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Elementary Teachers' Perceptions of Closing the Math Achievement Gaps Between Black and White Students in Grades 3–5

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Abstract

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MA, University of Mary Washington, 2016

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Project Study Submitted in Partial Fulfillment

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Abstract

The problem underpinning this study was a pronounced achievement gap between Black and White students, evident in standardized test score pass rates of third through fifth graders, in a school district in the U.S. state of Virginia. The purpose of this basic qualitative study was to explore the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math scores between Black and White students in Grades 3 through 5. Gay's work on culturally responsive teaching, which encompasses theory, research, and evidence-based instructional approaches teachers can implement to address achievement gaps, was the conceptual framework for this study. Qualitative data were collected from 12 district teachers who participated in semistructured interviews via Zoom or phone. Data analysis yielded five themes: math instructional strategies, resources, and progress monitoring; perceptions of Black students' math achievement; experiences of successes; experiences of challenges; and implementation of culturally responsive practices. Study results indicated that although the participants employed various approaches to bridge the math achievement gap, their use of culturally responsive teaching practices was superficial. The project deliverable is a 25-hr blended or hybrid professional development cohort consisting of synchronous and asynchronous learning experiences to be delivered over 6 weeks. Upon completing this training, teachers may become more culturally aware and better able to meet the academic needs of Black students. In turn, district leaders may be encouraged to create math support initiatives for elementary teachers that assist these educators in closing the achievement gap.

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Section 1: The Problem

Legislators, educators, and other stakeholders have noted the academic achievement gaps across racial groups in the United States for more than half a century. Standardized assessment data indicate that achievement gaps between White and Black students appear as early as kindergarten (Gopalan, 2019). Education officials have implanted policies, such as those emanating from the No Child Left Behind Act of 2001 and the Every Student Succeeds Act of 2015, to decrease the academic achievement gap between White and non-White students (Hung et al., 2020). Although the achievement gap between these groups has not grown over the last 50 years, neither has the gap closed (Hanushek et al., 2019). Teachers at the local level have not effectively addressed the differences in standardized mathematics test scores between Black and White students.

The Local Problem

A pronounced math achievement gap between White and Black students was evident in standardized math test score pass rates of third- through fifth-grade students in Virginia School District (VSD, pseudonym), a school district in the U.S. state of Virginia. Although there are a variety of instructional strategies and resources available for teachers to use to engage students with the content and standards, the gap in standardized math test scores between Black and White students has persisted. Previous researchers have focused on the factors contributing to the achievement gap (Acquah & Szelei, 2020; Hirn et al., 2018; Reardon et al., 2019), teachers' perceptions of their students and the achievement gap between demographic subgroups (Chin et al., 2020; Preis, 2020), and the use of culturally responsive pedagogy to address the achievement gaps between Black

and White students (Beard, 2019; Bowman et al., 2018; Ginsberg & Wlodkowski, 2019). In this basic qualitative study, I explored to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. The results of this study may help elementary teachers address the math achievement gap between Black and White students. Additionally, this study may add to the body of scholarly research on how elementary teachers address achievement gaps in standardized math test scores.

Rationale

Average academic achievement gaps vary across U.S. states, with some states reporting a smaller gap than others (Stanford University, Center for Education Policy Analysis, n.d.). The Virginia Board of Education's (2017) Comprehensive Plan for 2018 to 2023 showed a persistent achievement gap between White and Black students. Virginia educational officials use Standards of Learning (SOL) assessments to determine student mastery of content areas. All SOL test results can be accessed via an online database on the Virginia Department of Education (VDOE) website. They illustrate that a pronounced gap between White and Black students is evident in standardized math SOL test score pass rates of third- through fifth-grade students in the state overall and at VSD (VDOE, n.d.-a). Although the math SOL pass rates are higher at the local level, there is still a pronounced gap in achievement between White and Black students (VDOE, n.d.-a). Analyzing how elementary teachers perceive and address gaps in math assessment scores may explain the persistent math achievement gap between these student groups.

In this qualitative study, I explored to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges related to closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. Due to the COVID-19 pandemic and the cancelation of all 2019–2020 SOL assessments, the last SOL test was administered during the 2018–2019 school year (VDOE, 2021). Prepandemic, the math SOL pass rates for Black elementary VSD students ranged from 68% to 81% in Grades 3 through 5. Math SOL pass rates since 2014 have increased or decreased between 1% and 10% since 2014 (VDOE, n.d.-a). The 2018–2019 school year saw the largest increase in math achievement and the smallest achievement gap between Black and White students in Grades 3 through 5. The pass rates for Black third-grade students fluctuated more than Black fourth-grade and fifth-grade pass rates. One reason for the fluctuation in data is that the math SOL is the first standardized math test that third graders take, so they may not be familiar or comfortable with the rigors associated with the test.

The 2020–2021 school year marked the first time many elementary students in Grades 4 through 5 had taken a standardized assessment. The math SOL pass rates for the 2020–2021 school year drastically decreased for both Black and White students. They reflected nationwide trends in standardized test achievement (VDOE, 2021). The VDOE attributes the decrease in pass rates to "disruptions to instruction caused by the pandemic, decreased participation in state assessment programs, pandemic-related declines in enrollment, fewer retakes, and more flexible 'opt-out' provisions for parents concerned about community spread of COVID-19" (VDOE, 2021, p.1). Additionally, the VDOE

acknowledged the disproportionate impact that the pandemic had on marginalized populations such as the Black student population (VDOE, 2021). Tables 1–3 provide a comparison of state and local math standardized assessment pass rates for White and Black students from 2014-2022 to illustrate how the math achievement gap has persisted while pass rate fluctuated.

Table 1 compares state and local standardized math assessment pass rates for White and Black third-grade students. Since the 2014–2015 school year, the difference between state and local math SOL test score pass rates ranged between 10% and 28% points for Black third graders and between 3% and 9% for White third graders. The math SOL pass rates for third graders were higher than the state pass rates. The 2018–2019 school year saw an increase between 6% and 13% for both White and Black students across the state. The largest gap between state and local math SOL test pass rates for Black third graders was present in the 2021–2022 school year. At VSD, the math SOL test pass rate for Black third graders was 69%, which was 28% higher than the state pass rate for Black third graders.

The 2020–2021 school year marked the first standardized assessments administered after the COVID-19 school closures saw a decrease in math pass rates for both White and Black third graders. At the state level, the math pass rate for Black third graders decreased by 40% and, for White third graders, by 23%. At VSD, the pass rate for third graders decreased by 32% for Black students and 17% for White students. Math SOL local and state pass rates increased for both Black and White third graders between 11% and 20%. Although the VSD pass rates were higher for both White and Black third

graders, the math achievement gap has persisted, with differences ranging between 11% and 26%.

Table 1

Comparison of State and Local Standardized Math Assessment Pass Rates for Grade 3 by Race

Year	**Math assessment score**			
	Black students		White students	
	Virginia	District	Virginia	District
2014–2015	60	70	81	85
2015–2016	63	72	84	88
2016–2017	61	71	82	88
2017–2018	57	68	81	86
2018–2019	69	81	89	92
2020–2021	29	49	66	75
2021–2022	41	69	78	86

Note. Adapted from *SOL Pass Rates Results & Other Results*, by Virginia Department of Education, n.d.-a (https://www.doe.virginia.gov/data-policy-funding/data-reports/statistics-reports/sol-test-pass-rates-other-results). In the public domain.

The math SOL pass rates were more pronounced when comparing White and Black third graders. The difference between White and Black students' standardized test score pass rates ranged between 11% and 26% VSD and between 20% and 37% statewide. The most significant gap, a difference of 26%, between Black and White third graders at VSD occurred during the 2020–2021 school year. The state pass rate also had the largest gap between Black and White students during the 2020–2021 school year, with a difference of 37%. In contrast to VSD, the state math pass rate for third graders

has persisted with a difference of 37%, while the difference between Black and White third graders decreased to 17%.

Table 2 compares state and local standardized math assessment pass rates for Black and White fourth-grade students. Compared to the third-grade math assessment pass rates, the difference between VSD and Virginia overall was smaller. The fourth-grade math assessment pass rates for Black students at VSD ranged between 2% and 20% higher than the state math pass rates. White fourth graders at VSD scored between 2% and 10% higher than the state math path rates. Similar to the third-grade math pass rates, the largest gap of 10% between VSD and Virginia occurred during the 2020–2021 school year for White fourth graders. In contrast, the largest gap of 20% between VSD and Virginia occurred during the 2021–2022 school year for Black fourth graders.

Since the 2014–2015 school year, Black and White fourth graders at VSD have had higher math pass rates than the state math pass rates. The math achievement gap between Black and White fourth graders ranged between 12% and 26% at VSD and between 17% and 35% statewide. The smallest gap between Black and White fourth graders occurred during the 2018–2019 school year. Locally, there was a 12% gap between Black and White fourth graders. The largest gap between Black and White fourth graders occurred the next time the math SOL test was administered during the 2020–2021 school year. At VSD, there was a 26% difference between Black and White fourth graders. At the state level, there was a 35% difference between Black and White fourth graders. The math pass rate difference between Black and White fourth graders decreased the following school year (2021–2022) to 20% locally and 32% statewide.

Table 2

Comparison of State and Local Standardized Math Assessment Pass Rates for Grade 4 by Race

Year	**Math assessment score**			
	Black students		White students	
	Virginia	District	Virginia	District
2014–2015	72	74	89	91
2015–2016	71	75	89	91
2016–2017	69	75	88	90
2017–2018	66	73	86	88
2018–2019	71	80	89	92
2020–2021	32	51	67	77
2021–2022	45	65	77	85

Note. Adapted from *SOL Pass Rates Results & Other Results*, by Virginia Department of Education, n.d.-a (https://www.doe.virginia.gov/data-policy-funding/data-reports/statistics-reports/sol-test-pass-rates-other-results). In the public domain.

The math SOL results for fifth grade are similar to third-grade and fourth-grade results. White and Black fifth-grade math SOL pass rates were higher at the local level than at the state level. Table 3 compares state and local standardized math SOL pass rates for fifth-grade students. The fifth-grade math assessment pass rates for Black students at VSD ranged between 7% and 21% higher than the state math pass rates. White fourth graders at VSD scored between 3% and 10% higher than the state math path rates. The largest gap between state and local math SOL test pass rates occurred in the 2020–2021, with pass rates higher at the local level.

Table 3

Comparison of State and Local Standardized Math Assessment Pass Rates for Grade 5 by Race

Year	**Math assessment score**			
	Black students		White students	
	Virginia	District	Virginia	District
2014–2015	66	73	85	91
2015–2016	66	73	86	90
2016–2017	66	75	86	91
2017–2018	63	71	84	89
2018–2019	69	78	88	91
2020–2021	28	47	63	73
2021–2022	45	66	75	84

Note. Adapted from *SOL Pass Rates Results & Other Results*, by Virginia Department of Education, n.d.-a (https://www.doe.virginia.gov/data-policy-funding/data-reports/statistics-reports/sol-test-pass-rates-other-results). In the public domain.

At the state level, the gap between Black and White fifth graders has increased by 1% since the 2014–2015 school year ranging between 33% and 39%. Between 2014 and 2019, the gap in math SOL pass rates between Black and White fifth graders ranged between 13% and 18% with the smallest gap occurring during the 2018–2019 school year. During the 2020–2021 school year, the difference in math pass rates between Black and White fifth graders increased to 38% at VSD which was the same difference at the state level. The 2021–2022 math SOL pass rate gap between Black and White fifth graders saw an increase to 39% for Virginia and VSD.

Although the standardized test results from previous academic years show that both White and Black students have made academic gains, the academic achievement of

Black students still has lagged at the state and local levels. Research has indicated that various factors, such as teacher quality, teacher perceptions, socioeconomic status (SES), and parental involvement, impact the achievement gap between Black and White students (Acquah & Szelei, 2020; Beard, 2019; Byrd, 2020; Hirn et al., 2018; Reardon et al., 2019; Wang et al., 2020). Additionally, research suggests that using culturally responsive teaching practices (CRTP) improves Black students' academic achievement and engagement (Abacioglu, 2020; Gay, 2018; Ladson-Billings, 1994; Yu, 2022). This achievement gap at the state and local levels illustrates that some of the current instructional strategies are not addressing the needs of Black students. In the current study, I investigated the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD.

The local school district acknowledged that all students should have access to high-quality education and sought to address issues with the strategic learning plan. According to the district's strategic plan, students will be provided with authentic instructional opportunities that meet the needs of all students. The VSD strategic plan identifies that a culturally relevant curriculum will be used to ensure that students have equitable access to a high-quality and rigorous education. VSD leaders defined culturally relevant curriculum as instruction that supports student learning by connecting content to the students' cultural and linguistic background and life experiences. Additionally, according to the district's strategic plan, educators will engage in professional

development to enhance student achievement and promote the development of school leaders and build teacher capacity to provide rigorous learning experiences. Finally, the school district detailed how to ensure that staff and students feel welcomed and safe by cultivating inclusive environments that focus on the social-emotional health of all.

Definition of Terms

The following terms are essential to the study:

Cultural competency: The ability to understand how culture influences behavior and that inequity persists through social interactions (Mayfield, 2020).

Culturally responsive teaching: The use of culturally and ethnically diverse instructional materials to address students' academic needs and styles (Gay, 2018). This teaching practice acknowledges cultural diversity and how social structures have influenced students' thinking and learning (Gay, 2018). In related literature, "culturally responsive teaching" is used interchangeably with "culturally relevant teaching."

Culture: The values, behaviors, and beliefs that shape how individuals make meaning in our lives and the lives of others (Gay, 2018). Culture influences individuals' thinking processes and how they interact and communicate with others (Gay, 2018).

Deficit thinking: The perception that students' lack of success is due to their weaknesses or lack of desire to be successful rather than their strengths (Mun et al., 2020). Deficit thinking can also be characterized by specific assumptions about students based on their race or SES (Mun et al., 2020).

Standards of Learning (SOL): The minimum expectations for what all students attending Virginia public schools should master by the end of each school year or course

in all subject areas. SOL assessments are standardized measures of student success in meeting the minimum expectations in reading, writing, mathematics, science, and history (VDOE, n.d.).

Significance of the Study

This study is significant in that it may address a gap in practice so that local educational leaders may better understand the challenges that elementary teachers face when working to close the differences in standardized test scores between Black and White students at VSD. This study may benefit both educators and students. Identifying successful approaches to decrease the difference in test scores between Black and White students may help teachers become better equipped to address the standardized test score gap. Additionally, understanding the approaches, successes, and challenges in closing the differences in standardized test scores may improve the achievement of Black students. Social change can happen when policymakers and educational leaders recognize the value of instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5**.** Encouraging districts to provide all pupils with a rigorous academic curriculum that integrates and incorporates CRTP in all disciplines may lead to positive social change.

Research Questions

Math SOL pass rates for students at VSD are higher than the state pass rates, which suggests that teachers are providing instruction that promotes student achievement. Yet, there is still a gap in achievement between White and Black students in Grades 3 through 5. Teachers at the local level have not effectively addressed the differences in

standardized mathematics test scores between Black and White students. Based on previous research regarding achievement gaps between Black and White students, a variety of factors can influence student achievement. It is not known which factors are contributing to the math academic achievement gap between Black and White students in VSD. To gain a better understanding of the persistent math achievement gap in VSD, I conducted a basic qualitative study to explore the perceptions of elementary teachers in the district. Qualitative researchers investigate phenomena to provide accurate, real-life, and in-depth context regarding what participants have experienced (Atmowardoyo, 2018; Harwati, 2019). In this basic qualitative study, I examined to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. I sought to answer the following research questions (RQs):

RQ1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ3: What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ4: To what extent do elementary teachers understand or implement CRTP in order to close the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD?

Review of the Literature

The purpose of this literature review is to explore the factors that contribute to the achievement gaps between White and Black students. I also explored strategies that have been successful in reducing achievement gaps between White and Black students.

Conceptual Framework

I based the conceptual framework for this study on Gay's (2018) work on culturally responsive teaching, which encompasses theory, research, and evidence-based instructional approaches teachers can implement to address achievement gaps successfully. According to Gay, teachers must develop the ability to acknowledge and integrate their students' abilities and interests into instruction to improve student achievement. Gay's framework is supported by other researchers and details how culturally responsive pedagogy impacts students' academic achievement and socioemotional development from various cultural, ethnic, and linguistic backgrounds. For example, Ladson-Billings (1994) documented the instructional practices and characteristics of teachers who have experienced success with the academic achievement of Black students. Ladson-Billings conducted teacher interviews and classroom observations to provide examples of, and explain, CRTP. Ladson-Billings's (1994, 2012) work supports Gay's six guiding principles for improving student achievement with culturally responsive teaching.

The first principle acknowledges that culture has an impact on education Teachers' personal cultural backgrounds influence their perceptions of their students, their teaching practices, and their interactions with their colleagues and students (Gay, 2018). According to Ladson-Billings (2012), teachers who are culturally responsive are aware of the inequities that exist in marginalized student populations. Similarly, students' cultural and linguistic backgrounds influence how they perceive their teachers, their school, and their peers (Gay, 2018). Therefore, teachers must clearly understand their own cultural background and how their experiences shape their attitudes (Hale, 1982). This principle highlights the importance of considering culture when analyzing instructional practices that can improve the academic performance of Black students (Gay, 2018). When teachers have a clear understanding of culture and its influence on the educational system, they are able to adapt a more culturally responsive approach that is better equipped to address the needs and academic gaps of Black students.

The second guiding principle is that conventional paradigms or proposals used to address the academic achievement gaps between White and Black students will not be successful because deficit thinking is the foundation upon which educational reforms are built (Gay, 2018, p. 12). Many conventional educational reforms focus on what students who are culturally, ethnically, or linguistically different cannot do or learn. Students are considered "at risk," and interventions are highly structured and focused on instruction without considering the students' background. Additional research has indicated that Black students achieve at much higher rates when interventions consider their cultural background and social-emotional well-being (Gay, 2018; Howard, 2017; Ladson-

Billings, 1994). Reframing how instructional interventions are implemented can increase the achievement of Black students and help teachers realize the good intentions or goals they have for their students.

The third guiding principle is based on teachers' intentions. Gay (2018) acknowledged that teachers have good intentions regarding students who are culturally and racially different and may be aware of the cultural differences in the classroom. However, having an awareness of the cultural differences in the classroom is not enough to address the gaps in achievement between White students and Black students. Addressing educational inequities successfully involves taking action (Gay, 2018). Teachers must have the ability to engage a wide range of students in their classrooms This involves developing the capacity to identify instructional strategies that effectively engage students and using culturally responsive pedagogy to address the needs of students (Howard, 2017; Ladson-Billings, 2012). Having the capacity to use evidence-based instructional and classroom management practices with fidelity allows teachers to effectively address the needs of students and improve the achievement of Black students.

The fourth and fifth guiding principles both relate to cultural diversity. The fourth guiding principle views cultural diversity as a strength. According to Gay (2018) and Howard (2017), instructional practices are most effective when a variety of factors, such as community characteristics, background knowledge, and the cultural and linguistic backgrounds of teachers and students, are integrated into the implementation. The fifth guiding principle acknowledges that students have diverse abilities or talents, academic or nonacademic, that are influenced by their cultural background and environment.

Culturally responsive teachers do not make assumptions about their students' overall abilities based on their capability in one academic area or their socioeconomic background (Gay, 2018). Principles 4 and 5 require teachers to focus on their students' talents, avoid deficit thinking, and be aware of the barriers that may prevent student achievement.

The sixth guiding principle is related to teachers' understanding of the factors that may be a barrier to a student's achievement (Gay, 2018). Factors that can create barriers to a student's achievement include SES (Gopalan, 2019), parental involvement (Byrd, 2020; Lumadi, 2019), standardized test bias (Howard, 2017), and the type of curriculum implemented within the school district (Ladson-Billings, 2012). Additionally, Gay (2018) stated that standardized assessments and grades, which are used to measure student mastery of the academic standards, are not the cause of academic achievement gaps. This is primarily because standardized assessment scores and grades do not provide evidence explaining why Black students are underperforming compared to White students. When teachers do not understand the challenges that Black students face, they may not be able to help Black students make academic gains effectively.

Hammond's (2014) ready for rigor framework supports Gay's six guiding principles for improving student achievement with culturally responsive teaching. The framework describes four areas of CRTP that support teachers in building their capacity to use culturally responsive teaching in the classroom. The four areas of the ready for rigor framework are as follows:

- Awareness: Teachers are aware of their position within society and how their cultural background influences their perceptions of their students. Teachers also understand how schools can contribute to education inequities (Hammond, 2014).
- Learning partnerships: A learning partnership is established when teachers build relationships with students that are based on mutual trust and respect (Hammond, 2014; Howard, 2017).
- Information processing: Teachers understand how their students' cultural background can impact how their brains process information and can develop authentic learning experiences to help students gain a deeper understanding of content (Hale, 1982; Hammond, 2014).
- Community building: Teachers create a classroom environment that is safe and give students the opportunity to have choice and ownership over their work (Hammond, 2014; Howard, 2017).

Review of the Broader Problem

In the broader review of the study problem, I focused on examining why there is a consistent academic achievement gap between Black and White students and how the academic achievement gap has been addressed. Several databases were used to find peer-reviewed research, among them Education Source, Education Research Complete, Google Scholar, ProQuest Central, and Sage Research Methods. The following keywords were used to find literature: *achievement gaps*, *achievement gap in public schools*, *achievement gap in elementary schools, achievement of African American students*,

achievement gap impact, educators' role in the achievement gap, achievement gap perceptions, achievement gap and teacher effectiveness, and *achievement gap viewpoints.* The articles reviewed for this literature review were published between 2018 and 2022. Several sources published before 2018 were included to provide additional context for the achievement gap. I concluded that I had reached saturation when I was unable to locate new research about the achievement gap. The following themes are discussed in this literature review: the academic achievement gap over time, factors that contribute to the African American achievement gap, and strategies for addressing the African American achievement gap.

The Academic Achievement Gap Over Time

Over 50 years ago, Americans were first introduced to the academic achievement gap between Black and White students with the *Equality of Educational Opportunity Study* (also known as the *Coleman Report*). Author and Civil Rights supporter James S. Coleman collected data from "4,000 schools, 66,000 teachers, and almost 600,000 first-, third-, sixth-, ninth-, and twelfth graders" (Hill, 2017, p. 10). The *Coleman Report* reflected the 1960s period. Most school districts across the United States were segregated and favored White schools in terms of categories such as resource allocations, teacher quality, and class size (Hill, 2017; Jacobs, 2016). The study also indicated that African American students who were enrolled in integrated schools were more successful than those students enrolled in segregated schools (Jacobs 2016). Coleman astonished many with his assertion that the differences in resources between White and African American schools had little influence on student achievement. He asserted that family background

and peer influence impacted student achievement more than resource inequality (Hill, 2017). Coleman's research and analysis have generated additional debates about the academic achievement gaps between Black and White students.

Although the *Coleman Report* highlighted racial achievement gaps, the analysis did not support the more progressive viewpoint that a school's quality could reinforce racial and social disparities in the United States (Hill, 2017). Consequently, many researchers, civil rights leaders, and policy members found issues with the data and analysis reported in the *Coleman Report*. For example, economists did not agree with the statistical analysis, which illustrated that having quality resources did not significantly affect student achievement. Additionally, civil rights activists noted that the report did not contribute to African American achievement gaps to systematic discrimination but to African American culture. Even though many were suspicious of the *Coleman Report,* it shaped the way scholars researched educational issues and popularized empirical-based policymaking (James, 2016). Since the publishing of the *Coleman Report*, a variety of reforms have been enacted to address the academic achievement gap between Black and White students.

Legislators, educators, and other stakeholders have recognized and documented the achievement gaps across racial and socioeconomic groups in the United States for more than half a century. Billions of dollars are spent to provide educational opportunities for students to improve achievement. The first attempt to close the achievement gap occurred in 1965 when legislators passed the Elementary and Secondary Education Act (David & Marchant, 2015). The achievement gap persisted. Other policies,

such as the No Child Left Behind Act of 2001 and the Every Student Succeeds Act of 2015, were then implemented to decrease the academic achievement gap between White and Black students (Hung et al., 2020). Although these policies have contributed to a decrease in the achievement gaps, the gaps between White and minority students and economically disadvantaged and affluent students have persisted (David & Marchant, 2015). Standardized test data can be used to illustrate the persistent achievement gaps between White students and Black students.

Data from standardized tests has demonstrated that achievement gaps between White and Black students have decreased over the course of 40 years. However, significant achievement gaps have persisted between White and Black students (David & Marchant, 2015; Hung et al., 2020; Jacobs, 2016; Reardon et al., 2019). For example, between 1971 and 2012, the National Assessment of Educational Progress illustrated that the reading score gap of Black and White 9-year-old students decreased from 44 points to 22 points, while the reading score gap between White and Hispanic students decreased from 34 points to 21 points (David & Marchant, 2015). Average achievement gaps vary across each state, with some states reporting a smaller difference than others (Stanford University, Center for Education Policy Analysis, n.d.). The achievement gaps reported between White and Black students are influenced by a variety of factors.

Factors that Contribute to the African American Achievement Gap

Standardized assessment data highlighted that achievement gaps between White and minority students appear as early as kindergarten and continue throughout high school (Gopalan, 2019; Paschall et al., 2018). Research has indicated that several factors

contribute to the achievement gap. These factors include SES, neighborhood demographics and segregation, parental involvement, adult educational attainment, tracking, teacher quality, and school practices (Acquah & Szelei, 2020; Beard, 2019; Hirn et al., 2018; Hung et al., 2020; Reardon et al., 2019).

Socioeconomic Status. Achievement gaps vary across states and between districts within each state (Reardon et al., 2019). SES can be described as consisting of four components: family income and the SES of the family's neighborhood, school, and school zone (Wang et al., 2020). On average, Black students live in less affluent neighborhoods than White students (Reardon et al., 2019; Wang et al., 2020). Schools with higher populations of Black students were found to have a lower SES than schools with higher populations of White students (Wang et al., 2020). Some studies have concluded that socioeconomic differences across races account for between 15% and 50% of the achievement gap between White and Black students (Gopalan, 2019). The achievement of White and Black students were also examined when the SES of families were controlled during the study.

Achievement gaps persist in locations where White families and families of color have similar socioeconomic backgrounds (Reardon et al., 2019). For example, when comparing the achievement of Black students and White students from affluent backgrounds, White students have higher rates of achievement. Additionally, White students from economically disadvantaged backgrounds exceed the achievement of Black students with the same background (Henry et al., 2020). This research demonstrated that socioeconomic differences are not the only explanation for the racial achievement gap.

Student ability and academic achievement are influenced by school quality, access to extracurricular activities, school segregation, parent income, parent educational attainment, community characteristics, lack of health care, and familial stress (Stanford University, Center for Education Policy Analysis, n.d). Acknowledging all the factors that contribute to student achievement allows researchers to develop a better understanding of the ways in which stakeholders can address the achievement gaps between Black and White Students.

Parental Involvement. Research has indicated that parental involvement is essential to child development and academic achievement (Byrd, 2020; Lumadi, 2019). As parental involvement increases, student academic achievement also increases (Lumadi, 2019). Wang et al. (2020) stated that parental involvement can be described from a cultural or ethnic point of view. Compared to White parents, Black parents are less likely to volunteer at their child(ren)'s school or attend a school-sponsored event. More affluent schools tended to have more parental involvement than economically disadvantaged schools (Byrd, 2020; Wang et al., 2020). Additionally, teachers were more likely to consider parental involvement an issue when it is minority parents that are not involved in school functions (Wang et al., 2020). Analyzing the factors that influence parental involvement can yield a better understanding of how parental involvement impacts child development and academic achievement.

Research has evaluated the factors, such as SES, parental warmth, family conflict, and child(ren)'s internal and external behaviors that can predict parental involvement (Ogg & Anthony, 2020; Ucus et al., 2019). For example, Ogg and Anthony (2020)

studied how home-based parent involvement, SES, and parental warmth predicted academic achievement across all content areas using the Early Childhood Longitudinal Study data. Home-based parent involvement included activities such as working on homework, reading as a family, and participating in activities that are academically stimulating such as visiting a museum. The results indicated that home-based parent involvement did not significantly impact reading and math achievement. In contrast, home-based parental involvement significantly impacted student science achievement. The impact of home-based parental involvement on student achievement varied based on subject area.

Another study focused on the factors that can predict parental involvement and student behavior in families from low-income backgrounds (Ucus et al., 2019). Negative behavioral outcomes and less parental involvement were predicted when students experienced family conflict or stress at home. Increased parental involvement reduces the negative behaviors displayed by students. Parental warmth was defined as the ways in which parents addressed their child(ren)'s needs. The parental warmth of participants was observed during interviews with the researchers at the family homes. Evidence of parental warmth also predicted parental involvement. Parents with higher levels of parental warmth were more involved in their child(ren)'s education. This study illustrated that a variety of factors can influence parental involvement which may have an impact on student achievement.

Tracking. The first study about educational tracking was conducted by Guy M. Whipple, a superintendent and psychologist, in the early 1900s. After studying the impact

of homogeneous class groupings, Whipple concluded that classrooms should be created based on student ability to ensure that gifted students have an opportunity to develop academically (Beard, 2019, p. 32). Since Whipple's initial research, many studies have demonstrated the negative impacts of tracking students from economically disadvantaged backgrounds (Beard, 2019; Preis, 2020). For example, the academic "achievement gap between low and high-track students was larger than the gap between students who do not graduate and high school graduates" (Beard, 2019, p. 32). Tracking impedes educational equity because Black students are disproportionately placed in lower tracks. This is most likely due to teachers' use of subjective evaluative processes to place students in classes. As Black students progress through public schooling, being placed in lower tracks prevents students from taking more rigorous or higher-level courses, specifically in math and science, in high schools (Preis, 2020). Consequently, Black students miss out on educational enrichment opportunities and are ill-prepared for higher education (Beard, 2019). Academic tracking exacerbates the achievement between White and Black students because the culture of students and barriers to achievement are not considered when students assigning classes to students.

Teacher Quality and Effectiveness. Coleman et al. (1966) identified teacher quality or effectiveness as a factor that contributed to the achievement gap between Black and White students. Research has demonstrated that when students have access to more effective or higher quality teachers, they have higher standardized test scores (Byrd, 2020; Isenberg et al., 2022). On average, White students and students with a high socioeconomic background tended to have more experienced teachers. In contrast,

minority and economically disadvantaged students were less likely to have high quality teachers (Hanselman, 2019). Schools with higher populations of Black students and poverty tended to have higher numbers of less experienced teachers (Isenberg et al., 2022). Examining the distribution of high quality teachers and the strategies used to increase teacher effectiveness helped to explain why the achievement gap between White and Black students has persisted for decades.

For example, Isenberg et al. (2022) examined the distribution of effective teachers in 26 school districts across 5 years. This study found that the differences between teacher effectiveness in more affluent and economically disadvantaged schools were small but statistically significant. The research noted that Black students tended to have less effective math teachers than White students. Additionally, Isenberg et al. noted that "pockets of inequality" regarding the distribution of effective teachers could probably be found in many school districts. Based on these findings, the researchers concluded that redistributing high quality or experienced teachers within the school district to make school experiences more equitable for students would not significantly reduce the academic achievement gap between White and Black students. Since stakeholders have identifies teacher quality as a strategy to improve student achievement, polices have been created and implemented to increase the effectiveness of all students.

Performance pay was used also to as a strategy to increase teacher effectiveness and address the achievement gap between White and Black students. For example, Hill and Jones (2021) examined how incentives via performance pay affected the standardized test score gap between White and Black students. The researchers found that performance

pay did not significantly affect student achievement. When compared to White students, Black students experience smaller academic gains in school districts that implement performance pay as an incentive for teachers (Isenberg et al., 2022). One explanation for this may be related to teachers' perceptions of their students. In order to receive the incentive, teachers may target the students that they believe will make the most growth during the school year. Therefore, Black students may not have equitable access to high quality teachers due to deficit thinking or biases (Chin et al., 2020; Isenberg et al., 2022). Differences in how teachers approach students can influence student achievement and increase the gap between Black and White students.

In addition to performance pay, legislation has been used to address the inequitable distribution of high quality or effective teachers. The Every Student Succeeds Act of 2015 provides funding to ensure that schools with high populations of minority and economically disadvantaged students, specifically Title I schools, have access to effective teachers (Isenberg et al., 2022). States are required to develop an action plan so that Title I schools do not have larger populations of ineffective or novice teachers. As suggested by Isenberg (2022), if students from all backgrounds have long-term access to high quality teachers, teacher effectiveness or quality would have less impact on student achievement.

Educator Bias, Ideologies, and Expectations. In addition to access to high quality teachers, teacher expectations and biases can affect student achievement and their relationships with their teachers. Chin et al. (2020) found that teacher bias tended to be lower in school districts with higher populations of Black students. These data

demonstrated that schools and school districts with higher levels of racial bias have larger achievement gaps than schools and districts with lower levels of racial bias using data from Harvard University's Project Implicit focused on White/Black biases. Teacher biases impact teachers' capacity to evaluate students' abilities and behavior (Chin et al., 2020; Preis, 2020; St. Mary et al., 2018). For example, teachers' evaluation of students' math ability was biased against minority students and girls, specifically Black and Hispanic girls (Copur-Gencturk et al., 2019). Teachers with high levels of bias tended to have lower expectations for Black students and were more likely to accept when Black students were not engaged during instruction (Preis, 2020). The teacher biases influenced how they established their classroom and instructed their students.

Teachers play an essential role in creating and maintaining an environment in which students learn and develop. St. Mary et al. (2018) examined how elementary and middle school Black students perceived their academic achievement and revealed varying perceptions based on the teacher's role in the classroom. Elementary students tended to express positive perspective, noting their teacher's high expectations and investment in their success. In contrast, middle school students expressed negative perceptions, describing the influence of racial tension on relationships and a sense of neglect based on low expectations. Moreover, teacher interactions with students contribute to how students perceive themselves and their academic development. Additionally, the students' perceptions of their schools and motivation were influenced by the teachers' perception of the school. For example, when teachers compare the students' test scores with other higher achieving schools, participants reported feeling angry or less successful with their

academic achievement (St. Mary et al., 2018). It supported the assertion made by Bowman et al. (2018) that addressing the gap as early as possible can help students develop a positive racial (and cultural) identity and improve their self-efficacy and motivation.

The underlying ideologies of the current academic achievement gap are related to racial, gender, and socioeconomic disparities across the United States. Closing the achievement gap is a common goal amongst all educational leaders and community stakeholders. Although many states across the country have experienced a decrease in the achievement gap, it persists because of program and policy ineffectiveness (Hirn et al.; Hung et al., 2020). Many policymakers and educators believe that school quality impacts student achievement, and school inequalities contribute to the achievement gap between White and African American students (Hill, 2017; Jacobs, 2016). Even though many agree that there is an achievement gap that persists across racial, ethnic, and socioeconomic groups, different viewpoints exist concerning the achievement gap. For example, some may place importance on one type of achievement gap (Valant & Newark, 2016). Others reframe previous research to suggest solutions to decreasing the achievement gap (Jacobs, 2016). The next subsection describes how the African American achievement gap was addressed in recent studies.

Strategies for Addressing the African American Achievement Gap

Legislators and educators have implemented a variety of policies and strategies to address the achievement gaps that have persisted for several decades (David & Marchant, 2015; Jacobs, 2016; Hung et al., 2020). Research has revealed that the achievement gap is

decreasing, and various strategies available can positively increase academic achievement across racial and socioeconomic groups (Beard, 2019; Bowman et al., 2018; Ginsberg & Wlodkowski, 2019). These strategies involve establishing an equity-focused school culture and using CRTP to meet the needs of diverse learners.

Establishment of an Equity-Focused School Culture. According to Preis (2020), it is essential that administrators establish a school culture that is focused on equity. First, administrators must have the capacity to build and sustain a welcoming and competent school culture. Administrators also must build teachers' ability to be culturally competent in their classrooms (Byrd, 2020; Preis, 2020). According to Preis, this will involve ensuring that there is teacher buy-in and addressing any conflicts that may arrive between staff members as they work to become more culturally competent. Additionally, there are a variety of ways to address the academic gap. For example, teachers must use data-driven instructional practice and formative and summative assessments to meet the needs of Black students. The use of data-driven instruction will help teachers collaborate with their colleagues to create differentiated and student-centered instruction. Finally, Preis stated that the implementation of metacognitive strategies, such as making an inference, asking questions, and analyzing concepts, can reduce the achievement gap between Black and White students.

In addition to preparing teachers to address the needs of Black students, administrators must use a variety of different ways to increase parental involvement. Administrators can accomplish this goal by ensuring that parents feel welcomed within the school. Administrators and school staff should begin to develop a good rapport with

parents at the start of the school year (Byrd, 2020). Establishing partnership with families is important to addressing teacher biases because they are developing a better understanding of their students.

Use of Culturally Responsive Teaching Practices to Increase Achievement. Extensive research has suggested that the use of CRTP improves the academic achievement and engagement of Black students (Abacioglu, 2020; Gay, 2018; Ladson-Billings, 1994; Yu, 2022). Ladson-Billings (1994, 2012) documented the instructional practices of teachers who experience success with Black students and described how CRTP can be implemented in the classroom. She concluded that to increase the academic achievement of Black students, teachers must be aware of how they think about their student, instruction, curriculum, and the world around them. Teachers' development of sociopolitical consciousness influences the actions that teachers accept to engage with students (Ladson-Billings, 2012). In addition to teacher thinking, qualities such as attitudes towards multiculturalism and the ability to take the perspectives of others have been identified as important for the implementation of CRTP and positive student achievement (Abacioglu, 2020). The teacher qualities have been described in various studies.

Ladson-Billings's (1994, 2012) work on CRTP and student achievement has been supported by other studies. For example, Yu (2022) studied the impact of CRTP on student achievement in a diverse urban school. This quantitative study explored whether CRTP had a significant impact on students' attitudes about math and science, math and science test achievement, and the human resources used to support instruction. Data

analyzed in this study was collected from teachers and students during a university-hosted math and science summer program using CRTP. Yu found that CRTP significantly increased students' attitudes toward math and science and improved overall student achievement. This study also identified family members or guardians as the most common example of human resources used to support instructions, which demonstrated that establishing a strong relationship between schools and families can increase students' achievement. The findings of this study supported the use of CRTP to establish partnerships with families.

Taylor et al. (2021) explored a gardening metaphor as a framework that educators can use to address the achievement gap between Black and White students. The framework is comprised of six components: soil, seed, root, environment, gardener, and gardener support. The soil is a representation of Black students and their experiences, such as discrimination, that may negatively influence academic achievement. The seed symbolizes the intentional use of curriculum and instructional strategies that empower students and engage them in rigorous and culturally relevant activities. The root symbolizes Black students' cultural identity, while the environment represents all the factors that impact their academic and social development. The gardener is the teacher and the strategies they use to build a positive rapport and effectively engage with Black students. Finally, the gardener support refers to the resources, such as professional development and administrators, that are available to support teachers' work with Black students. Taylor et al. provided an example of an economically disadvantaged, all-Black elementary school that successfully addressed achievement gaps. They found that all the

components of the framework, except environment, scored between 100 and 80.. The low score on the environment component demonstrated that the school did not make strong connections with the community and families. This research demonstrated that school staff must have the capacity to make meaningful connections with families regardless of cultural background.

Implications

This literature review explored the factors contributing to the achievement gaps between White and Black students. The literature review also examined strategies that have successfully reduced the achievement gaps between White and African American students. The conceptual framework and scholarly research indicate various factors influencing the academic achievement gap. Therefore, a qualitative approach was utilized to collect and analyze data, focusing on explaining why or how a phenomenon occurs (Edmonds & Kennedy, 2017). This approach allowed me to gain insight into the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. Additionally, the qualitative approach helped determine to what extent culturally responsive instructional practices influence teachers' instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD.

Data collected and analyzed from this study may impact future research in several ways. Locally, school administrators and central office leaders will better understand the

challenges that elementary teachers face when working to close the differences in standardized test scores between Black and White students at VSD. This study may help identify instructional approaches that are more successful in regard to improving the math achievement of Black students and reveal the extent to which culturally responsive instructional practices influence teacher perceptions. The findings of this study led to the creation of a project deliverable, a professional development cohort (see Appendix A), based on the conceptual framework to support educators in becoming better equipped to address the math achievement gap between Black and White students.

Additionally, this study can be extended to reach educators and students nationally and internationally. For example, the expansion of this study to surrounding locations can compare how elementary teachers' perceptions of their instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students differ based on their location. Expanding the location of the approach can help determine if similar instructional approaches are contributing to how elementary teachers address the math achievement gap between White and Black students in their classrooms. Next, this study could lead to a longitudinal study that explores more specific instructional practices identified as successfully contributing to the success of Black students in the findings. A longitudinal study may help explain how implementing specific instructional strategies improves the math achievement of Black students. The results of this longitudinal study can positively impact the math achievement of Black students because teachers, administrators, and

other school leaders will better understand the approaches that successfully close the differences in standardized test scores and promote academic success.

Summary

In Section 1, math standardized test score evidence from the state and local level were shared and demonstrated that there is a math achievement gap between Black and White students. According to the district's strategic plan, teachers will provide instructional opportunities that meet the needs of all students and promote student academic growth in reading and math. The strategic plan also promoted continuous academic and professional improvement and a culture that values diversity. I also described the purpose of this study, which is to investigate the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. This study determined to what extent culturally responsive instructional practices influence teachers' instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. To guide my investigation, I developed four RQs about teachers' perceptions of their approaches, successes, and challenges in closing the gap in math achievement between Black and White students.

