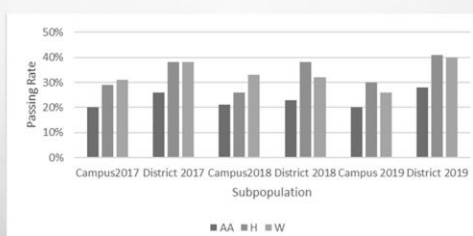
The problem at John M. Middle school (pseudonym) was it was unknown if and how teachers were using CRE to help increase learning opportunities for African American students.

Why is this an important problem to the school and district?

## PURPOSE

The purpose of this basic qualitative study was to explore teachers' perceptions of how they use culturally relevant education instructional practices to teach mathematics to middle-grade African American students. Further, teachers' perceptions of their preparedness in using culturally relevant education will be explored.

## LET'S TALK DATA LOCAL SETTING



Teachers will have a fifteen-minute discussion of the graph. What do they notice regarding the graph? Why is it important to review this graph? Return to the whole group to share discussion notes.

## BREAK TIME

## REVIEW – INSTRUCTIONS

- Teachers to discuss the tenets. Then discuss the research questions and findings.
- Make notes on from discussion
- Be prepared to bring back to whole groups for questions and answers

## WHY QUALITATIVE RESEARCH

A basic qualitative design allowed the teachers to discuss their experiences and perceptions through interviews about how they taught using culturally relevant education instructional practices to middle-grade African American students and their preparedness. In addition to discussing what support they need to teach African American students.

CRT	TABLE DISCUSSION	CRP
Culturally responsive teachers are socially and academically empowering by setting high expectations for students with a commitment to every student's success.		Culturally relevant pedagogues think in terms of legitimate academic achievement and not merely test-scores. After later adoption of culturally relevant pedagogy began to equate student achievement with standardized test scores or national rankings, Ladson-Billings (2009) clarified what more accurately described her intent: "student learning"—what it is that students actually learn and are able to do as a result of pedagogical interventions with skilled teachers" (p. 34).
Culturally responsive teachers are multidimensional because they engage cultural knowledge, experiences, contributions, and perspectives.		Culturally relevant pedagogues focus on cultural competence, which "refers to helping students to recognize and honor their own cultural beliefs and practices while acquiring access to the wider culture, where they are likely to have a chance of improving their socioeconomic status and making informed decisions about the lives they wish to lead" (Ladson-Billings, 2006, p. 36). Culturally relevant pedagogues understand that students must learn to navigate between home and school, and teachers must find ways to equip students with the knowledge needed to succeed in a school system that oppresses them (Delgado-Gaitan, 2006; Ladson-Billings, 2006; Uribe, 2005).
Culturally responsive teachers validate every student's culture, bridging gaps between school and home through diversified instructional strategies and multicultural curricula.		Culturally relevant pedagogues seek to develop sociopolitical consciousness, which includes a teacher's obligation to find ways for "students to recognize, understand, and critique current and social inequalities" (Ladson-Billings, 1995b, p. 476). Sociopolitical consciousness begins with teachers recognizing sociopolitical issues of race, class, and gender in themselves and understanding the causes before then incorporating these issues in their teaching.
Culturally responsive teachers are socially, emotionally, and politically comprehensive as they seek to educate the whole child.		
Culturally responsive teachers are transformative of schools and societies by using students' existing strengths to drive instruction, assessment, and curriculum design.		
Culturally responsive teachers are emancipatory and liberating from oppressive educational practices and ideologies as they do "the real of processed absolute reality from conceptions of wholeness that typically taught in schools." (Oje, 2016, p. 38)		



## CULTURALLY RELEVANT EDUCATION TENETS

- Constructivist methods - How to choose activities that are student-centered for example activities that include inquiry-based learning where students can construct their own learning.
- Critical reflection - How teachers facilitate lessons where students use their own personal and mathematical experiences to construct learning and understand how to use that new learning to make a difference in their community.
- Critique of discourses of powers - How teachers can facilitate learning where students can use the mathematics content to solve societal issues in their community.
- Cultural competence - How teachers can use mathematics classroom activities to go beyond cultural celebrations, food, and general music of students to bring awareness to their own cultural background while learning to honor others.