In Section 1, I also reviewed the existing literature to form the conceptual framework and provide a critical review of the broader problem that is associated with the gap in achievement between Black and White students. In this section, Gay's (2018)

work on culturally responsive pedagogy detailed the theory, research, and evidence-based instructional approaches teachers can implement to address achievement gaps successfully. The themes outlined in the literature review for this study focused on the academic achievement gap over time, factors that contribute to the African American achievement gap, and strategies that have successfully reduced the achievement gap between White and African American students. These themes are related to the significance of using evidence-based, culturally responsive instruction to successfully address achievement gaps, as described in the Conceptual Framework section. Additionally, the studies indicated that the achievement gap had been persistent for several decades, and a variety of factors contribute to the achievement gap between White and African American students. These factors included parental involvement, SES, teacher quality, and teacher perceptions and expectations. The findings of the reviewed studies also suggested that the implementation of CRTP can increase the achievement of Black students.

In Section 2, I describe the methodology of this study. This section includes a justification for the use of a qualitative approach. The criteria for selecting and gaining access to participants are also described. Additionally, I explain how participants' rights were be protected and the creation of the researcher–participant working relationship. Finally, in Section 2 I describe how I collected, tracked, and analyzed the data for the study.

Section 2: The Methodology

VSD had an ongoing achievement gap between its Black and White student populations. According to the district strategic plan, students will have the opportunity to engage in authentic learning experiences that will prepare them for life after they graduate. The goals set forth in the strategic plan included measurable growth in reading and math. In order to support this goal, the strategic plan also included goals dedicated to recruiting, developing, and retaining highly effective teachers. In this study, I investigated the extent to which culturally responsive instructional practices influenced elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD.

Qualitative Research Design and Approach

To collect data relevant to this study, I took a basic qualitative research approach, the most prevalent type of qualitative research in the educational field (Merriam & Tisdell, 2016; Nath, 2004). This study took place in the district where the participants taught. Data collected for a basic qualitative study can take the form of observations, document analysis, and interviews (Merriam & Tisdell, 2016). Qualitative researchers investigate phenomena to provide accurate, real-life, and in-depth context to what participants have experienced (Atmowardoyo, 2018; Harwati, 2019). I selected this research approach to explore the teachers' perspectives regarding how they addressed math instruction and achievement gaps in their classrooms. This approach was appropriate because it allowed me to gain an in-depth understanding of the extent to

which CRTP influence elementary teachers' instructional approaches, successes, and challenges in closing in narrowing the differences in standardized test scores between Black and White students in Grades 3 through 5 at VSD.

The RQs were aligned with the purpose of this study. The RQs were as follows:

RQ1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ3: What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD?

RQ4: To what extent do elementary teachers understand or implement CRTP in order to close the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD?

I based the conceptual framework of this study on Gay's (2018) work, which details how implementing culturally responsive teaching can successfully address achievement gaps between White and Black students. Additionally, Ladson-Billings (2012) demonstrated that teachers' job experience, expectations, cultural background, and knowledge of CRTP shaped Black students' academic achievement. To understand elementary teachers' perceptions of their approaches, successes, and challenges in closing

the math achievement gap between Black and White elementary students and the extent to which culturally responsive instructional practices influence their decision-making, I conducted semistructured interviews with experienced teachers. The interviews were my primary source of data. Data were analyzed by coding the participants' responses. After analyzing the data, I created a deliverable project based on the perceptions and experiences of the participating teachers.

The basic qualitative research approach was appropriate for this study because it allowed me to develop an in-depth understanding of elementary teachers' experiences with addressing the math achievement gap between Black and White students (see Edmond & Kennedy, 2017; Merriam & Tisdell, 2016). With this approach, participants were able to decide how they respond to interview questions, and I had the opportunity to collect firsthand information during the interview. I conducted one-on-one interviews with elementary teachers to collect data about their perceptions of instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White elementary students and the extent to which CRTP influence their experiences. Each participant had a choice of either a virtual, phone, or face-to-face interview. The data collected from this basic qualitative study allowed me to analyze how teachers make sense of their experiences in the classroom (see Merriam & Tisdell, 2016). I investigated elementary teachers' perceptions of their approaches, successes, and challenges in closing the differences in standardized test scores between Black and White students and the extent to which culturally responsive instructional practices influences teachers in VSD.

Other qualitative designs were not appropriate for this study. The focus of the phenomenological approach is the "lived experiences" of participants; this approach is more suited to the study of strong emotional experiences (Merriam & Tisdell, 2016). I investigated the participants' perceptions of a specific issue, not a strong emotional experience. An ethnographic approach was not appropriate because it focuses on the relationship between the participants and the culture in which they live (Harwati, 2019). In this study, I focused on how teachers' experiences with addressing the math achievement gap between Black and White students and the extent to which CRTP influence teachers' experiences. The grounded theory approach is appropriate when there is little data available on a phenomenon. Data collected from a grounded theory study are used to generate a theory (Edmonds & Kennedy, 2017). A grounded theory approach was not appropriate for this study because I investigated how teachers address the math achievement gap between Black and White students. Finally, a case study involves investigation of a phenomenon in a real-world setting; the researcher then cultivates a narrative based on how the participants make meaning of their experiences (Merriam & Tisdell, 2016). The case study was not appropriate because I did not focus on the specific instructional strategy of culturally responsive teaching.

Quantitative and mixed-methods approaches were also inappropriate for this study. A quantitative research approach would not be appropriate because I was not seeking to determine if there is a causal relationship between instructional practice and student achievement. A mixed-methods approach involves the collection of both qualitative and quantitative methods for data sources (Merriam & Tisdell, 2016). The

mixed-methods approach was inappropriate because I focused on elementary teachers' perceptions and the extent to which culturally responsive instructional practices influence their instructional practices. In order to gather sufficient data, I needed to speak directly to each participant using semistructured interviews.

Participants

In this subsection, I describe the criteria for selecting study participants and explain why the sample size is chosen. I used purposeful sampling to recruit participants for this study. My aim was to recruit between 12 and 15 third- through fifth-grade teachers from four Title I elementary schools within the local district. Purposeful sampling allows the researcher to gain insight into a phenomenon by selecting specific participants (Merriam & Tisdell, 2016). The selection criteria created for this study ensured that potential participants have experience working with Black students. Additionally, the participants were informed that their participation is voluntary and provided with details about the purpose of the study. Procedures were put in place to ensure confidentiality.

Criteria for Selecting Participants

Third- through fifth-grade teachers from four Title I elementary schools in VSD were invited to participate in this basic qualitative study. Participants included in this study were from three of the four selected Title I elementary schools. This district has approximately 94 schools, including 61 elementary schools, 17 middle schools, 13 high schools, and three other school sites. The selection of elementary schools for this study was be based on the school's Title I status. Twenty-nine of the 61 elementary schools are

Title I schools. In this district, Title I schools tend to be more diverse than other elementary schools, so this ensured that teachers have experience teaching Black students. Teachers invited to participate must have had at least 2 years of experience within the district and taught in classes with two or more Black students. Ensuring that Black students are in each classroom is appropriate for data collection because it will ensure that teachers have experience instructing Black students.

Sampling and Sample Size

I used purposeful sampling to recruit participants for this study. Purposeful sampling allows the researcher to gain insight into a phenomenon by selecting specific participants (Merriam & Tisdell, 2016). Twelve teachers were recruited for this study. According to Hennink and Kaiser (2022), saturation can be reached with smaller sample sizes, such as nine to 17 interviews, in qualitative research. This conclusion was made after the researchers analyzed sample sizes of qualitative studies selected from four databases (Hennink & Kaiser 2022). Many qualitative study sample sizes have smaller sample sizes when the participant population is not diverse (Hennink & Kaiser 2022). I chose a 12 to 15 participant sample size for this study because the participants were selected from a relatively homogeneous population. Each participant will be an elementary teacher that has had Black students in Grades 3 through 5 for at least 2 years in VSD.

Procedures for Gaining Access to Participants

The local district had a specific approval process in place for gaining access to participants. I requested permission to conduct the study from the local district's

superintendent representative by completing the appropriate paperwork (see Appendix B). The paperwork included a written description of the purpose of the study, the RQs, and the roles of the participants and researcher. I specified that the four sites would be included in the study. While I waited for approval from VSD, I requested approval to conduct the study from the Walden University Institutional Review Board. I received approval to conduct research within VSD via email (see Appendix C) and letter (see Appendix D). Appendix E contains my communication with the VSD representative.

Once the Walden Institutional Review Board process was completed (approval no. 04-12-23-1027415), I followed VSD's procedures for gaining access to participants. Researchers from outside organizations are not allowed to contact potential research participants. A VSD liaison from central office was assigned to help me access participants. The assigned liaison forwarded my research invitation (see Appendix F) to the third- through fifth-grade teachers who worked at the four sites selected for this study. This invitation included a description of the study, informed consent document, and an electronic interest form (see Appendix G). Teachers who were interested in participating in this study had 2 days to review and sign the informed consent documents. After the informed consent document was signed, I scheduled the interview with the participant.

Establishment of a Researcher–Participant Working Relationship

To ensure that the study is valid, it is important to establish a positive working relationship with each participant. According to Katz-Buonincontro (2022), it is important to consider how the differences between the backgrounds or perceptions of myself and the participants may shape our interaction during interviews. Two common

characteristics that I shared with my participant is my role as an educator and my experience as an elementary classroom teacher. I used this commonality to build a trusting relationship with participants which will ensure the validity of my study (Merriam & Tisdell, 2016). The use of a specific semistructured interview protocol helped establish a positive working relationship with each participant.

The semistructured interview protocol used in this study encouraged participants to be honest about their experiences in the classroom. This interview protocol consisted of several different types of questions. Including a variety of question types and allowing the opportunity for follow up questions will elicit a holistic view of the participants' experiences in addressing the math achievement gap between Black and White students (Merriam & Tisdell, 2016). Additionally, to ensure that I had an accurate overview of the participants' perceptions, I ensured that I give an adequate amount of time to allow the participant to think about, craft, and clarify their answers to each question.

Measures to Protect Participants' Rights

I used Walden University's Research Ethics Approval Checklist to ensure that sufficient measures will be in place to protect the participants' rights during the study. First, providing informed consent allows participants to understand the purpose of the study, and their participation is voluntary. Participants will be reminded of their rights and the nature of this study each time I interact with them. Data collected from this study was kept confidential. The purpose of ensuring confidentiality is to protect participants from harm (*The SAGE Handbook of Qualitative Research Ethics*, 2018). Any demographic details, such as years of experience and gender, was stored and used to

prevent readers from detecting the participants' identities. All data collected was stored in password protected documents on a device or drive that only I can access. When not in use, the device and drive storing all data was locked in my office in a secure filing cabinet. The device employed a screen lock that will require the password to be reentered if it is left idle for 10 minutes or more. Any printouts of data or identifying information will be stored in a locked filing cabinet when not in use. All data collected was stored on a password protected drive for 5 years.

Data Collection

I used semistructured interviews with teachers as my primary source of data. These data were analyzed by coding the participants' responses after the interview. The semistructured interviews allowed me to determine to what extent CRTP influence elementary teachers' instructional approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. A deliverable project, a professional development workshop, based on the findings, was created once data was collected and analyzed using the elementary teacher'' perceptions.

An interview schedule or protocol consists of topics and repeated questions that provide a structure for the interview (Bearman, 2019). Interviews are most productive when participants are meaningfully engaged with clear and relevant open-ended questions. The interview protocol used for this study was aligned with the RQs and based on the research problem that teachers at the local level have not effectively addressed the differences in standardized math test scores between Black and White students. The

purpose of the interview questions were to reach data saturation. Data saturation will occur when the researcher no longer yields new information during the data collection process (Guest et al., 2006). The interview protocol included the flexibility for follow-up questions to help clarify participant responses during the interview. This format allowed me to gather in-depth data to answer the RQs.

Additionally, the interview protocol was used to keep me organized and focused on the RQs. During the interview, I took notes on a printed Word document template with the list of interview questions and spaces to record the participants' answers. The spaces were large enough to make a note of any clarifying questions that are asked during the interviews. During the interview, I used the closed captioning feature on Zoom to help me accurately capture the participants' answers to each question. The notes pages for each interview were labeled with the participant's number and stored in a locked filing cabinet. All data was then recorded on a centralized Excel document to organize data for analysis. The Excel document consisted of one tab per participant and a space for me to record my initial thoughts during data analysis.

I gained access to the participants by following the procedures set by the local district. Once I was approved to conduct research within the district, I invited third- through fifth-grade teachers from four sites in VSD to participate in my study. The local district did not allow researchers from outside organizations to contact potential participants for research purposes. The VSD representative assigned a liaison from central office to assist the researcher in participant recruitment. A representative from the VSD central office sent an invitation email that I wrote (see Appendix F) to potential

participants from the four sites. The email included an electronic interest and consent Google Form (see Appendix G). Interested participants received a copy of their completed Google Form via email after selecting submit. Within 2 days of receiving the completed interest and consent Google Form, I reviewed each participant's information to confirm their eligibility. Once verified, I emailed the participant to schedule an interview using an electronic scheduling resource called Sign Up Genius (see Appendix H). Participants could choose from a list of morning or afternoon interview times for 2 weeks. If the participant could not make one of the times listed on the Sign Up Genius, I worked with them to schedule a time that would work best for them.

Teachers from four Title I elementary schools in VSD were invited to participate in this basic qualitative study. Three of the four selected sites were represented in this study. One interview was be conducted with each participant and took no more than 45 minutes to complete. This interview included an opportunity for the participants to review the interview transcripts and make any changes or additions to their responses. The interviews were conducted via phone or video conference based on the preference of the participant during non-school hours. I used printed copies of the Word template during the interview to take handwritten notes. Additionally, after the interview, I reviewed each recording and my notes to make sure that all data were collected. The audio recording of the interview was sent to a transcription service, GoTranscript, which ensured the confidentiality of the recording and returned the transcript within 24 hr.

Once the transcriptions were complete, I reviewed the transcript and listened to the audio recording to ensure that and the transcription was accurate. Transcripts were

then emailed to each participant. They had 24 hr to review their transcript, request adjustments, and approve it for accuracy. To streamline the transcript verification process, participants completed a Google Form to confirm that they had reviewed the transcript (see Appendix I). They also indicated whether they wanted to clarify or redact portions of the interview. Upon completing the transcript verification Google form, I sent each participant a $20 thank you gift card via text message, allowing them to select between Amazon or Target.

Sufficiency of Data Collection

I used several strategies to ensure that the data collected were sufficient to develop an understanding of, and were in alignment with, the RQs (see Appendix J). First, an interview protocol (see Appendix K) that provides the flexibility for clarifying questions will give each participant the opportunity to share their perspectives. When these data collected is repeated by multiple participants, I can assume that data saturation has occurred (Guest et al., 2006). Additionally, data collected from my notes and interview transcripts will be reviewed multiple times to ensure that no new data or codes are found before analysis (Fusch & Ness, 2015). Once no new data or codes are found, data saturation has been reached, and other researchers can replicate the study (Fusch & Ness, 2015; Guest et al., 2006). A system for tracking data will be in place to ensure that data saturation is reached.

Data Tracking

My system for tracking data consisted of a reflective journal and a device that can record audio. During each interview, I used the reflective journal to take notes and make

observations. The interviews were be recorded to ensure that each participant's responses are accurate. Each participant received a number to ensure confidentiality. Any identifying information will be stored in a separate document that is password protected. As I engaged with the participants throughout the interview, I used a reflective journal to take notes before, during, and after each interview. Before emailing the audio recording to the transcription service, I reviewed the recording with my notes to identify any additional observations. When not in use, my journal, recording, and interview transcripts were locked in a filing cabinet in my home office or on a password protected document on my device.

Role of the Researcher

I am currently employed as an instructional coach in the school district where the research was be completed. In my position within the district, I do not supervise or evaluate any of the participants. I may have interacted with a participant during professional development sessions in my role as an instructional coach. Professional development sessions that I have conducted in the past were related to the implementation of specific instructional technologies in the classroom. Professional development sessions that I have facilitated have not discussed gaps in student achievement in math standardized test scores.

According to Fusch and Ness (2015), the role of the researcher is important and cannot be separated from the research process because I was the primary data collection instrument. Therefore, it is essential that I was clear about how the study was completed and how my interactions with participants may influence these data that I collected and

my relationship with the participants. I avoided bias by carefully creating interview questions and taking a neutral stance during the interview (Merriam & Tisdell, 2016). I also made certain that I valued the participants' time by ensuring that there is minimal interruption to their routine. Interviews were conducted via video or phone conference based on the participants' schedules. During the interviews, I made sure that I respectfully capture the participants' responses.

Data Analysis

The semistructured interview was the data tool used in the study. The data collection process was completely anonymous. Each participant received a number to ensure the confidentiality of these data collected. Teachers who consented to participate in the study taught Grades 3 through 5 in VSD. They also met the criteria of having at least 2 years of experience within the district and having taught in classes with two or more Black students. Each participant was interviewed based on their preference and schedule. In order to develop a clear understanding of these data, I analyzed the interview notes and transcripts using the coding methods and techniques described by Saldana (2021). Participants had an opportunity to review the interview transcripts and make revisions if necessary. Data analysis took place after all data was collected.

Data Coding Procedure

I used an Excel spreadsheet to track and analyze data. The spreadsheet contained 17 tabs, including dedicated sections for notes from each interview (see Appendix L), a tab featuring a table listing the initial codes from each interview, and a table displaying the final codes organized by participant and organized according to the themes that

emerged during the coding process. The notes taken during the interview were handwritten on a paper template (see Appendix M) and then transferred to the Excel spreadsheet upon completion of the interview. Electronically organizing these data in a spreadsheet allowed me to use the search feature to track recurring words or phrases.

The data analysis process was manual and consisted of three coding cycles: in vivo coding, axial coding, and categorically theming these data. Before emailing the interview transcript to the participant, I listened to the interview and reviewed the transcript to ensure no errors. I also noted any additional observations regarding the participant's statements. The transcripts were organized into a Microsoft Word document and printed with larger margins. The margins of the transcript Word document were used for manual coding and taking notes. After the participants verified their transcrip"s accuracy, I re-read it before coding to note emerging patterns and potential codes (Saldana, 2021). Before beginning the first cycle of coding, I considered the use of a computer-assisted qualitative data analysis program, NVivo 14, to help me organize these data. Upon reviewing the software, I decided analyzing these data manually would have less of a learning curve and save time.

Once data collection was completed, I began to analyze these data. The first cycle consisted of in vivo coding. I used the participant's words or phrases as codes as I read each transcript. These words or phrases were written in the margin of the printed transcript. The completed codes were added to the table on the Excel spreadsheet and separated by each participant. Transferring the codes into an Excel spreadsheet to track how often similar codes occurred and ensure that these data is credible. This initial cycle

allowed me to gain insight into the participants' perspectives and identify strong participant statements (Saldana, 2021). The goal of the second cycle of coding was to reanalyze these data for new information and begin to consolidate the in vivo codes. Axial coding was used to categorize the in vivo codes by combining them based on similarity and the RQ in which they align. The final cycle, theming these data categorically, involved organizing the axial codes based on phrases related to each RQ.

After these themes were identified from these data, I assembled these data into a narrative of the participants' perceptions and drew conclusions relevant to the RQs. Saldana (2021) stated that the first stage in constructing an analysis of data is descriptive in nature and helps the reader better understand the research. These data analysis for this study was based on the semistructured interviews. The conclusions drawn from these data described teacher'' perceptions of their approaches, successes, and challenges in closing the differences in standardized test scores between Black and White third-fifth students and the extent to which culturally responsive instructional practices influence teachers in VSD.

Credibility

I used several strategies to establish the credibility of this study. I utilized member checking and peer debriefing to ensure that the findings of the study were accurate and credible. According to Merriam and Tisdell (2016), the way in which these data is collected, analyzed, and made sense of in the study can ensure the validity and reliability of a study. I ensured that the findings and conclusions drawn of the study are valid and

reliable. The findings were shared with the participants before the study is published. Careful data collection and analysis ensured that the research findings are accurate.

Member checking occurred in multiple ways and involved the consultation of participants and other colleagues (Merriam &Tisdell, 2016; Saldana, 2021). First, I asked three to five educators to review the interview questions and share any feedback. The educators invited to review the interview questions included a classroom teacher from a neighboring district, an administrator, and a math specialist. After the interview, I shared the transcript of the interview with each participant to ensure the accuracy and give them opportunity to modify their responses before data analysis. Each participant was given an opportunity to review comments and verify the accuracy or modify the responses. The study's credibility was be ensured because the participants had an opportunity to validate their responses throughout these data collection and analysis processes. The project was designed based on the findings of the study.

Peer debriefing occurred before and after these data was collected. Peer debriefing involved the researchers' consultation with colleagues regarding data collection, data analysis, and other components of a study (Merriam & Tisdell, 2016). Three to five experienced educators from outside of the research sites served as my peer debriefers during data collection and analysis. I consulted with the peer debriefers about the interview questions and data collected. The consultations with the peer debriefers helped ensure that the findings are aligned to these data collected.

Data Analysis Results

The problem underpinning this study was a pronounced achievement gap between Black and White students, evident in standardized test score pass rates of third- through fifth-graders in the state of Virginia, including VSD. The study's purpose was to explore the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math scores between Black and White students in Grades 3 through 5 at VSD. Qualitative data were collected from 12 participants. Data saturation was reached with 12 participants. All participants had at least 2 years of experience within the district and had taught classes with two or more Black students. The participants also taught third- through fifth-grades. Participant consent was obtained before data collection from semistructured interviews. Eleven interviews were conducted via Zoom, and one interview was conducted via phone at the request of the interviewee. Interviews were recorded on Zoom with closed captioning. Participants were told that the interview would be recorded, and they had the opportunity to review the transcript and revise if they chose to. They were also informed that notes would be taken during the conversation. Analysis of the collected data yielded five themes, which were in alignment with the study's four RQs (see Table 4).

The first RQ explored the approaches elementary teachers' used to close the differences in standardized math test scores between Black and White third through fifth graders. I used the second question and third RQs to discover the perceptions of third- through fifth-grade teachers successes and challenges in closing the differences in

standardized math test scores between Black and White third through fifth graders. Finally, I used the fourth RQ to examine the extent to which elementary teachers understand or implement CRTP in order to close the differences in standardized math test scores between Black and White students in Grades 3 through 5.

Table 4

Alignment of Themes to Research Questions

Research question	Theme	Topic
RQ1	1	Math instructional strategies, resources, and progress monitoring
	2	Perceptions of Black students' math achievement
RQ2	3	Experiences of successes
RQ3	4	Experiences of challenges
RQ4	5	Implementation of culturally responsive practices

In this section, I discuss the coding procedures used to develop themes. First, I focused on the coding cycles utilized during these data analysis to ensure alignment between the RQs, the conceptual framework, and these data collected. After explaining these data analysis process, I detailed the findings from each RQ to discover the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math scores between Black and White students in Grades 3 through 5 at VSD.

Coding Procedure for Theme Development

An Excel spreadsheet was employed to track and analyze these data collected electronically. The spreadsheet contained 17 tabs, including dedicated sections for notes

from each interview (see Appendix L), a tab featuring a table listing the initial codes from each interview, and a table displaying the final codes organized by participant and organized according to the themes that emerged during the coding process. The notes taken during the interview were handwritten on a paper template (see Appendix M), which was transferred to the Excel spreadsheet upon completion of the interview. Electronically organizing these data in a spreadsheet allowed me to use the search feature to track recurring words or phrases.

These data analysis process was manual and consisted of three coding cycles: in vivo coding, axial coding, and categorically theming these data. Before emailing the interview transcript to the participant, I listened to the interview and reviewed the transcript to ensure no errors. I also noted any additional observations regarding the participant's statements. The transcripts were organized into a Microsoft Word document and printed with larger margins. The margins of the Word document were used for manual coding and the taking of notes (see Appendix L). After the participants verified their transcript's accuracy, I re-read it before coding to note emerging patterns and potential codes (Saldana, 2021). Before beginning the first cycle of coding, I considered the use of a computer-assisted qualitative data analysis program, NVivo 14, to help me organize these data. Upon reviewing the software, I decided analyzing these data manually would be more efficient.

Once data collection was complete, I began to analyze these data. The first cycle consisted of in vivo coding. I used the participant's words or phrases as codes as I read each transcript. These words or phrases were written in the margin of the printed

transcript. The completed codes were added to the table on the Excel spreadsheet and separated by each participant. Transferring the codes into an Excel spreadsheet to track how often similar codes occurred and ensure that these data is credible. This initial cycle allowed me to gain insight into the participants' perspectives and identify strong participant statements (Saldana, 2021). The goal of the second cycle of coding was to reanalyze these data for new information and begin to consolidate the in vivo codes. Axial coding was used to categorize the in vivo codes by combining them based on similarity and the RQ in which they align. The final cycle, theming these data categorically, involved organizing the axial codes based on phrases related to each RQ.

After themes based on these data were identified, I assembled these data into a narrative of the participants' perceptions and drew conclusions relevant to the RQs. Saldana (2021) stated that the first stage in constructing an analysis of data is descriptive in nature and helps the reader better understand the research. These data analysis for this study was based on the semistructured interviews. The conclusions drawn from these data described teachers' perceptions of their approaches, successes, and challenges in closing the differences in standardized test scores between Black and White emenentary students and the extent to which culturally responsive instructional practices influence teachers in VSD.

Research Question 1

What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD? The themes that emerged from the coding procedure and

analysis were based on the semistructured interview protocol employed in the study. During the interviews, elementary teachers were asked to describe their approaches to math instruction to address gaps between Black and White third through fifth graders. Additionally, they were asked to describe the district, school, and teacher-supplemented resources they utilized in their classroom to address math achievement. Finally, they were prompted to explain how they progress monitor their students and their perceptions of the math achievement of their Black students. Two themes emerged from RQ1: (a) math instructional strategies, resources, progress monitoring, and (b) perceptions of Black students' math achievement.

Theme 1: Math Instructional Practices, Resources, and Progress Monitoring

The third- through fifth-grade teachers were asked to describe their approaches to math instruction to address gaps between Black and White third through fifth graders. Their main approach involved the use of small group instructions or the workshop model. T11 explained that the workshop model consisted of "a whole group lesson and/or practice, and then breaking into small group[s], like a teacher table." Other explanations of the workshop or small group model were very similar to T11. For example, T3 stated, "I typically… start with a whole group mini-lesson …, no more than 20-ish minutes. And then we move into small group[s], so independent work [and] working with the teacher." T4 also started with a mini-lesson followed by three-rotation stations "one technology, one at my table, and one with hands-on manipulatives to practice the skill. T11 explained that their district has encouraged and endorsed a workshop model over the last few years.

The model includes a number sense routine, whole group lesson, a "technology piece where students are either on a program like Reflex or IXL," and game centers.

Teachers typically used the whole group or mini lesson to introduce new concepts to their students. T2 explained that the whole group lesson consisted of explicit instruction. During the mini-lesson, students had the opportunity to use manipulatives and other hands-on activities to engage with the math concept. T5 teaches a concepts through PowerPoint or has students use individual whiteboards and manipulatives. T9 used anchor charts and vocabulary videos to introduce the topic to students. According to T9, "We'll do an anchor chart where the kids will write it down in their log, so they have that resource to always go back to. And then we'll do some practice problems together as a class."

Teachers also use music during the mini lesson to engage students. T5's team use Number Rocks or Flocabulary To actively engage students. Similar to T5, T7 used music to provide a hook and get students interested in what they'll be learning. T7 also used questioning strategies during this activity to help students connect with math concepts. For example, after playing a song, T7 would ask, "What was the song about? What words popped out? What was repeated?". T10 explained that they used music during math instruction because "students learn through repetition, and they learn through music." Repetition in lyrics helps students remember the vocabulary and math concepts as T10 proceeds with instruction. T7 also mentioned the repetition strategy as another reason to use music in the classroom. According to T7, students "think about the song and then

they're able to apply that strategy also to that math." After the mini-lesson, all of the teachers used small group instruction to reinforce the mini-lesson.

Small group instruction was described by T8 as guided practice. During each unit, teachers pulled groups of students based on specific needs. T2 explained that after a concept has been taught, students are broken into a range of groups based on student need. T7 pulled groups of about three or four students with them during small group instructional time and explained that the duration of time spent with student groups varied based on the level of support required to master the concept. In T7's class, certain students merely needed a brief check before working independently. Meanwhile, others benefited from 10-15 minutes of assistance, and some required a step-by-step explanation of the process. T3 used a similar grouping strategy to T7 during small group instruction. T3 used student work "to inform who needs more support and what kind of support, [and] to kind of decide who gets taken when." Groups are fluid and change with each concept based on student need. T4 typically kept some of the lower achieving student together in one group to keep instruction equitable. This flexible approach to small group instruction allowed for teachers to provide targeted instruction to their students.

Seven of the 12 teachers employed similar grouping strategies to organize small group instruction and independent work. For example, T4 used heterogeneous grouping to keep the students functioning around the room together. Similarly, T1 described their reasons for creating heterogeneous groups, "I always want somebody who can add some good mathematical thinking, who has the vocabulary with kids who are struggling with vocabulary. So, my grouping is very, very intentional." T1's goal was to ensure that

"every student in the group would have access" to the lesson while also "leveraging students to teach each other." The intentional grouping of students also influenced how students engaged with math independently.

For example, while each teacher pulled small groups of students for instruction, students were engaged in a variety of different activities that focused on either the current skill or a skill that was learned earlier. For example, while T11 worked with a small group of students, other students are practicing previously learned skills. T3 agreed with T11 and stated, that students work on either spiral or other digital math programs. T11 continued that the assignments are those that students can do independently. All of the teachers incorporated technology into their workshop model. T5 and T8 assigned their students virtual task cards called Boom Cards to help them review concepts. Other teachers, such as T2, T3, T4, T5, T8, T9, T10, and T11, used adaptive online math resources to support students' work with specific math and fluency skills. For example, Reflex and Frax were used during math instruction to build fact fluency. T5 explained that Reflex is a fact fluency-based game where students add, subtract, multiply, and divide numbers from zero to 12. Students then move on to Frax, which is used to introduce and reinforce concepts related to fractions. T10 likes to use Ellevation because it works on math vocabulary and provides immediate feedback to the students to support progress monitoring. Table 5 includes a list of the adaptive online math resources used by teachers to support math instruction and categorized based on who provides the resource: district, school, or teacher.

Resources Used to Support Math Instruction. Teachers used a variety of resources to support the district-endorsed workshop model during math instruction. The resources used can be categorized by level: district endorsed or provided, school endorsed or provided, and teacher supplemented. Table 5 provides an overview of the different types of resources that participants employed to support math instruction. The district-endorsed resources and instructional strategies are accessible via Canvas. T1 stated that these Canvas modules "are pretty awesome" and include a variety of instructional resources. According to T7, the district provided curriculum is helpful because "it tells you what type of answer you should be looking for" when teaching specific skills. T8 also explained that the Canvas curriculum explained the required math standards and contain the summative unit assessments.T11 described VSD's math Canvas modules noting that the modules are approved by the math department and follow very closely the standards for that unit. Lessons are not paced daily but grouped by standard and have many resources. "Sometimes it'll take them to an external program like an online practice that they can try."

In addition to the math Canvas modules, the use of manipulatives is encouraged by VSD. T2 stated that "the county provides you a list of manipulatives that you need for each unit, and those should be provided to every student for every unit, not just students who need them. They're for all your students." T12 stated that VSD "encouraged us to make sure the kids have time to use manipulatives, to play with them, and get used to them." Additionally, T3, T5, and T6 specifically mentioned the use of a district-endorsed virtual manipulatives resource called "BrainingCamp" to support math instruction.

According to T5, students can use the manipulatives in BrainingCamp that might not be available in the classroom.

Table 5

Resources Used to Support Math Instruction at the Local School District

Resource type	District	School	Teacher supplemented
Curriculum	Canvas modules with resources and unit assessments		Worksheets, anchor charts, activities
Technology	Mastery Connect, Ellevation, Origo Math, Desmos, BrainingCamp	Reflex, Frax, IXL, Flocabulary, Dreambox	Prodigy, BottleMath, Boom Cards, Legends of Learning, 99Math, MobyMax
Strategy	Workshop model, number sense routines, CRA Model	Remediation, before-/after-school tutoring	Music, gamification of instruction, student choice and discourse
Other	List of manipulatives, professional development for math department	Math support staff (math coaches and tutors) Special education teachers	Teacher-created task cards, worksheets, PowerPoint presentations, anchor charts

The use of manipulatives is included in another district-endorsed strategy, the concrete, representational, and abstract method, as shown on the district's webpage for elementary school mathematics. T6 described this method as "starting with the manipulatives, not just moving right to pencil [and] paper." T7 used the method to meet the needs of the students in their classroom, stating that students need to touch it, see it, and put it together to understand the concept. T7 continued, stating That they make sure that struggling students need to engage with manipulatives before moving into the

abstract concepts. T1 also described the use of the concrete, representational, and abstract method during math instruction as a form of progress monitoring:

> So, as I'm walking around and asking questions and getting kids to explain their thinking, I'm also analyzing how they're doing. Where are they in their trajectory? … They're either on the very concrete stage of understanding the problem, they're either moving more towards the abstract stage, so where are they in that pathway of their mathematical thinking?

The final district endorsed resource mentioned were number sense routines or number talks. When teachers implemented number sense routines, students had the opportunity to explain their thinking. T5 stated that "I prefer … the ones that are open-ended, just so I can see [what] kids' brains are thinking." During number talks in T5's classroom, they put a number on the board, and students discuss how many different ways they can get to that number using computation. Students also had an opportunity to explain their thinking to their classmates during the number sense routine. For example, T8's students shared their strategy for answering a question and compared their strategy with other strategies used to solve the same problem.

In addition to the resources or strategies provided by VSD, each school provided resources to support math instruction. These additional resources included remediation before, during, or after school and math support staff. Math support staff at each school consisted of at least one math coach and assistant tutor. These staff members assisted with remediation during school hours. The remediation that occurred during the school day involved small group instruction of selected students based on data conversations.

According to T3, the math support staff would pull small groups of identified students. T8 confirmed that a math tutor would work throughout the year with the students who need the most math support. T8 elaborated that tutoring sessions occurred daily and lasted between 30 and 40 minutes.

Finally, teachers supplemented math instruction with a variety of different resources based on students' needs. This included the use of technology such as Prodigy, BottleMath, Boom Cards, Legends of Learning, 99Math, MobyMax, and YouTube math music videos. Teachers also created activities based on specific skills. For example, T8 created their own resources for their classroom, including room transformations —with activities based on the curriculum from the county such as task cards or games. Teachers also find or create worksheets or written assignments based on math skills. T3 often uses Common Core sheets that are closely aligned to some of the math standards.

Progress Monitoring. Teachers progress monitored their students' math achievement using formative and summative assessment strategies. Progress monitoring involved the use of a combination of technology resources, district-created unit assessments, and teacher-created assignments and observations. T11 looked at daily independent work, and unit assessments or quick checks. T1, T5, T8, T9, and T10 also mentioned the use of quick checks or exit tickets to check for student understanding of math concepts. Exit tickets could be either be low or high tech. For example, T3 and T10 used the district purchased digital assessment platform, Mastery Connect, to use or create quick checks or exit tickets to progress monitor students' math achievement.

Other forms of progress monitoring occurred through monitoring independent work, observing how students engaged with the math concepts, and student conversations. For example, T7 used student completion of independent work as a way to progress monitor students during math instruction. According to T7 students who are still struggling are not able to finish the independent work. T9 monitored student progress during math instruction by checking in with students and making observations "at the beginning while they're doing their work." Early check-ins helped T9 identify students who needed extra math support. T10 also conferenced with students during math instructional time and described their reasoning for conferencing with students. "Allowing students to see their data at the same time, [lets] them … reflect" on their learning process and progress. Feedback is immediate during that one-on-one conference. These diverse approaches to progress monitoring include student observations and one-on-one student conferences.

Another progress monitoring strategy involved the analysis of the reports included in the adaptive online math technologies assigned to students during math. T3 chose to use the technology to progress monitor because is immediate. For example, T3 used Bottle Math reports to monitor student progress. Reports are color coded green, yellow, and red, which helps easily track student understanding of specific skills. Another example involved the use of the reports from Boom Cards, an electronic task card platform for students to demonstrate their mastery of a concept. T5 explained how the Boom Cards were used the monitor student progress:

> What's really nice about Boom Cards is that it'll show you five different categories. It shows you how often they got on to play, what their best average was, how many times they had to go back and fix something, and then what their …latest average was. So, I can look at those data to see how it changed from Monday to Friday.

Teachers implemented a range of strategies to monitor the ongoing progress of their students in mathematics, aiming to attain a comprehensive understanding of their academic achievements in the subject.

The VSD provided math curriculum included unit assessments in the Canvas module for each standard. After each unit assessment was given, teachers met with their grade-level team to discuss these data. Most of the grade-level teams use Excel spreadsheets to track data for each unit assessment that is separate from the district's student information system. T4 explained that these data spreadsheet breaks down every assessment by what Virginia standard was covered during the math unit. T5 described the organization of these data spreadsheet. "That spreadsheet is magical in itself" with reporting categories including students with disabilities, Hispanic students, Black students, and English Language Learners. "We can see the breakdown not only by the standard for our class, but we can see the breakdown of the standard by the student and their backgrounds." Grade-level teams who did not use a spreadsheet consistently tracked unit assessment data through the online platform Mastery Connect, which supports the assessment and is connected to the district's student information system. For example, T6

is able to pull up a report on Mastery Connect; that provides question-by-question data for each student. These data report is then used to facilitate these data conversation.

Data conversations focused on the assessed standard and student achievement by question and demographic group or subgroup. T4 stated that their grade-level team would "sit down and have a data conversation about our discrepancies throughout the unit and what our plan for remediation is." T2 described their grade level's approach to data conversations. "We break it [data] down by standard. And then we also look at different subgroups of students based on what our school improvement plan is for that year." Teachers compared results between different school populations and analyze these data. "Did all the students miss a particular question? Why would they miss that question? Was it the way that it was asked? Did we not expose them to the way that it was worded? Or do they truly not understand the concept of the question?" T4's grade-level team included discussion comparison conversions between classrooms. After comparing data T4 says that teachers with the highest scores share successful strategies with the team and that teacher will provide remediation on that skill for the next 4 or 5 days.

Additionally, these data conversations included the creation of a plan to meet the needs of students who did not master the standard. Math coaches employed at each school supported these data conversations. T10 stated that the math coaches attend their data conversations and look at the skills that need improvement. T12 similarly explained how the math coach comes to the data conversation with these data already prepared. During these meetings, teachers can see areas of weakness and the math coach supports

student data analysis and skill remediation. Once these data was analyzed, the math coach and grade level collaborated to create a plan of action to address academic gaps.

The action plans created from these data conversations depended on student need and occurred both during the day and before or after school. T5 explained that math remediation for specific skills occurred "during our core extension time, which is … a 45-minute block where we get to really focus on what the students need." During core extension, teachers sometimes switch students based on the skills in which the students needed additional support. T5 described how core extension worked when remediation was occurring. "This year, we rotated kids. And I found when we rotated kids that our kids actually did a lot better [be]cause they got instruction from different teachers." In addition to math remediation during core extension time, teachers have also had remediation built into the regular math block for students who receive other services. Math coaches and math tutors supported remediation for specific math skills throughout the school day.

Theme 2: Perceptions of Black Students' Math Achievement

Teachers' observations about the size of the math achievement gap between Black and White students varied. Ten out of 12 teachers saw a discrepancy in the math achievement between Black and White third- through fifth-grade students. T4 described the math achievement of Black elementary students as "a little bit lower than the average for our entire grade level." T6 acknowledged that the difference was noticeable and an area of concern for their school. T10 noted that most of the time, the achievement of Black students was below grade level. Teachers not only addressed math achievement

gaps between Black and White students but also compared the math achievement of Black students across different demographic groups.

Eight out of 12 teachers focused their observations on the overall math achievement of Black students and compared Black student achievement to other demographic groups such as SES, English Language learner, Special Education, and Gifted and Talented. For example, T12 observed that there was a tremendous gap when Black students were compared with their fellow White students and Asian students. Black students and students with disabilities were the lowest performing in math. T2 stated that after the COVID-19 pandemic, there was "a more obvious discrepancy between White and Black students. In previous years, discrepancies were more pronounced between "poverty vs. non-poverty" and "general education versus …special education." These teacher observations indicate that the disparities exist across demographic groups.

Teachers also made observations about their students' background and their influence on overall math achievement. For example, T11 indicated that the background of her Black students influenced their math achievement, feeling generally that Black students fall in one of two categories: They are very successful or they struggle. T11 explained that in their classroom, Black students with highly educated parents or in a higher income bracket are higher achieving students. Compared to T11's Black student math achievement, White students in the class were a more homogeneous group with less variance in their achievement in math." Similarly, some teachers, such as T7, T10, and T11, attributed the difference in math achievement between Black and White students

within the grade level varied based on parental involvement. For example, T7 listed parental involvement as a contributing factor to the math achievement of their Black students, stating that it was the biggest difference in their students' growth. The teachers' observations on their students' backgrounds and their potential impact on their overall math achievement helps reveal patterns across elementary schools in VSD.

Finally, teachers highlighted specific skills that contributed to the math achievement of Black elementary students. For example, T3 highlighted that solving word problems is a skill that her Black students, including the gifted students, struggled with throughout the year. Also, T5 and T10 noticed that specific strategies, such as the use of games or competition, yielded higher levels of math achievement for the Black students in their classroom. T5 felt that Black students were more engaged when activities had a game approach. Teachers' observations of their Black students' academic progress in math to various demographic groups reveal the current make up of their classrooms.

Research Question 2

What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD? The theme, experiences of success, that emerged from the coding procedure and analysis were based on the semistructured interview protocol employed in the study. Elementary teachers were asked to describe the successes that they experienced when addressing the math achievement gap between Black and White students in their classrooms. Teachers also described their motivations for implementing

specific strategies that positively impacted the math achievement of Black third through fifth graders. If applicable, teachers explained what supports were in place or were in place to help them successfully address the math achievement of Black third through fifth graders.

Theme 1:Experiences of Successes

Teachers emphasized strategies that contributed to the academic success of Black students in math, which were categorized into three main categories: student discourse and collaboration, community building, and explicit and small group instruction. During math instruction, teachers expected their students to justify and explain their work. They also used peer teaching and promoted teamwork to facilitate teamwork between students. Teachers implemented community building strategies to ensure active participation in math instruction. Additionally, teachers included explicit and small group teaching, both during and after regular school ours, in their approach to address the gaps in the math achievement of Black students.

Student Discourse and Collaboration. One of the common strategies described by teachers that had the most significant impact on the math achievement of Black students was the use of student discourse and collaboration. During math instruction, student discourse and collaboration involved students justifying and explaining their thinking, teaching each other, and working together to solve a problem. T1 described:

> I want the kids on the edge of their seats, hunched forward, diving in front of them. So that the work is in the middle of the table, and everybody's on the edge of their seats looking in the middle of the table. … I want to hear my kids arguing

> about math. I want to hear discussions of, "No. It needs to do this because of-" And so I'm hearing my kids justifying their thinking. I'm hearing them arguing with each other, and rationalizing, and sharing how they got their answers.

In addition to T1, ten other participants provided students with opportunities to engage in discussions and collaborate during math instruction.

Eight of the 12 participants used specific strategies to get students to converse and collaborate during math. For example, T8 used partner work, turn and talk, and sharing out. Similarly, T1, T3, T5, T6, T7, T9, T10, and T12 gave students an opportunity to share their learning with their peers. T12 invites students to share their work indicating that at least one students will volunteer to show how they solved a problem on the board. When students shared their thinking during math instruction, teachers ensured that multiple strategies for solving the same problem were shared. T12 told their students that "in math there's so many ways you can solve a problem." They go on to explain "we have many learners here. … You got to talk so our audible learners can hear how you solved it." T3 also emphasized the importance of verbalization in solving math problems stating that students "have to be able to ask questions of [their] peers." They used the jigsaw discussion method to get students to explain their thinking with word problems. T1 taught "tudents how to ask questions using sentence stems posted throughout the classroom. Being transparent and open in the classroom gives T1 the opportunity to teach the kids about open and closed questions, which helps students understand that "no one question is the right question. The intentional strategies implemented to cultivate

dialogue and collaboration during math instruction assist in the creation of an inclusive learning environment that encourages multiple perspectives and inquiry.

Community Building. Eleven out of 12 teachers also described how building community and forming relationships with students in their classrooms had a great impact on the math achievement of Black students. Teachers described how they used what they've learned about their students to help them with their math instruction. For example, T5 acknowledged that their Black students were more engaged using specific assignments during math instruction; one student in particular hates worksheets. "He'd rather write me a song on how he can do this." T4 used a specific interest survey at the beginning of the year to get to know their students. Some questions were written to elicit students' feelings about math, speaking in front of the classroom, and reading aloud. Other questions focused on personal interests such as home activities and books students like to read. Additionally, relationships with the students were fostered through the use of reflection after an assignment or assessment. For example, T10 uses reflective practices and that one-on-one data check conferences. **W**ith students. Similarly, T8 stated that getting to know what students struggled with was especially important. They explained to their students that "I need to know because if you tell me nothing's hard, I have nothing to teach you."

Each teacher described procedures they put in place to support student discourse, collaboration, and treatment in the classroom. For example, T3 described a respect agreement that was put in place based on the statement "We want equal attention." The purpose of T3's respect agreement was to ensure that students understood how the

workshop model worked during math instruction. T3 acknowledged that some students needed more help than others. Therefore, they met regularly with students who need extra support because "if you haven't learned it before, sometimes you need it a couple extra minutes to soak it all in." When students no longer need the extra support, the amount of explicit instruction with the teacher during math workshop decreased. T1 also shared how a classroom community was built to support collaboration and discourse. The classroom seating arrangement was changed weekly at the beginning of the school year "so that they literally have to work and get to know everybody." Students also have the opportunity to share personal worries and stories in order to constantly build up the "understanding that we all feel this way…Things may be different today, but the feelings that we feel as humans haven't changed." The approaches outlined by each teacher helped to establish and maintain a supportive learning environment and engage students in meaningful math instruction.

Explicit and Small Group Instruction. In addition to the use of student discourse, collaboration and community building, teachers detailed how explicit and small group instruction had a great impact on the math achievement of Black students. T2 found that hands-on explicit instruction, manipulatives, and opportunity for hands on practice had the greatest impact on the math achievement of Black students. T9 believed that the gradual release model provides a valuable resource when solving math problems. Through clear guidance and structured practice, students can observe the problem-solving methods of their peers, enabling them to subsequently apply those techniques on their own.

For 10 out of 12 teachers, explicit instruction involved the use of manipulatives and specific vocabulary strategies. For example, T6 explained that a virtual manipulatives app, BrainingCamp, had a positive impact on the achievement of Black students. Using the manipulatives app makes the students feel empowered and excited and then, they are able to do the work more independently. Another employed by T7 to develop the vocabulary acquisition during math instruction was guided language acquisition development. This technique, which is mainly targeted at English Language Learners, features a color coding strategy that works for all students during math instruction. For example, when teaching topics involving fractions, T7 consistently uses the same color for numerators and denominators. Throughout their teaching, they emphasize the constancy of colors, explaining to students that if they forget how to set up a problem, they can rely on the consistent color scheme.

Five out of 12 teachers identified small group instruction as a strategy that had a great impact on the math achievement of Black students. For T11, small group work fostered a better understanding of what students know and what they need to know and helped clear up misconceptions. During small group instruction, students cannot hide, pretend they are on task, or just watch the instruction taking place. Small group instruction also included the remediation that occurred before, during, and after school. This remediation was provided by teachers and math support staff. For example, T7 and T9 acknowledged that support from math support staff and tutoring help support Black students' math achievement. T12 described how small group pull-out groups occurred after the math team saw the low results on math assessments. Math coaches, a math tutor,

and a volunteer then pulled students for small group intervention. T12 observed that Black students would have progressed more if they had been learning in small groups from the beginning. According to T12, when students "practice in front of you. That's when you can actually catch what they're doing wrong." Small group instruction, including targeted remediation and additional support, emerged as a highly effective strategy for enhancing the math achievement of Black students. The personalized attention provided by the teachers offered a clearer understanding of students' knowledge and addressed misconceptions more effectively, which underlined the potential for accelerated progress and learning.

Research Question 3

What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third- through fifth-grade students at VSD? The theme, experiences of challenges, that emerged from the coding procedure and analysis were based on the semistructured interview protocol employed in the study. Elementary teachers were asked to describe the challenges that they have experienced in closing the math achievement gaps between Black and White students. Additionally, teachers were asked to detail the support they had received or needed to address the challenges they experienced in the classroom. Challenges can be categorized as either academic or nonacademic: student academic gaps, student engagement, and parental involvement.

Theme 1: Experiences of Challenges

Teachers acknowledged the challenges they faced in addressing the disparities in math achievement between White and Black third through fifth graders. The challenges were organized into three categories: student gaps, student engagement, and parental involvement. Pre-existing academic gaps from prior academic years were difficult to address during the school day. Additionally, teachers identified challenges related to student engagement, which encompassed academic, behavioral, and emotional factors. Teachers also described parental involvement, specifically the disparity in involvement between White and Black families, as a challenge.

Student Academic Gaps. One challenge that seven out of 12 teachers faced when addressing the differences in math achievement between Black and White third through fifth graders was the academic gaps that students brought with them from previous school years. For example, T6 stated that the challenge of balancing the needs of students who did not go to preschool or who do not have the same background knowledge as other students in the class. T6 continued, stating, "You're trying to fill so many holes, and they were home for a year. … You're just trying to backfill so much. That's probably the hardest." The substantial academic gaps stemming from prior educational experiences presented obstacles for several teachers during math instruction.

Five of the 12 teachers found it difficult to address all of the students' academic gaps during the school day. For example, T4 explained that students who are underperforming in math may also be underperforming in other areas. Those students get pulled in multiple directions making it difficult to provide remediation during the school

day. Therefore "We don't always close the gap. We … address the gap… we try, and then we run out of time before we can close it." Although teachers found it challenging to address all of the students' academic gaps during the school day, each school had resources, such as a Title I math coach, to support teachers' math instruction.

Eight out of the 12 teachers explained that there are supports in place to support the academic challenges associated with addressing the math achievement gap between Black and White third through fifth graders. Title I math coaches were involved in supporting teachers during math instruction. T10 acknowledged that the math coach supports them when a challenge arises, stating that "if I have a challenge and I talk to the math coach, they will try and see how best they can assist." T10 added that a math coach can provide a fresh perspective, different ideas, which may help students. T12 was appreciative of the math coach's support during professional learning communities (PLCs) because they helped classroom teachers understand "what students need to be able to know how to do" and provide support for how to teach the concept.

Student Engagement. Student engagement was another challenge that four teachers faced when addressing the differences in math achievement between Black and White third through fifth graders. The types of student engagement described during each interview are categorized as academic, behavioral, or emotional. Academic student engagement included work completion and participation during instructional time. According to T7, getting students to participate during math instructional time was the biggest challenge. Another challenge related to academic student engagement was homework completion. T7 continued; "I had students that just brought me their work-but

it was not their answers. They didn't do it." T10 and T12 also had issues with homework completion and described specific strategies that they attempted to get students engaged. T10 used homework as an entry ticket into the classroom and described the purpose of homework with students:

> I'm asking you to complete the homework. Remember, if I teach you right now, it might just stick for now, and then by the time you go home, and you start playing the game, you forget everything. Tomorrow when I come back, and I give you the same question again, you go, "Oh, I don't remember. Oh, you didn't teach me that." "Oh, guess what? We have to work on this, all right? "Tomorrow morning before you come in my classroom, I'm going to ask you a few questions, so make sure you do the homework." I have to find very unique ways.

Similarly, T12 used transition time to review homework concepts, stating to students: "Okay, let's practice now. We've got like 5 minutes or in the hallway." The challenges highlight the complex nature of addressing math achievement disparities which extends beyond the curriculum and includes the essential strategy of actively engaging students in their learning journey.

Four of the 12 teachers mentioned struggling to figure out what worked best for a diverse classroom setting. For example, trial and error helped T3 to figure out what worked best for her Black students noting that it took until the end of December to determine what worked. Additionally, T5 acknowledged that their own background played a part in how they engaged students as a novice teacher. Coming from a small town with a predominantly White community, they found teaching in such a diverse

school eye-opening. T5 expected everyone to "be successful [with] what I was doing …and learn the way …[I] teach them." T5 admitted that they struggled getting to know students, their backgrounds, and what worked best for them.

When three teachers spoke of behavioral student engagement, they focused on student attendance. For example, T11 stated that in previous schools, attendance was a huge challenge, whether the students just didn't come to school or had inconsistent attendance. T12 agreed that attendance was a challenge in addressing the math achievement gaps between Black and White students. T12 continued: "Oh my gosh, it has been horrific, pretty much catastrophic. We had so many students who had missed. My D student, he was up to 80 days. My G student, he was up to about 50." T11 described the difficulty of meeting the needs of students that were transient or had high levels of absenteeism: "I had them for 3 months. They came in May. Now I'm expected to close the gap by June. That's not going to happen." The chronic absenteeism made it difficult for teachers to address the math achievement gaps of some of the Black students in their classrooms.

Emotional student engagement included descriptions from five teachers concerning the of a lack of confidence or academic stamina, which have led to Black students shutting down. T1 felt that overcoming self-images was the biggest challenge. ". And unfortunately, the news today has told Black kids who they are, and what they are without them exploring themselves." When students shut down, T7 spoke about trying to encourage Black students that they are still capable. T12 reasoned that students do not have the stamina or initiative to say, "what do I need to do to get this?" Observations

related to emotional student engagement reveals the challenges that some of the teachers faced when trying to foster a supportive and engaging learning environment.

Parental Involvement. The final category of challenges described by six of the 12 teachers was related to parental involvement in their child(ren)'s education. T10 explained that "If their parents are not involved, it poses a challenge for the teachers. That is where I see most of my problem." Similarly, T7 stated that Black students with parental support; "who did show up for conferences and did have some expectations for their students" had more growth than students without those supports. Three of the sic of the teachers who identified parental involvement as a challenge compared the parental involvement of Black and White parents at their sites. T12 explained that home life impacted the math achievement of Black students and differed from the home life of White students. T12 explained the difference:

> With my White students, the ones that we've had this year, they have a lot of support at home. Their parents are coming to the conferences. They're responding when we reach out to them on Dojo and email. When it comes to our African American students – I'm thinking of I'll call him K, in particular, he pops right in mind. Failed his math as well. Bombed most of all his unit tests. He's in a single-parent household. We reached out to Mom many, many, many times. Then mom is like, "Look, I'm doing the best I can. We about to be homeless," here I am asking you, "Why aren't you working with him at home? Can you help?" She's not at least a bit worried about that. She's like, "I'm in survival mode right now."

> That was one of the many challenges. They just don't have that support at home that some of our White students have.

T1 acknowledged that "Home life can affect a student's learning, and so I think that if we're looking at the demographical situation, I would say we really need to work on the home life."

The teachers who focused on parental involvement as a challenge also described how their school implemented strategies to increase parental involvement. For example, T6 acknowledged that the average parent doesn't think like a teacher, and programs such as Title I do a great job with family, with educating the parents, and bringing the families in. In addition to the support from the Title I Department, some sites implemented programs to increase both parent and student engagement with the school. Additionally, T12 described how their school brainstormed how to increase parent buy-in and get parents to understand that education is going to take the student, the parent, and the teacher working altogether. At T12's site, staff members discussed having quarterly evening parent meetings during which teachers talk about the importance of education and teach families how to help their children.

Another issue associated with parental involvement was the ability of parents to transport students to and from before or after school tutoring. T4 stated that the elimination of after school buses caused issues with tutoring. T4 explained that the lack of activity buses was an issue because "The kids that you get to show up to tutoring are the ones that have a ride. And a lot of the time, that's not a lot of our students." Similarly, T2 described that "one of the biggest challenges is just making sure that we are providing

equal chances for everyone and not just students who their parents are able to get them here early or pick them up late." T2 explained that "we don't have the funding to provide the buses anymore." Overall, teachers acknowledged the logistic constraint to ensuring that there is equitable access to remediation for all families.

Research Question 4

To what extent do elementary teachers understand or implement CRTP in order to close the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD? The theme, implementation of culturally responsive practices, that emerged from the coding procedure and analysis were based on the semistructured interview protocol employed in the study. During the interviews, third- through fifth-grade teachers were asked to define culturally responsive teaching and how they apply the practices during math instruction. Teachers also described the types of culturally responsive professional development in which they participated. Finally, teachers were given the opportunity to explain what additional support they would need to apply CRTP during math instruction.

Theme 1: Implementation of Culturally Responsive Practices

Teachers' knowledge of CRTP was characterized by the emphasis on several strategies. They described culturally responsive teaching in terms of fostering a sense of community, promoting inclusion, and continuously acknowledging and valuing their students' cultures, backgrounds, and life experiences. Additionally, professional development contributed to teachers' knowledge of culturally responsive practices. While

the professional development, facilitated by the district or school, prioritized the needs of diverse learners, they didn't always focus on culturally responsive practices.

Teachers' Definition of Culturally Responsive Teaching. When asked to define culturally responsive teaching, all teachers acknowledged that their students' background and culture played a role in their education. Definitions included keywords such as everyone, all students, all, each student, culture, background, and relationships. For example, T2 defined culturally responsive teaching as ensuring that all students, "especially students that come from different backgrounds, Black students, … feel empowered to become lifelong learners and critical thinkers." Additionally, T4 described culturally responsive teaching as "acknowledging the prior knowledge that your student walks into from day one and all of the experience that they have from home." They felt that includes taking in considerations of religious affiliations, cultural backgrounds, and "realizing that their schema is not going to be the same as yours." During instruction, teachers need "to nurture what they have already brought to the table to continue to help them grow." Similarly, T10 explained that CRTP involved the use of students' backgrounds and schema during instruction. T10 stated that "sometimes we have to slow down. Sometimes we have to revisit and try and see how best we can use what the students know from their cultural background to help them. You bring the real world into the classroom." The teachers' definitions of culturally responsive teaching were similar involving recognizing and incorporating each student's background, culture, and prior experiences into instruction.

Teachers also included community and relationship building in their definition of culturally responsive teachings. T1 defined culturally responsive teaching as "making sure that you have a true personal relationship with each one of your students." According to T5, being culturally responsive meant "being proactive in getting to know the community in which I'm teaching." For T5, this included having a clear understanding of all of the holidays acknowledged in the school calendar and ensuring that students understand why they have specific days off and their significance. Similarly, T8 stated that relationship building is the foundation of CRTP and also involves "keeping our biases, whether they're intentional or unintentional, under wraps." Overall, teachers acknowledged the importance of community and relationship building as critical components of culturally responsive teaching, emphasizing the need for fostering genuine connections with students and a commitment to understanding cultural nuances.

Culturally Responsive and Related Professional Development. All teachers have engaged in professional development sessions that focused on culturally responsive instructional practices. The common goal of many of these professional development sessions was to support teachers in creating inclusive learning environments that respect and address student'' cultural backgrounds and experiences. The described sessions were delivered in a variety of formats, including in-person and virtual. The professional development experiences could be categorized as either district-provided or school-provided.

VSD organized and delivered a variety of different professional development opportunities throughout the school year. Although teachers did not describe any

professional development that focused on culturally responsive math instruction, they confirmed that culturally responsive professional development was required by the district. T2 stated that “there is a required professional development by the county about culturally responsive teaching.” According to T10 and T11, this required culturally responsive training was delivered through Canvas. T10 described the purpose of the Canvas course as looking at student's background in order to make learning meaningful “because if students don't see the meaning of things, they're going to not be receptive to it.” Although there wasn't explicit mention of professional development focused on culturally responsive math instruction, the recognition of mandatory cultural competency training might influence teacher’’ perspectives on and definitions of culturally responsive teaching.

Other forms of professional development that were offered by VSD occurred either in person or virtually. T4 stated that VSD offered professional development in the last few years about responding to current events in the classroom and culturally responsive classroom management. T8 described a culturally responsive train-the-trainer initiative that provided participants with culturally responsive learning to take back and educate their colleagues. According to T8, this train-the-trainer role was “a whole new role put into place to … bring culturally responsive and family engagement into one.” During the training, participants discussed personal insecurities and discussed the importance of knowing yourself in order to be an effective culturally responsive teacher.

The districted-provided professional development sessions described by teachers focused on general instructional modifications, classroom engagement strategies, and

instructional strategies tailored to English Language Learners. T7 clarified that the primary focus of numerous sessions provided by VSD is to assist students, particularly English Language Learners, in addressing various gaps and distinguishing between modifying and accommodating instructional approaches.T4 described a Zoom training that focused on meeting the needs of students that have experienced poverty because teachers may need to adjust their instruction to make the curriculum accessible. T9 explained a session about increasing classroom engagement that involved the facilitator modeling how to implement specific strategies in the classroom. T9 explained that the facilitator taught as if she was teaching an elementary school class, making the content relatable to teachers. The facilitator gave dancing breaks and other activities to keep teachers engaged during the training.

Like the VSD provided professional development, individual schools provided various professional development throughout the year. This professional development focused on meeting the needs of diverse learners; however, CRTP were not always the focus of professional development. School-provided learning took place during staff meetings. For example, T12 stated that most staff meetings, focused on either English Language Learners or students with disabilities, but Also included strategies to support Black students. T5 also acknowledges that professional development during staff meetings focused on "how we can all, as a school, work together for our diverse students." School-provided learning also occurred through external workshops offered by external organizations. For example, T3 was sent to the Ron Clark Academy in Georgia for culturally responsive training. T3 explained that the facilitators talked about not

making assumptions based on how a student looks. During the experience, T3 observed students making elevator pitches of themselves, and while the other students played music in the background. For example, someone played the bongos while another student talked about how wonderful they are. While schools within VSD offered diverse professional development opportunities throughout the school year, the focus often centered on meeting the needs of diverse learners, with varying emphasis on CRTP. Staff meetings and external workshops addressed aspects such as ELL students and fostering student collaboration.

Implementation of Culturally Responsive Practices During Math. Each teacher described how they implemented culturally responsive instructional practices during math instruction. They also acknowledged the challenges in identifying specific culturally responsive math instructional practices. Both T3 and T9 stated that math was a more difficult and "trickier" subject to teach in a culturally responsive way. Similarly, T12 stated that being culturally responsive was easier during language arts but harder to incorporate during math. Despite these identified challenges, teachers described how they utilized a combination of instructional and classroom community-building strategies that they considered to be culturally responsive to support math instruction.

The instructional practices that teachers identified focused on ensuring that learning was accessible and making instruction relevant to their students. T11 stated that during math instruction, they do not oversimplify instruction but have the expectation that everyone can access higher level math. Accommodations were used by each teacher to make learning accessible for students. T7 acknowledged that the use of

accommodations during math instruction was expected from all teachers. For example, T10 used the chunking instructional strategy to break concepts or instruction in smaller parts to promote student understanding of math concepts. Small group instruction and the use of hands-on manipulatives were also described as methods to meet students' needs during math instruction.

Additionally, seven teachers described how they made their math instruction relevant to their students. For example, T2, T3, T10, and T11 spoke about making math instruction relevant by supporting the students in making real-world connections to math. T11 acknowledged "Real-world connections are a big one actually, trying to help students understand, how am I actually going to use this in my life?" T2 explained how they supported students in making real-world connections to math. "If we're studying something, we try to let the students talk about …things that they've done… experiences that they've had, and just using … cultural knowledge experiences and styles to make their learning more relevant." Teachers made math instruction relevant by actively facilitating real-world connections for their students, helping to foster a deeper understanding of the practical applications of math concepts.

Each teacher also tapped into students' cultures and interests, such as music and games, to create connections between math and their everyday lives. T7 described their preparation for instruction:

> I try to integrate all cultures and their thinking when I'm doing my teaching. One of the things that I love about working here is that we have a large group of diversity, and we have different cultures. Some students come from other

countries with certain ways of doing math already-and some students do not have any.

Similarly, T1, T2, T4, T5, T6, and T8 all described making word problems more relevant by embedding their students' culture and experiences into the task. T1 stated that "When I'm writing lesson plans or when I'm changing or doing a problem from the math Canvas, I'll change it to the students' names. So, I make sure that my students see themselves in the problems as well." T2 also spoke about creating word problems that allow students to see themselves. T5 explained that "I think that representation piece is really important in the delivery methods we use to make sure that all students feel seen and represented in what we're doing." T6 described this strategy as making "the problems a little more applicable to the kids." Teachers implemented diverse approaches when incorporating students' cultures and interest into math instruction in order to support students' ability to make connections with math and their everyday lives.

Classroom community-building strategies were identified as culturally responsive practices that support math instruction. For example, T11 explained that community building was used frequently and included class meetings to establish the way students should treat each other and to build conversations around math. Teachers shared that part of community building included providing students with opportunities to share their history and experiences. T1 stated that "My goal is to make sure that they see who they are and that they like something about themselves, and they recognize what it is that is amazing about them." T1 explained how students share their experiences in the classroom.

> I try to make sure that kids are able to find a space where they share about their own histories and their own pathways because …sometimes, our kids don't even know their pathway, their histories. And so, it's fascinating for them to start asking more questions.

T3 highlighted that classroom conversations with students were used to get to know students and differentiate between formal and informal language. The provided a variety of language models so that students can differentiate between the informal language of home and formal academic language. T11 also mentioned that community building involved the use of student collaboration, "which is like the social piece where they're working together and connecting with others." Teachers' implementation of classroom community-building strategies was a crucial culturally responsive practice, creating an inclusive environment where students feel valued, share their histories, and engage in collaborative learning.

Culturally Responsive Math Instructional Needs. Teachers described the type of support that they would need to implement culturally responsive math instructional practices successfully. This most requested support included the use of modeling and reflecting upon culturally responsive math instructional practices. Describing themselves as a visual learner, T5 stated "I think being given a toolbox of practices to use is one of the best places to start…I [want to] see you do it before I do it or hear how to do it before I attempt it." Similarly, T12 explained the need for modeling specific strategies as a way to support culturally responsive math instruction "we need to visually see it. Because it's one thing for them to talk about in our PDs [professional development sessions] and to

give us these handouts, but to actually see it happening and how it's implemented." T12 expressed that teachers are given resources without having an opportunity to observe the supports in action. Teachers expressed a need for an opportunity to actively engage with the district provided resources.

In addition to modeling, teachers discussed having time to reflect upon and work on culturally responsive math activities. T11 stated that "we don't think of math always being something that you would have to be culturally responsive of because math is supposed to be the universal language." They felt that if "a counter is a counter, what does it matter if it's a square or whatever"" However, as they went on to explain "the way people in other cultures or communities relate to or think about [math] … might be totally different than what we're used to." Teachers emphasized the need for dedicated time for reflection and collaborative work on creating culturally responsive math lessons.

Teachers also mentioned the use of observation and feedback cycles with a facilitator to support the implementation of culturally responsive math instructional practices successfully. T9 explained: "I don't know if there could be any way to come up with more ideas or even have someone come into your classroom… [with] any suggestions." Similarly, T4 explained a session that would be supportive to their team by giving feedback and modeling after an observation to help with future plans. The collaborative process of observation and feedback cycles would allow for the exchange of ideas and feedback, contributing to ongoing professional development.

Discrepant Cases

During these data analysis phase, there was one discrepancy found. Three teachers, T1, T8, and T9, reported that they did not see a gap in math achievement between Black and White students during the current school year. T1 stated that "I don't know that I've noticed anything different compared to any other demographic in my classroom." T1 continued, stating that "I'm feeling like currently, right now, that they are achieving quite well." T8's classroom contained a gifted cluster, which consisted of Black and White students, and described her Black students' achievement as "actually very successful in math." In contrast, T9 reported that all of her students had gaps and could not differentiate math achievement between Black and White students. T9 explained that all students were lacking foundational skills possibly due to deficits incurred during the COVID-19 pandemic.

T1 and T9 provided an additional explanation of why they did not see a gap in math achievement between Black and White students during the current school year. T1 attributed the lack of an achievement gap to hard work in the classroom and shared "I'm probably more concerned about my Hispanic population right now." T9's Black student that was not in the Gifted program struggled with paying attention during instructional time. T9 stated that "when he is paying attention and when he has that like little extra support from me, he is able to succeed." Additionally, T9 contributed to this success by building a relationship with the student. T9 explained that "… we have a very good relationship…[and] I'm able to get him … more on track." They attributes their success

to their efforts with the classroom, personalized instructional support, and the establishment of positive teacher-student relationships.

Summary of Data Analysis

This section reported these data analysis and theme identification in narrative form. This basic qualitative study examined to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. These data collection results were organized based on the RQs and themes. Four RQs underpinned this study.

These data was collected using the semistructured interview protocol listed in Appendix K and revisited several times during these data analysis process. Additionally, these data was linked to Gay's (2018) work on culturally responsive teaching, which detailed the theory, research, and evidence-based instructional approaches teachers can implement to address achievement gaps successfully. The themes that developed were Theme 1- Math instructional strategies, resources, and progress monitoring, Theme 2- Perceptions of Black students' math achievement, Theme 3- Experiences of successes, Theme 4- Experiences of challenges, and Theme 5-Implementation of culturally responsive practices.

Theme 1: Math Instructional Strategies, Resources, and progress Monitoring

Third- through fifth-grade teachers employed various approaches to bridge the academic gap in math achievement between Black and White students. They predominantly utilized small group instruction or the workshop model during math

instruction. The workshop model, promoted by VSD, consisted of a brief whole-group lesson and concept-focused stations, including a teacher-led small group lesson. Teachers worked with small groups based on student needs while engaging the class in various math activities. Additionally, teachers used district-endorsed, school-provided, or teacher-supplemented resources during math instruction. Schools supplemented district initiatives with their own resources, including after-school remediation and math support staff.

Additionally, teachers employed various strategies to progress monitor student math achievement. These strategies involved adaptive math technology resources, district-created unit assessments, teacher-created assignments, and observations. Teachers acknowledged that adaptive math technology resources such as Boom Cards and IXL generated useful reports for monitoring student progress in math. After each unit assessment, grade-level teams discussed and tracked data using Excel spreadsheets. During data conversations, teachers focused on the standards assessed and student achievement by demographic groups and questions. With support from their math coach, teachers created an action plan based on their data conversation to address any unmastered content.

Theme 2: Perceptions of Black Students' Math Achievement

Teachers held diverse perspectives on the extent of the math achievement gap between Black and White third- through fifth-grade students. While acknowledging the achievement gap, teachers focused on the following: overall math achievement, student backgrounds, parental involvement, and demographic groups (SES, English Language

Learners, Special Education, Gifted and Talented). Teachers also listed specific skills that impacted the math achievement of Black students.

Theme 3: Perceptions of Successes

Teachers highlighted strategies that improved the math achievement of Black students and can be categorized as student discourse and collaboration, community building, and explicit or small group instruction. Teachers employed strategies such as justifying and explaining solutions, peer teaching, and teamwork to encourage student discourse and collaboration. Additionally, teachers utilized classroom community-building strategies to successfully engage students during math instruction. Explicit instructional strategies included using manipulatives and targeted vocabulary. Small group remediation, both during and after school, was also perceived as impactful to the math achievement of Black students.

Theme 4: Perceptions of Challenges

Teachers identified challenges in addressing math achievement disparities between Black and White third and fifth graders. Students' academic gaps from previous school years made it difficult to manage all academic gaps within school hours. Another challenge highlighted by teachers was student engagement, which was categorized as academic (work completion and participation), behavioral (attendance), and emotional (confidence and stamina). Parental involvement was also identified as a challenge. Teachers compared parental involvement between Black and White parents.

Theme 5: Implementation of Culturally Responsive Practices

Teachers' definitions of culturally responsive teaching focused on community building, inclusion, and recognizing students' backgrounds, cultures, and experiences. In addition, teachers participated in various professional development opportunities to support teachers in creating inclusive learning environments that respect and address students' cultural backgrounds and experiences. They engaged in professional development provided by the district or school provided, focusing on diverse learner needs, although not exclusively focused on culturally responsive practices. While implementing these practices during math instruction, teachers acknowledged the challenges in identifying specific practices and utilized various instructional approaches such as accommodations, community building strategies, and relevant content based on students' cultures and interests to make math instruction, including connecting work problems to students' experiences. Teachers expressed the need for support for implementing culturally responsive math instructional practices, emphasizing modeling, reflecting, and facilitator-led observation and feedback cycles. They also emphasized the importance of having time for reflection and developing on culturally responsive math activities.

Section 3 presents the project. I begin by discussing the rationale. Next, I provided a review of the literature. Additionally, I explained the project description, which consisted of resources, existing supports, potential challenges, and solutions to the challenges. The deliverable project was a professional development workshop for third- through fifth-grade students. I also provided a detailed proposal for the implementation of

the deliverable, including a timetable and a description of the responsibilities and roles of the facilitator. This section ended with project implications and a project evaluation plan.

Section 3: The Project

The project developed from this research study was a blended professional development cohort for elementary teachers. Professional development is essential to teacher growth and improves student achievement (Parsons, 2019; Kohen & Borko, 2022). In this basic qualitative study, I examined to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. Study results indicated that although third- through fifth-grade teachers employed various approaches to bridge the academic gap in math achievement between Black and White students, their use of CRTP during math was superficial. I developed the project to support teachers' use of culturally responsive instructional practices to address the needs of their students after the study is published. The purpose of this professional development is to improve teachers' understanding of how to implement culturally responsive instructional practices during math.

Description and Goals

The deliverable project for this study is a 25 hr blended or hybrid professional development cohort consisting of synchronous and asynchronous learning experiences over the course of 6 weeks (see Appendix A). This cohort will be hosted in Canvas and implemented during the summer. Participants will complete 12 hr of synchronous (face-to-face) learning, 13 hr of asynchronous learning, and optional coaching hours. Okon (2023) defined a hybrid learning environment as the integration of online learning and

traditional face-to-dace learning. Hybrid or blended professional development environments provide stakeholders with the flexibility of online coursework and allows for opportunity for hands on experiences (Koukis & Jimoyiannis, 2020; Wakefield, 2022; Peden et al., 2022; Okon, 2023). The third- through fifth-grade teachers from VSD will be invited to participate in the cohort. By the end of the professional development, participating teachers should understand culturally responsive teaching and how to implement culturally responsive instructional practices during math to address the math achievement gap between Black and White third through fifth graders.

I developed the blended or hybrid professional development cohort to fill the instructional gap in math for to third- through fifth-grade teachers. According to Meyer et al. (2023), educators successfully access professional development when it is well structured with clear expectations. The professional development sessions consist of a Canvas course with resources organized into modules based on the themes found in the study's findings. A facilitator guide was created to guide participants through the 25–hr course. An outline of the course in the form of a syllabus was included in the introduction. Specific times are provided for each activity facilitated during the face-to-face sessions. Each module in the Canvas course includes a variety of resources such as interviews with experts, webinars, podcasts, and articles focused on culturally responsive teaching and culturally responsive math instruction (see Appendix A). Resources also consist of handouts such as the face-to-face PowerPoint presentation slides, graphic organizers, and activity directions to guide activities and provide teachers with opportunities to record their thinking. These documents were created to support teachers'

implementation of CRTP in math and were based on teacher needs (see Biccard, 2019). The professional development documents are also aligned to the specific goals of the cohort. Each module consists of a specific discussion forum and protocol to facilitate reflection about each module topic. Finally, the Canvas course will serve as a resource hub for teachers to use once they finish the cohort.

The aim of the professional development cohort is to provide teachers with resources and strategies to address the challenges associated with the math achievement gap between Black and White third through fifth graders. To accomplish this goal, the professional development cohort will

- Enhance teacher's ability to implement culturally responsive math instruction by exploring engaging math resources, successful evidenced-based instructional strategies, and effective progress monitoring strategies.
- Foster a collaborative and reflective PLC focused on understanding and addressing the challenges associated with the math achievement gap between Black and White third through fifth graders.
- Develop an action plan for integrating culturally responsive math instruction into the curriculum, using district and school provided resources to address achievement discrepancies effectively.

The intent of the training is to provide teachers with the knowledge and support necessary to navigate the challenges associated with addressing the achievement gap and promote equitable learning outcomes for students. Additionally, these goals for the professional

development cohort will be listed in the Canvas course introduction and reiterated during each in-person session.

The recommended size for each professional development cohort is 20–30 third- through fifth-grade teachers. The professional development consists of six live 2-hr face-to-face meetings. During the face-to-face meetings, teachers will actively collaborate with their colleagues as they engage in a variety of activities to learn more about culturally responsive math instruction. These synchronous sessions will be complemented by optional coaching office hours via Zoom that are strategically offered twice per week to facilitate personalized support for teachers throughout the cohort. In addition to the face-to-face meetings, the cohort features 13 hr of asynchronous, self-paced activities that empower educators to personalize their learning experience during each module. Teachers will be expected to spend a minimum of 2 hr engaging with the asynchronous learning, which involves reading articles, watching videos, listening to podcasts, participating in discussions, and reflecting upon their learning. Additionally, teachers will have the opportunity to spend more time exploring resources based on their individual needs. The knowledge that participants gain from this professional development cohort will be evaluated with formative and summative activities. The formative activities included face-to-face discussions, discussion posts, and interactive activities. The summative activity is an evaluation form (see Appendix M). The goal of this cohort structure is to offer a flexible learning environment by offering a blend of synchronous, asynchronous, and optional coaching opportunities.

Rationale

Professional development supports teachers' capacity to meet their students' needs. Participation in professional development can help teachers become more culturally competent and positively impact teachers' self-efficacy (Johnson et al., 2021; Makopoulou et al., 2021). In this study, I investigated the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. A pronounced math achievement gap that has ranged from 11% to 26% between White and Black students was evident in standardized math pass rates of third through fifth grades in the state and in VSD. The study's findings acknowledged the achievement gap with teachers describing their perspectives on the overall math achievement, student backgrounds, parental involvement, and demographic information of their Black and White students.

The VSD strategic plan identified that a culturally relevant curriculum will be used to ensure that students have equitable access to a high quality and rigorous education. VSD leaders defined a culturally relevant curriculum as instruction that supports student learning by connecting content to the students' cultural and linguistic background and life experiences. Extensive research indicates that using CRTP improves Black students' academic achievement and engagement (Abacioglu, 2020; Gay, 2018; Ladson-Billings, 1994; Yu, 2022). I found that teachers had knowledge of culturally responsive instruction. Additionally, teachers implemented culturally responsive

instructional practices to support math instruction while acknowledging the challenges in identifying specific culturally responsive instructional practices.

The study results also revealed that third- through fifth-grade teachers in VSD acknowledged the need for additional professional development. Teachers expressed the need for support for implementing culturally responsive math instructional practices, primarily through modeling and reflecting. They requested a facilitator model or provided specific strategies to support culturally responsive math instruction. In addition, teachers emphasized the importance of having time for reflection and working on culturally responsive math activities. Finally, teachers highlighted the need for observation and feedback cycles led by a facilitator to effectively integrate culturally responsive practices into their math instruction. The VSD teachers' perceptions were used to build their capacity to implement culturally responsive math teaching practices and provide opportunities to reflect upon their current teaching practices.

Review of the Literature

Genre Related to the Project

Professional development is pivotal in building teacher capacity and improving student outcomes. Research has highlighted the importance of high-quality professional development in enhancing student learning (Heck et al., 2019). Parkhouse et al. (2023) stressed the value of differentiating professional development to meet the specific needs of teachers. Professional development provides a platform for teachers to reflect, receive constructive feedback, and access support from a content expert (Kohen & Borko, 2022; Wakefield, 2022). Teachers also have an opportunity to observe the content being

modeled so that they can experience the teaching strategies from the perspectives of their students (Turner et al., 2019). Professional development is an effective approach for engaging teachers with new content and facilitating its successful implementation.

Professional development sessions were appropriate to address the problem of this study, which was a gap in math achievement test scores between Black and White third through fifth graders. Dixon (2022) emphasized the importance of fostering educators who are knowledgeable about CRTP and capable of translating their beliefs and dispositions into action. This genre related to the project is aligned closely with the objective of designing a professional development program developed to bridge disparities in student math achievement. Various professional development methods and structures exist to build teacher capacity and improve student outcomes. professional development can be in-person, entirely virtual, or a combination of both. Fishman et al. (2013) found that virtual and in-person professional development significantly improved teachers' capacity and student outcomes. The professional development cohort was based on effective professional development strategies.

Literature Search Strategy

I used the Walden University Library to search for peer-reviewed scholarly work for this literature review. Several databases were primarily used to find peer-reviewed research: Academic Search Complete, EBSCOhost, Education Source, Education Research Complete, ERIC, ProQuest Central, Sage Research Methods, and Taylor and Francis Online. The articles reviewed for this literature review were published between 2019 and 2023. Several sources published before 2019 were included to provide

additional context about professional development. I concluded that I had reached saturation when I was unable to locate new research about professional development related to my project. The following search phrases and keywords were used to find articles for this project: *adult learning theory*, andragogy, *cultural competence, culturally responsive professional development, culturally relevant professional development, culturally responsive math, culturally relevant math, heutagogy, just in time PD, math professional development, math professional development, professional development, professional learning, online professional development, hybrid professional development, blended professional development, blended professional development, benefits of professional development, professional development reflection, professional development modeling, teacher growth, professional development impact, supporting adult learning, Senge's five disciplines collective inquiry, SMART goal,* and *collaboration.* The following themes are discussed in this literature review: characteristics and models of effective professional development, online professional development, hybrid professional development, impact on teaching and student outcomes, reflective professional development and teacher growth, and culturally responsive professional development.

Characteristics of Adult Learners

It is essential to understand how adults learn to support teachers' growth and development effectively. Teachers play a critical role in shaping their students' learning experiences in an educational system that is constantly evolving. Consequently, the development of high-quality professional development depends on an understanding of the specific ways in which adults absorb, process, and apply their learning to solve a

problem. Adult learning focuses on andragogy, an approach to teaching adults (Alabisi & Vucetic-Trifirò, 2023). Merriam and Bierema (2014) summarized the six critical assumptions about adult learners that are pivotal to designing learning experiences for adults. As individuals mature, their self-concept shifts from dependency to self-direction. Therefore, the learning environment must be adult-centered and based on the development of trust and respect (Knowles, 1980; Merriam & Bierema, 2014). Additionally, adult learners have a variety of experiences that can be used as additional resources for learning. Consequently, an adult's willingness to learn is tied to their role in society, which highlights the importance of personalizing learning experiences to meet the needs of each adult (Knowles, 1980). Therefore, adults are typically driven by internal motivation, an understanding of the purpose of the learning, and focused on the application of learning to solve a problem (Merriam & Bierema, 2014). A clear understanding of how adults learn supports the creation of a strong foundation for effective professional development.