Aronson & Laughter, 2016

## RESEARCH QUESTION ONE AND FINDING

- RQ1: What were John M. Middle school teachers' perceptions of how they use culturally relevant education to teach mathematics to middle-grade African American students?
  - Teachers were using practices that reflected culturally relevant education when they gathered information about students' home life, cultural celebrations, and mathematics experiences and embed that information in mathematics lessons

## RESEARCH QUESTION TWO AND FINDING

- RQ2: How do teachers at John M. Middle school perceive their preparedness to teach mathematics to middle-grade African American students using culturally relevant education instructional practices?
- Teachers used their school training, teaching experiences, and personal experiences to prepare to teach African American students. They also stated they used data to drive their instruction.

## RESEARCH QUESTION THREE AND FINDING

- RQ3: What supports do John M. Middle school teachers perceive they need to teach culturally relevant education instructional practices in mathematics to African American students?
- Teachers desire support from the administration. They want the administration to provide training on how to teach African American students. The teachers shared they are experiencing challenges when trying to use culturally relevant education when teaching African American students. Teachers also desire support with finding materials and resources that are age-appropriate.

## TABLE DISCUSSION

- What aha's teachers observe in the findings (table discussion)
  - Discuss aha's in the whole group assembly
  - Place aha's on the post-it in your group be prepared to share

## TIME FOR QUESTIONS AND ANSWERS

Culturally Relevant Education Professional Development	
Daily Exit Ticket:	
What activity stood out the most to you today?	
Please explain why you selected this activity.	
What did you find the least useful to your learning about Culturally Relevant Education?	
Name: (Optional) _____	Grade Level: (Optional) ____

Teachers complete the exit ticket for Day 1 Professional Development

## DAY TWO GOAL

By the end of the session, teachers will be familiar with the study's conceptual framework and be able to identify the different tenets of the framework with specific theorists' information. This will be done by using videos of the different theorists plus articles from the works of the theorists

## DAY TWO – ACTIVITIES

Sign-in/breakfast  
Recap of day 1  
Padlet – what was your take-away from day 1

## LET'S REVIEW CULTURE DEFINITION

- Provide the definition of culture used in the Project Study
- Teachers watch videos on what is culture: Ladson-Billings, Geneva Gay, and James Banks
- Table discussion of what is culture to them
- Whole Group discussion

ARE THERE ANY AHA MOMENTS IN THE DEFINITION

## DEFINITION OF CULTURE

Culture was defined as "deep-rooted values, beliefs, languages, customs, and standards shared among a group of people. Milner stated that culture determines how we think, believe, and behave and affects how we teach and learn" (Milner, 2016 pp. 8-9)".

**BREAK TIME**



## WHOLE GROUP DISCUSSION

The whole group discussion will develop a definition of culture for the rest of the professional development sessions. This would allow participants to be on the same level when discussing culture and culturally relevant education.

## TABLE TALK

Table will receive the definition of the culture used in the study. Teachers will compare what they believe is the definition of culture with the study. Then teachers will develop a definition at the table for the whole group assembly to be used during the professional development.

**LUNCH**  
**11:30 – 12:30**  
**P.M.**

Key: 1 = Always, 2 = Usually, 3 = Sometimes, 4 = Rarely, 5 = Never

**Student Learning and Achievement—Academic, personal, and social experiences**

- 1.a. Sends consistent messages and clear expectations that all students can be prepared to be college ready and attend college.
- 1.b. Discusses and supports students to take academically rigorous courses and tests that support students' options to attend a 4-year college as well as a range of postsecondary institutions (e.g., grades, PSAT/SAT/ACT).
- 1.c. Targets and provides additional academic support based on individual progress (e.g., tutoring, organizational skills, study skills, creating individual academic plans).
- 1.d. Engages students in active learning.
- 1.e. Utilizes multiple assessments for academic, personal, and/or social success.

**Cultural Competence—Cultural identities and background experiences for student learning and achievement**

- 2.a. Builds on students' prior knowledge and interest in the learning process across the school (e.g., the curriculum, extracurricular activities, student leadership, testing).