Acknowledging the interconnectedness between pedagogy, andragogy, and heutagogy is also crucial to developing targeted support for adult learners. In contrast to andragogy, pedagogy refers to teaching children (Alabisi & Vucetic-Trifirò, 2023). Pedagogy is teacher-focused, with the teachers determining how content is organized, delivered, and assessed (Merriam & Bierema, 2014). Understanding the focus of pedagogy, the transmission of knowledge, allows educators to support adult learning by providing structure to new learning and opportunities for learners to have agency over their learning (Alabisi & Vucetic-Trifirò, 2023). To give adult learners autonomy over

their learning, the educator must be a facilitator or coach who supports the learning process by cultivating opportunities to think critically about a problem or apply their learning to a real-life situation (Knowles, 1980). Additionally, adult learners take an active role in the learning process and are involved in planning, delivering, and evaluating their learning (Merriam & Bierema, 2014). Implementing an andragogical model provides more opportunities for adult learners to collaborate. Professional development that takes a heutagogical approach, which involves self-determined learning, helps to empower adult learners.

Heutagogy, or self-determined learning, allows adult learners to take control of their learning process. Like andragogy, adult learners actively participate in learning and determine the learning objectives, instruction, and success criteria (Alabisi & Vucetic-Trifirò, 2023). Glassner and Back (2019) state that heutagogy promotes a learner's passion for learning. The autonomy of self-determined learning promotes a more personalized learning experience because learners are encouraged to use their experiences as resources to guide their learning. Knowles (1980) outlined a six step process for creating an environment conducive to self-directed learning. The process begins with cultivating a learning environment based on respect, trust, and support. Once a positive culture has been established, a needs assessment must be completed to determine the focus of the learning. The facilitator develops learning objectives from this assessment, identifies appropriate learning resources, implements appropriate instructional strategies, and creates the success criteria (Merriam & Bierema, 2014). Practical support for adult learners depends on acknowledging the interconnectedness between pedagogy,

andragogy, and heutagogy. The strategies selected to support adult learners, such as scaffolds, collaboration, and direct instruction, should be based on their needs and promote critical thinking and problem-solving.

Characteristics and Models of Effective Professional Development

Creating effective professional development involves aligning content with the National Professional Learning Standards and incorporating essential characteristics identified in the research. The National Professional Learning Standards, developed by Learning Forward, are categorized into three areas, each representing an essential element of adult learning poised to impact student success significantly (Learning Forward, n.d.). In the first category, rigorous content for each learner, the standards describe the foundational content of adult learning that contributes to student success. The second category, transformational processes, provides an overview of how professional development engages teachers in learning that significantly changes their knowledge, instruction, and perspective. The third category, conditions for success, outlines the characteristics of professional learning that form the foundation of high-quality learning. Table 6 summarizes the three main professional learning categories, their respective subcategories, and the focus of each subcategory.

Table 6

Overview of National Professional Learning Standards

Category	Subcategory	Subcategory focus for learner
Rigorous content for each learner	Equity practices	Comprehend the historical, cultural, and societal contexts of students while building relationships and utilize students' strengths during instruction.
	Curriculum, assessment, and instruction	Comprehend how to select, implement, and assess high-quality curriculum and instructional materials for students.
	Personal expertise	Build capacity to apply standards and research into instruction.
Transformational processes	Equity drivers	Build capacity to address biases and collaborate with diverse colleagues and students.
	Evidence	Understand how to plan professional learning using data and resources from a variety of sources.
	Implementation	Understand how to maintain professional learning initiatives.
	Learning designs	Set goals that are grounded in research and design learning that is evidenced-based.
Conditions for success	Equity foundations	Establish and sustain processes to ensure that staff learning is equitable and supported.
	Culture of collaborative inquiry	Build collaboration skills to ensure continuous improvement.
	Leadership	Advocate continuous improvement through the use of a clear vision for professional learning.
	Resources	Ensure that resources for professional learning are distributed equitably and monitored for impact.

Note. This table is summary of the National Professional Learning Standards outlined by Learning Forward (n.d.).

Several characteristics contribute to creating a conducive environment for teachers to enhance their instructional practice. The most favorable learning environment for teachers occurs when teachers are put in the role of change agents, work together to make sense of the pedagogy, and engage in problem solving with each other's support (Yoon et al., 2020). Research has yielded several characteristics of effective professional development. Wakefield (2022) identified eight characteristics of impactful professional development:

- Content-specific: Professional development is content-specific when the facilitator's goal is to focus on building teacher capacity with specific areas of instruction.
- Active engagement: Teachers are actively engaged in professional development when they participate in hands-on experiences, structured discussions, problem-solving activities, and collaborative learning (Yoon et al., 2020; Meyer et al., 2023; Walker, 2023).
- Collaboration: Intentional peer-to-peer interaction during professional development can predict how teachers' instructional practices change upon completion of the professional development(Meyer et al., 2023).
- Demonstration of successful practice: When effective instructional strategies are modeled, teachers have an opportunity to observe and learn from content experts (Turner et al., 2019).
- Receiving coaching from a content expert: Effective professional development also includes coaching sessions where teachers receive support

from a content expert tailored to their specific needs (Hunzicker, 2019; Kohen & Borko, 2022; Wakefield, 2022).

- Feedback and Reflection: Constructive feedback is essential for effective feedback. As teachers engage with focused instructional strategies, they should receive feedback on their teaching practices or the materials they select for specific, actionable instruction and focused on student outcomes (Kohen & Borko, 2022). Teachers should also have opportunities to reflect or think critically about their practice and beliefs (Hunt et al., 2023).
- Continuous support: Continuous support in professional development ensures that teachers receive ongoing assistance and resources to refine their skills and knowledge (Dixon, 2021).
- Professional development duration: Professional development without ongoing support prevents teachers from effectively implementing new instructional practices in their classrooms (Gladney, 2021).

Although effective professional development is characterized by these seven elements, there are a variety of methods to deliver professional development to teachers.

Professional Development Models Related to the Project

Various professional development models are available to support teachers as they build their capacity to implement new instructional practices. In developing the project in this study, I drew from the components of adult learning theory and from four professional development models: collaborative groups, coaching, online professional development, and blended professional development. These professional learning models

were selected based on the themes that emerged from the data analysis. Teachers will have an opportunity to reflect upon their instructional approaches and experiences with addressing gaps in math achievement and support their implementation of cultural responsive strategies. Additionally, each of these professional development models are currently implemented at VSD, according to the district's webpage for professional learning. Collaborative groups are highlighted as a dynamic method for fostering teacher growth because this learning facilitates challenging conversations, reflection on problems of practice, and evidence-based discussions, contributing to professional development (Onrubia et al., 2022). Coaching is another significant model that enhances teacher capacity by setting clear goals, collecting performance data, addressing biases, and providing individualized support (Wood, 2016; Ma et al., 2018; Gladney, 2021; Keijzer, 2020; Sulisliyo et al., 2021; Viera, 2021). When intentionally designed for social interaction, online professional development offers flexibility, fosters metacognitive awareness, and enhances teaching practices (Powell & Bodur, 2019; Beach et al., 2022; Meyer et al., 2023). Blended learning combines face-to-face and online strategies, providing flexibility and promoting collaboration (Koukis & Jimoyiannis, 2020; Oakley et al., 2023). This section explores each of these professional development models, explaining how they support teacher growth and development of teachers.

Collaborative Groups

In order to prompt participants to engage in difficult conversations, it is important to provide an opportunity for teachers to collaborate. Productive teacher collaboration depends on five essential practices: sharing and reflection upon problems of practice,

using evidenced-based explanations for any conclusions, using experience to make connections, responding to, and elaborating ideas generated from the collaboration, and examining ideas from multiple perspectives (Onrubia et al., 2022). Onrubia et al. (2022) found that using a combination of discourse-promoting strategies in an intentional manner supports teacher collaboration during professional development. One example, question loop-request information, involves asking questions about teaching practices, accepting teachers' descriptions, and introducing additional information. Another example, question loop-guided analysis, combines teachers' analyses with the use of simulations or examples to support their understanding. The researchers' third example, answering through examples, combines acknowledgement of teachers' challenges and questions with the use of content-related examples. These practices enhance the quality of teacher collaboration and contribute to the professional growth of teachers, Onrubia et al. concluded.

Collaborative teacher study groups are a relationship-centered professional development model that promotes learning through engaging in discussions with qualified content experts and exchanging ideas. These study groups can be a powerful professional development model because they provide teachers with continuous content-specific support through reflective inquiry, constructive feedback, and sharing problems of practice and finding solutions for those problems (Johnson et al., 2022). Additionally, research regarding the use of collaborative groups emphasizes the importance of continued support of teachers after an initial professional development (Carbone & Reynolds, 2013; Jones, 2023). For example, collaboration can support the development

of new instructional practices and change perceptions of the teachers' practice. Collaborative groups are successful when they are built on trust, and the participants share the same values and goals for learning (Carbone & Reynolds, 2013). Collaborative groups are a powerful professional development model that fosters continuous instructional support and positive change when there is trust, shared values, and learning goals within the group.

Professional Learning Communities. Collaborative groups can also take the form of a PLC. A PLC is an ongoing process of collaboration in recurring cycles of collective inquiry with the goal of improving student achievement (DuFour et al., 2016; DuFour et al., 2021). Recent studies, such as those by Levy et al. (2022), Tam (2023), and Zhang et al. (2023), demonstrated the effectiveness of PLCs as a model for professional development and improved self-efficacy. Three essential beliefs underpin PLCs. First, teachers are committed to ensuring all students engage in rigorous learning. Second, teachers must collaborate and take responsibility for all students to ensure their success. Third, teachers focus on "evidence of student learning" to drive instruction and meet individual needs (DuFour et al., 2016, p.12). According to Dufour et al. (2021), PLCs are effective when all the participants believe that improving student learning involves continuous learning integrated into the workplace. When given an opportunity to continuously collaborate in PLCs, teachers' ability to meet the needs of all students.

The effective implementation of PLCs facilitates teacher decision-making and promotes the use of innovative methods to address student needs and enhance their capacity. According to DuFour et al. (2016), PLCs are guided by six principles that

emphasize collective responsibility, collaborative teamwork, equitable curriculum implementation, development of common formative assessments, a structured process for interventions and extensions, and the strategic use of student data to inform instructional strategies (DuFour et al., 2021). These guiding principles highlight the transformative power of targeted collaboration, focusing on student learning. Through the strategic cultivation of collective responsibility, targeted cooperation, and the systemic utilization of student data, teachers are involved in a process that drives their instruction and approaches to intervention and extension. Additionally, the focus on a "guaranteed and viable curriculum" and common formative assessments can play a role in determining the professional development needed to build teachers' capacity to deliver instruction and monitor student progress (DuFour et al., 2016, p. 14). Consequently, the successful implementation of PLCs supports continuous improvement of student outcomes.

The first principle entails establishing a shared mission, vision, values, and goals, forming the four pillars of a successful PLC (DuFour et al., 2021). This principle emphasizes the collective nature of the PLCs, where teachers collaborate in decision-making, progress monitoring, and knowledge sharing. Creating a shared mission determines the purpose of the PLC and provides direction for the work. Although the concepts of mission and vision are sometimes considered interchangeable, the vision of a PLC can be defined as a realistic aspiration for the team or school's future, driving positive change. Shared values within a PLC represent the collective commitments that teachers will implement to accomplish the shared mission, vision, and goals. Clear goals within the PLC enable the systematic monitoring and evaluation of the progress toward

the shared goals, ensuring alignment with the shared mission, vision, and values (DuFour et al., 2021). DuFour et al. (2016) advocated using SMART goals to monitor collective progress- a strategic, specific, measurable, attainable, results-oriented, and time-bound process (Conzemius & O'Neill, 2014). Establishing a shared mission, vision, values, and goals holds all teachers accountable for the team's work. The subsequent five principles build upon this foundational principle.

Effective PLCs include collaborative teams focused on learning and implementing a "guaranteed and viable curriculum" (DuFour et al., 2021, p.70). These principles encourage teams to work interdependently towards shared learning goals (DuFour et al., 2016). Working as a collaborative team contributes to teachers' content knowledge and instructional strategies by facilitating the sharing of successful instructional strategies. Additionally, through collaborative discussions on standards mastery, teachers enhance their understanding of what students must master by the end of each unit (DeLuca et al., 2017; DuFour et al., 2021). PLCs must clearly define student learning objectives and success criteria to ensure equitable learning. All those participating in the PLCs must ensure that equitable instruction is framed with high expectations (DuFour et al., 2021). Integrating collaborative teams and equitable curriculum during PLCs enhances students' understanding of student needs.

These two principles are interconnected, as collaborative teamwork and curriculum development involve collective inquiry to address student needs. Over time, collective inquiry during PLCs can transform teachers' approach to instruction and student evaluation, typically emphasizing student engagement. During PLCs, engaging in

collective inquiry allows teachers to develop more effective instructional strategies and address classroom challenges, increasing their confidence to use new strategies (Shim & Thompson, 2021). The collective inquiry also promotes effective collaboration between the members of the PLC (DeLuca et al., 2017). Combining learner-focused collaboration and collective inquiry creates opportunities to ensure equitable curricula, enhance teachers' content knowledge, and improve student outcomes.

The following three principles focus on leveraging common formative assessments to monitor student progress, improve the team's ability to achieve collective goals, and provide interventions and enrichment to ensure that all student needs are met. Common formative assessments, which can encompass various sources, allow PLC members to gauge the effectiveness of both the curriculum and instructional practices in mastering content and guide decisions about the next steps for instruction (DuFour et al., 2021). Additionally, common formative assessments promote collective reflection during the PLCs. Teachers collaborate to share their experiences with content and student progress. PLCs allow teachers to purposefully craft or modify common informative assessments and identify instructional gaps (Fisher et al., 2019; Bergeron, 2020). This collective reflection helps to improve instructional practice and student outcomes (Adminraal et al., 2021). Moreover, common formative assessments support the identification of the most effective instructional practices and guide the process of providing interventions or enrichments for students who need additional support or have already mastered the content (Fisher et al., 2019; DuFour et al., 2021). The integration of

common formative assessments within these principles is a powerful tool for continuous improvement.

These six principles of effective PLCs are supported by the Five Disciplines outlined by Senge et al. (2012) and provide support for continuous learning and improving student outcomes. The Five Disciplines consist of personal mastery, mental models, shared vision, team learning, and systems thinking. In PLCs, the concept of personal mastery involves supporting the growth of individuals through reflection. The discipline of mental models represents each person's perceptions of their work, which is shared and explored through collective inquiry and reflection (Senge et al., 2012). Through collective inquiry, teachers have an opportunity to build their capacity as they discuss their experiences with their colleagues (Fisher et al., 2019; Shim & Thompson, 2021). The discipline of shared vision is aligned with the DuFour et al. (2016) principle of establishing a shared mission, vision, values, and goals because participants are working collaboratively toward a common purpose. Team learning in PLCs involves individuals collaborating through daily communications to reach shared goals and address challenges. The fifth discipline, systems thinking, encourages collaboration, valuing all perspectives, and using various tools to problem-solve challenges (Senge et al., 2012). Like the systems thinking discipline, DuFour et al. (2016) encourage individuals to work interdependently towards shared learning goals with a focus on learning. When implemented effectively, collaborative groups or PLCs improve student achievement (Jones, 2023). The strategic collaboration of teachers can positively impact student outcomes and teacher capacity and build collective staff efficacy.

Collaboration and Collective Staff Efficacy. Collective staff efficacy describes the shared school belief that all students have the ability to achieve success and exceed a year's worth of academic growth. Collective staff efficacy correlates with student achievement with an effect size of d=1.39 (Hattie & Zierer, 2017; Sweeny & Harris, 2020). According to Donohoo (2016; 2018), high levels of collective staff efficacy occur when teachers believe in their colleagues' ability to facilitate student mastery of complex instruction, cultivate student creativity, and promote student self-confidence in their academic abilities. Although collective staff efficacy is greatly impacted by school structures and climate, when teachers focus on the "impact of teaching" instead of the teaching process, they positively impact student achievement (Hattie & Zierer, 2017, p. 27). Consequently, existence of collective staff efficacy increases productivity within the school community leading to increased teacher leadership, dedication to students and colleagues, and positive relationships and attitudes towards students (Donohoo, 2018). The effective implementation of collaborative groups or PLCs improves student achievement and plays an essential role in fostering collective efficacy while fostering teachers' ability to meet the needs of their students.

Coaching

Research has indicated that coaching positively impacts teacher capacity (Gladney, 2021; Sulisliyo et al., 2021; Viera, 2021). Coaching is typically offered by a content expert and can be delivered formally or informally. Each site selected for this study had at least one math coach. Like collaborative groups, coaches can positively impact collective staff efficacy by building their teachers' confidence as they equip them

to effectively implement new strategies (Sweeny & Harris, 2020). It can also be more effective than traditional 1-day workshops (Ackerman et al., 2023). Viera (2021) described the coaching process as consisting of several staples. First, the coach and teacher must create clear goals for the coaching process. Performance data must be collected to evaluate the effectiveness of the relationship between coach and teacher and modify the original goals as necessary. An action plan for the coaching, complete with related resources, must also be developed and implemented with fidelity. Finally, the goal and teacher or student outcomes will be evaluated at the end of the coaching process (Viera, 2021). Coaching models, such as student-centered coaching, involves the coach and teacher working together in a cycle of co-planning, coteaching, and evaluating student progress. Coaching cycles are more flexible than typical professional development because the goal of the cycle can be adapted to meet the specific needs of the teacher or a small group of teachers (Sweeney & Harris, 2020). Additionally, coaching allows teachers to better understand how their background, biases, and beliefs influence their instructional practice (Keijzer, 2020). Multilevel coaching was included in the project to ensure that teachers were provided the opportunity to receive individualized support.

Multilevel Coaching. Multilevel coaching can be defined as an approach to professional development that involves three components: high-quality professional development, supervisory coaching, and side-by-side coaching (Wood et al, 2016). The first component of multilevel coaching serves as the foundation of the coaching process and involves teachers engaging in high-quality professional development (Wood et al.,

2016). After completing the professional development, supervisory coaching occurs in which the teachers receive support as they implement what they learned during the professional development session (Wood et al., 2016). Teachers who need additional support will engage in side-by-side coaching, which is personalized to their needs (Wood et al., 2016). With this approach, teachers move between each level of support based on the teachers' performance and data collected during instruction. Gladney (2021) acknowledges that individualized coaching is essential for teacher growth, and a one-size-fits-all professional development is often ineffective. The significance of multilevel coaching lies in the ability of the coach to individualize support based on teachers' needs. This approach, as acknowledged by Gladney (2021), is essential for teacher growth and is substantiated by previous studies highlighting the importance of engaging in differentiated coaching after the initial professional development session (Wood et al., 2016; Gage et al., 2017; Kraft et al., 2018). Data-driven multilevel coaching subsequently enhance both teacher practice and student outcomes. As teachers navigate through individualized levels of support, the impact on their growth and subsequently on their students' academic success becomes evident.

Online Professional Development

Technology has provided opportunities for the emergence of online professional development. Online professional development provides teachers with an opportunity to enhance their skills and knowledge about a particular instructional strategy (Meyer et al., 2023). Powell and Bodur (2019) explained that online professional development provides teachers access to various educational topics that address their needs. Online professional

development offers flexibility in terms of time and location, which allows teachers to access workshops, courses, and resources at their convenience (Powell & Bodur, 2019). Additionally, online professional development can be a cost-effective option for teachers because it eliminates the need for travel expenses (Powell & Bodur, 2019). Dash et al. (2012) characterized online professional development into models that can be delivered formally or informally: synchronous online learning and asynchronous online learning, each offering unique opportunities for teachers. For example, synchronous online learning incorporates social interaction in the form of discussions to replicate the experience of face-to-face professional development, which requires participants to be available simultaneously (Dash et al., 2012). In contrast, asynchronous online learning allows teachers to complete learning based on their schedule (Dash et al., 2012). Online professional development empowers educators with accessible resources to enhance their teaching practices.

Self-paced, online learning can significantly impact the participating teachers' behaviors, aligning with the framework of just-in-time professional development. For example, research has highlighted that online professional development benefits teachers when they engage in cognitive and behavioral strategies (Beach et al., 2022). Those who participated in online professional development consistently monitored their learning progress and indicated a heightened awareness of their personal goals and the relevance of materials to their teaching practice (Beach et al., 2022). The heightened metacognitive awareness aligns with characteristics of just-in-time professional development, where teachers take complete control of their learning (Calleja et al., 2021). Additionally, just-

in-time professional development is flexible and self-directed (Greenhalgh & Koehler, 2017). Social media platforms facilitate just-in-time professional development by allowing teachers to find various professional learning whenever they need additional support (Greenhalgh & Koehler, 2017; Calleja et al., 2021). Regardless of the frequency of a teacher's participation, online professional development gives teachers an opportunity to monitor their learning, critically evaluate content and resources, and increase self-efficacy for the teaching strategy (Beach et al., 2022). This research supports the notion that online professional development can shape and enhance teaching practices.

Research has also emphasized the importance of well-structured and goal-oriented online professional development because they significantly impact teachers' instructional practice and perceptions (Powell & Bodur, 2019; Meyer et al., 2023). If online professional development is designed with intention, it can lead to significant gains in teacher knowledge and beliefs similar to traditional face-to-face professional development (Fishman et al., 2013). Strategies such as cognitive activation, which involves reflective and interactive activities alongside collaboration in online professional development, have been found to predict positive changes in teacher professional practices (Powell & Bodur, 2019; Meyer et al., 2023). Therefore, the effectiveness of online professional development is contingent on design and implementation because just providing access to reflection questions in an online format does not effectively support teachers' implementation of new instructional practices (Powell & Bodur, 2019). Additionally, online professional development can significantly impact teacher

perceptions and practices regarding content. Therefore, targeting teacher perceptions and practices during the professional development design process will likely create a lasting impact on teachers (Hunt et al., 2023). A well-structured online professional development is differentiated to account for the participants' teaching experience, expertise, and context (Powell & Bodur, 2019). Integrating clear objectives and active learning strategies within a well-structured online environment is critical to enhancing the overall effectiveness of online professional development experiences.

In addition to an intentional online professional development design, social interaction and collaboration are critical for effective online professional development. Yoon et al. (2020) highlight the importance of creating online courses that intentionally foster social capital among teachers. This approach combines essential teacher learning characteristics with strategies encouraging collaboration and community-building. The study emphasized that using prompts that facilitate the exchange of information between teachers yielded higher levels of collaborative discourse (Yoon et al., 2020). However, a recurring challenge in current online professional development is the insufficient provision of opportunities for collaboration among participants, highlighting the need to implement additional strategies to improve teachers' online experience (Powell & Bodur, 2019). One proposed solution is adopting hybrid or blended learning models, which combine traditional and virtual professional development to offer a balanced approach (Meyer et al., 2023). Using hybrid or blended learning models may provide teachers with the benefits of in-person collaboration and the flexibility of online professional development to create a more effective learning environment for teachers.

Blended Professional Development

Blended learning is an educational approach that combines face-to-face and online strategies to deliver professional development (Koukis & Jimoyiannis, 2020; Wakefield, 2022; Peden et al., 2022; Okon, 2023). This model of professional development integrates technology and traditional face-to-face activities (Kohen & Borko, 2022; Oakley et al., 2023), offering flexibility in terms of when and where learning takes place while maintaining the benefits of face-to-face learning (Kohen & Borko, 2022). Teachers participating in blended professional development can engage with various learning materials, including videos, interactive simulations, and traditional classroom discussions (Penden et al., 2022; Okon, 2023). The purpose of the blended learning approach is to improve teaching practices (Wakefield, 2022), improve professional development (Peden et al., 2022), and optimize student engagement and outcomes by leveraging the strengths of both online and traditional instructional methods (Koukis & Jimoyiannis, 2020). When implemented effectively, blended learning can bridge the gap between traditional face-to-face and online professional development.

There are several benefits associated with the blended learning approach. First, blended learning is effective for professional development because it supports ongoing opportunities for educators to reflect on their practice and access learning materials, which is crucial for improving teaching skills (Kohen & Borko, 2022; Okon, 2023). Additionally, blended learning can promote collaboration (Penden et al., 2022) and build strong professional relationships or a sense of community among teachers (Murai & Muramatsu, 2020; Wakefield, 2022). This can lead to more meaningful interactions

between teachers, contributing to improved learning outcomes for teachers (Arifani et al., 2020). Finally, blended professional development is highly adaptable, allowing facilitators to incorporate various delivery models, technologies, and pedagogical approaches to accommodate diverse learning styles (Oakley et al., 2023). These benefits make blended learning an effective educational approach catering to diverse learning needs and content.

While research has demonstrated the advantages of blended professional development (Kohen & Borko, 2022; Oakley et al., 2023; Okon, 2023), it has also highlighted that teachers have voiced concerns about this approach. For example, teachers may worry about experiencing technical difficulties and issues related to the digital divide when participating in or implementing the online components of learning (Peden et al., 2022; Khairunnisak et al., 2022). Teachers may also find it challenging to navigate the transition between face-to-face and online learning. Consequently, teachers may initially require ongoing support during the blended professional development (Kohen & Borko, 2022). Therefore, it's important to account for teachers' concerns when developing professional development.

Impact of Professional Development on Teacher and Student Outcomes

Studies have demonstrated that professional development has significantly impacted teachers and students (Heck et al., 2019; Alansari and Rubie-Davies, 2021; Makopolou et al., 2021). For example, Heck et al. (2019) and Alansari and Rubie-Davies (2021) emphasized the positive impact of a variety of professional development approaches on instructional practices, perceptions, and teacher knowledge. Teachers who

participate in professional development improve their instructional practices regardless of the approach in which they engage. As a result, students' learning experience was improved, and teachers' instructional practices were more effective (Heck et al., 2019). Additionally, professional development can significantly improve teachers' self-efficacy and build collective staff efficacy in the content that they are engaged with during learning (Hattie & Zierer, 2017; Makopolou et al., 2021). Professional development builds teacher capacity to address various challenges in the classroom and implement new instructional practices (Alansari and Rubie-Davies, 2021; Makopolou et al., 2021). Alansari and Rubie-Davies (2021) explained that participation in professional development allows students to engage and learn from each other, indirectly contributing to improving the students' learning experience. Teachers' engagement in high-quality professional development improves instructional practice and fosters students' academic achievement.

Students whose teachers underwent professional development benefit academically across all content areas. For example, Cantrell et al. (2023) found that teachers who participated in culturally responsive professional development supported higher gains in their students' reading achievement. Additionally, teachers supported during professional development are better able to deliver more effective math instruction, which results in improved math skills for students (Biccard, 2019; Kaskens et al., 2023). According to Shireell et al. (2019), professional development can impact teacher instructional beliefs and practices, resulting in improved student achievement.

Students are positively influenced by increasing their academic achievements, providing access to equitable learning environments, and creating engaging learning experiences.

Culturally Responsive Professional Development

Culturally responsive professional development encompasses a wide range of approaches to equip teachers with the knowledge, skills, and dispositions essential to creating an inclusive learning environment. Several students have demonstrated the benefits associated with culturally responsive professional development. For example, intentionally designed professional development supports teachers as they become culturally aware and shift their perspectives away from deficit thinking (Parkhouse et al., 2023). Culturally responsive professional development can teach teachers how to effectively implement CRTP (Mburu, 2022). Additionally, teachers who engaged in culturally responsive professional development demonstrated significant growth in implementing CRTP (Cantrell et al., 2023). These findings illustrate the role of culturally responsive professional development in the promotion of inclusive and equitable learning environments.

Research has also demonstrated how teachers can become culturally responsive. For example, Parkhouse et al. (2023) identified four distinct zones that contribute to cultural responsiveness:

1. Consciousness-raising: In this initial zone, teachers experience a significant shift from deficit views to more positive perspectives of Black students. This shift in awareness is reinforced by their developing relationships with their students.

Teachers in this zone begin to reevaluate their reactions to student behaviors, their sociopolitical awareness, and their perspectives of students.

2. Consciousness- and relationship-building: Teachers in this zone have a higher level of awareness about social injustices when compared to the consciousness-raising zone. They are working to think about their students in a more nuanced way. They are also beginning to reflect upon their views on school policies, such as tracking and discipline.
3. Knowledge- and practice-building: Teachers in this zone have high social awareness, positive perceptions of students, and relationships with their students. They enter culturally responsive professional development with the goal of creating authentic, real-world experiences for their students.
4. Practice-refining: Teachers in this zone are characterized by an awareness of how societal dynamics, including language discrimination and lack of funding, impact their Black students' educational experiences.

It is important to gradually address each zone when designing professional development and provide opportunities for differentiation and collective reflection during the learning process (Parkhouse et al., 2023). The zones identified by Parkhouse et al. (2023) are incorporated into the in person sessions to support teachers as they build their cultural awareness. By recognizing where teachers are in terms of cultural responsiveness, professional development can better equip teachers to support teachers as they create inclusive and equitable learning environments.

In addition to knowing teachers' background knowledge of CRTP, teachers must engage in continuous professional development. This professional development should provide opportunities for teachers to reflect and collaborate (Gladney et al., 2021; Johnson et al., 2021). For example, collaborative groups can support teachers as they become more culturally aware of the students in their classroom (Johnson et al., 2021). Collaborative groups, such as PLCs, promote teamwork that is focused on sharing successful instructional strategies to enhance teachers' content knowledge and instructional approaches, while collaborative discourse specific to standards mastery fosters a deeper understanding of students' learning objectives (DuFour et al., 2016; DeLuca et al., 2017; DuFour et al., 2021). Dixon (2021) stated that teachers should be encouraged to reflect upon their educational practices, experiences, and student relationships during professional development. Teacher participation in reflection aligns with the discipline of team learning by Senge et al. (2012), which emphasizes individual and collective reflection on educational practices and experiences. Additionally, as teachers explore resources to develop their content knowledge and new perceptions with new knowledge, they continuously improve and evolve (Senge et al., 2012; Johnson et al., 2021). Professional development must be intentionally designed to cultivate teachers' cultural responsiveness as they engage with the content and collaborate with colleagues.

Project Description

This project comprises diverse resources and instructional approaches organized within a Canvas course. The deliverable project for this study is a 25-hr blended or hybrid professional development cohort consisting of synchronous and asynchronous learning

experiences over the course of 6 weeks. Each module addresses a distinct topic related to implementing culturally responsive math practices in the elementary classroom. Each face-to-face session will begin with an activity related to the module topic with an opportunity to reflect afterwards. The purpose of this initial activity is to model a strategy that can be immediately implemented in the classroom. Teachers will have the flexibility to engage with asynchronous materials at their own pace between these face-to-face sessions. Additionally, teachers can connect with the facilitator during weekly office hours, which occur before or after school between the face-to-face sessions. All materials will be accessible to teachers via Canvas, enabling them to work independently, prepare for upcoming sessions, or dig deeper into resources related to culturally responsive teaching. Throughout this professional development cohort, teachers will collaborate to create, practice, and reflect upon culturally responsive math strategies, enhancing their ability to implement new classroom strategies.

Existing Supports

Before the professional development cohort begins, I will secure a suitable location from the VSD central office to accommodate attendee and presenter needs. I allocated extra setup time before each professional development session to prepare interactive activities. Materials for each face-to-face session will include anchor chart paper, markers, pens, pencils, Post-it notes, math manipulatives, and index cards. Anchor chart paper will be displayed on the wall as a question "graffiti wall," where teachers can pose questions, make comments, or share ideas during the face-to-face sessions. I will use the additional materials, Post-it notes, pens, pencils, and index cards, for various

activities during each session. Math manipulatives will also be employed to introduce culturally responsive math practices. Teachers must bring their laptops to access training materials and participate in activities. They will also need access to their math curriculum standards and other math resources.

Potential Barriers and Solutions

There are three potential barriers to this professional development cohort. One potential barrier for the professional development cohort may be the time commitment involved. Teachers must dedicate 1 day per week for a 2-hr face-to-face session after school over 6 weeks and complete asynchronous work in between. To address this, I can ensure that teachers have breaks during the sessions and provide them with practical resources that can be immediately implemented in their classrooms. Offering incentives such as snacks or light refreshments can motivate teachers to participate. Another potential barrier is teachers' reluctance to engage in culturally responsive discussions. To address this, I can initiate conversations about CRTP during the first face-to-face session to gauge teachers' knowledge and cultural awareness levels. Creating a safe environment for teachers to share their challenges and collaborate can encourage participation and growth. Additionally, providing opportunities for collaboration and coaching throughout the professional process can help overcome this barrier. The final potential barrier is technology. Teachers must be familiar with navigating the learning management system, as all resources are embedded in Canvas modules. To address this, I will provide an overview of the Canvas course setup during the first session and allocate time for teachers to explore the course. To mitigate internet issues, arriving early to ensure

internet connectivity and offering hard copies of resources linked to Canvas can serve as backups. Having a backup computer or iPad ready can also address technology-related challenges.

Professional Development Implementation and Timetable

This summer professional development cohort spans 6 weeks and consists of synchronous and asynchronous work. There are six, 2-hr face-to-face sessions that give teachers an opportunity to dive into culturally responsive math instruction through hands-on activities, fueled by collaborative inquiry, discussion, and reflection. We will begin each session with a culturally responsive math task and reflection protocol to model culturally responsive math in the classroom. Teachers will reflect on their teaching practices in comparison to the model lesson. In addition to the 12 hr of face-to-face sessions, teachers will engage in 13 hr of asynchronous learning, which includes reading articles, watching videos, evaluating lessons, and participating in reflections and discussions. Most participation opportunities will occur digitally, utilizing resources on Canvas. Additionally, teachers will be expected to spend a minimum of 2 hr engaging with asynchronous learning. Manipulatives and other materials will be provided to teachers for each modeled activity. The face-to-face sessions will conclude with a reflective protocol and an explanation of the asynchronous work between sessions. Optional coaching office hours will be offered twice per week to facilitate personalized support for teachers throughout the cohort.

In order to continue supporting the participants' learning after completion of the professional learning cohort, virtual cohort cafe meetings will be scheduled throughout

the school year on teachers' workdays. During the cohort, the Canvas page will host a "Cohort Cafe" discussion board, a place to ask questions, post ideas, and share additional resources. The purpose of this open discussion forum is to provide additional instructional support and encouragement to the participants. Like the "Cohort Cafe," the virtual cohort cafe meetings are designed to give the cohort participants opportunities to support their math instruction through collaboration within the cohort learning community. Live Cafe Cohort Meetings will begin during the teacher workweek for flexible sessions at two time slots: 8:00-9:00 a.m. or 5:00-6:30 p.m. These optional gatherings may feature guest speakers, such as math coaches and representatives from the VSD math and professional learning department. A page in the Canvas course is dedicated to promoting the meetings.

Roles and Responsibilities

As the facilitator, my role involves creating a Canvas course for the 6-week professional development cohort, delivering both synchronous and asynchronous learning. I prepared the handouts, activities completed, and an evaluation tool for the attendees. I used Walden's Library to research current studies related to professional development and CRTP. Prior research emphasized setting clear goals and expectations for each professional development session (Powell & Bodur, 2019; Meyer et al., 2023). Therefore, at the start of each session, I will ensure that participants understand the session's goals and how the information will inform their math instruction. Participants will have access to session goals and materials via the Canvas course. Additionally, I will facilitate participants' navigation of the Canvas course to ensure they can access all

materials. I will arrive early to set up technology and materials to ensure smooth face-to-face sessions. At the end of the cohort, I will share feedback from participants with school administrators and the superintendent to inform future initiatives.

Project Evaluation Plan

The purpose of the professional development cohort is to develop the attendees' capacity to implement culturally responsive math instruction in their classrooms. According to Borg (2018), this objective is aligned with the need to analyze the impact of the learning and determine if teachers feel that they have built their knowledge of culturally responsive math instruction. Formative and summative evaluations are two unique types of assessments used in education, including professional development, each serving different purposes and occurring at different stages of the learning process (Borg, 2018; Bin Mubayrik, 2020). Formative evaluations are used to adapt learning in real time and ensure that the attendees are effectively supported (Bin Mubayrik, 2020). In contrast, summative evaluations are used for accountability and making judgments about the overall quality of learning (Bin Mubayrik, 2020). Teachers will be assessed using formative and summative evaluations during the professional development cohort.

Formative Evaluations

During the professional development cohort, teachers will be continuously monitored and supported. Escorbor et al. (2018) stated that the use of formative evaluations during the learning process improves learner performance during the learning process. Additionally, formative assessment is beneficial because it provides timely feedback in order to adjust instruction to meet the needs of the learners (Trumbull &

Lash, 2013). Several strategies were used as formative evaluation during the professional development cohort to ensure that teachers were progressing with their work. First, teachers are tasked with a "Hopes and Dreams' activity. This activity asks them to create goals for themselves based on what they hope to achieve from the professional development cohort. This information will be used to further personalize the learning experience for each teacher. Each module on the Canvas course consists of an asynchronous discussion forum, which prompts teachers to reflect upon where they are with the work and their experiences from that module. Teachers also have an opportunity to ask questions and receive feedback from the facilitator and their peers. Additionally, the optional office hours provided each week by the facilitator will serve as a formative evaluation. The questions or concerns expressed during office hours will determine if teachers need additional support.

Summative Evaluation

Teachers will be asked to evaluate the effectiveness of the professional development cohort after the third and sixth modules. Summative evaluations are typically standardized and comprehensive and defined as an "assessment of learning" (Bin Mubayrik, 2020). This summative evaluation aims to measure third through fifth grade teachers' learning during the professional development cohort. This professional development cohort's summative evaluation (see Appendix M) will consist of a Likert scale to rate teachers' learning experience, with 5 (*strongly agree*), 4 (*agree*), 3 (*neither agree nor disagree*), 2 (*disagree*), and 1 (*strongly disagree*). The other components of evaluation include the date, session number, name, and school. Teachers are required to

provide their school name so that a summary of the information can be shared with their administrator and the Professional development Department. If the teacher is requesting specific support, I will ask them to provide their name to ensure they get the support they need. Otherwise, the evaluation will remain confidential. Additionally, teachers will rate the following statements:

- "The goal of the cohort was clearly defined."
- "The professional development topic is relevant to support addressing math achievement gaps."
- "The information and resources provided supported my learning."
- "The asynchronous work was clearly explained and presented."
- "My engagement with the information caused me to reflect upon my beliefs and instructional practices."
- "I feel comfortable implementing a strategy that I learned in my instruction this week."

The final portion of the evaluation consisted of three questions. What specific aspect of your learning experience resonates with you the most? What additional support do you need to build your capacity with culturally responsive math instruction? What suggestions do you have for future professional development? The information from this summative evaluation will be shared with stakeholders and used to drive future professional development initiatives for elementary teachers.

Overall Evaluation Goals

The formative and summative evaluations integrated into this professional development cohort would help determine the blended learning environment's effectiveness. The purpose of this professional development cohort is to empower teachers to address the challenges associated with the math achievement gap between Black and White third through fifth graders. The first goal is to deepen teacher's understanding of how to implement culturally responsive math instruction. The second goal is to foster a collaborative and reflective PLC focused on addressing the math achievement gap between Black and White third through fifth graders. The third goal is to develop an action plan for integrating culturally responsive math instruction into math instruction to effectively address achievement discrepancies. The formative and summative evaluations integrated into this professional development cohort would help determine the blended learning environment's effectiveness. The goal of this professional development cohort is to empower teachers to address the challenges associated with the math achievement gap between Black and White third through fifth graders. The first goal is to deepen teacher's understanding of how to implement culturally responsive math instruction. The second goal is to foster a collaborative and reflective PLC focused on addressing the math achievement gap between Black and White third through fifth graders. The third goal is to develop an action plan for integrating culturally responsive math instruction into math instruction to effectively address achievement discrepancies. The formative evaluations will help hold teachers accountable for their learning during the professional development cohort. The summative evaluation will help determine the

effectiveness of the entire professional development It would also provide the stakeholders with information on the support teachers need to address the math achievement gap between Black and White students.

Description of Key Stakeholders

This project has several key stakeholders: the presenter, teachers, math coaches, principals, and central office administrators. First, the central office administrators would determine whether the professional development cohort will be delivered to elementary teachers in VSD. Overall, all elementary teachers would benefit the most from this professional development cohort. Math coaches would also benefit from the training in order to support their teachers' implementation of culturally responsive math instruction. Finally, the principals may benefit from completing the sessions explaining culturally responsive math instruction because it would give them an opportunity to see what the instruction feels like from a student's perspective.

Project Implications

Social Change Implications

Education is a cornerstone of society and ensuring that all students receive equal opportunities for success is a fundamental goal of educational institutions. Research has demonstrated that CRTP can have far-reaching benefits for stakeholders, particularly kindergarten through Grade 12 schools, school districts, administrators, teachers, and students (Ladson-Billings, 1994, 2012). Bassey (2016) stated that implementing culturally responsive instruction can promote social change by empowering students, creating more equitable educational opportunities, and addressing disparities to improve

achievement. Additionally, Min et al. (2022) acknowledge that administrators need to provide opportunities for professional development to enhance their staff's cultural competence. This research implies a potential shift in professional development to effectively prepare educators for culturally responsive teaching.

The study's results hold potential benefits for diverse elementary schools within VSD, especially those dedicated to meeting the needs of all students. One of the key takeaways from this study is the importance of adopting a more culturally responsive learning environment across all schools. Additionally, elementary schools that exhibit achievement gaps between White and Black students should pay particular attention to how CRTP can impact math achievement for Black students. Bean-Folkes and Ellison (2018) stressed the importance of recognizing and valuing what students from diverse backgrounds bring to the classroom. To ensure a more inclusive and culturally responsive learning environment, elementary schools can audit classroom resources to ensure they reflect the school's diverse population and support teachers' ability to integrate culturally responsive instruction in their classrooms. This audit can guide schools in deciding which resources to purchase to ensure that all students' cultures are represented in their instruction. These actions can contribute to a more inclusive and culturally responsive learning environment.