**Teachers will take a questionnaire on their preparedness to teach using culturally relevant education before discussion of the four CRE Tenets**

- 2.b. Learns about students' culture and community and includes their cultural and academic identities as part of the learning process across the school (e.g., the curriculum, counseling office, parent/family involvement).
- 2.c. Understands and addresses the personal and cultural biases toward Black and Latinx youth and how they are viewed as college-bound or not (e.g., visual representations).
- 2.d. Fosters meaningful relationships between student and school personnel by focusing and building on student's assets versus deficits.
- 2.e. Fosters meaningful relationships between students and their peers as they influence student's academic success and college-going identities.

**Critical Consciousness/Awareness—Knowledge of the college-going processes for student learning and achievement**

- 3.a. Demystifies the college-going process (e.g., course curriculum sequence, financial aid, campus visit) by disseminating information about college requirements, the application process, and important deadlines.
- 3.b. Negotiates inconsistent messages between and among staff and/or students regarding clear expectations for college readiness.
- 3.c. Addresses nonacademic concerns (e.g., personalized support for behavior, peer pressure, violence).
- 3.d. Discusses issues about race/ethnicity, gender, and achievement (e.g., Amal, Love Letter to Albuquerque Public Schools, questioning how many Black and Latino males enter a specific college and graduate).
- 3.e. Provides opportunities for student voice and advocacy for their own learning (e.g., student leadership).

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## CULTURAL COMPETENCE GUIDING QUESTIONS

### Guidance Questions

Name your assumptions of students' learning abilities

Examine your assumptions – talk with your colleagues to challenge your assumptions

How to talk to students – how will talking to other teachers help talk to students

Build from students' strength – after naming and examining assumptions, talking with colleagues use what you learned to build from new knowledge and create more-equitable education opportunities for African American students

Recognized that developing cultural competence is an ongoing endeavor – teachers must continue to critical reflect on their assumptions and students' cultural background, life experience

Aronson & Laughter, 2016; Knight-Manuel & Marciano, 2019

## Cultural Competence - Discussion

- Aronson and Laughter (2016) purport culturally relevant teachers know how to build relationship with students by investigating the students' background, community, and how students learn.
- Safe environment and honor others
- The way students see the world and how the world sees them.
- Teachers discuss how to support students learning of other students' differing perspectives in and out of the classroom

Aronson and Laughter, 2016; Knight-Manuel and Marciano, 2019; Malazonia et al., 2021

## CRITICAL REFLECTION – PREPARATION DISCUSSION

- Teachers create an identity map about how they see themselves (Knight-Manuel and Marciano, 2019)
  - Teachers discuss their perceptions on how they teach African American students,
  - Teacher examine any stereotypical views,
  - Teacher determine how to use the knowledge of the students and connect their views, beliefs, and expectations to the curriculum and the classroom environment using the CRE Tenets.
- Curriculum and activities to engage students in analyzing the societal issues of all cultures represented in society -

*Garden Project on Area and Perimeter connection to Healthy Lifestyle in the African American Homes*

*Math Talk and Journal Talk connecting mathematics concepts to societal issues and solutions*

(Aronson and Laughter, 2016; Holladay, 2021; Knight-Manuel and Marciano, 2019; Pang et al., 2021)

## CRITIQUE OF DISCOURSES OF POWER GUIDING QUESTIONS

### Questions

Identify and Reflect on the societal and/or institutional structures that have made your own achievements possible.

Name and address barriers that you think exist in students' academic achievement

How do you support youth's sociopolitical consciousness ongoing process that includes your own critical self-reflection

How do keep aware of government policies, that may relate to the student's education and how would affect students' access to educational opportunity, including college and career readiness

What changes you can make to your curriculum, pedagogy, and or school structures that could build on African American students' strengths and challenge inequities they encounter, while supporting their engagement in school.

**Knight-Manuel & Marciano, 2019**

## Critique of Discourses of Power - Discussion

- Teachers discuss what that know about the education system as it relates to it being an oppressed system to African American students
- Teachers name and address barriers to students' academic achievement
- Action Plan on how to act on specific changes that can be made to the curriculum, pedagogy, and school structures to build middle-grades African American strengths and challenge inequities they encounter
- Incorporate lessons that will increase learning for opportunities students to be social agents

statistics on traffic profiling

Hernandez-Saca, D., & Tai, T. (2013). Dr. Howard on Black Students. United States: Equity Alliance. Retrieved from [vimeo.com/66858441](https://vimeo.com/66858441)

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Aronson and Laughter, 2016; Kafele, 2021; Knight-Manuel and Marciano, 2019

## CRITICAL REFLECTION GUIDING QUESTIONS

Family History	Cultural Other	Cultural Self Personal	Cultural Self-Professional
What country, other than the United States, do you identify as a place of origin for you and your family? What word or concept best describes your family?	With what culture, other than your own, are you familiar??	What is your preferred learning style?	Why did you choose to become a teacher?
What piece of advice or wisdom (one that reflects the values of your family) has been handed down through the generations	What has been your most challenging cultural experience?	How would you describe your schooling experience?	Who was your most influential K-16 teacher?
What celebration, ceremony, or ritual do you and your family value and observe?	What negative comment or stereotype have you heard people make about the members of a group with which you identify?	How do you like to spend your spare time?	What is your role as a teacher?

Aronson & Laughter, 2016; Knight-Manuel & Marciano, 2019; Kondo, 2022

## Constructivists methods – Table Discussion

- The concept, meaning, definitions, and origin of constructivism
  - Piaget & Cognitive Constructivism; Lev Vygotsky & Social Constructivism,
- Different type of constructivist approaches,
- significance of constructivist approaches in education
- role of a constructivist teacher
- role of a constructivist learner
- Choose hands-on activities and inquiry-based instruction
  - Collaboration
  - Problem-Solving

(Aronson & Laughter, 2016; Bishara, 2021; Gresham & Burleigh, 2019; Kretschmar, 2021; Vaishali and Misra, 2019)

## TIME FOR QUESTIONS AND ANSWERS

Culturally Relevant Education Professional Development	
<b>Daily Exit Ticket:</b>	
What activity stood out the most to you today?	
Please explain why you selected this activity.	
What did you find the least useful to your learning about Culturally Relevant Education?	
Name: (Optional) _____	Grade Level: (Optional) ____

Teachers complete the exit ticket for Day 2 Professional Development

### DAY 3 – ACTIVITIES CREATING LESSON PLANS, GATHERING MATERIALS, AND RESOURCES

- Padlet – what stood out for you on day 2?
  - Discuss sample lesson and discuss using the Tenets from Educating African American students and how are the children (Boutte, 2016, 2023)
  - Break out sessions with grade level to discuss how culturally relevant education works with current state standards and campus initiatives
- Sample Mathematics Lessons (Brown et al., 2019)

### DAY THREE GOAL

By the end of the session, teachers will have gathered materials and identified resources to use culturally relevant education in the mathematics classroom.

Teachers will do this by reviewing current practices, comparing them to the culturally relevant education conceptual framework, and finding programs that focus on culturally relevant education

### DAY THREE – MORNING ACTIVITIES

- Sign-in/breakfast
  - Recap of day 2
- Padlet – what was your take-away from day 2

## PREPARING TO USE CULTURALLY RELEVANT EDUCATION

- Teachers are to write down examples of each tenet
  - Learning is more relevant
  - Students' cultures are affirmed and extended
  - Skills are taught (not simply covered). Teaching and learning must go together. If students are not learning, then instruction is likely to be ineffective.
  - Explicit instruction is needed on unfamiliar information, attitudes, etc.
  - Students are actively engaged conventional and nonconventional strategies are used
  - Ongoing counternarratives are provided
  - Teacher-student relationships are central
  - Authentic relationships are developed with students
  - Students are exposed to global perspectives and knowledge using videos, different resources, speakers travel
  - Teachers engage in ongoing discussions with students regarding social and political realities