Administrators and teachers play pivotal roles in ensuring the success of students. The study's findings have the potential to transform their approaches to education. For example, understanding how to analyze data helps administrators and school staff understand student achievement across racial and socioeconomic groups. Building the

capacity to use achievement data to differentiate their instructional strategies to meet the diverse needs of all students, closing achievement gaps (Knips et al., 2023). Additionally, by adopting CRTP, educators can increase their cultural awareness and establish positive relationships with students from diverse backgrounds (Bean-Folkes & Ellison, 2018; Roose et al., 2019). This benefits students academically and fosters a more inclusive and supportive school environment. Although this study was focused on teachers, administrators attending the professional development cohort would be encouraged to reflect upon how they incorporate their students' cultures within the school setting. This introspection can lead to more inclusive and culturally sensitive school policies and practices.

Additionally, the study's results can influence how PLCs and school leadership teams use data to address academic gaps and drive instruction. Regarding data-driven decision-making, administrators and teachers engaging in the professional development cohort can look at their students' data and learn how to discuss data with equity as a focus. Data-driven decision-making practices allow teachers and administrators to analyze student progress and discuss how to improve student performance (Bowers, 2010). Consequently, participating in this cohort will build the teachers' capacity to use data and enhance their ability to support their colleagues with data analysis (Marsh & Farrell, 2015). By understanding how to analyze data effectively, PLCs and school leadership teams enhance vertical articulation by ensuring an alignment of instructional strategies across all grade levels within the school. In addition, grade-level PLCs can

ensure horizontal articulation through their collective inquiry about the data and their instructional decision-making.

Pre-service teachers also stand to benefit from the study's results. Teacher preparation courses that focus on CRTP equip these future educators with the skills and knowledge to build welcoming and engaging classrooms for students of all backgrounds. Previous research has indicated that the preservice teachers' self-efficacy for CRTP significantly changed after completing the culturally responsive coursework (Whitaker & Valtierra, 2018). These teachers would have the capacity to create instructional practices that consider students' cultures and backgrounds, cultivating real-world activities that make learning more engaging and relevant. The implementation of specific strategies dedicated to culturally responsive teaching can be a potent tool in addressing the persistent achievement gaps across racial groups.

Importance to Local Stakeholders

Local educational leaders can gain deeper insights into the challenges faced by elementary teachers when striving to narrow the disparities in standardized test scores between Black and White students. This understanding is essential in identifying effective strategies for addressing these score gaps and preparing teachers to address the standardized test score divide. Offering teachers an opportunity to delve into the influence of culture on education and students' learning experiences can make them more conscious of their interactions with individuals from various cultural backgrounds. It can also deepen their understanding of the local community in which they reside and work, creating a more inclusive and culturally responsive educational environment.

Understanding the approaches, achievements, and challenges in bridging the gaps in standardized test scores holds the potential to enhance the academic performance of Black students. Teachers, along with instructional coaches and administrators participating in the professional development cohort, may adapt their approach to math instruction to promote students' ability to articulate their mathematical reasoning. This shift encourages all students, regardless of their race, to view themselves as capable mathematicians. The school leaders, teachers, and support staff engaged in this cohort may also gain valuable insights into creating culturally responsive learning opportunities within math instruction. This could lead to a reevaluation of curriculum pacing guides, providing teachers with essential resources and guidance for incorporating culturally responsive math teaching practices into their pedagogy.

Active participation in the professional development cohort may foster greater cultural awareness among teachers, enabling them to integrate one or more culturally responsive teaching strategies into their math instruction. Exposure to diverse activities may encourage teachers to reconsider the supplementary resources they use to enhance their math instruction. Furthermore, while this professional development focuses on teachers implementing culturally responsive math practices, math coaches involved in the study can offer enhanced support as they engage in conversations about standardized test scores and other assessments, addressing observed gaps. These math coaches can work one-on-one with teachers to overcome challenges using the strategies learned from the professional development cohort.

Administrators participating in this professional development cohort have a unique opportunity to reflect on their expectations for teachers and classrooms in meeting students' needs. They may contemplate their role and how they can provide support to teachers as they become more adept at implementing CRTP in math instruction. Additionally, administrators may begin to reassess their interactions with the school community, seeking ways to enhance and celebrate the diversity within the school community.

In Section 4, I concluded this study. I discussed the project's strengths and limitations and included recommendations for alternative approaches. Additionally, I provided insights on scholarship, product development, leadership, and change. The following segment featured a reflective analysis of my evolution as a scholar, practitioner, and project developer. I also described my project's significance and the implications, applications, and prospective avenues for future research.

Section 4: Reflections and Conclusions

Project Strengths and Limitations

The project has both strengths and limitations. The strengths of this study consisted of the qualitative research design and the project developed based on the study's findings. The teachers demonstrated flexibility in employing various instructional strategies such as student discourse, community building, and explicit instruction. Findings revealed active tracking of student progress and an understanding of culturally responsive practices, reflecting a commendable level of self-efficacy that could be further enhanced through targeted professional development. In contrast, limitations were comprised of unexpected elements that restricted the study, such as recruitment procedures within VSD and recruiting participants to the professional learning cohort. Despite these limitations, data saturation was reached with 12 participants.

Strengths

Gay's (2018) work regarding culturally responsive pedagogy was the framework that underpinned this investigation into the extent to which culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 at VSD. In developing the study, I drew from the literature review findings regarding why there is a consistent academic achievement gap between Black and White students and how the academic achievement gap has been addressed.

Third- through fifth-grade teachers employed a variety of instructional strategies and resources to address disparities in math achievement. This diversity in instructional approaches demonstrated flexibility and a willingness to adapt teaching methods to meet the unique needs of students. Teachers identified strategies that have positively impacted the math achievement of Black students, such as student discourse, community building, and explicit instruction. These instructional practices can serve as a valuable resource for other teachers looking to replicate these successes. Additionally, the findings revealed that teachers at VSD actively track student progress and use this information to adapt their teaching methods, which can lead to improved outcomes. The study also highlighted that teachers have an understanding of culturally responsive practices and are aware of the support they need to implement culturally responsive practices in their math instruction. The teachers' willingness to adapt their instruction to meet the diverse needs in their classrooms reflects a level of self-efficacy that can be enhanced with targeted professional development.

Another strength of this study was the basic qualitative methodology. Data were collected from 12 third- through fifth-grade teachers at VSD, within the range of the sample size desired for this study. To explore the perceptions of third- through fifth-grade teachers in VSD in depth, I used a semistructured interview protocol. The use of a semistructured interview protocol provided organization to this data collection process while providing the opportunity to ask clarifying questions to better understand the participants' responses. The explanations provided by the participants during the interviews facilitated a deeper understanding of the extent to which they employ CRTP in

their math instruction and provided insight into the support they needed to enhance their teaching capacity.

This professional development cohort offers a comprehensive learning experience featuring face-to-face synchronous sessions, diverse asynchronous activities to dive deeper into the subject matter, and practical application of the learned strategies in their classroom with facilitator support. The cohort includes optional office hours where teachers can receive personalized support based on their needs and those of their students. The design of the professional development cohort was driven by the expressed need for support for implementing culturally responsive math instructional practices, primarily through modeling and reflecting. Participants will also engage in culturally responsive math activities that they can implement in their classrooms immediately, followed by opportunities for reflection and feedback from peers and the facilitator. To evaluate the effectiveness of the cohort, I developed formative and summative evaluation tools. These tools were created to help teachers reflect upon their instructional approach and assist the facilitator in adapting or supplementing instruction to meet individual teacher needs. Additionally, a summative evaluation tool will be distributed midway and at the end of the cohort to gather participant feedback. Feedback from the summative evaluation can inform the design of future professional development sessions. The evaluation allows teachers the opportunity to suggest topics for future learning.

Limitations

Although saturation was reached, the study initially encountered limitations related to the recruitment procedures within VSD. These limitations stemmed from

restrictions that prevented the direct emailing of participants across the four sites. Moreover, in adherence to district policy, the recruitment email was dispatched only twice by the central office representative, potentially leading some recipients to overlook it as spam. Consequently, it was challenging to initiate a more personalized recruitment process for the site where participants were lacking. Furthermore, an additional limitation emerged when some potential participants expressed initial interest in the study. However, after reaching out to them with the consent form and interview schedule, no response was received from these individuals.

Although there are advantages to implementing a professional development cohort consisting of synchronous and asynchronous learning, the time commitment expected from the teacher could pose another limitation. The PD cohort requires weekly attendance at 2 hr, in-person sessions for 6 weeks at a specified location within VSD. Teachers are also expected to dedicate at least an additional 2 hr of asynchronous work. This significant time commitment, encompassing travel, in-person attendance, and asynchronous work, could deter participation due to its demands on personal time and schedules. Therefore, some teachers may hesitate to participate in this opportunity due to the demanding time requirements.

Recommendations for Alternative Approaches

I considered several alternative approaches for the study results, particularly regarding the design of the professional development cohort. Initially, I considered creating a fully asynchronous program featuring self-paced modules with mandatory discussion posts. Although this approach would not reduce the time commitment, it

would grant teachers the flexibility to set their schedule for professional development, aligning with their preferred pace. The self-paced modules would extend over an extended period, supplemented by two mandatory coaching sessions with the facilitator to support integrating CRTP in the classroom. These required coaching sessions serve as a means of holding teachers accountable for their learning and implementing culturally responsive math teaching practices.

Another design variation for this professional development cohort would be conducting all synchronous sessions via Zoom instead of in-person meetings. This shift to Zoom-based synchronous sessions would eliminate the need for travel time to attend in-person sessions, creating a more accessible learning experience. Zoom sessions could incorporate breakout rooms to facilitate small group discussions, and instructional technologies like Nearpod, Padlet, and Poll Everywhere could be utilized to engage cohort participants and reinforce the presented information.

Providing ongoing support is a critical aspect of the study results. To distribute the time commitment more evenly for teachers, the professional development cohort could be extended over the school year in different ways. For example, instead of a 12-week duration, the cohort could be extended to 24 weeks. Teachers would attend either in-person or synchronous Zoom sessions for 1 hr after school every other week. They would also have additional time to complete asynchronous work, practice culturally responsive teaching methods, and reflect on their classroom experiences with the facilitator's support.

Another approach would be to establish a year-long cohort within a school. This extended timeframe would offer the opportunity to impact the teaching practices of an entire school, spanning from prekindergarten to fifth-grade teachers. This year-long professional cohort could occur during school hours, such as in staff meetings or PLCs. This approach would begin with a workshop providing an overview of culturally responsive math practices and establishing a safe culture of collaboration. Subsequent PLC sessions would focus on teachers collaborating to implement CRTP in their classrooms, supported by the school's leadership team, including math coaches, instructional coaches, administrators, and the facilitator. Because this cohort spans the entire school year, peer-to-peer coaching could be implemented to support teachers in their learning journey, fostering a sense of community and collaboration among the school team.

During the synchronous sessions, teachers could also be provided with more opportunities to practice delivering culturally responsive teaching strategies among their peers and receive feedback from peers and the facilitator before implementing these strategies in their classrooms. Peer coaching would allow two or more teachers to share insights, engage in reflection, and provide each other feedback in a goal-oriented and supportive environment, improving student achievement (Ma et al., 2018; Hsieh et al., 2021). These practice opportunities could enhance teachers' confidence and support the implementation of these practices in their classrooms.

The final alternative approach to the professional development cohort could entail forming partnerships with multiple math coaches. These coaches would offer additional

support to teachers, with each coach dedicated to a specific grade level. The math coaches would facilitate coaching cycles to build teacher capacity to implement culturally responsive instructional practices by setting specific goals that are designed to address student achievement gaps (Sweeney & Harris, 2020). They would model how to teach specific concepts, provide feedback on lessons and action plans, and even visit schools to observe teacher practices and offer further guidance and feedback.

Alternative Definition and Solutions to the Problem

An alternative perspective might consider that not all teachers and administrators are well-acquainted with the full spectrum of resources and professional development opportunities tailored to address the diverse needs of learners, both within the district and external resources. Alternatively, teachers may find themselves overwhelmed by the many available resources and need help to discern the most effective ways to implement them that promote CRTP. Another perspective could be that educators are well-versed in implementing CRTP across other subject areas but may need help with translating these practices into the context of mathematics. The professional development cohort established for this study is designed for third- through fifth-grade teachers with diverse student populations. A potential solution could involve the comprehensive participation of teachers and elementary administrators, coaches, and math support staff in professional development that specifically focuses on CRTP. This collective engagement would ensure that all stakeholders clearly understand the significance of culturally responsive teaching and its potential impact on student achievement. Shared knowledge

and commitment amongst school staff can contribute to a more equitable and effective educational environment.

Scholarship, Project Development and Evaluation, and Leadership for Change

I continually strive to enhance my knowledge of curriculum instruction and seek ways to support teachers in addressing the diverse needs of their students. As a classroom teacher in a diverse elementary school, I encountered various academic needs and disparities among students across racial and socioeconomic backgrounds. This experience fueled my curiosity about which instructional practices had the most significant impact on all students, sparking my interest in CRTP. As I embarked on my doctoral journey at Walden University, I delved deeper into the origins and consequences of the achievement gap among White and Black students and other marginalized groups. This educational journey gave me a more profound understanding of how teachers' perceptions, backgrounds, experiences, and expectations influence their students' learning, the content they learn, and their self-perception.

As a scholar, I have had the opportunity to explore my passion for culturally responsive teaching and reinforce my commitment to effecting positive social change. My goal has become more steadfast: to empower students from marginalized backgrounds, helping them recognize themselves as scholars and important contributors to society. My research has led me to diverse scholars and approaches to culturally responsive teaching that I find captivating. This curiosity sometimes presented challenges in staying focused, as the wealth of information in this field can be overwhelming. The capstone project was a significant opportunity to delve deeper into my beliefs about

CRTP and how I can better serve marginalized students and their teachers. Conducting qualitative research and engaging in meaningful conversations with teachers about their practices was an exciting and rewarding experience. This project aims to enhance teachers' capacity to create meaningful math experiences and to affirm to students that they are mathematicians, regardless of their cultural or racial background. Developing a solution to improve math test scores through qualitative research was an accomplishment I take great pride in. My passion for learning has shaped me into a researcher, scholar, and advocate for social and educational change.

I have grown in my knowledge of, and ability to implement, the Professional Standards for Educational Leaders (National Policy Board for Educational Administration, n.d.). The standards include elements that educational leaders can use to have a meaningful impact on students and teachers. For example, my research of recent studies and other literature regarding culturally responsive teaching has helped me better advocate for students' academic success and well-being (Standard 2). Most of my growth in scholarship and leadership was related to Standard 3, which focuses on equity and cultural competency. I am more equipped to promote diversity and assets within my school and support students as they educate their peers about their culture. Additionally, I am more competent to help teachers recognize their students' strengths and acknowledge or welcome their culture into the classroom. Finally, I feel more comfortable leading conversations about bias and deficit thinking with my colleagues. Regarding Standard 4, which addresses curriculum, instruction, and assessment, I am more competent in leading data conversations and supporting teachers as they monitor their students' progress.

Finally, I have grown in the area of Standard 7, which refers to fostering a professional community of teachers that promotes the overall success of students, both academically, socially, and emotionally. I have used what I have learned about culturally responsive teaching to impact how I work with my colleagues, design professional learning, and support their needs in a personalized and meaningful way.

Reflective Analysis as a Scholar

A fundamental requirement for a researcher is the ability to locate and comprehend peer-reviewed journals. Researchers need to find current research pertinent to their area of study, allowing for a deeper exploration of the subject and enhancing their understanding. The process of conducting a literature review, while often perceived as time-consuming, is simultaneously a rewarding one. Analyzing the existing body of literature has had a transformative impact on my role as an instructional coach and as an individual. Through this research journey, I had the opportunity to reflect upon my teaching and coaching methods. It heightened my awareness of how I engage with students and teachers, made me more attuned to the diverse demographics and needs of individuals in my school, and prompted me to reconsider my perspective on the community where I live and work.

As I gradually became more at ease with my identity as a scholar, I also gained confidence in my writing and research capabilities. Being naturally inclined to overthinking, I often found myself in a state of perpetual revision, constantly feeling that my work could be further refined. Overthinking was a significant challenge during this journey, leading to occasional delays in decision-making, such as formulating questions

for research participants or designing my project. I also navigated the transition between different school districts, a process that can be both complex and challenging. Despite these obstacles, I was driven by the belief that students deserve a high-quality education that is inclusive, safe, and appreciative of their diverse cultures.

Reflective Analysis as a Project Developer

This journey has significantly enhanced my ability to develop impactful professional development experiences. Prior to commencing my studies at Walden University, I had accumulated a wealth of experience in creating professional development opportunities for teachers. Some of these initiatives were developed individually, while others were collaborative efforts with fellow teacher leaders. My diverse experiences in designing various forms of professional development, ranging from shorter workshops, self-paced learning, and more extensive programs, provided me with the necessary foundation to construct this professional development cohort based on the findings of the study.

My prior collaborative experiences in crafting effective professional development equipped me with the skills to design a more comprehensive and extended cohort spanning over 12 weeks. The process of developing this project has offered me numerous opportunities to reflect on my pedagogical approach and what truly constitutes culturally responsive professional development. It also allowed me to reflect on how to model and convey CRTP to individuals with limited prior exposure.

In designing this professional development cohort, I placed great importance on providing teachers with choice and the chance to practice with ongoing support before

transitioning to independent implementation. I invested considerable thought into how I could support teachers throughout the 12-week program to build their capacity and confidence in integrating culturally responsive math practices into their classrooms. Additionally, I focused on creating a safe and inclusive environment to ensure that participants in the cohort felt comfortable sharing reflections and posing challenging questions. This environment was intended to be a welcoming space where teachers could engage in meaningful dialogue and grow as professionals.

Reflective Analysis as a Practitioner

Effective teachers play an essential role in facilitating meaningful learning experiences and fostering academic achievement among students from diverse cultural, racial, and socioeconomic backgrounds. Innovative school leaders committed to enhancing their educators' capabilities and nurturing a supportive school community are essential in ensuring that students learn in an environment that is both welcoming and inclusive, thus promoting their academic success. The process of developing this project has highlighted the crucial role of professional development in elevating teacher effectiveness and cultivating self-efficacy.

This journey began with the identification of a problem, followed by an extensive analysis of current literature. A data collection method was crafted, informed by insights from the existing body of literature. Subsequently, data was collected, examined, and dissected to better understand teachers' perceptions and their specific requirements for implementing CRTP in their classrooms. The findings from this study were instrumental in crafting the design of a professional development cohort with the purpose of enhancing

mathematical instruction. Throughout this professional development cohort, teachers were provided with ample opportunities to practice, reflect, and receive guidance from the facilitator. They were encouraged and empowered to voice their questions and ideas, fostering a dynamic exchange of knowledge, both in virtual and in-person settings.

My hope is that teachers engaging in this professional development cohort will continue to engage in introspection regarding culturally responsive teaching and its application to address the diverse needs of their learners. Furthermore, I hope that teachers will become more cognizant of how their cultural backgrounds influence their teaching practices and how their students' cultural backgrounds impact their learning experiences. The ongoing support provided to teachers throughout this professional development cohort will serve as a catalyst for driving social change within the school community, as it ensures that they receive sustained guidance and mentorship. Overall, this study has reaffirmed my commitment to the implementation of CRTP and my dedication to fostering equitable and inclusive educational environments for all students.

Reflection on the Importance of the Work

The purpose of this basic qualitative study is to examine to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in Grades 3 through 5 in VSD. The project was created to support teachers as they address the achievement gap in math scores across racial groups while aligning with the district’s strategic plan. There are several benefits of

this study to the field of Education, and it may be an asset to any district experiencing achievement gaps and wants to fill those gaps using CRTP.

Implications, Applications, and Directions for Future Research

Implications and Applications

Teacher capacity can be improved with professional development. When professional development is high-quality, it enhances student learning and outcomes (Heck et al., 2019). Additionally, well-designed professional learning provides a platform for teachers to reflect, receive constructive feedback, and access support from a content expert (Kohen & Borko, 2022; Wakefield, 2022). This project study invited third-through fifth-grade teachers from VSD to share their perceptions of their math approaches, successes, challenges, and knowledge of culturally responsive teaching. The project designed based on data collected was an implementation plan for a long-term professional development opportunity to support the implementation of culturally responsive math practices in the elementary classroom. Upon completing this professional development cohort, teachers may become more culturally aware and better able to meet the academic needs of Black students.

Recommendations for Future Research

Scholarly literature influences the direction of future research. To advance the field of culturally responsive math instruction, there are several promising avenues to explore. The study can be expanded to secondary education to determine if the gap is persistent and if the challenges and successes are consistent over time. This expansion would provide valuable insights into observed patterns and determine which strategies

and resources best support addressing the math achievement gap. Future research can employ a basic qualitative study approach to investigate how culturally responsive instructional practices impact elementary teachers' perceptions, strategies, achievements, and challenges in narrowing the disparities in standardized math test scores between Black and White students in Grades 6 through 12 within VSD. Additionally, future research could study the long-term effects of CRTP on a cohort of math students from third through sixth grades. This research would take the form of a longitudinal study, utilizing the test scores of the student group as the basis for analysis. Researchers may also explore the extent to which primary teachers (kindergarten through second grade) implement CRTP in their math instructions. Finally, further research may center on how extended blended professional development related to CRTP influences teachers' perceptions of the achievement gap between Black and White students and their approaches to addressing it over an extended period. Given that the literature in the project study highlighted a variety of factors contributing to achievement gaps, it is essential for forthcoming research to be deliberate in its selection of the specific factors it chooses to emphasize.

Conclusion

Overall, this research study has deepened the understanding of key stakeholders in VSD regarding the perceptions of third- through fifth-grade teachers regarding their math instruction and the persistent achievement gap between Black and White students. This basic qualitative research investigated the impact of culturally responsive instructional practices on elementary teachers' perspectives, methodologies, achievements, and

challenges in narrowing the disparities in standardized math test scores among Black and White students in Grades 3 through 5 in VSD. Current research and collected data informed all decisions related to the study. CRTP, on the whole, have proven to be an effective tool for meeting the needs of a diverse learning environment. They also enhance teachers' awareness of how their own culture influences their teaching and how their students' culture affects their learning experiences. The findings of this research were used to develop a professional development cohort that supports the implementation of math instruction in third- through fifth-grade classrooms. I believe that this project study has the potential to influence future decision-making in VSD with respect to the creation of math support initiatives for elementary teachers and to provide scholars with valuable insights into the types of support needed to address the achievement gap between Black and White students.

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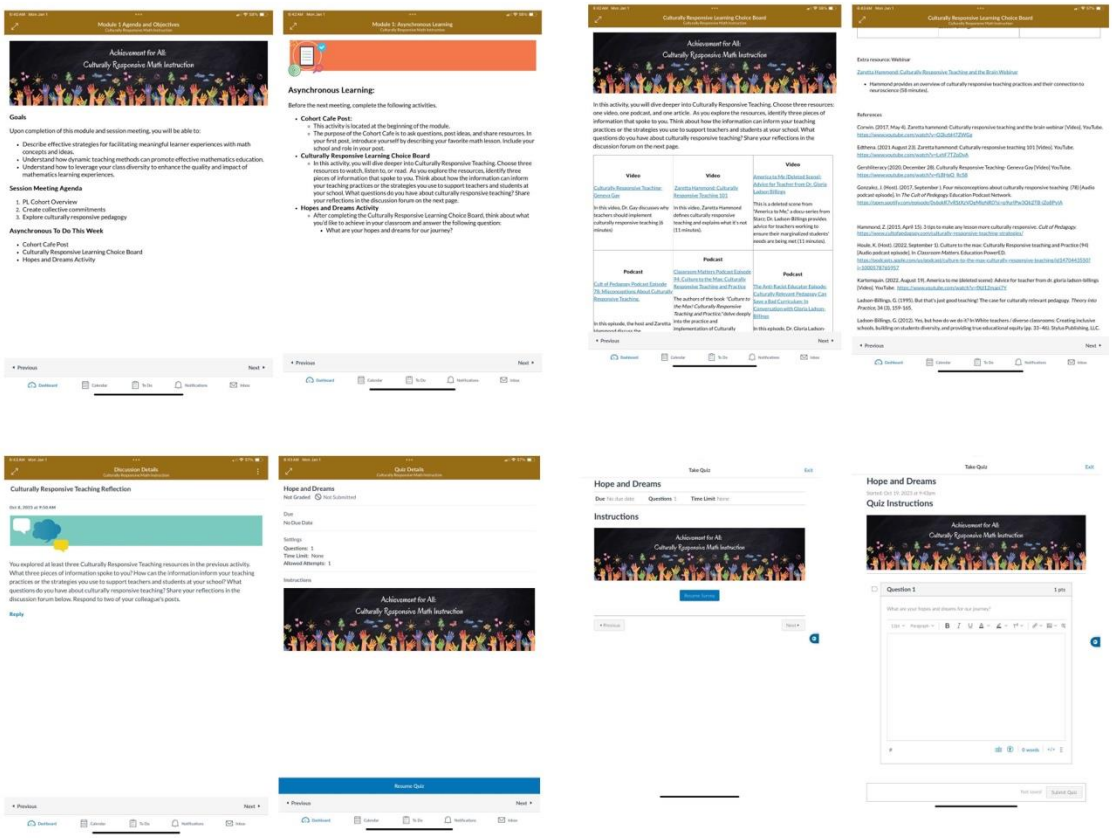
Appendix A: The Project

Professional Development Cohort Title: Achievement for All: Culturally Responsive

Welcome Module

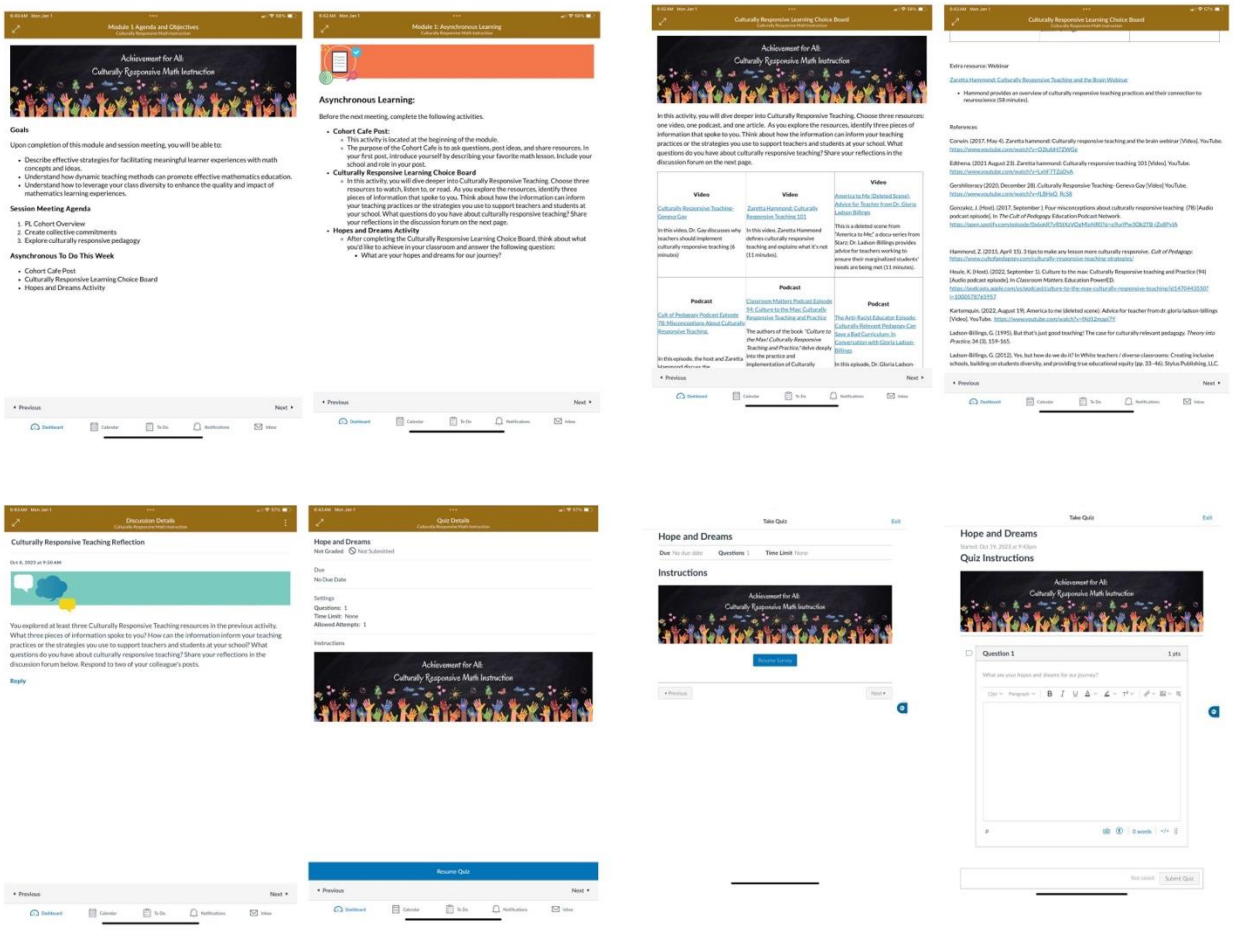
The purpose of this module is to provide participants with an overview of the cohort. It also serves as a place for teachers to ask questions using the Cohort Café discussion page and attend optional coaching office hours to receive extra support.



Math Instruction Module 1: Introduction and Culturally Responsive Teaching

Module 1 Canvas Module

The snapshot of this module includes all supporting materials, activities, and discussion posts.

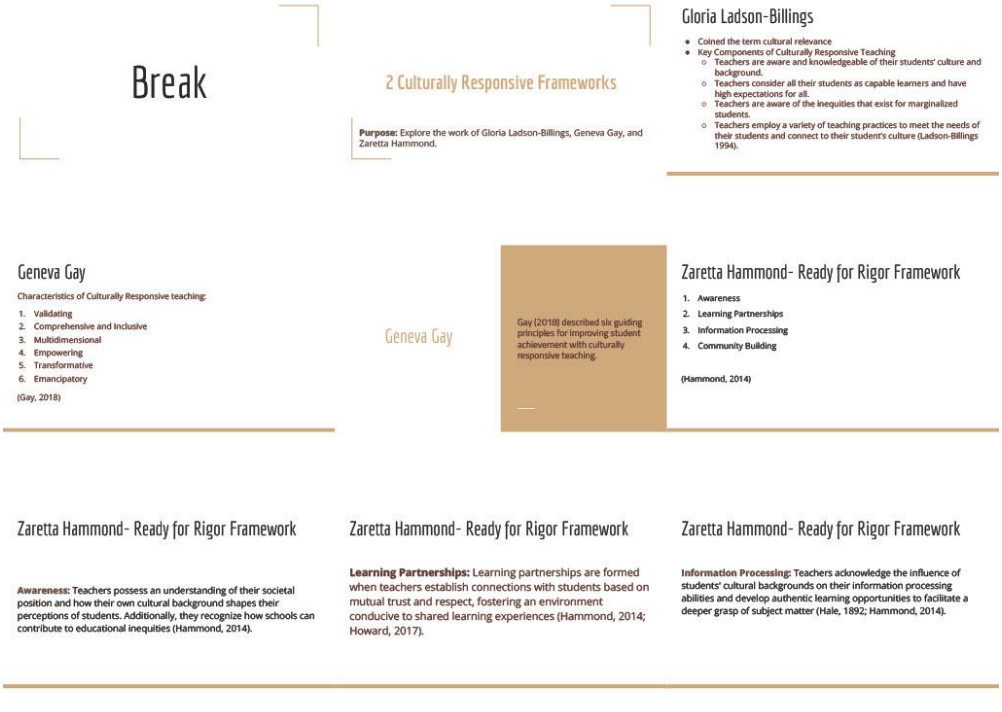


Module 1 Synchronous Session Slides

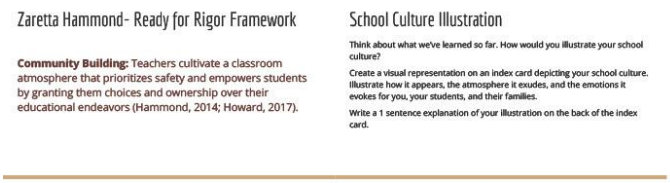
Slides 1-9

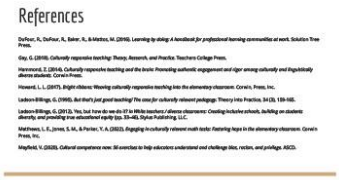

An Introduction to Culturally Responsive Teaching
Module 1
Who is joining this journey?
Block Party Discussion Protocol
Allows students to share their ideas with their peers
Directions: As the music plays, move around the room and introduce yourself to at least three people. When the music stops, return to your seat.
Cohort Goals
To deepen teachers' understanding of how to implement culturally responsive math instruction
To foster a collaborative and reflective professional learning community focused on addressing the math achievement gap between Black and White third through fifth graders.
To develop an action plan for integrating culturally responsive math instruction into math instruction to effectively address achievement discrepancies.
Session Goals
01 Review the components of the PL cohort.
02 Establish common vocabulary associated with Culturally Responsive Pedagogy.
03 Begin to understand how culture impacts student learning, relationships, and the community.
04 Begin to develop an understanding of Culturally Responsive Pedagogy.
Our Journey
This cohort will take place over 12 weeks and consist of 6 face-to-face (synchronous) sessions and asynchronous learning. Each face-to-face session will take place after school from 4:30-6:30 p.m. Our Asynchronous learning will consist of various experiences that reinforce our synchronous learning and include opportunities for reflection and practice.
Collective Commitments
"Collective commitments (or values) represent the promises made among and between all stakeholders that answer the question, What must we do to become the organization we agreed we hope to become?"
-DuFour et al., 2016
Collective Commitments Protocol
1. Independent brainstorming
2. Round Robin share out
3. Organize and refine commitments
4. Finalize commitments
Temperature Check
1. What was your first experience learning about culturally responsive teaching?
2. Have you ever experienced culturally responsive teaching? If yes, describe your experience.
Purpose: Examine and establish common vocabulary associated with Culturally Responsive Teaching
1 Common Vocabulary
Vocabulary Matching Activity:
With your team, match the term with the correct definition.

Slides 10-18


Break
2 Culturally Responsive Frameworks
Purpose: Explore the work of Gloria Ladson-Billings, Geneva Gay, and Zaretta Hammond.
Gloria Ladson-Billings
Coined the term cultural relevance
Key Components of Culturally Responsive Teaching
Teachers are aware and knowledgeable of their students' culture and background.
Teachers consider all their students as capable learners and have high expectations for all.
Teachers are aware of the inequities that exist for marginalized students.
Teachers employ a variety of teaching practices to meet the needs of their students and connect to their student's culture (Ladson-Billings 1994).
Geneva Gay
Characteristics of Culturally Responsive teaching:
1. Validating
2. Comprehensive and Inclusive
3. Multidimensional
4. Empowering
5. Transformative
6. Emancipatory
(Gay, 2018)
Geneva Gay
Gay (2018) described six guiding principles for improving student achievement with culturally responsive teaching.
Zaretta Hammond- Ready for Rigor Framework
1. Awareness
2. Learning Partnerships
3. Information Processing
4. Community Building
(Hammond, 2014)
Zaretta Hammond- Ready for Rigor Framework
Awareness: Teachers possess an understanding of their societal position and how their own cultural background shapes their perceptions of students. Additionally, they recognize how schools can contribute to educational inequities (Hammond, 2014).
Zaretta Hammond- Ready for Rigor Framework
Learning Partnerships: Learning partnerships are formed when teachers establish connections with students based on mutual trust and respect, fostering an environment conducive to shared learning experiences (Hammond, 2014; Howard, 2017).
Zaretta Hammond- Ready for Rigor Framework
Information Processing: Teachers acknowledge the influence of students' cultural backgrounds on their information processing abilities and develop authentic learning opportunities to facilitate a deeper grasp of subject matter (Hale, 1892; Hammond, 2014).

Slides 19-23





Module 1 Speaker Notes

Time	Slide	Notes
4:30- 4:35	1.	Before the session begins, teachers should sign in and get settled. Welcome the teachers to the session and share the title of the presentation so the audience is reminded of what we will be learning about over the course of 12 weeks.
4:35 - 4:40	2.	Teachers will engage in a block party discussion protocol. the purpose of this protocol is to give teachers an opportunity to introduce themselves to the people that they will be working with over the course of the next 12 weeks. During the activity, teachers will walk around to at least three people to introduce themselves as the music plays. once the music stops, teachers will return to their seats.
4:40 - 4:43	3.	Read this slide aloud to introduce the goals of the cohort to the teachers.
4:43 - 4:45	4.	Read the slide allowed to review the goals of Module One.
4:45 - 4:55	5.	Say: " This learning will take place over the next 12 weeks. There will be a total of 6 face-to-face (synchronous) sessions, which will be held after school from 4:30 to 6:30 p.m. In addition to these

		sessions, we will have asynchronous learning activities. These asynchronous activities are designed to complement our synchronous sessions and provide reflection and practice opportunities." Open the Canvas Course and instruct teachers to access the Canvas Course invite to join the cohort. Next, guide them through the welcome and syllabus page in Module 1. Make sure to read aloud the section of the syllabus that explains how each module is organized. Afterward, preview Module 1's contents with the teachers and emphasize that all the necessary resources for each module will be available within the Canvas course. It's important to explain how to navigate the course effectively and draw their attention to the 'Cohort Cafe,' which serves as a space for asking questions and sharing ideas and resources. Take this opportunity to ensure that each teacher can access and navigate the Canvas course smoothly.
4:55 - 4:58	6.	Read slide five aloud to define Collective Commitments. Say: "The purpose of creating collective commitments for this professional development is to ensure that we have a common vision for our time together."
4:58 - 5:15	7.	Note: Teachers will need a writing utensil, post-it notes, or index cards for the collective commitments protocol. Slide 7 provides the steps for the protocol. 1. Independent brainstorming: Give teachers 3 minutes to brainstorm commitments. Say- "For the next 3 minutes, brainstorm "We will" statements that will benefit our team while we collaborate and learn together." 2. Round Robin share out: Ask the teachers to share their ideas aloud (2-3 minutes) 3. Organize and refine commitments: Teachers will work together to find common themes from their commitments (5 minutes) 4. Finalize commitments: Teachers will choose no more than four commitments to guide our journey (4 minutes)

		Read aloud the finalized collective commitments. Say: "Embracing collective commitments serves as a constant reminder for us to remain aware of our expectations for each other as we engage in new learning." (2 minutes) (DuFour et al., 2016)
5:15 - 5:23	8.	Before reviewing common vocabulary, engage teachers with a temperature check. This activity should help determine how much teachers know about culturally responsive teaching. Say: "Now that we have established our collective commitments, let's get a temperature check on our knowledge of culturally responsive teaching. Say: "With your table group, answer the following questions: What was your first experience learning about culturally responsive teaching? Have you ever experienced culturally responsive teaching? If yes, describe your experience." Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group. After 5 minutes, give teachers an opportunity to share (2 minutes).
5:17 - 5:25	9.	Now, let's examine common vocabulary associated with Culturally Responsive Teaching. Establishing common definitions helps facilitate effective discussions and understand why some words are painful to others (Mayfield, 2020). Common Vocabulary Activity: The purpose of this activity is to introduce common vocabulary. Be sure to have enough vocabulary cards for each table group Give teachers 5 minutes to work as a team to match the term with the correct definitions. After five minutes, review the terms with the teachers (see answer key).
5:25 - 5:35	10.	Break
5:35 - 5:37	11.	Say, " Now let's talk about the culturally responsive frameworks of Gloria Ladson-Billings, Geneva Gay, and Zaretta Hammond"
5:37 - 5:42	12.	Say, "Dr. Ladson-Billings is well-known for her work in critical race theory and culturally relevant teaching. Ladson-Billings (1994) examined and documented the instructional practices and

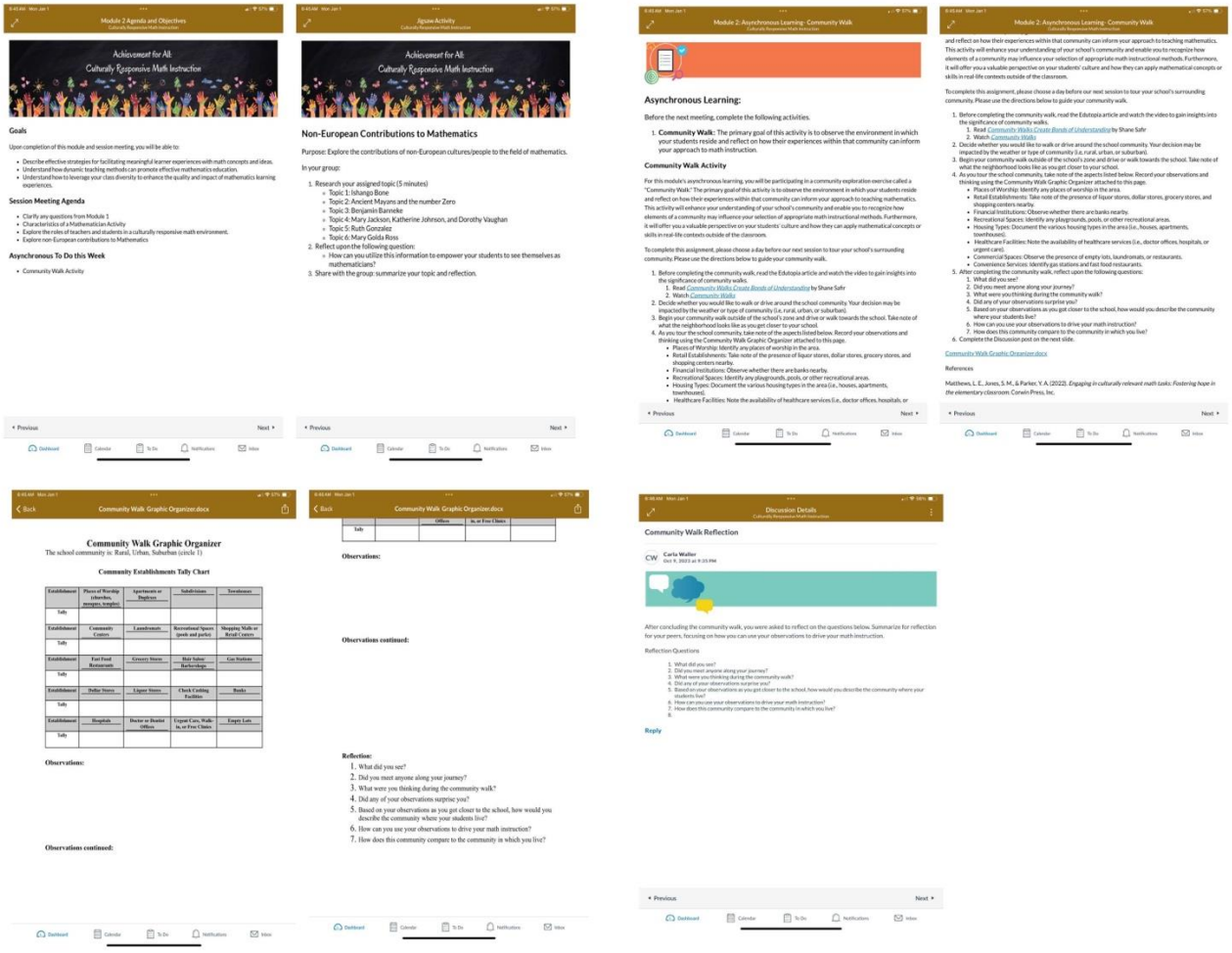
		characteristics of teachers who have experienced success with the academic achievement of Black students. She describes four key components of culturally relevant or culturally responsive teaching" Read the slide aloud.
5:42 - 5:44	13.	Say, "In her book, Dr. Geneva Gay used principles from multicultural education theory, research findings, and practical classroom applications to illustrate that African, Asian, Latino, and Native American students' achievement can be enhanced with culturally responsive teaching. She defined six characteristics of culturally responsive teaching: validating, comprehensive and inclusive, multidimensional, empowering, transformative, and emancipatory."
5:44 - 5:49	14.	Read slide and day the following: "The first principle emphasizes the impact of culture on education, highlighting how teachers' and students' cultural backgrounds influence perceptions and interactions, emphasizing the importance of teachers understanding their own cultural backgrounds for more effective teaching. The second principle challenges conventional approaches to addressing academic achievement gaps between White students and Black students, emphasizing the need to move away from deficit thinking and consider students' cultural backgrounds and social-emotional well-being in interventions. The third principle underscores the importance of teachers translating good intentions into action by actively engaging a diverse range of students using evidence-based instructional and classroom management practices. The fourth principle promotes the view of cultural diversity as a strength, advocating for the integration of various factors, including community characteristics and cultural backgrounds, into instructional practices. The fifth principle emphasizes the need for teachers to recognize and nurture diverse talents and abilities in students, avoiding assumptions based on academic performance or socioeconomic background.

		The sixth principle highlights the importance of teachers understanding and addressing various barriers to student achievement, including socioeconomic factors, parental involvement, standardized test bias, and curriculum challenges, while recognizing that standardized assessments and grades alone do not explain academic achievement gaps among students of different backgrounds."
5:49 - 5:52	15.	Say: "The Ready for Rigor Framework describes four areas of culturally responsive teaching practices that support teachers in building their capacity to use culturally responsive teaching in the classroom (Hammond, 2014). The four areas of the Ready for Rigor Framework are as follows: (read the slide)"
	16.	Read the slide to describe the component from the Ready for Rigor Framework.
	17.	Read the slide to describe the component from the Ready for Rigor Framework.
	18.	Read the slide to describe the component from the Ready for Rigor Framework.
	19.	Read the slide to describe the component from the Ready for Rigor Framework.
6:08 - 6:18	20.	Complete the school culture illustration with the teachers. Read the directions on the slide aloud. Read the slide. Give 6 minutes to complete the activity and 4 minutes to share with others.
6:18 - 6:25	21.	Open the Canvas course to review the Asynchronous work with teachers. Read the directions from each page aloud.
6:25 - 6:30	22.	Give teachers time to ask questions to wrap up the session.
END OF SESSION		

Module 2: Setting the Stage for Culturally Responsive Math Instruction Part 1

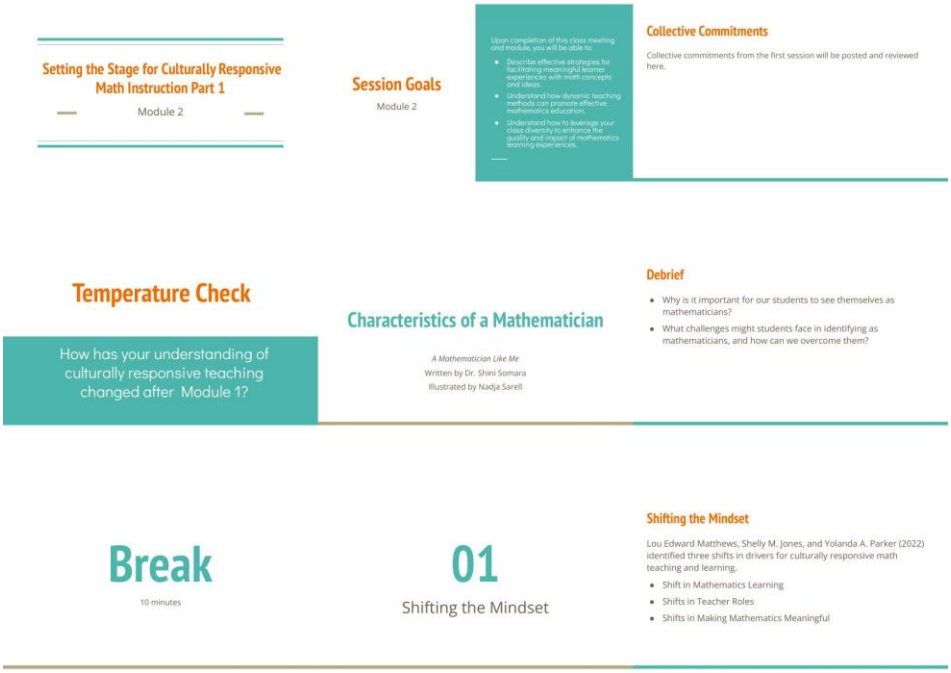
Module 2 Canvas Module

The snapshot of this module includes all supporting materials, activities, and discussion posts.

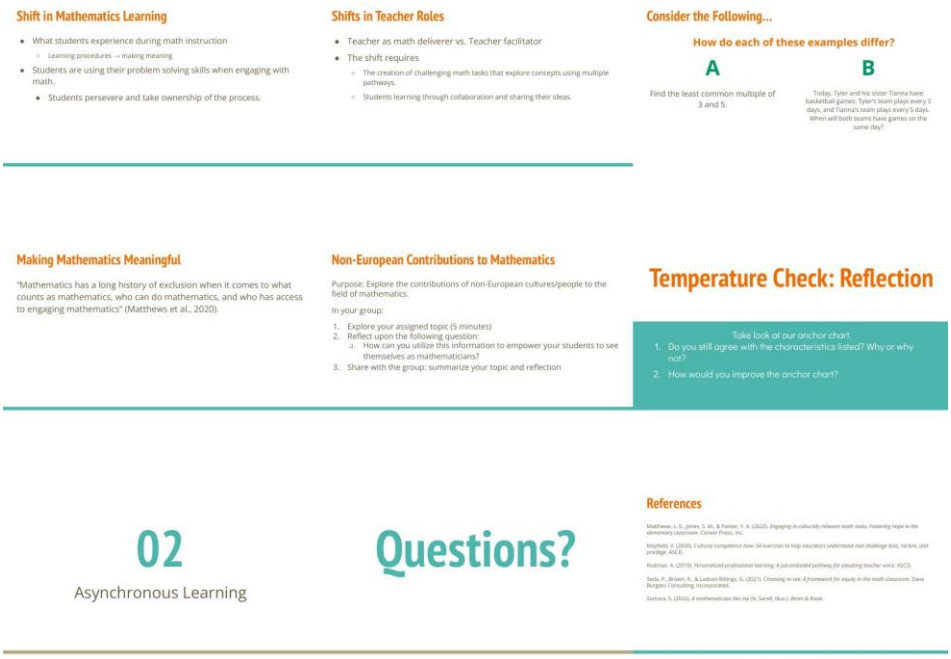


Module 2 Synchronous Session Slides

Slides 1-9


Setting the Stage for Culturally Responsive Math Instruction Part 1
Module 2
Session Goals
Module 2
Upon completion of this class meeting and module, you will be able to:
Describe effective strategies for facilitating meaningful learner experiences with math concepts and ideas.
Understand how dynamic teaching methods can promote effective mathematics education
Understand how to leverage your class diversity to enhance the quality and impact of mathematics learning experiences.
Collective Commitments
Collective commitments from the first session will be posted and reviewed here.
Temperature Check
How has your understanding of culturally responsive teaching changed after Module 1?
Characteristics of a Mathematician
A Mathematician Like Me
Written by Dr. Shini Somara
Illustrated by Nadja Sarell
Debrief
Why is it important for our students to see themselves as mathematicians?
What challenges might students face in identifying as mathematicians, and how can we overcome them?
Break
10 minutes
01
Shifting the Mindset
Shifting the Mindset
Lou Edward Matthews, Shelly M. Jones, and Yolanda A. Parker (2022) identified three shifts in drivers for culturally responsive math teaching and learning.
Shift in Mathematics Learning
Shifts in Teacher Roles
Shifts in Making Mathematics Meaningful

Slides 10-18


Shift in Mathematics Learning
What students experience during math instruction
Learning procedures → making meaning
Students are using their problem solving skills when engaging with math.
Students persevere and take ownership of the process.
Shifts in Teacher Roles
Teacher as math deliverer vs. Teacher facilitator
The shift requires
The creation of challenging math tasks that explore concepts using multiple pathways.
Students learning through collaboration and sharing their ideas.
Consider the Following...
How do each of these examples differ?
A
Find the least common multiple of 3 and 5.
B
Today, Tyler and his sister Tianna have basketball games. Tyler's team plays every 3 days, and Tianna's team plays every 5 days. When will both teams have games on the same day?
Making Mathematics Meaningful
"Mathematics has a long history of exclusion when it comes to what counts as mathematics, who can do mathematics, and who has access to engaging mathematics" (Matthews et al., 2020).
Non-European Contributions to Mathematics
Purpose: Explore the contributions of non-European cultures/people to the field of mathematics.
In your group:
1. Explore your assigned topic (5 minutes)
2. Reflect upon the following question:
a. How can you utilize this information to empower your students to see themselves as mathematicians?
3. Share with the group: summarize your topic and reflection
Temperature Check: Reflection
Take look at our anchor chart.
1. Do you still agree with the characteristics listed? Why or why not?
2. How would you improve the anchor chart?
02
Asynchronous Learning
Questions?
References

Module 2 Speaker Notes

Before this module, review teacher reflection discussion posts and clarify any misconceptions. If needed, use the temperature check to answer questions.

Time	Slide	Notes
4:30-4:32	1.	Welcome teachers to the second session and read the slide title aloud. *Ensure that teachers have signed in before beginning the session.*
4:32-4:34	2.	Say, "This is part one of a two-part module we will work through for the next four weeks." Read the session goals aloud.
4:34-4:36	3.	Remind the teachers of our collective commitments during the first session. Give them 2 minutes to read the slide to themselves.
4:36-4:43	4.	The purpose of the temperature check is to give teachers a chance to reflect upon the work they completed last week and ask questions. Say: "With your table group, answer the following questions: How has your understanding of culturally responsive teaching changed after module 1?" Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group. After 5 minutes, allow teachers to share (2 minutes).
4:43-5:13	5.	Complete the following activity with the teachers. Math Activity- Characteristics of a Mathematician Materials Needed • Book: "A Mathematician Like Me" Written by Dr. Shini Somara and illustrated by Nadja Sarell • Anchor chart paper • Markers • Blank sheets of paper • Sticky notes • Document camera • Colored pencils *Before beginning this session, ensure teacher materials are on each table and create an anchor chart with a stick figure entitled "Characteristics of a Mathematician."*

		1. Begin by introducing the lesson's objective: "Today, we will explore how we can help our students see themselves as mathematicians." (1 minute) 2. Instruct the teachers to draw a stick figure of themselves on the sheet of paper (3 minutes) 3. Before beginning the read aloud, say, “As I read this book, write, or draw the qualities of a mathematician they notice in the story. You can also record your thoughts or ideas. What questions do you have for me?” (3 minutes) 4. Read the book aloud to teachers using the document camera so everyone can see the pages (10 minutes). 5. Turn and Talk: After the read aloud is complete, ask teachers to share their qualities of a mathematician with their table group and list the qualities they have in common. (4 minutes). 6. Call on each table group to share their answers. As they share their answers, have a volunteer record them (5 minutes). 7. Create the “Characteristics of a Mathematician” anchor chart to display for the rest of the session (5 minutes).
5:13-5:20	6.	Whole group reflection. Ask the following two questions to the entire group. 1. "Why is it important for our students to see themselves as mathematicians?" 2. "What challenges might students face in identifying as mathematicians, and how can we overcome them?"
5:20-5:30	7.	Break
5:30-5:32	8.	Say, “The purpose of the previous activity was to prompt us to start considering how to inspire and nurture students to embrace their roles as mathematicians. We may need to reconsider our approach to teaching mathematics to achieve this. Let's take a moment to discuss how we can adjust our mindset to lay the foundation for culturally responsive math education.”
5:32-5:35	9	Read the slide aloud.
5:35-5:39	10.	Say, “Shifts in mathematical thinking represent a transformation in what students experience during math instruction. Instead of merely learning procedures, the focus shifts towards actively making meaning from mathematical concepts. This shift encourages students to become adept problem solvers, persevering through challenges and taking

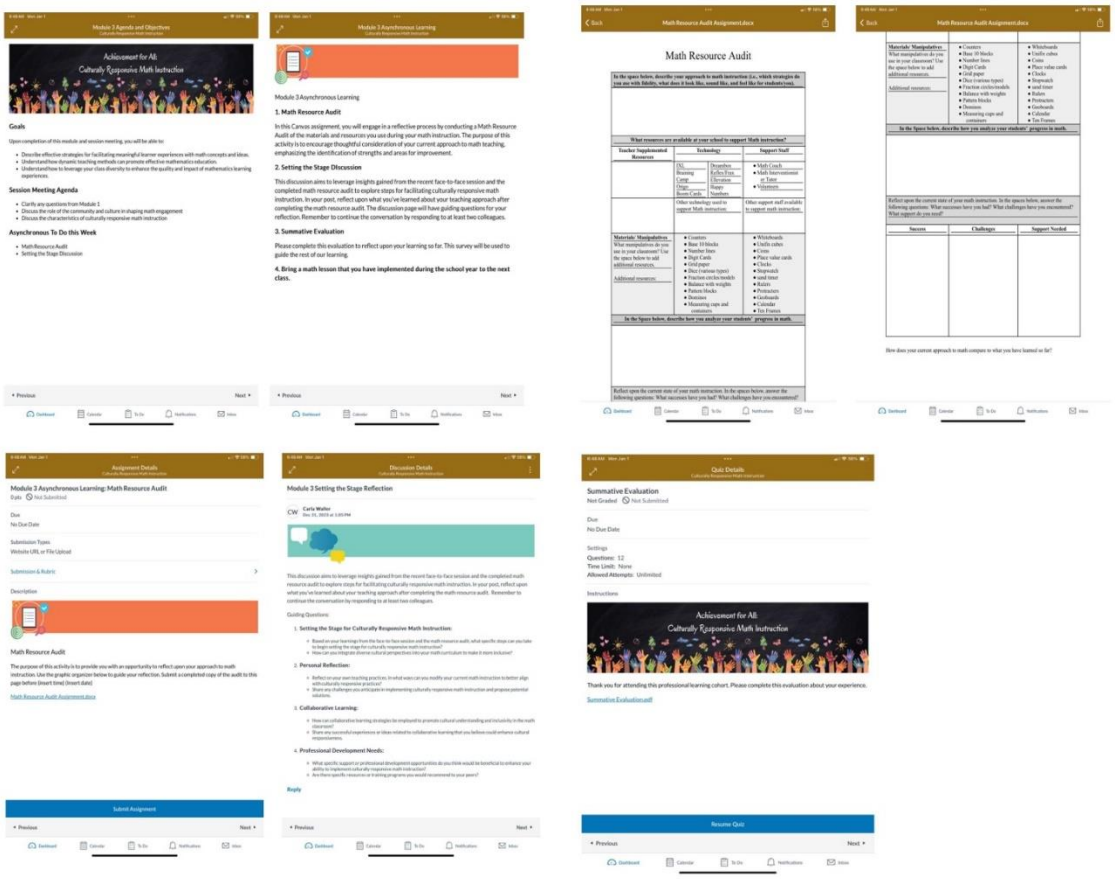
		ownership of their problem-solving processes. Students are challenged to employ various problem-solving strategies, fostering connections, communication, and collaboration while nurturing their mathematical ideas' growth. The shift in ownership from teacher to student is fundamental to this change. It aims to empower students to view themselves as capable problem solvers, thereby fostering a deeper engagement with mathematics" (Matthews et al., 2022).
5:39-5:43	11.	Say, "The shift from the traditional role of a teacher as a math deliverer to that of a teacher facilitator is a transformative process in mathematics education. This shift requires a fundamental change in how students engage with math. It strongly emphasizes the active creation of meaning during mathematical activities and encourages students to utilize a diverse range of problem-solving strategies. Creating challenging math tasks that explore concepts through multiple pathways becomes central to this approach. Collaboration and sharing of ideas among students are vital components fostering connections, communication, and collaboration. Moreover, this shift underscores the importance of students being conscious of the problem-solving process as they tackle math challenges, promoting a deeper understanding of mathematical concepts. To facilitate this transition, teachers are encouraged to guide students through the problem-solving process and present them with math problems to solve independently, followed by a guided analysis of their problem-solving approaches. Ultimately, this shift signifies a move from teacher-led instruction to empowering students, encouraging them to see themselves as capable problem solvers and take ownership of their mathematical learning journey" (Matthews et al., 2022).
5:43-5:46	12.	Say, "With your table group, consider the following questions. How does each example differ? How are the students engaging with the information?" Give the teachers 3 minutes to discuss. After the time is up, ask volunteers to share.
5:46-5:50	13.	Read the quote on the slide. Say, "Most of the mathematicians prominently featured in our curriculum tend to be white and male. However, it is crucial to recognize that the world of mathematics extends far beyond European origins. Every culture has made substantial contributions to the development of mathematics. Let's take a moment to delve into some

		examples of non-European mathematical achievements" (Matthews et al., 2022).
5:50-6:15	14.	The goal of this activity is to acquaint teachers with the contributions of non-European cultures to the field of mathematics. Say, "The goal of this activity is to explore the contributions of non-European cultures/people to the field of mathematics. We will use the Jigsaw protocol for this exercise. You all will be divided into six groups, and each group will be assigned one of the topics listed on the Canvas page dedicated to the Jigsaw activity. Each group will have approximately 10 minutes to explore the assigned resource and reflect on how you can utilize this information to empower your students to see themselves as mathematicians. Each group will then describe what they learned and explain how the information can support math instruction. What questions do you have for me?"
6:15-6:20	15.	Facilitate a whole group conversation. Say, "Take a look at the anchor chart. Do you still agree with the characteristics listed? How would you improve the anchor char"
6:20-6:25	16.	Open the Canvas course to review the Asynchronous work with teachers. Read the directions the page aloud.
6:25-6:30	17.	Give teachers time to ask questions to wrap up the session.
END OF SESSION		

Module 3: Setting the Stage for Culturally Responsive Math Instruction Part 2

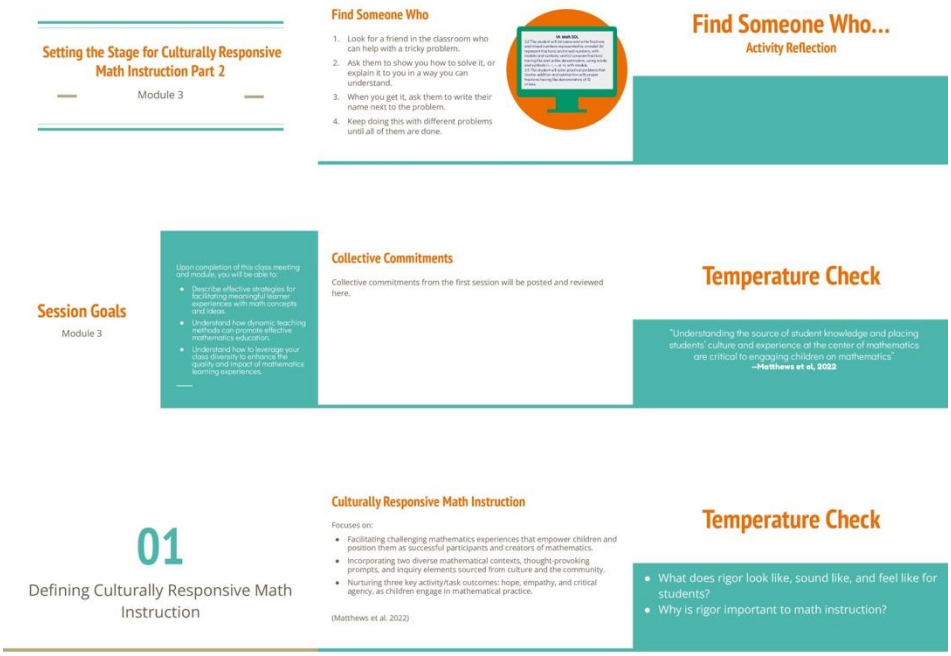
Module 3 Canvas Module

The snapshot of this module includes all supporting materials, activities, and discussion posts.

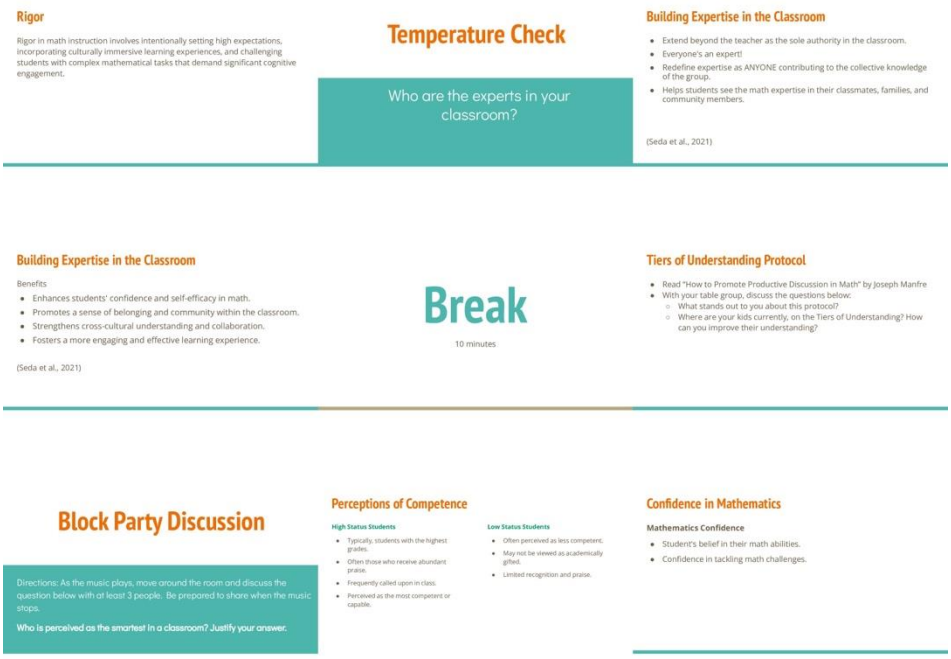


Module 3 Synchronous Session Slides

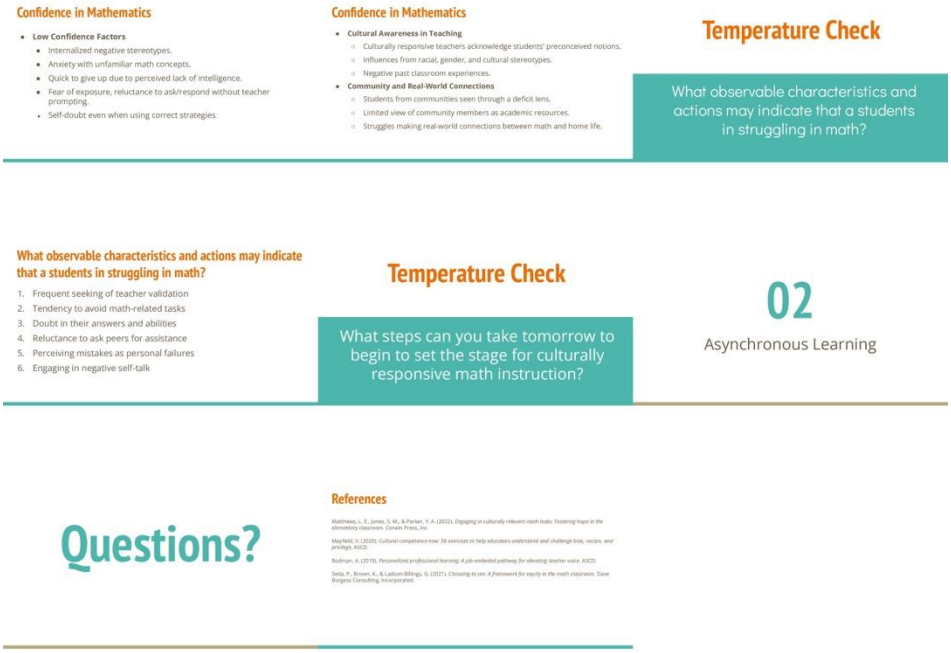
Slides 1-9


Setting the Stage for Culturally Responsive Math Instruction Part 2
Module 3
Find Someone Who
1. Look for a friend in the classroom who can help with a tricky problem.
2. Ask them to show you how to solve it, or explain it to you in a way you can understand.
3. When you get it, ask them to write their name next to the problem.
4. Keep doing this with different problems until all of them are done.
Find Someone Who...
Activity Reflection
Session Goals
Module 3
Upon completion of this class meeting and module, you will be able to:
Describe effective strategies for facilitating meaningful learner experiences with math concepts and ideas.
Understand how dynamic teaching methods can promote effective mathematics education.
Understand how to leverage your class diversity to enhance the quality and impact of mathematics learning experiences.
Collective Commitments
Collective commitments from the first session will be posted and reviewed here.
Temperature Check
"Understanding the source of student knowledge and placing students' culture and experience at the center of mathematics are critical to engaging children on mathematics"
–Matthews et al, 2022
01
Defining Culturally Responsive Math Instruction
Culturally Responsive Math Instruction
Focuses on:
Facilitating challenging mathematics experiences that empower children and position them as successful participants and creators of mathematics.
Incorporating two diverse mathematical contexts, thought-provoking prompts, and inquiry elements sourced from culture and the community.
Nurturing three key activity/task outcomes: hope, empathy, and critical agency, as children engage in mathematical practice.
(Matthews et al. 2022)
Temperature Check
What does rigor look like, sound like, and feel like for students?
Why is rigor important to math instruction?

Slides 10-18


Rigor
Rigor in math instruction involves intentionally setting high expectations, incorporating culturally immersive learning experiences, and challenging students with complex mathematical tasks that demand significant cognitive engagement.
Temperature Check
Who are the experts in your classroom?
Building Expertise in the Classroom
Extend beyond the teacher as the sole authority in the classroom.
Everyone's an expert!
Redefine expertise as ANYONE contributing to the collective knowledge of the group.
Helps students see the math expertise in their classmates, families, and community members.
(Seda et al., 2021)
Building Expertise in the Classroom
Benefits
Enhances students' confidence and self-efficacy in math.
Promotes a sense of belonging and community within the classroom.
Strengthens cross-cultural understanding and collaboration.
Fosters a more engaging and effective learning experience.
(Seda et al., 2021)
Break
10 minutes
Tiers of Understanding Protocol
Read "How to Promote Productive Discussion in Math" by Joseph Manfre
With your table group, discuss the questions below:
What stands out to you about this protocol?
Where are your kids currently, on the Tiers of Understanding? How can you improve their understanding?
Block Party Discussion
Directions: As the music plays, move around the room and discuss the question below with at least 3 people. Be prepared to share when the music stops.
Who is perceived as the smartest in a classroom? Justify your answer.
Perceptions of Competence
High Status Students
Typically, students with the highest grades.
Often those who receive abundant praise.
Frequently called upon in class.
Perceived as the most competent or capable.
Low Status Students
Often perceived as less competent.
May not be viewed as academically gifted.
Limited recognition and praise.
Confidence in Mathematics
Mathematics Confidence
Student's belief in their math abilities.
Confidence in tackling math challenges.

Slides 19-25



Module 3 Speaker Notes

Before this module, review teacher reflection discussion posts and clarify any misconceptions. If needed, use the temperature check to answer questions.

Time	Slide	Notes
4:30-4:32	1.	Welcome teachers to the second session and read the slide title aloud. *Ensure that teachers have signed in before beginning the session.*
4:32 - 4:40	2.	Find Someone Who Activity 1. Pass out a copy of the activity. 2. Say, "Today, we're going to try out an activity often used as an icebreaker in classrooms and during professional development workshops. We are going to review our knowledge of fractions." 3. Read the directions on the slide aloud. 4. Say. "You have 8 minutes to work with your classmates to complete this activity." 5. After 8 minutes, the teachers returned to their seats.

4:45 - 4:50	3.	Facilitate a discussion with the teachers using the following questions: 1. How did you feel during the activity? 2. Based on what you know, how is this activity culturally responsive?
4:50 - 4:52	4.	Say, "Today, we will be continuing to set the stage for culturally responsive teaching." Read the session goals aloud.
4:52 - 4:55	5.	Remind the teachers of our collective commitments during the first session. Give them 2 minutes to read the slide to themselves.
4:55 - 5:05	6.	The purpose of the temperature check is to give teachers a chance to reflect upon the work they completed last week and ask questions. Say: "With your table group, read the quote and reflect upon your experience with your community walk. How can your observations or experience drive your math instruction?" Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group. After 5 minutes, allow teachers to share (5 minutes). Note: This activity may take longer than 10 minutes.
5:05 - 5:06	7.	Say, "Now, let's take a look at the components of culturally responsive math instruction."
5:06- 5:08	8.	Read the slide aloud.
5:08 - 5:18	9.	Read the slide aloud. Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group. After 5 minutes, allow teachers to share (5 minutes).
5:18 - 5:22	10.	Say, "It is crucial that we understand that rigor goes far beyond just having high expectations for all students. It's about creating a holistic, equitable learning environment that is deeply rooted in quality and cultural relevance. When discussing equitable math instruction, we are not merely about expecting all students to perform at a certain level. It's about

		ensuring that every student has access to well-designed learning experiences of the highest quality. But it doesn't stop there; it's also about fostering a profound commitment to mathematics education that is culturally embedded. In this context, rigor plays a pivotal role in shaping a high-quality learning environment. So, what does rigor mean here? It can be defined as the presence of adequate mathematical complexity within the curriculum and instruction. In simple terms, it means that the material we teach must challenge our students. It should not be so easy that it fails to engage their intellectual capabilities. Rigor should place significant cognitive demands on the learner, pushing them to think critically, problem-solve, and explore mathematical concepts deeply. It involves a meticulous and deliberate consideration of student culture and community. This means taking the time to understand our students' unique backgrounds, experiences, and needs. It means recognizing that cultural diversity is a valuable resource in the learning process. Embracing rigor also involves being willing to embrace complexity in both intellectual and relational aspects. In other words, it's not just about making math problems more challenging but also about being attuned to the relationships and dynamics within the classroom. It's about nurturing a supportive, inclusive environment where all students feel seen and heard" (Matthews et al., 2022).
5:22 - 5:25	11.	Read the questions aloud. Give teachers 2 minutes to discuss these questions. As they talk, listen in on each group. After 2 minutes, allow teachers to share (2 minutes).
5:25 - 5:28	12.	Say, "First, we need to extend beyond the traditional model of the teacher as the sole authority in the classroom. We must start viewing our students as experts in their own right. Expertise should not be confined to the teacher alone but redefined as contributing to the group's collective knowledge. When everyone is seen as an expert, the dynamics in the classroom change. So, remember that each student possesses unique strengths and experiences that can contribute to the collective learning process. This shift in perspective fosters an environment where learning is a collaborative effort, and all voices are valued. (Seda et al., 2021)."
5:28 - 5:30	13.	Say, "The benefits of including everyone as experts in the math classroom are numerous. It enhances students' confidence and self-efficacy in math. When students feel like they are experts and that

		their contributions matter, they are more engaged and motivated. This approach also promotes a sense of belonging and community within the classroom, making students feel valued and understood. Additionally, the inclusion of everyone as experts strengthens cross-cultural understanding and collaboration, preparing students for a diverse and interconnected world. By emphasizing the expertise of all students, we foster a more engaging and effective learning experience, where knowledge is built collectively, and no one is left behind" (Seda et al., 2021).
5:30 - 5:40	14.	10 minute break
5:40 - 5:50	15.	Read the slide aloud. Give the teachers 3-5 minutes to independently read and reflect upon the article. Then, give the teachers 5 minutes to discuss the question. Ask the teachers to share their reflections.
5:50 - 5:55	16.	Read the directions on the slide aloud and complete the activity.
5:55 - 5:58	17.	Say, "Usually, students with the highest grades or those who receive the most praise and are frequently called upon tend to be designated as high-status students. These students are considered to be the most competent or capable. On the flip side, low-status students are often perceived as less competent or not as academically gifted. Research has consistently indicated that the classification of students into low or high-status categories is frequently influenced by factors such as race, ethnicity, gender, and negative stereotypes (Seda et al., 2021).
5:58 - 6:00	18.	Say, "Mathematics confidence refers to a student's belief in their ability to excel in math and their confidence in tackling mathematical challenges" (Seda et al., 2021).
6:00 - 6:03	19.	Say, "Students' low confidence may result from internalized negative stereotypes or anxiety when facing unfamiliar mathematical concepts. Consequently, they tend to give up quickly, associating struggles with a lack of intelligence. They may also fear being exposed and are less inclined to ask questions or respond to inquiries without teacher prompting. Additionally, these students tend to doubt their correctness even when employing the right strategies" (Seda et al., 2021).
5:03 - 6:06	20.	Say, "Culturally responsive teachers understand that students bring preconceived notions about who is considered mathematically adept.

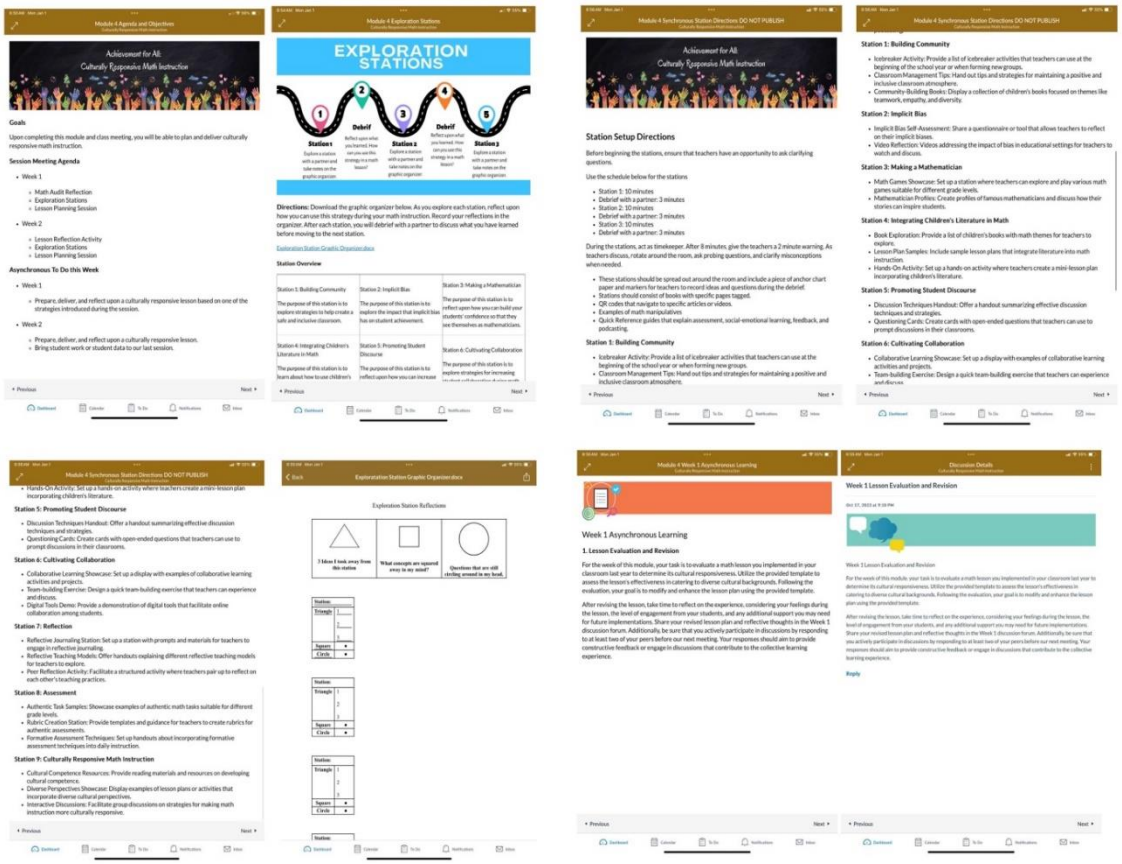
		These perceptions are often influenced by racial, gender, and cultural stereotypes and past negative classroom experiences. Moreover, students hailing from communities perceived through a deficit lens typically do not view community members as valuable academic resources, and they may struggle to make real-world connections between math and their home life" (Seda et al., 2021).
6:06 - 6:10	21.	Read the questions aloud. Give teachers 3 minutes to discuss these questions. As they talk, listen in on each group. After 2 minutes, allow teachers to share (2 minutes).
6:10 - 6:14	22.	Read each bullet and add the following information below to each characteristic. Say, "1. Frequent Teacher Validation: When a student frequently seeks validation from the teacher, it might be a sign of insecurity or a lack of confidence in their math abilities. They may need reassurance to feel capable. 2. Task Avoidance: If a student tends to avoid math-related tasks, it could be an indication of struggling. This avoidance may stem from a fear of making mistakes or a lack of understanding, and it's important to address it early on. 3. Doubting Their Answers: Students who doubt their answers may lack confidence in their problem-solving skills. They might hesitate to trust their judgment, even when their solutions are correct. This self-doubt can hinder their progress. 4. Reluctance to Seek Help: A student less likely to ask their peers for help might struggle silently. They may fear judgment or believe they should be able to solve problems on their own. Encouraging them to seek help when needed can be beneficial. 5. Viewing Mistakes as Failures: Seeing a mistake as a failure can be a significant red flag. Students who internalize mistakes as personal failures may develop a negative attitude toward math. It's important to help them understand that making mistakes is a natural part of the learning process. 6. Engaging in Negative Self-Talk: When students engage in negative self-talk, constantly doubting their abilities or saying they're not good at math, it can hinder their progress. This negative self-perception can become a self-fulfilling prophecy" (Seda et al., 2021).
6:14 - 6:22	23.	Read the questions aloud. Give the teacher 4 minutes to reflect on an index card or sticky note. Then, teachers should share their ideas with their table group for feedback (5 minutes).