Boatto, 2016-2023; Brown et al., 2019

## SAMPLE LESSON ONE

- CRE lesson examples – first example: why would creating a garden at the school for vegetables to identify the area and perimeter would be culturally relevant. Teachers will discuss why this would be a culturally relevant lesson. If they don't think it is, how can a teacher make it a culturally relevant education lesson using CRE tenets. (45 minutes)

## SAMPLE LESSON TWO

- Next sample mathematics lesson on functions. Teachers are analyzing if this sample lesson is culturally relevant or not. Teachers using current literature will analyze the lessons and make edits to the lessons. (45 minutes)

## SAMPLE LESSON THREE

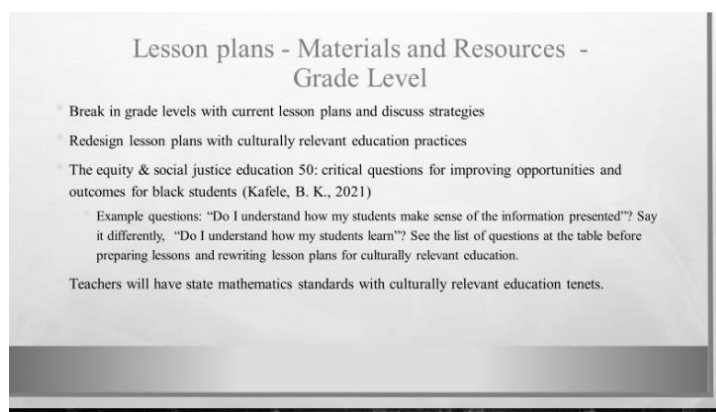
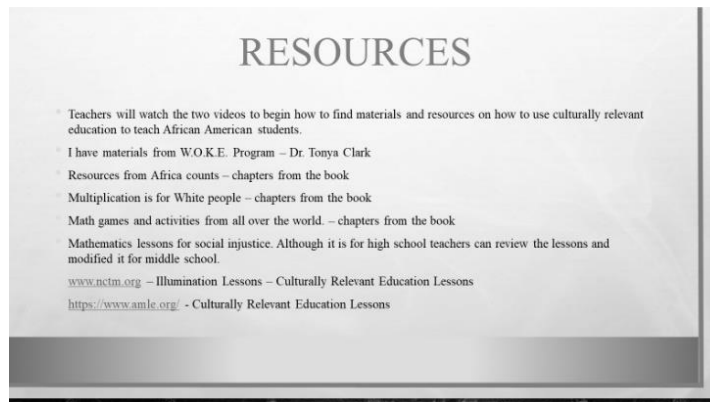
Next sample mathematics lesson on Pythagorean Theorem – lesson on distance between a liquor store, motel, and a school. Is the liquor store and motel too close to the school? How can teachers design this lesson to be culturally relevant? (45 minutes)

## SAMPLE LESSON FOUR

Next sample mathematics lessons on buying a car for 20% interest rate. Teachers will take this lesson and make it a culturally relevant lesson. (45 minutes)

## COMPARING AND CONTRASTING LESSON PLANS

- Teachers will compare their lesson plans with the four tenets of culturally relevant education and the eleven guidelines from Boutte, (2016) how to educate African American students.
- Teachers will discuss how they can make their lessons culturally relevant.
- Teachers will review Dr. Tyrone Howard video from Knight-Manuel and Marciano, (2019).
- Teachers will develop a lesson on a mathematics concept with using the culturally relevant education theory.





## PROFESSIONAL DEVELOPMENT RECAP

- \* Recap the last three days. Questions and Answers session.
- \* Provide qr code for summative evaluation.



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### Evaluation for Culturally Relevant Education Professional Development

1. I gained knowledge about using constructivist methods to develop bridges connecting students' cultural references to academic skills and concepts.