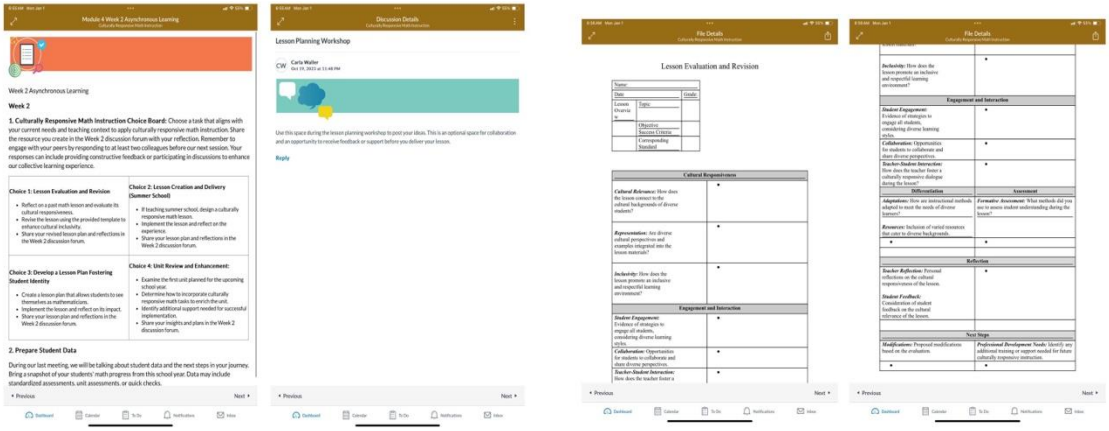
6:22-6:28	24.	Open the Canvas course to review the Asynchronous work with teachers. Read the directions on the page aloud.
6:28-6:30	25.	Give teachers time to ask questions to wrap up the session.
END OF SESSION		

Module 4: Planning for Culturally Responsive Math Instruction

Module 4 Canvas Module

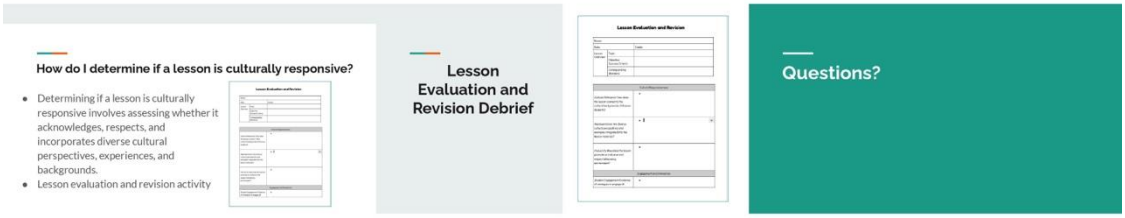
The snapshot of this module includes all supporting materials, activities, and discussion posts.



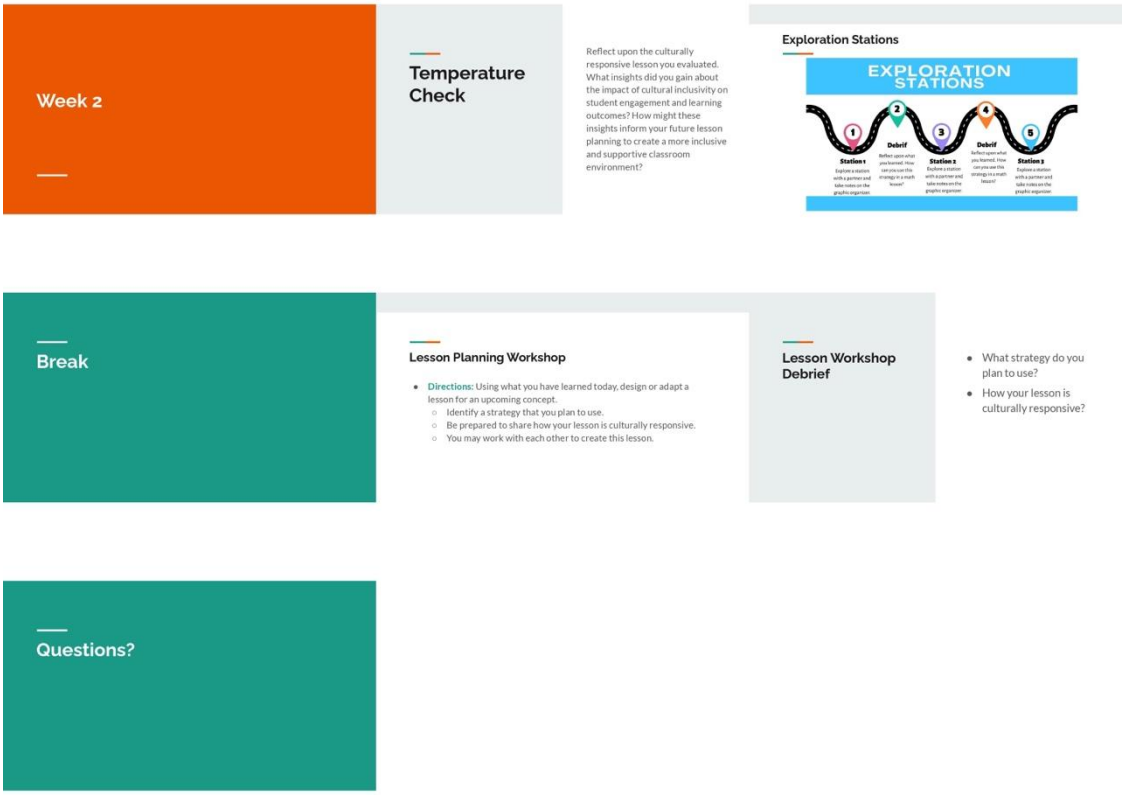


Module 4 Synchronous Session Slides

Slides 1-9



Slides 10-18



Module 4 Speaker Notes

Before this module, review teacher reflection discussion posts and clarify any misconceptions. If needed, use the temperature check to answer questions. Prepare the station materials prior to this session. Please note that this module is two weeks long.

Time	Slide	Notes
4:30-4:32	1.	Welcome teachers to the second session and read the slide title aloud. *Ensure that teachers have signed in before beginning the session.*
4:50 - 4:54	2.	Say, "Today, explore culturally responsive math practices in more depth and plan a lesson that you will implement before our next session." Read the session goals aloud. Remind the teachers of our collective commitments during the first session. Give them 2 minutes to read the slide to themselves.

4:54 - 5:10	3.	Read the slide aloud. Give the teachers 3-5 minutes to revisit their Math Resource Audit. Then, give the teachers 5 minutes to discuss the question. As teachers discuss, rotate around the room, ask probing questions, and clarify misconceptions when needed. Ask the teachers to share their reflections.
5:10 - 5:55	4.	Say, "Today, you will participate in exploration stations. The purpose of these stations is to give you the agency to explore culturally responsive teaching practices at your own pace." Navigate to the "Exploration Station" page in Canvas Module 4. Instruct the teachers to navigate to this page. Say, "As you explore each station, reflect upon how you can use this strategy during your math instruction. Record your reflections in the organizer. After each station, you will debrief with a partner to discuss what you have learned before moving to the next station." Before beginning the stations, ensure that teachers have an opportunity to ask clarifying questions. Use the schedule below for the stations • Station 1: 10 minutes • Debrief with a partner: 3 minutes • Station 2: 10 minutes • Debrief with a partner: 3 minutes • Station 3: 10 minutes • Debrief with a partner: 3 minutes During the stations, act as timekeeper. After 8 minutes, give the teachers a 2 minute warning. As teachers discuss, rotate around the room, ask probing questions, and clarify misconceptions when needed. • These stations should be spread out around the room and include a piece of anchor chart paper and markers for teachers to record ideas and questions during the debrief. • Stations should consist of books with specific pages tagged. • QR codes that navigate to specific articles or videos. • Examples of math manipulatives • Quick Reference guides that explain assessment, social-emotional learning, feedback, and podcasting.

5:55 - 6:00	6.	Break
6:00 - 6:25	7.	Read the slide. Direct all participants to open Canvas a download the Lesson Evaluation and Revision Template. Say, "We are going to use what we've learned so far to evaluate a math lesson that you have implemented this year. We are going to walk through this evaluation together and determine how we can make the lesson more culturally responsive. You may choose to complete this activity with your table group, a partner, or independently. What questions do you have for me?" Give teachers an opportunity to get into groups and acces their lesson plan. (2 minutes). From 6:05-6:20, give participants time to evaluate their lesson based on the template posted in Canvas. As they walk, rotate around the room asking clarifying questions. From 6:20-6:30, participants will have an opportunity to share their experiences with the the evaluation.
6:25 - 6:30	8.	Explain to the participants that they will be evaluating a lesson of their choice and posting about their experience in the discussion forum. Show teachers the Canvas page and allow time for questions.
END OF SESSION FOR WEEK 1 WEEK 2 IS BELOW		
Time	**Slide**	**Notes**
4:30-4:32	1.	Welcome teachers to the second session and read the slide title aloud. *Ensure that teachers have signed in before beginning the session.*
4:50 - 4:54	2.	Say, "Today, explore culturally responsive math practices in more depth and plan a lesson that you will implement before our next session." Read the session goals aloud.

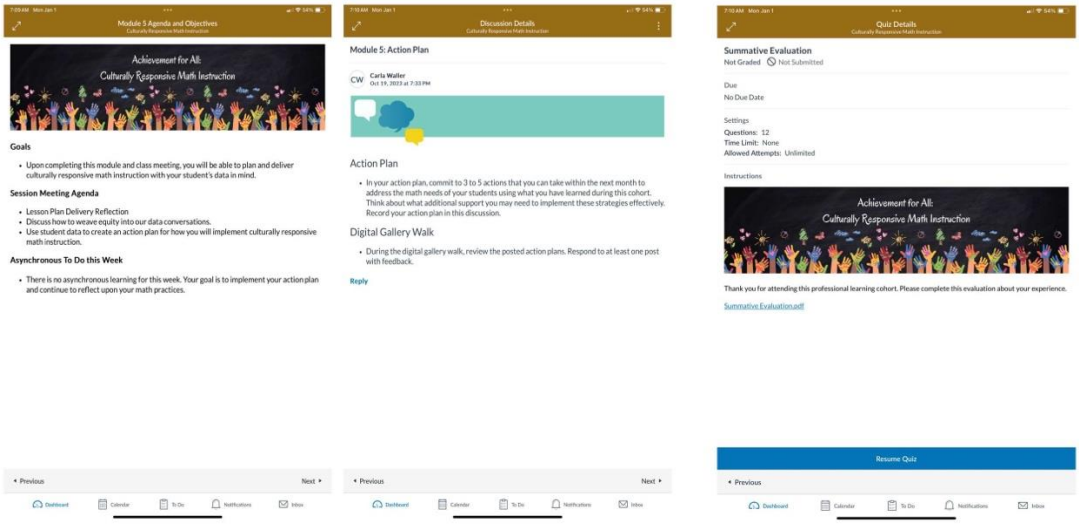
		Remind the teachers of our collective commitments during the first session. Give them 2 minutes to read the slide to themselves.
4:54 - 5:10	11.	Read the slide aloud. Give the teachers 3-5 minutes to revisit their lesson evaluation, Then, give the teachers 5 minutes to discuss the question. As teachers discuss, rotate around the room, ask probing questions, and clarify misconceptions when needed. Ask the teachers to share their reflections.
5:10 - 5:55	12.	Say, "Today, you will participate in exploration stations. The purpose of these stations is to give you the agency to explore culturally responsive teaching practices at your own pace." Navigate to the "Exploration Station" page in Canvas Module 4. Instruct the teachers to navigate to this page. Say, "As you explore each station, reflect upon how you can use this strategy during your math instruction. Record your reflections in the organizer. After each station, you will debrief with a partner to discuss what you have learned before moving to the next station." Before beginning the stations, ensure that teachers have an opportunity to ask clarifying questions. Use the schedule below for the stations • Station 1: 10 minutes • Debrief with a partner: 3 minutes • Station 2: 10 minutes • Debrief with a partner: 3 minutes • Station 3: 10 minutes • Debrief with a partner: 3 minutes During the stations, act as timekeeper. After 8 minutes, give the teachers a 2 minute warning. As teachers discuss, rotate around the room, ask probing questions, and clarify misconceptions when needed. • These stations should be spread out around the room and include a piece of anchor chart paper and markers for teachers to record ideas and questions during the debrief. • Stations should consist of books with specific pages tagged. • QR codes that navigate to specific articles or videos. • Examples of math manipulatives

		• Quick Reference guides that explain assessment, social-emotional learning, feedback, and podcasting.
5:55 - 6:00	13.	Break
6:00 - 6:25	14.	Read the slide and clarify any questions. As teachers work, rotate around the room, ask probing questions, and clarify misconceptions when needed.
6:25 - 6:30	16.	Facilitate a discussion with the two questions on the slide.
END OF SESSION		

Module 5: Continuing the Journey: The Action Plan

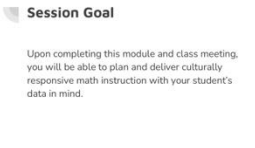
Module 5 Canvas Module

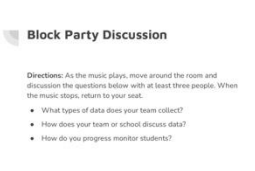
The snapshot of this module includes all supporting materials, activities, and discussion posts.

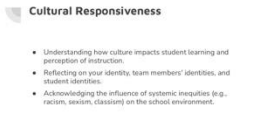


Module 5 Synchronous Session Slides

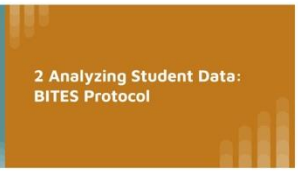
Slides 1-9

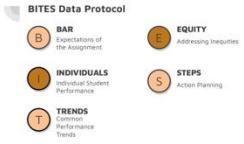


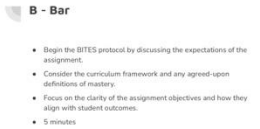


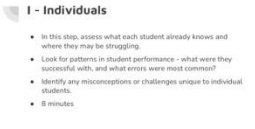


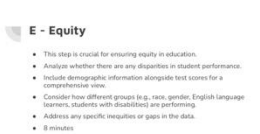
Slides 10-18











Slides 19-21

Module 5 Speaker Notes

Before this module, review teacher reflection discussion posts and clarify any misconceptions. If needed, use the temperature check to answer questions.

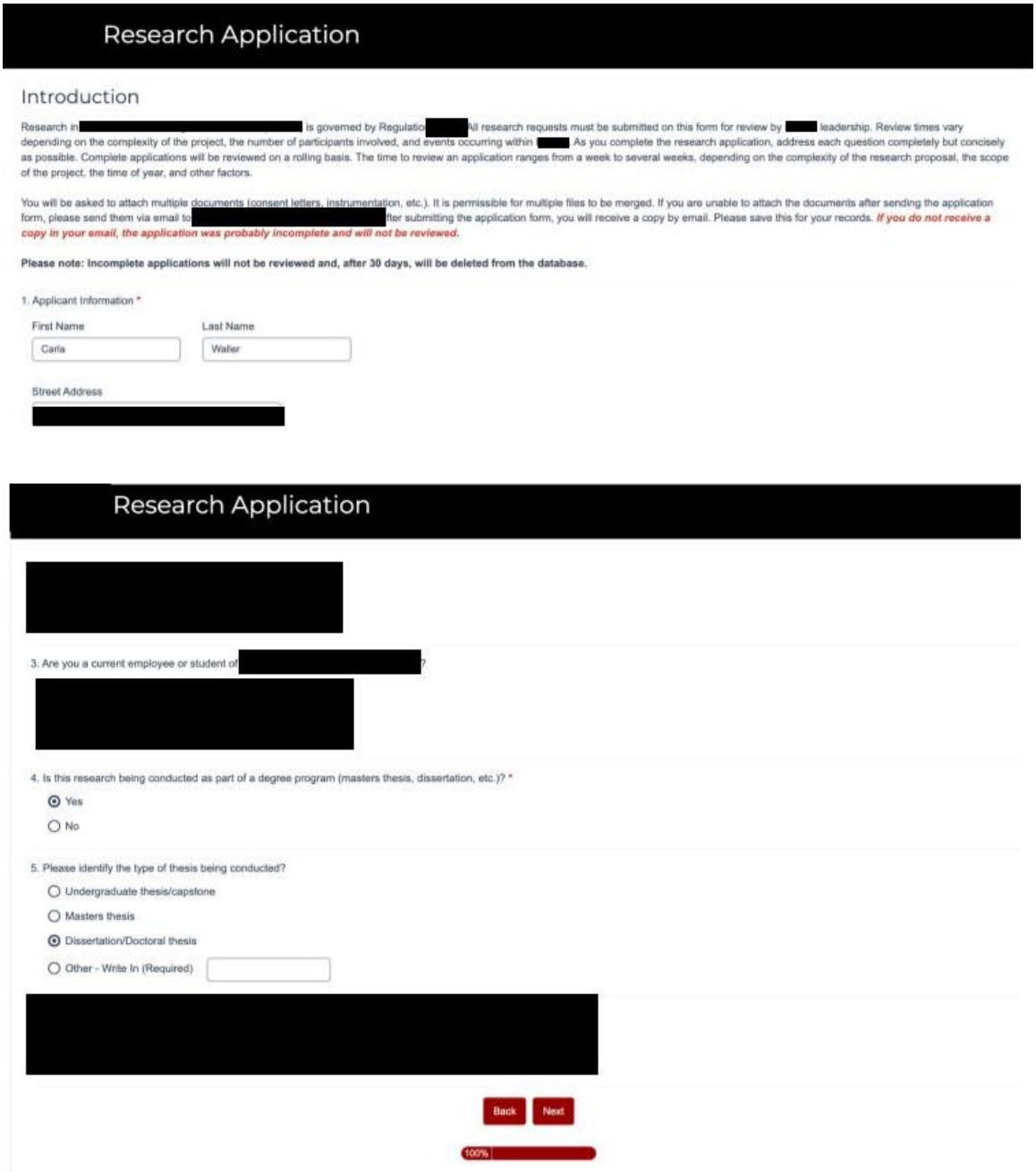
Time	Slide	Notes
4:30-4:32	1.	Welcome teachers to the second session and read the slide title aloud. *Ensure that teachers have signed in before beginning the session.*
4:50 - 4:52	2.	Say, "Today, we will discuss how to weave equity into data conversations." Read the session goals aloud.
4:52 - 4:54	3.	Remind the teachers of our collective commitments during the first session. Give them 2 minutes to read the slide to themselves.
4:54 - 5:04	4.	The purpose of this activity is to allow teachers to share their experiences from the lesson they delivered. Say: "With your table group, reflect upon the culturally responsive task you completed. What insights did you gain about the impact of cultural inclusivity on student engagement and learning outcomes? How might these insights inform your future lesson planning to create a more inclusive and supportive classroom environment?" Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group. After 5 minutes, allow teachers to share (5 minutes). Note: This activity may take longer than 10 minutes.

5:05 - 5:09	5.	Read the slide aloud. Give teachers 5 minutes to discuss these questions. As they talk, listen in on each group.
5:09 - 5:11	6.	We collect a variety of data throughout the year. It is essential that we weave equity into our data conversations. In order to achieve this, successful data discussions require teams to be mindful of the impact of culture, individual perspectives, systemic inequities, and potential implicit biases. Let's discuss how we can prepare your team for more equitable conversations about student data.
5:11 - 5:12	7.	Say, "To embark on the path of equitable data conversations, it's important to start by comprehending the profound influence of culture on student learning and their perceptions of instruction. This understanding lays the foundation for more inclusive and effective educational practices. It is also essential to engage in self-reflection, examining not only your own identity but also the identities of your team members and the diverse backgrounds of your students. This reflective process can unveil biases, fostering a more empathetic and culturally responsive approach to education. Furthermore, delving into the community where you work, perhaps through activities like the Community Walk, grants valuable insights into your school's unique dynamics and culture. Lastly, it is crucial to recognize the enduring impact of systemic inequities, such as racism, sexism, and classism, on the overall school environment. Acknowledging these systemic challenges is the first step toward addressing them and ensuring an equitable learning atmosphere for all students." (Knips et al., 2023).
5:12 - 5:15	8.	Say, "It's important to understand and address implicit bias. Your team should embrace a positive mindset as you approach data conversations to reduce the potential for subconscious bias. You should be aware that biases can seep into data analysis, potentially leading to inaccurate conclusions. Finally, you should identify different types of biases and where they may manifest in your work to mitigate their impact" (Knips et al., 2023).
5:15 - 5:17	9.	Say, "I acknowledge that we collect a plethora of data from our students. We have to get to a place where we can collect and identify data that is meaningful to instruction. To prepare your team for equitable data conversations, you must reflect on the purpose of data collection identifying the most important and meaningful data for your team. Your team should also discuss the feelings, perspectives, and experiences of marginalized groups and individuals" (Knips et al., 2023).

5:17 - 5:27	10.	Say, “Let’s take a break and prepare to look at your student data.” Give the teachers a break and time to group themselves based on grade level. There may be multiple groups from each grade level. Teachers should also have their data ready to share with the group.
5:27 - 5:28	11.	Say, “We will practice weaving equity into your data conversation.”
5:28 - 5:31	12.	Say, “The BITES protocol is a comprehensive approach to analyzing student data equitably, fostering deeper conversations around data from its preparation to taking action based on the insights gained. This protocol introduces a structured framework for educators to discuss their students' performance while emphasizing the importance of equity in the process (Knips et al., 2023). As I explain this protocol, you will work with your group to analyze your data.”
5:31 - 5:37	13.	Read the slide. Give teachers 5 minutes to complete this portion of the protocol. Rotate around the room to clarify misconceptions and listen to the conversations.
5:37 - 5:46	14.	Read the slide. Give teachers 8 minutes to complete this portion of the protocol. Rotate around the room to clarify misconceptions and listen to the conversations.
5:46 - 5:55	15.	Read the slide. Give teachers 8 minutes to complete this portion of the protocol. Rotate around the room to clarify misconceptions and listen to the conversations.
5:55 - 6:04	16.	Read the slide. Give teachers 8 minutes to complete this portion of the protocol. Rotate around the room to clarify misconceptions and listen to the conversations.
6:04 - 6:09	17.	The purpose of this activity is to allow teachers to reflect upon their experience with the protocol. Say, “With your table group, How do you feel about the BITES protocol so far? How could you implement this process with your team?”
6:09 - 6:10	18.	Say, “The last part of the BITES protocol will help you form an action plan for implementing culturally responsive math instruction.”
6:10 - 6:20	19.	Read the slide.

		Say, "Your goal for the next 10 minutes is to determine 3 to 5 actions that you can take within the next month to address the math needs of your students using what you have learned during this cohort. Think about what additional support you may need to implement these strategies effectively. Record your action plan in the discussion post for module five."
6:20 - 6:25	20.	Say, "Now that everyone has recorded their action plan in the discussion forum, we will take a digital gallery walk of the action plans. Please respond to at least one post with feedback."
6:25 - 6:30	21.	Thank the teachers for their participation in the professional development cohort. Encourage them to complete the final evaluation. Provide a hard copy of the evaluation to each teacher. Tell them that the evaluation is also available electronically on Canvas.
END OF SESSION		

Appendix B: District Research Application



Research Application

Introduction

Research in [redacted] is governed by Regulatio[redacted]All research requests must be submitted on this form for review by [redacted] leadership. Review times vary depending on the complexity of the project, the number of participants involved, and events occurring within [redacted]. As you complete the research application, address each question completely but concisely as possible. Complete applications will be reviewed on a rolling basis. The time to review an application ranges from a week to several weeks, depending on the complexity of the research proposal, the scope of the project, the time of year, and other factors.

You will be asked to attach multiple documents (consent letters, instrumentation, etc.). It is permissible for multiple files to be merged. If you are unable to attach the documents after sending the application form, please send them via email to [redacted] fter submitting the application form, you will receive a copy by email. Please save this for your records. ***If you do not receive a copy in your email, the application was probably incomplete and will not be reviewed.***

Please note: Incomplete applications will not be reviewed and, after 30 days, will be deleted from the database.

1. Applicant Information *

First Name: Carla

Last Name: Waller

Street Address: [redacted]

Research Application

[redacted]

3. Are you a current employee or student of [redacted]?

[redacted]

4. Is this research being conducted as part of a degree program (masters thesis, dissertation, etc.)? *

- (•) Yes
- ( ) No

5. Please identify the type of thesis being conducted?

- ( ) Undergraduate thesis/capstone
- ( ) Masters thesis
- (•) Dissertation/Doctoral thesis
- ( ) Other - Write In (Required)

[redacted]

Back Next

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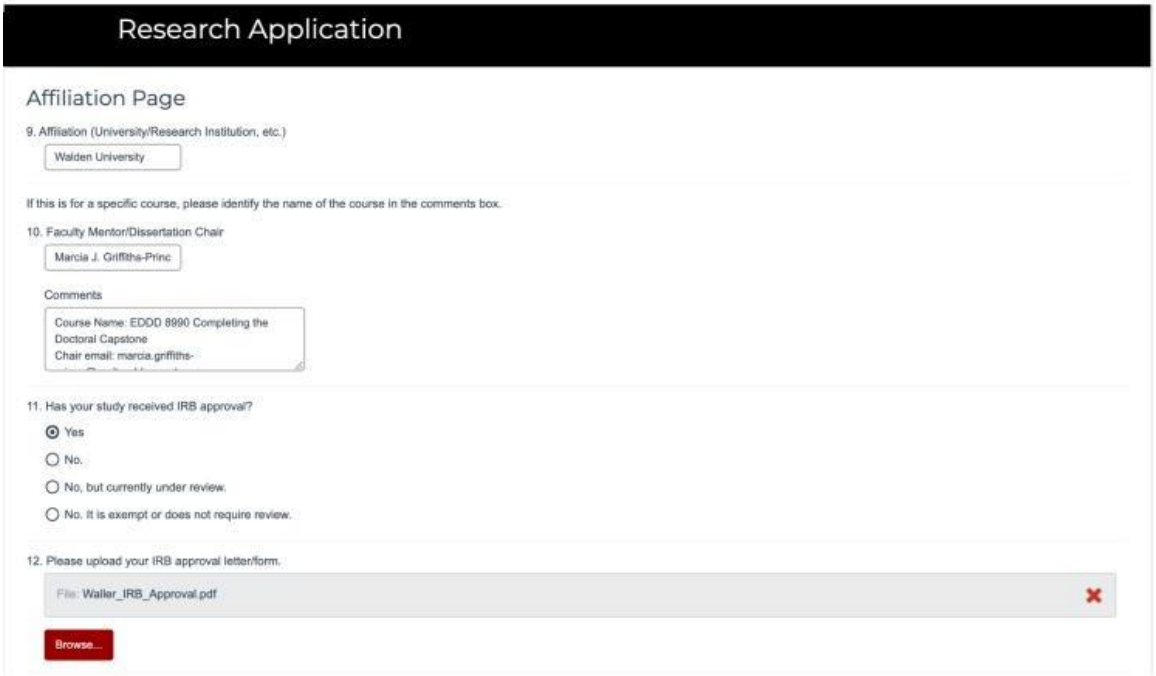

Research Application

Affiliation Page

9. Affiliation (University/Research Institution, etc.)

Walden University

If this is for a specific course, please identify the name of the course in the comments box.

10. Faculty Mentor/Dissertation Chair

Marcia J. Griffiths-Princ

Comments

Course Name: EDDD 8990 Completing the Doctoral Capstone
Chair email: marcia.griffiths-

11. Has your study received IRB approval?

- (•) Yes
- ( ) No.
- ( ) No, but currently under review.
- ( ) No. It is exempt or does not require review.

12. Please upload your IRB approval letter/form.

File: Waller_IRB_Approval.pdf

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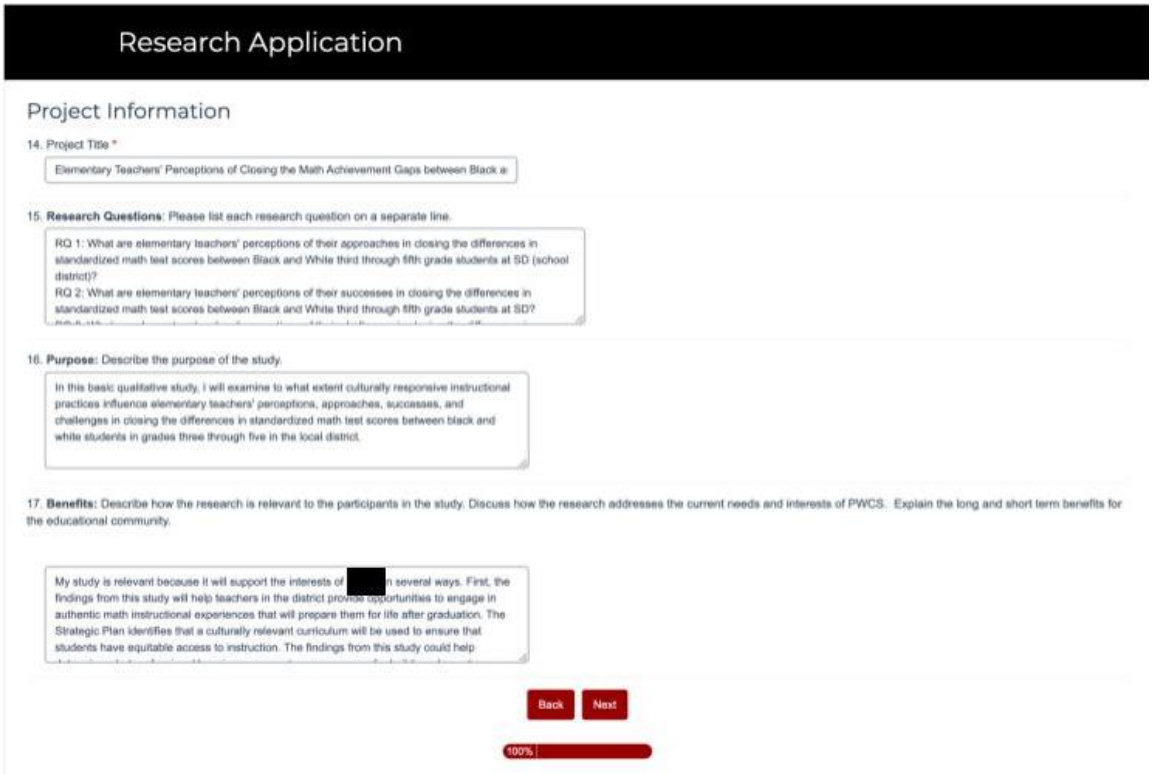

Research Application

Project Information

14. Project Title *

Elementary Teachers' Perceptions of Closing the Math Achievement Gaps between Black a

15. **Research Questions**: Please list each research question on a separate line.

RQ 1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third through fifth grade students at SD (school district)?
RQ 2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third through fifth grade students at SD?

16. **Purpose:** Describe the purpose of the study.

In this basic qualitative study, I will examine to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between black and white students in grades three through five in the local district.

17. **Benefits:** Describe how the research is relevant to the participants in the study. Discuss how the research addresses the current needs and interests of PWCS. Explain the long and short term benefits for the educational community.

My study is relevant because it will support the interests of [redacted] in several ways. First, the findings from this study will help teachers in the district provide opportunities to engage in authentic math instructional experiences that will prepare them for life after graduation. The Strategic Plan identifies that a culturally relevant curriculum will be used to ensure that students have equitable access to instruction. The findings from this study could help

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Research Application

Research Design and Participants

18. **Research Design:** Describe the research methodology you will be using.

I will be using a basic qualitative study design. The basic qualitative research approach is appropriate for this study because it will allow me to develop an in-depth understanding of elementary teachers' experiences addressing the math achievement gap between Black and White students. The conceptual framework of this study was based on Geneva Gay's work, which details how implementing culturally responsive teaching can successfully address

19. **Participants:** Who are your intended participants and how will they be selected?

- Please be as specific as possible. For example, random sample of 25 elementary teachers.
- If you plan to select participants from more than one school, please identify the number of schools needed.
- If you already have specific schools sites in mind, please identify them.
- If this is a data request only, please enter DATA REQUEST ONLY in the field.

Between 12 and 15 elementary teachers will be recruited for this study using purposeful sampling. The participants for this study will be third through fifth grade teachers from three elementary schools within [redacted]. The participants will have also taught classes with two or more Black students to ensure that they have had experience working with Black students. I would like to have 5 participants from each elementary school. I have three schools in mind

20. **Participant Protections & Privacy:** Address how you will protect the rights of your participants and mitigate potential risks of the study. How do the treatment, data collection, and reporting procedures ensure that the participant's privacy and legal rights will be protected? How to the reporting procedures preserve the anonymity of individuals, schools, and the school system? Where and how will the data be stored?

I will ensure that I have protected the rights of my participants and mitigate the potential risks of my study in several ways. Each interview will occur in a private location. No one will be able to overhear the interview or see who is involved in the study. My supervisor and coworkers will not know who participated in my study. All research data collected will be password protected on my personal laptop. I am the only person who has the password to

21. Upload your participant consent form. If you have multiple forms (i.e., parent, student, etc.) you may combine them into one form to upload.

File: Waller_Consent_Form_Final.docx

Browse...

Research Application

Data Collection and Analysis

22. **Data Collection**: Describe your data collection and analysis procedures.

- What data collection instruments will you use (e.g., test, survey, questionnaire, interview protocol, etc.)?
- How and when will the instruments be used?
- How will you minimize the potential disruption on instruction?

If you are asking for existing data (attendance information, grades, etc.) please provide a detailed description of what you are requesting.

I will use semi-structured interviews my primary data collection tool. Data collection will be used during noncontract hours (before or after school). This will ensure that instruction is not disrupted. The data analysis process will consist of at least two cycles of coding. After the participants have an opportunity to review the interview transcripts and notes for accuracy, I will re-read and review the data multiple times to ensure there are no errors. Reviewing the

23. In the spaces below, please list each participant, the task they are to complete, and the estimated time commitment.

	Participant/Participant Group	Task	Time Commitment
1.	5 Participants Site A	interview	45 minutes
2.	5 Participants Site B	interview	45 minutes
3.	5 Participants Site C	interview	45 minutes
4.			
5.			
6.			
7.			
8.			

Comments

Each participant will be interviewed during noncontracted hours. The interview should last no more than 45 minutes.

24. Please upload your data collection instruments (survey, interview questions, observation protocols, etc.).

File: Waller_Interview_Questions.docx

Browse...

25. **Data Analysis**: Briefly describe the methods to be used in analyzing the data for the research project. For example, you might specify linear regression, ANCOVA, or specific coding procedures.

The first cycle of coding will consist of both manual and software coding to help me understand the data collected. Based on the number of participants in the study, there will be a large amount of data to process and analyze. I will use a coding software, such as NVivo, to help me identify common themes and patterns between each interview. The goal of the second coding cycle is to reanalyze the data for new information, develop a more coherent

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100%

Research Application

Timeline of Research Activities

26. **Timeline of Research Activities**: Provide a ***specific*** timeline for completing the research activities. Including:

- Plan for contacting/recruiting participants, including any reminders that might be sent;
- Plan for data collection (survey administration, interviews, etc.)
- Estimated time needed for analysis.

Applications will not be reviewed unless a full timeline is included.

I plan to have the data collection and analysis complete seven weeks after I receive approval. The first week will consist of recruitment and interview scheduling. I will use each site's staff directory to contact third through fifth grade teachers. Teachers that are interested in participating in this study will have two days to review and sign the informed consent documents. After signing the informed consent documents, I will schedule the semi-structured

27. **Resources**: What is the amount of [redacted] supplies and equipment required?

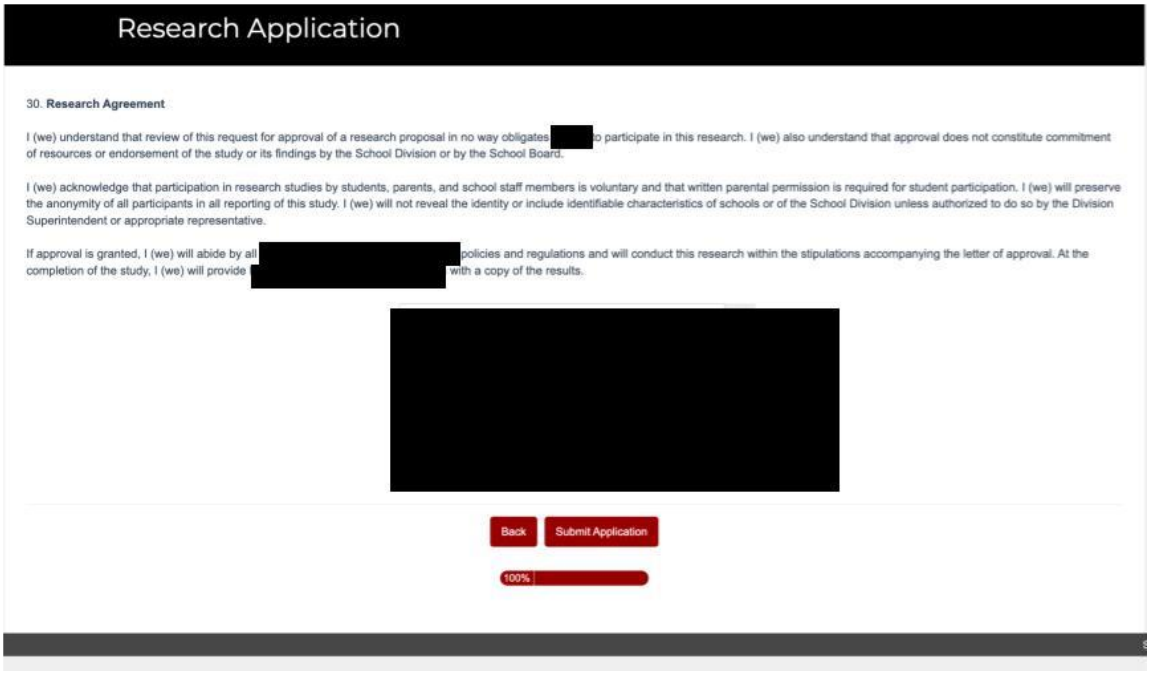
N[redacted] supplies and equipment are need for this study.

28. **Sharing Results:** It is expected that a complete report be submitted to Program Evaluation in a timely manner after the completion of the research. What is the expected submission date?

[redacted]

29. **Additional Information**: Please provide additional notes that will help the reviewers understand the research proposal.

[redacted]



Research Application

30. **Research Agreement**

I (we) understand that review of this request for approval of a research proposal in no way obligates [redacted] to participate in this research. I (we) also understand that approval does not constitute commitment of resources or endorsement of the study or its findings by the School Division or by the School Board.

I (we) acknowledge that participation in research studies by students, parents, and school staff members is voluntary and that written parental permission is required for student participation. I (we) will preserve the anonymity of all participants in all reporting of this study. I (we) will not reveal the identity or include identifiable characteristics of schools or of the School Division unless authorized to do so by the Division Superintendent or appropriate representative.

If approval is granted, I (we) will abide by all [redacted] policies and regulations and will conduct this research within the stipulations accompanying the letter of approval. At the completion of the study, I (we) will provide [redacted] with a copy of the results.

[redacted]

Back Submit Application

100%

Appendix C: Research Site Approval Email

Research Request

You replied on Mon 5/1/2023 8:04 AM

[redacted]

Fri 4/28/2023 10:49 AM

Carla Waller Approved.pdf

Good morning,

This email is to inform you that your research request has been approved to be conducted after the SOLs, as described in the attached letter. I am excited about your research because it will add a unique contribution to the field.

Since we do not allow emails to be sent to our [redacted] staff and you are requesting to work with teachers who teach mathematics, your point of contact will be [redacted] Elementary Mathematics Coordinator. [redacted] will assist you with distributing the information about your study. I will email an introduction email to you and [redacted] You may work with your principal at [redacted] on distribution or allow the mathematics coordinator to distribute the information to the teachers at [redacted].

We only send emails to recruit participants for the study twice. You'll need to give [redacted] a summary of your study and a way to sign-up.

Good luck with your research, and do not hesitate to reach out with any questions.

Kind regards,

[redacted]

[redacted]

Appendix D: Research Site Approval Letter

[redacted]

April 28, 2023

Carla Waller
[redacted]

Dear Carla Waller,

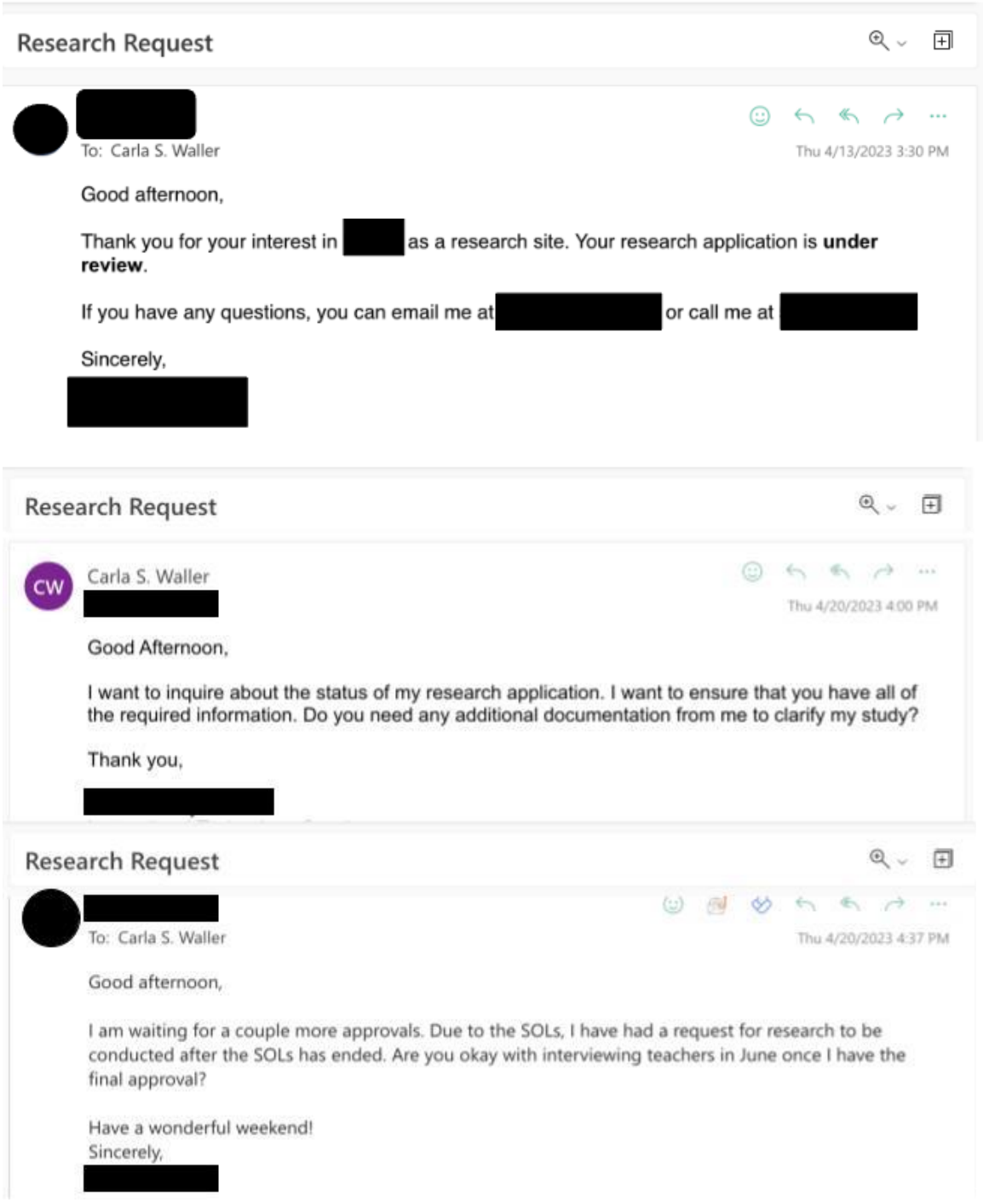
The purpose of this letter is to let you know that your request to conduct research, titled "Elementary Teachers' Perceptions of Closing the Math Achievement Gaps between Black and White Students in Grades 3-5," in [redacted] has been reviewed by [redacted] leadership. Your proposal has met the standards required for research in [redacted] and has been approved.

Please ensure that all identifying information has been removed in the final reporting of the study. Thank you for your interest in [redacted] as a research site, and we wish you success with your study.

Sincerely,

[redacted]

Appendix E: Communication With Project Site Representative



Research Request

[redacted]

To: Carla S. Waller

Thu 4/13/2023 3:30 PM

Good afternoon,

Thank you for your interest in [redacted] as a research site. Your research application is **under review**.

If you have any questions, you can email me at [redacted] or call me at [redacted]

Sincerely,

[redacted]

Research Request

CW Carla S. Waller

[redacted]

Thu 4/20/2023 4:00 PM

Good Afternoon,

I want to inquire about the status of my research application. I want to ensure that you have all of the required information. Do you need any additional documentation from me to clarify my study?

Thank you,

[redacted]

Research Request

[redacted]

To: Carla S. Waller

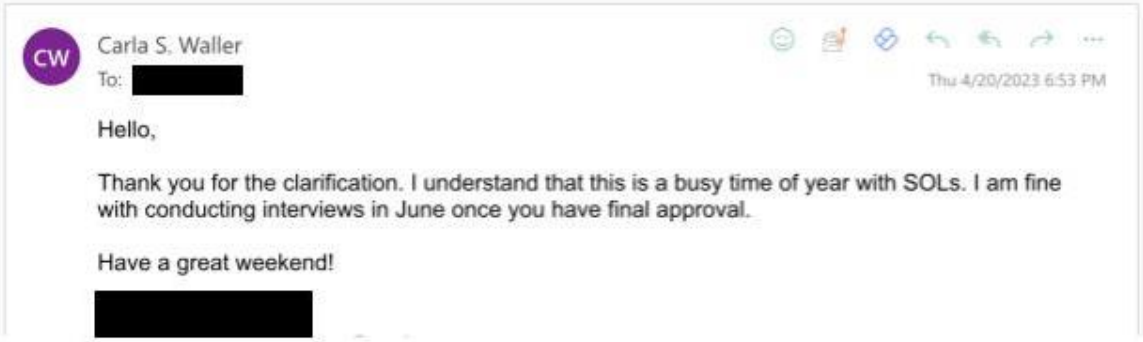
Thu 4/20/2023 4:37 PM

Good afternoon,

I am waiting for a couple more approvals. Due to the SOLs, I have had a request for research to be conducted after the SOLs has ended. Are you okay with interviewing teachers in June once I have the final approval?

Have a wonderful weekend!
Sincerely,

[redacted]



CW Carla S. Waller
To: [redacted]
Thu 4/20/2023 6:53 PM

Hello,

Thank you for the clarification. I understand that this is a busy time of year with SOLs. I am fine with conducting interviews in June once you have final approval.

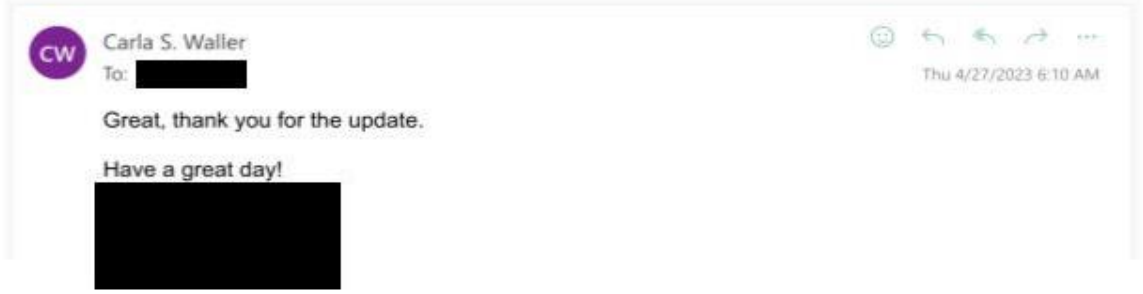
Have a great weekend!

[redacted]

[redacted]
To: Carla S. Waller
Wed 4/26/2023 3:24 PM

I have received approval from [redacted] I hope to hear back from two more schools today. I will make sure to keep you posted.

Have a wonderful day!
Sincerely,
[redacted]

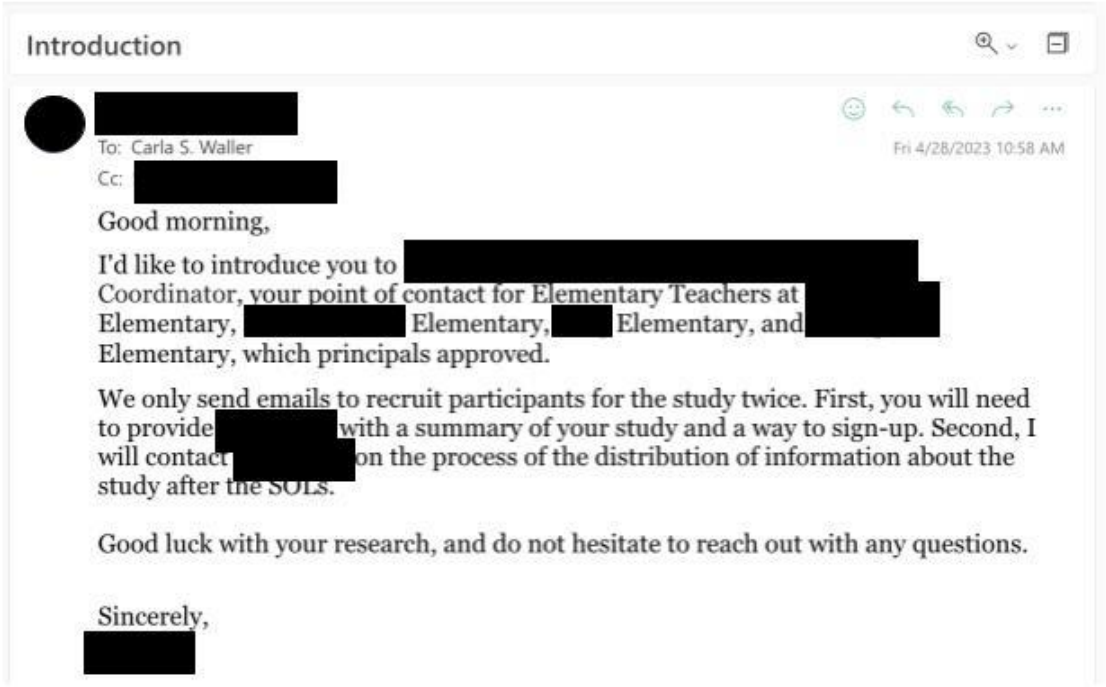


CW Carla S. Waller
To: [redacted]
Thu 4/27/2023 6:10 AM

Great, thank you for the update.

Have a great day!

[redacted]



Introduction

[redacted]

To: Carla S. Waller

Fri 4/28/2023 10:58 AM

Cc: [redacted]

Good morning,

I'd like to introduce you to [redacted] Coordinator, your point of contact for Elementary Teachers at [redacted] Elementary, [redacted] Elementary, [redacted] Elementary, and [redacted] Elementary, which principals approved.

We only send emails to recruit participants for the study twice. First, you will need to provide [redacted] with a summary of your study and a way to sign-up. Second, I will contact [redacted] on the process of the distribution of information about the study after the SOLs.

Good luck with your research, and do not hesitate to reach out with any questions.

Sincerely,

[redacted]

Introduction

CW

Carla S. Waller

To: [redacted]

Mon 5/1/2023 8:10 AM

Cc: [redacted]

Good Morning,

I have submitted the approval letter to IRB. I appreciate the help that I received so far. I'm looking forward to conducting research within [redacted]

Ms. [redacted] thank you for serving as the point of contact for participant recruitment. I will get the study information and sign-up form to you as soon as I receive feedback from my Chair.

Have a great day,

[redacted]

Appendix F: Participant Invitation

The assigned central office liaison will send the invitation below to third through fifth grade teachers working at the four selected sites via email.

The purpose of this basic qualitative study is to examine to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in grades three through five in a specific school district in Virginia. My goal is to illuminate the strategies that third through fifth grade teachers use to address math achievement gaps and discover how teachers can be better supported to meet the needs of their students. For this study, you are invited to describe your classroom experiences.

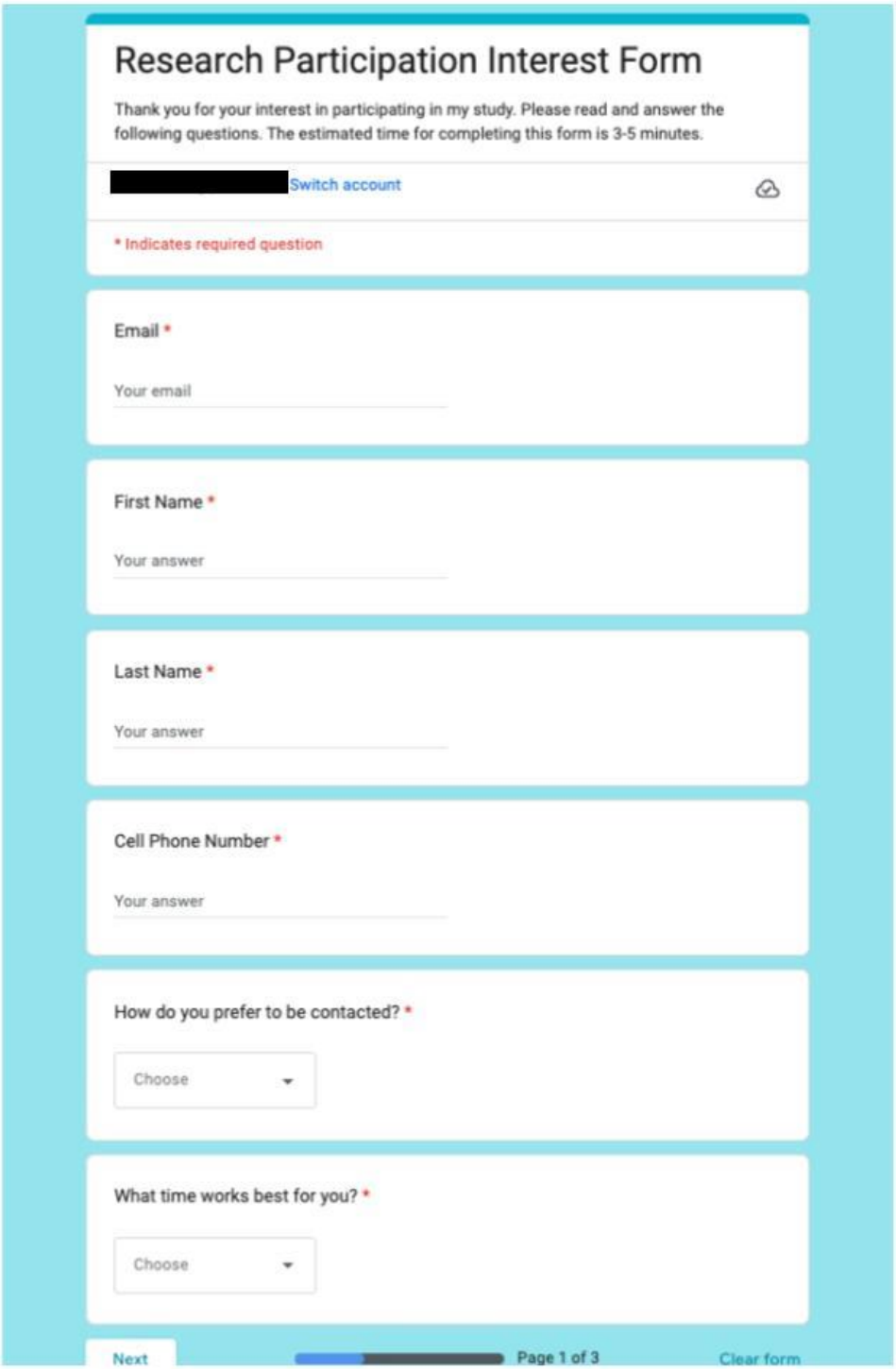
About the study:

- Participation is voluntary and consists of one one-on-one 30-45 minute interview via Zoom.
- Your identity will not be disclosed in the final report of the study.
- You would receive a $20 Visa gift card as a thank you upon completion of the interview.

This interview is part of the doctoral study for Carla Waller, an Ed.D. student at Walden University. Interviews will take place during June 2023.

Please complete this form to let the researcher know of your interest. If you have any questions, please reach out to me at XXX@XXX.XXX or (XXX) XXX-XXXX

Appendix G: Participant Interest and Consent Google Form



Research Participation Interest Form

Thank you for your interest in participating in my study. Please read and answer the following questions. The estimated time for completing this form is 3-5 minutes.

[redacted] Switch account

* Indicates required question

Email *

Your email

First Name *

Your answer

Last Name *

Your answer

Cell Phone Number *

Your answer

How do you prefer to be contacted? *

Choose

What time works best for you? *

Choose

Next

Page 1 of 3

Clear form

Research Participation Interest Form

[redacted] Switch account

Draft saved

* Indicates required question

Demographic Information

Please provide some information about your teaching experience.

Where do you currently teach? *

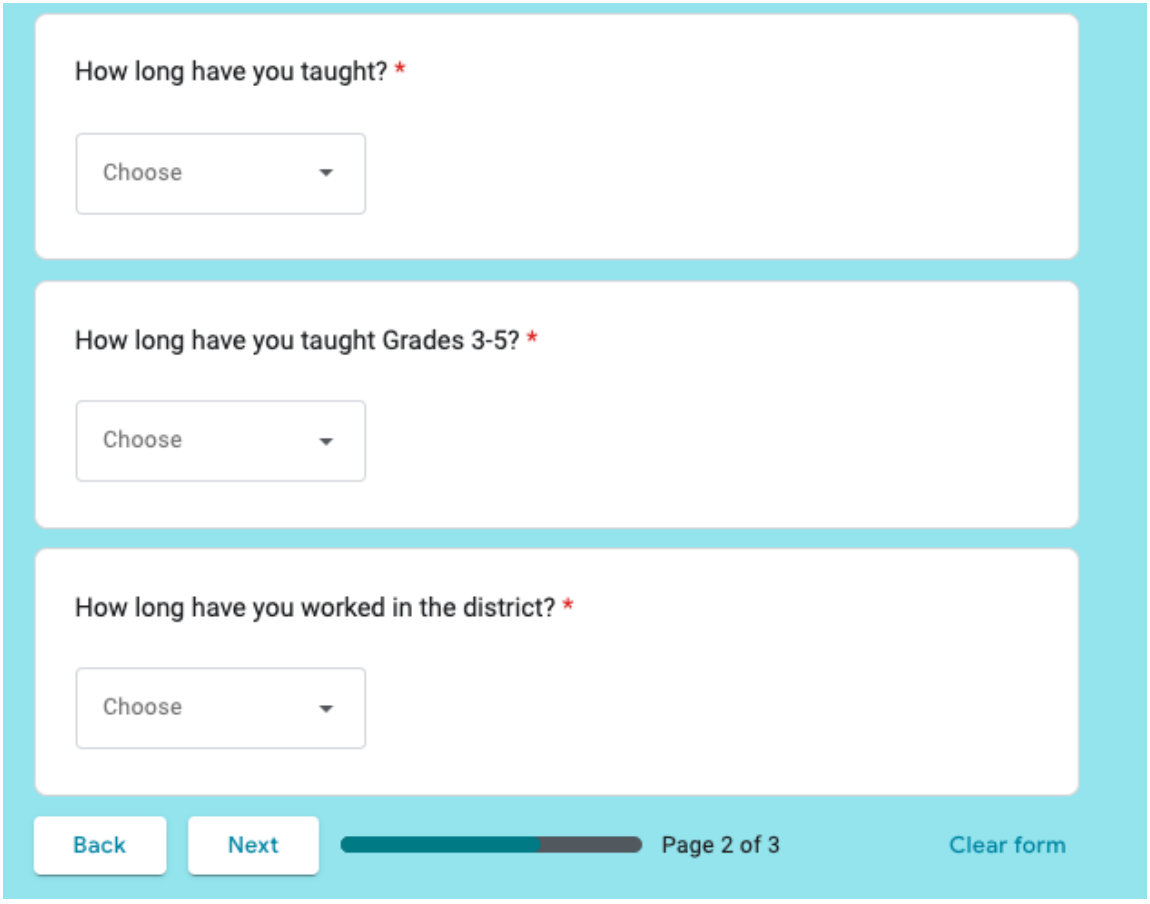
Your answer

What grade(s) do you currently teach? *

- [ ] Third
- [ ] Fourth
- [ ] Fifth
- [ ] Other:

What grades have you taught? *

- [ ] Pre-K
- [ ] Kindergarten
- [ ] First
- [ ] Second
- [ ] Third
- [ ] Fourth
- [ ] Fifth
- [ ] Other:


How long have you taught? *
Choose
How long have you taught Grades 3-5? *
Choose
How long have you worked in the district? *
Choose
Back
Next
Page 2 of 3
Clear form

Research Participation Interest Form

[redacted] Switch account

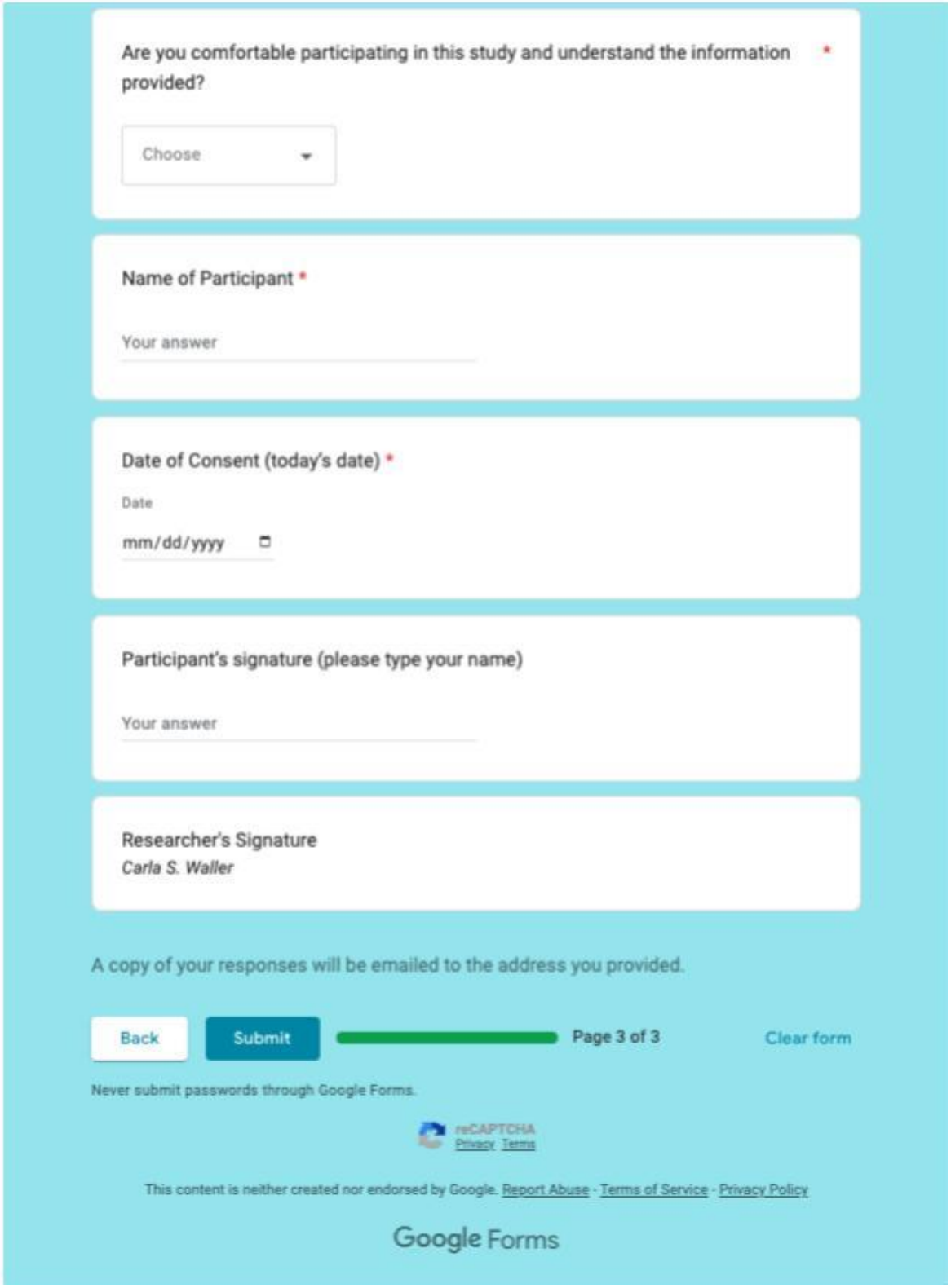
* Indicates required question

Informed Consent

Please read the Informed Consent and complete the section below.

Are you comfortable participating in this study and understand the information provided? *

Choose


Are you comfortable participating in this study and understand the information provided? *
Choose
Name of Participant *
Your answer
Date of Consent (today's date) *
Date
mm/dd/yyyy
Participant's signature (please type your name)
Your answer
Researcher's Signature
Carla S. Waller
A copy of your responses will be emailed to the address you provided.
Back
Submit
Page 3 of 3
Clear form
Never submit passwords through Google Forms.
reCAPTCHA
Privacy Terms
This content is neither created nor endorsed by Google. Report Abuse - Terms of Service - Privacy Policy
Google Forms

Appendix H: Participant Communication

The following templates were emailed to participants after they completed the Research Study Interest and Consent Google Form.

Good Morning/Afternoon (insert name),

I'm reaching out to schedule an interview with you. I appreciate your interest in participating in my study. Please use **this link** to schedule a time for an interview. If you do not see a date or time that works for you, *don't hesitate to contact me, and we can schedule a time that works better for you.*

I look forward to hearing from you soon.

Have a great day,
Carla Waller

Good Afternoon,

I'm sending this email to confirm your participation in my basic qualitative research study. Thank you for agreeing to participate in my research study. Our Zoom interview is scheduled for (insert date) from X:XX-X:XX. The link that we will use for this interview is listed below.

(Insert Zoom link)

When you completed the interest form, you should have received a response receipt via email. I have attached an additional copy of the signed consent form that you completed for your records.

If you have any questions, please feel free to contact me at (XXX) XXX-XXXX.

Looking forward to our interview!

Carla Waller

Good Morning/Afternoon (insert name),

Thank you again for your willingness to participate in my study. The transcript of our interview is ready for you to review. You have until (insert time and date) to review the attached transcript. Please complete **this form** after you have reviewed the transcript. Once I receive your reply, I will send you the $20 gift card as a thank you for your time.

Have a great day,

Carla Waller

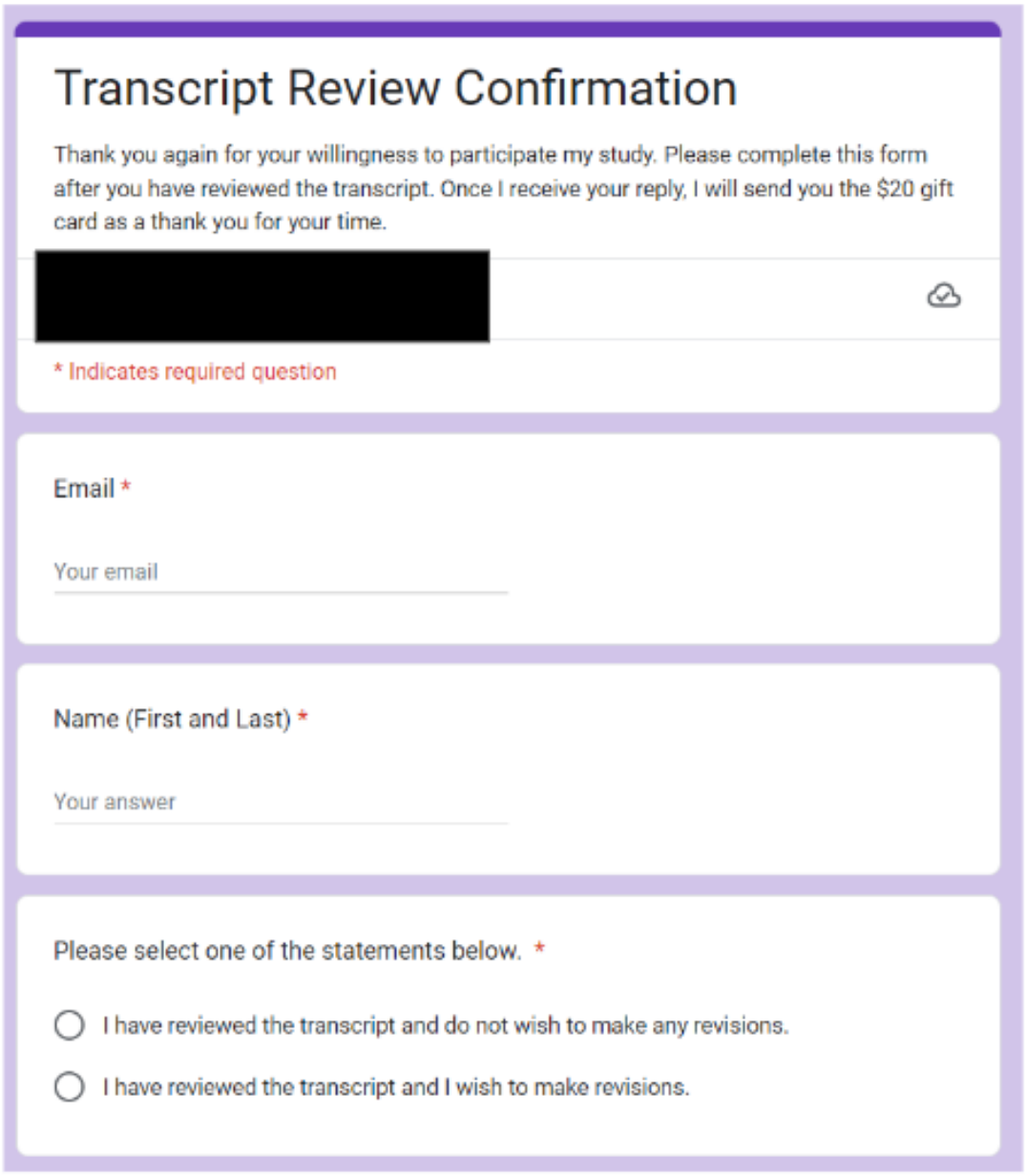
Good Morning/Afternoon (insert name),

Thank you again for your willingness to participate in my study. I have received your transcript review confirmation. You should receive your $20 gift card via text this afternoon.

Have a great day,

Carla Waller

Appendix I: Interview Transcript Verification Google Form



Transcript Review Confirmation

Thank you again for your willingness to participate my study. Please complete this form after you have reviewed the transcript. Once I receive your reply, I will send you the $20 gift card as a thank you for your time.

[redacted]

* Indicates required question

Email *

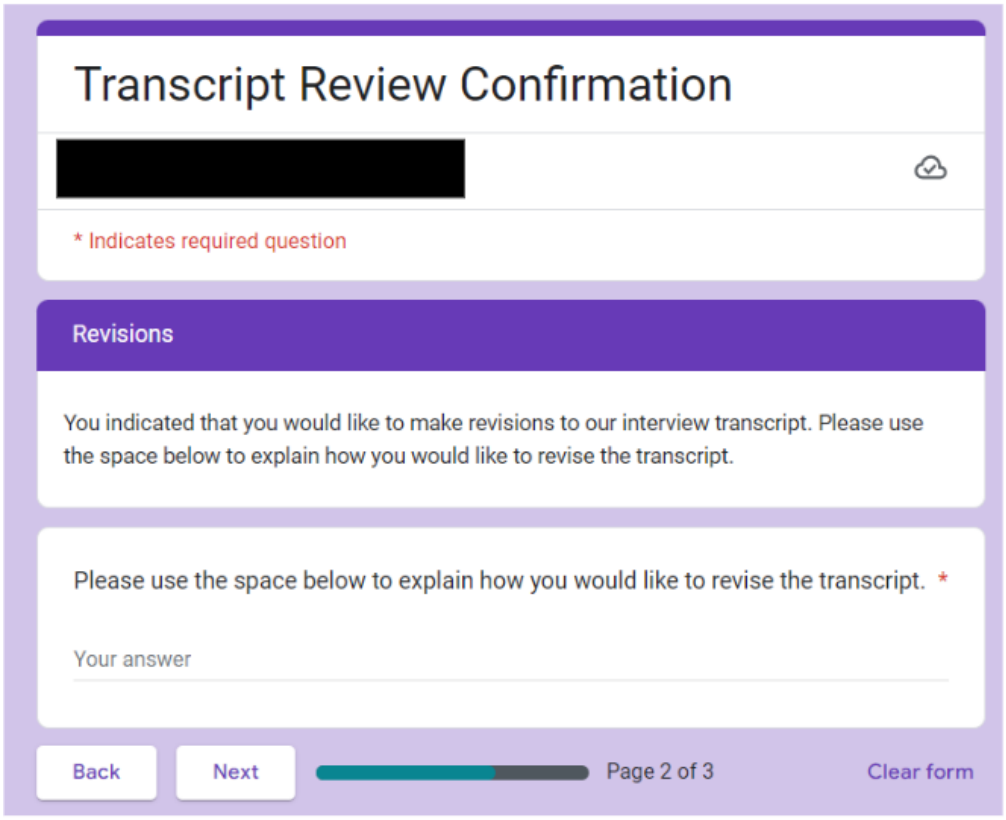
Your email

Name (First and Last) *

Your answer

Please select one of the statements below. *

- I have reviewed the transcript and do not wish to make any revisions.
- I have reviewed the transcript and I wish to make revisions.



Transcript Review Confirmation

[redacted]

* Indicates required question

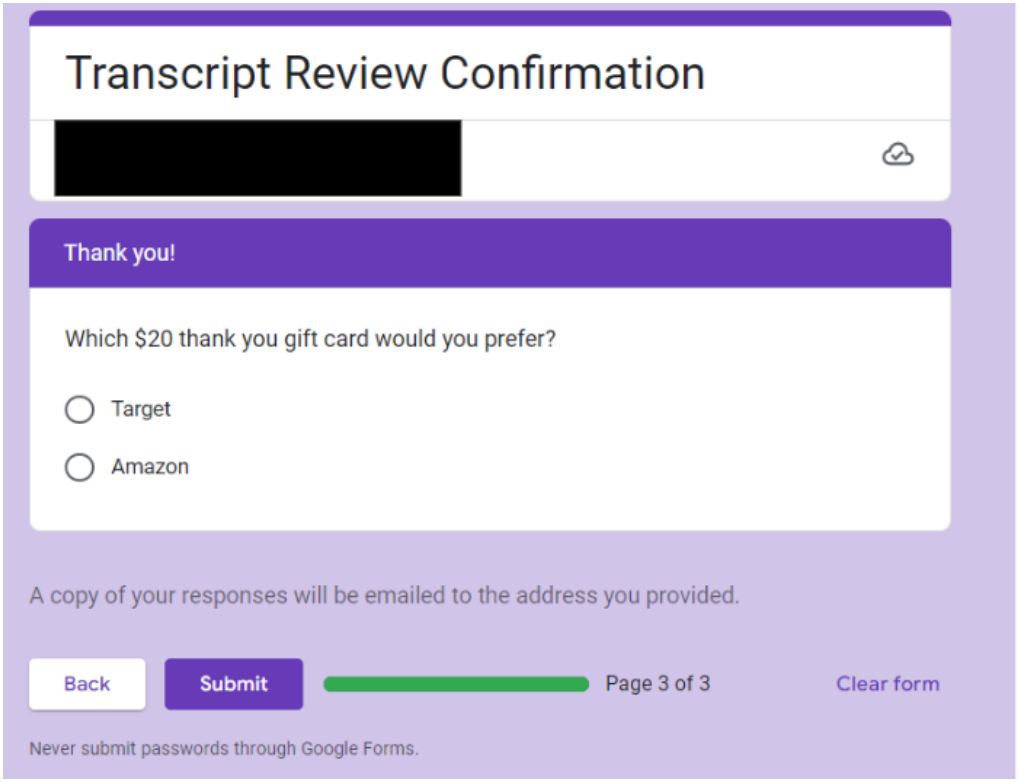
Revisions

You indicated that you would like to make revisions to our interview transcript. Please use the space below to explain how you would like to revise the transcript.

Please use the space below to explain how you would like to revise the transcript. *

Your answer

Back Next Page 2 of 3 Clear form



Transcript Review Confirmation

[redacted]

Thank you!

Which $20 thank you gift card would you prefer?

- Target
- Amazon

A copy of your responses will be emailed to the address you provided.

Back Submit Page 3 of 3 Clear form

Never submit passwords through Google Forms.

Appendix J: Alignment of Interview Questions to Research Questions

Research Question or Element	Interview Question
RQ1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?	How would you describe your approach to math instruction (i.e., which strategies do you use with fidelity)?
	What math instructional strategies that are endorsed or encouraged by your school or district?
	How do you analyze student progress in math? (data related question). What have you noticed about your Black students' progress in math
RQ2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?	What instructional strategies you have implemented that have the greatest impact on your Black student achievement in math (i.e., which strategy has contributed to the decrease in the achievement gap)?
	**What influenced your decision to implement the instructional strategies that successfully impacted Black student achievement in math?
RQ3: What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?	What challenges have you encountered when you are attempting to close achievement gapes between White and Black Student?

RQ4: To what extent do elementary teachers understand or implement culturally responsive teaching practices in order to close the differences in standardized math test scores between Black and White students in grades three through five at VSD?	Explain what you know about culturally responsive/relevant teaching.
	What culturally responsive instructional practices are implemented in your school or district to support math instruction?
	How have you used culturally responsive instructional practices are implemented in your school or district to support math instruction?

Appendix K: Semistructured Interview Protocol

Part 1: Interview Information

Date of Interview: Location: Zoom, nd or In-Person

Participant's Pseudonym: Time of Interview:

Grade: Duration of Interview:

Part 2: Interview Introduction

Good Morning!/Afternoon!

First, thank you for volunteering to participate in my basic qualitative study. I am conducting this study to fulfill a requirement for my graduate program. The purpose of this basic qualitative study was to examine to what extent culturally responsive instructional practices influence elementary teachers' perceptions, approaches, successes, and challenges in closing the differences in standardized math test scores between Black and White students in grades three through five in a specific school district in Virginia.

This interview will be about 30 minutes. You should be aware that you have the right to stop or withdraw from this study at any time. During this interview, please feel comfortable sharing your experiences addressing math achievement gaps between black and white students and your knowledge and use of culturally responsive teaching practices. I will be assigning you a pseudonym to protect your identity and role within your location.

I will be recording this interview using Zoom on my laptop to ensure that I accurately capture our conversation. I am the only person who will have access to this recording. I will also take notes during the interview. I will provide you with a transcript of the interview so that you can review it for accuracy.

You read and signed the consent form when you completed the Research Participant Interest Form. Do you have any questions before we begin?

Part 3: Semistructured Interview Questions

Please note that probing questions may be asked to clarify information

RQ 1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?

- How would you describe your approach to math instruction (i.e., which strategies do you use with fidelity, what does it look like, sound like, and feel like for students/you)?
- What math instructional strategies are endorsed or encouraged by your school or district?
    - How often do you use these strategies during your math instruction?
- How do you analyze student progress in math? (data-related question)
- What have you noticed about your Black students' progress in math?
    - How do these observations differ from your white students?

RQ 2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?

- What instructional strategies have you implemented that have the greatest impact on your Black student achievement in math (i.e., which strategy has contributed to the decrease in the achievement gap)?
- What influenced your decision to implement the instructional strategies that successfully impacted Black student achievement in math?
- What support have you received to achieve this success?

RQ 3: What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?

- What challenges have you encountered when you are attempting to close achievement gaps between White and Black Students?
- What supports would help you address these challenges?
    - What supports have you had in the past to address these challenges?

RQ 4: To what extent do elementary teachers understand or implement culturally responsive teaching practices in order to close the differences in standardized math test scores between Black and White students in grades three through five at VSD?

- Explain what you know about culturally responsive/relevant teaching.
- What district or external professional development have you received in regard to culturally responsive teaching practices?
- What culturally responsive instructional practices are implemented in your school or district to support math instruction?
- How have you used culturally responsive instructional practices implemented in your school or district to support math instruction?

Is there anything else you want to add about your experiences addressing math gaps between Black and White students that we may not have spoken about?

Any probing questions will be framed using the participant's words. Please see the examples below:

- How so?
- What do you mean by "..."?
- Please clarify.
- Could you please explain "..."?
- Tell me more about "..."
- Please expand on…
- What I heard you say was "...". Could you expand on that?
- I want to ensure that I understand, it sounds like your saying "...". Is that correct? Or would you like to elaborate?

Part 4 Conclusion

This concludes our interview. Thank you so much for participating. I appreciate the time you took out of your busy schedule to participate in my study. The Next Step in this process requires me to give you a transcript of our interview. I will send you a copy via

email within the next two to five business days. You will have 24 hours to review the transcript for accuracy. When it has been returned to me, I will send you a $20 Amazon or Target gift card as a thank you for your participation. Thank you again. I will be reaching out to you soon.

Appendix L: Interview Notes Excel Template

Date of the Interview		Location		
Participant's Pseudonym		Time of Interview		
Grade		Duration of Interview		Other Notes
What grades have you taught?		How long have you taught?		
How long have you taught Grades 3-5?		How long have you worked in PWCS?		
RQ 1: What are elementary teachers' perceptions of their approaches in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?				
How would you describe your approach to math instruction (i.e., which strategies do you use with fidelity)?				
What math instructional strategies are endorsed or encouraged by your school or district? How often do you use these strategies during your math instruction?				
How do you analyze student progress in math? (data-related questions)				
What have you noticed about your Black students' progress in math? How do these observations differ from your white students?				
RQ 2: What are elementary teachers' perceptions of their successes in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?				
What instructional strategies have you implemented that have the greatest impact on your Black student achievement in math (i.e., which strategy has contributed to the decrease in the achievement gap)?				
What influenced your decision to implement the instructional strategies that successfully impacted Black student achievement in math?				
What support have you received to achieve this success?				
RQ 3: What are elementary teachers' perceptions of their challenges in closing the differences in standardized math test scores between Black and White third through fifth grade students at VSD?				
	What challenges have you encountered when you are attempting to close math achievement gaps between White and Black Students?			
	What supports would help you address these challenges? What supports have you had in the past to address these challenges?			
RQ 4: To what extent do elementary teachers understand or implement culturally responsive teaching practices in order to close the differences in standardized math test scores between Black and White students in grades three through five at VSD?				
	Explain what you know about culturally responsive/relevant teaching			
	What district or external professional learning have you received in regard to culturally responsive teaching practices?			
	What culturally responsive instructional practices are implemented in your school or district to support math instruction?			
	How have you implemented culturally responsive instructional practices in your school or district to support math instruction?			
	What supports do you think you or other teachers need to implement culturally responsive instructional practices to support math successfully?			

Appendix M: Summative Evaluation Form

Name (Optional): _____

School: _____ Date: _____

Training Session Completed (circle 1): Session 3 Session 6

Thank you for attending this professional development cohort. Please complete this evaluation about your experience.

	5 - Strongly Agree	**4 - Agree**	**3 - Neutral**	**2 - Disagree**	**1 - Strongly Disagree**
The goal of the cohort was clearly defined.					
The professional development topic is relevant to supporting addressing math achievement gaps.					
The information and resources provided supported my learning.					
The asynchronous work was clearly explained and presented.					
My engagement with the information caused me to reflect upon my beliefs and instructional practices					
I feel comfortable implementing a strategy that I learned in my instruction this week.					

What specific aspect of your learning experience resonates with you the most?

What additional support do you need to build your capacity with culturally responsive math instruction?

What suggestions do you have for future professional development?