*I strongly disagree I disagree I am neutral I agree I strongly agree*

2. I gained knowledge about how to engage students in critical reflection about their own lives and society.

*I strongly disagree I disagree I am neutral I agree I strongly agree*

3. I gained knowledge about how to facilitate students' cultural competence in their own and other students' cultures.

*I strongly disagree I disagree I am neutral I agree I strongly agree*

4. I gained knowledge about working with students to understand and dismantle oppressive systems through the critique of discourses of power

*I strongly disagree I disagree I am neutral I agree I strongly agree*

5. How much would you say that your mindset about teaching students of color changed as a result of this PD?

*Not Change Minimal Change Average Change Substantial Change*

6. What stands out as the most important knowledge that you gained?

7. Please describe what aspect of this PD had the most impact on that change

<b>Culturally Relevant Education Professional Development</b>	
<b>Daily Exit Ticket:</b>	
What activity stood out the most to you today?	
Please explain why you selected this activity.	
What did you find the least useful to your learning about Culturally Relevant Education?	
Name: (Optional) _____	Grade Level: (Optional) ____

## Appendix B: Interview Protocol

Thank you for participating in this project study. The purpose of this study was to explore mathematics teachers' perception of using culturally relevant education instructional practices to teach mathematics to middle-grades African American students. It will also explore how prepared teachers feel to use culturally relevant education instructional practices to teach mathematics to African American students. Each teacher will have a code to keep the interview confidential, and he/she will have a personalized digital recorded time that was password protected. The interview should take 45 to 60 minutes. Teachers will choose how they would like to participate, recording on a virtual platform, face-to-face, or by phone. Thank you again for participating in this study.

Time of Interview:

Date:

Location:

Interviewer:

Interviewee (Code Name)

1. Tell me what you know and understand about integrating culturally relevant education in the mathematics classroom?
2. In what ways were you prepared to use culturally relevant education in your classroom?
3. What constructivist methods do you believe are effective for African American students when teaching mathematics?
4. How do you know you are using cultural competence in the classroom? Describe some strategies you use to ensure all cultures are acknowledged and accepted.

5. How do you use critical reflection in mathematics lessons? Describe some strategies where you allow students to reflect on how mathematics can be used in their community.

Prompt: Do you think there are ways that you could use critical reflection?

6. How do you design lessons to deepen students' thinking about the mathematics that they are studying and to solve current societal issues? Prompt: Do you think there are ways that you could design lessons to deepen student thinking?

7. How do you gather information about and use information about students' home life, cultural background, and mathematics experiences to prepare lessons? Do you think there are ways that you could gather information about and use information about students' home life, cultural background, and mathematics experiences to prepare lessons?

8. What challenges have you experienced when integrating culturally relevant education into mathematics lessons?

9. What support do you believe you need to teach culturally relevant education instructional practices to African American students?

10. How do you prepare to teach culturally relevant education to African American students in mathematics?

11. What training or professional development did you attend that helped you teach mathematics culturally relevant education to African American students?

## Appendix C: Invitational Email

Subject Line: Teachers are being sought for a research study on Culturally Relevant Education

Lorna Randle, a doctoral student at Walden University, was looking for teachers for a research study. You are receiving this email because you are a mathematics teacher of African American Students at the study site. Your email address was obtained from the school's internal email platform. This study was about teachers' perception of how they use culturally relevant education instructional practices to teach middle-grades African American students. The research study will also explore the teachers' perception of their preparedness to teach culturally relevant education. If you take part in this study, you would be interviewed for one hour using virtual or face-to-face options. To take part in this study, individuals must be mathematics teachers and teach African American students in the local setting. If you have any questions, please reply to this email as well. Your privacy was vital. Although you will have a consent form that will have your name, that was the only place it will be located. A code will be assigned to the transcript and the recorded interview.

Your participation in this study was not linked to the district or the campus. It also was not linked to your appraisal. Participation in this study was strictly voluntary with no monetary incentives.

Respectfully,

Lorna Randle  
Doctoral Student  
Walden University

## Appendix D: Interview Question Responses

Interview Questions and Responses:

*Tell me what you know and understand about integrating culturally relevant education in the mathematics classroom?*

More Relatable to students' culture

Use social media, sneakers, use money, music.

Family, Historical References, use scenarios connected to a person's lives.

Go beyond traditional teachings by focusing more abstract than just numbers,

Building Rapport, using middle cultural as well as students' cultural background, Using real-world scenarios and examples,

*In what ways were you prepared to use culturally relevant education in your classroom?*

*How do you prepare to teach culturally relevant education to African American students in mathematics? How do you gather and use information about students' home life, cultural background, and mathematics experiences to prepare lessons?*

Using social media, using self-experience, collaborating with colleagues, discussing the cultural divide with colleagues and peers, research culture, educating self by talking to students, creating a bond with students, knowing the neighborhood and families already around, college professors and past experiences

*What constructivist methods do you believe are effective for African American students when teaching mathematics?*

Making it relatable

Using students' love of candy to create word problems.

Math talks and teacher talks.

Use processes and steps, drawing, and illustrations, give manipulatives, learn about the learning styles of African American students, check for understanding using journal writing.

Group work, exit tickets, competition with sports, make sure students finish all assignments such as warmups and exit tickets.

*(One aspect of CULTURALLY RELEVANT EDUCATION was ensuring cultural competence in the classroom. This means ensuring that students get opportunities to understand, appreciate and interact with people from cultures or belief systems different from one's own).*

*How do you know you are using cultural competence in the classroom? Describe some strategies you use to ensure all cultures are acknowledged and accepted.*

Playing music and using translation. Having conversations with them about students' likes and dislikes, current events, communities' happenings,

Cultural similarities and differences with other cultures. Using story problems with students' information and answers, mixing up groups with diverse cultures and ethnic groups, using ice breakers, using individual experiences to connect with the students, food comparison with all cultures and ethnic groups, teaching to be kind, and setting expectations.

*(Another aspect of CULTURALLY RELEVANT EDUCATION was critical reflection, which was the process of analyzing, reconsidering, and questioning one's experiences within a broad context of issues and content knowledge)*



*How do you use critical reflection in mathematics lessons?*

Prompt: Do you think there are ways that you could use critical reflection?

Create your word problems, involving content from individual experiences, community. Reflection involves African American behavior in the real world, critical knowledge of careers, using trial and error to figure out mathematics and life lessons, making sense of the math using reflecting on what was going on in the world, using problems in the city, using essential questions which are questions that allow the students to know why they are learning about a math concept and how to use it. Teachers use critical reflection to determine if the student learned the lesson and if they did not know what they should change and how students will understand it.

*How do you design lessons to deepen students' thinking about the mathematics concept they are studying and how to use those concepts to solve current societal issues?*

*Prompt: Do you think there are ways that you could design lessons to deepen student thinking?*

Using technology, statistics regarding current events such as financial literacy in the African American Community, how to make good decisions regarding buying houses, property, cars, and land, why was it important to take high-level mathematics, connect real-world problems such as how to purchase carpet for a room in the house, use data from prior experiences in the mathematics classroom

*What challenges have you experienced when integrating culturally relevant education instructional practices in mathematics lessons?*

Students' behavior, not having the resources to help develop lessons that will encourage the use of culturally relevant education in mathematics lessons. Parents lack participation in the students' mathematics lessons because they do not like it or are good at it. Finding topics, real-world connections with math because some topics may be too advanced, age group,

*What support do you believe you need to teach culturally relevant education instructional practices to African American students?*

Need materials and resources on the culturally relevant education from campus and district administration. I would like support from my parents. The parents may have negative thoughts on mathematics which also trickles down to the students.

*What training or professional development did you attend that helped you teach mathematics culturally relevant education to African American students?*

No training regarding African American students.

Only training was on mental health and at-risk students.

There was training on ESL and ELL students.

There was a training on culture from last year more toward social-emotional learning not specifically on African American students or any ethnic group.

Sad that there has not been any training on African American students.

Training at the high school level on how to incorporate culture in the classroom.

### Appendix E: Member Check Letter

Your participation as an interviewee in the qualitative study as a middle school mathematics teacher to identify information that contributes toward teachers' use of culturally relevant education when instructing African American students was vital. I enclosed a brief synopsis of the comments captured from your interview. Please review and confirm that the information accurately reflects a summary of your input. E-mail me should you desire to add modify or delete anything. Please notify me if there are questions or concerns regarding the findings.

Thank you for participating in the study.

Lorna Randle  
Doctoral Candidate-Walden University