8-8-2023

Mathematical Voices from the South: Books Clubs as a Conduit for Intersectional Inquiry and Praxis within a High School Mathematics Teacher Critical Friends Group

Rachel E. Seasholtz
Georgia State University

ACCEPTANCE

This dissertation, MATHEMATICAL VOICES FROM THE SOUTH: BOOK CLUBS AS A CONDUIT FOR INTERSECTIONAL INQUIRY AND PRAXIS WITHIN A HIGH SCHOOL MATHEMATICS TEACHER CRITICAL FRIENDS GROUP, by RACHEL SEASHOLTZ, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Education, in the College of Education & Human Development, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.

_____
David W. Stinson, Ph.D.
Committee Co-Chair

_____
Pier A. Junor Clarke, Ph.D.
Committee Co-Chair

_____
Caroline C. Sullivan, Ph.D.
Committee Member

_____
Date

_____
Gertrude Tinker Sachs, Ph.D.
Chairperson, Department of Middle and Secondary Education

_____
Paul A. Alberto, Ph.D.
Dean, College of Education & Human Development

AUTHOR'S STATEMENT

By presenting this dissertation as a partial fulfillment of the requirements for the advanced degree from Georgia State University, I agree that the library of Georgia State University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote, to copy from, or to publish this dissertation may be granted by the professor under whose direction it was written, by the College of Education & Human Development's Director of Graduate Studies, or by me. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this dissertation which involves potential financial gain will not be allowed without my written permission.

_____

RACHEL ELIZABETH SEASHOLTZ

NOTICE TO BORROWERS

All dissertations deposited in the Georgia State University library must be used in accordance with the stipulations prescribed by the author in the preceding statement. The author of this dissertation is:

Rachel Elizabeth Seasholtz
Department of Middle and Secondary Education
College of Education & Human Development
Georgia State University

The directors of this dissertation are:

David W. Stinson, Ph.D.
Department of Middle and Secondary Education
College of Education & Human Development
Georgia State University
Atlanta, GA 30303

Pier A. Junor Clarke, Ph.D.
Department of Middle and Secondary Education
College of Education & Human Development
Georgia State University
Atlanta, GA 30303

CURRICULUM VITAE

Rachel Elizabeth Seasholtz

ADDRESS: 30 Pryor Street
Atlanta, GA 30303

EDUCATION:

Ed.D.	2023	Georgia State University Curriculum and Instruction Concentration in Mathematics Education
M.Ed.	2017	University of Georgia Mathematics Education
B.S.Ed.	2017	University of Georgia Mathematics Education
B.S.	2017	University of Georgia Mathematics

PROFESSIONAL EXPERIENCE:

2017–2023	Mathematics Teacher Decatur High School

PRESENTATIONS:

Custer, D., & **Seasholtz, R**. (2019, October 17). *The precalculus project you've been wanting: Trig, matrices, and fractals* [Conference session]. The Georgia Mathematics Conference, Eatonton, GA, United States.

PROFESSIONAL SOCIETIES AND ORGANIZATIONS:

2017–present	National Council of Teachers of Mathematics
2017–present	Georgia Council of Teachers of Mathematics
2020–present	Benjamin Banneker Association
2021–present	Association of Mathematics Teacher Educators

MATHEMATICAL VOICES FROM THE SOUTH: BOOK CLUBS AS A CONDUIT FOR INTERSECTIONAL INQUIRY AND PRAXIS WITHIN A HIGH SCHOOL MATHEMATICS TEACHER CRITICAL FRIENDS GROUP

by

RACHEL SEASHOLTZ

Under the Direction of Dr. David W. Stinson and Dr. Pier A. Junor Clarke

ABSTRACT

Within the U.S. education system, and particularly within mathematics education, there is and always has been a standardization of knowledge that more times than not reveres and perpetuates dominant hegemonic perspectives of whiteness, patriarchy, Christianity, ableism, English-speaking, and so on (Battey & Leyva, 2015; Joseph,1994; Martin, 2009; Stinson, 2004). The perpetuation of this hegemonic ideology has too often resulted in those who are positioned at the margins of U.S. society (e.g., women, people of color, English-Language Learners, immigrants, the working poor, people with disabilities, and so on) to not benefit from mathematics curriculum and instruction to the extent of those who are privileged. Although there exists a growing group of critical mathematics education researchers who identify forms of hegemony and suggest practices that might support equity for traditionally marginalized and minoritized students (e.g., de Freitas, 2008; Frankenstein, 1990; Gutiérrez, 2002, 2009; Gutstein, 2003; Leyva et al., 2021a, 2021b; Seda & Brown, 2021), too often issues of inequity and injustices in research are addressed in isolation or in parallel manner rather than in a compounding and intersecting manner. Bullock (2018), however, argued that intersectionality

could offer a way for critical mathematics educators to address the complexities of inequities and injustices in a multilayered, compounding, and intersecting manner.

Therefore, informed by Collins and Bilge's (2020) intersectional inquiry and praxis, this qualitative case study investigated the ways that four high school mathematics teachers' engagement with intersectionality as a method of critical inquiry and praxis via participation in a critical friends group book club (Curry, 2008; Jacobs et al., 2011; Mensah, 2009) influenced their curriculum and instructional decisions. Primary data collection included group book club discussions and individual exit interviews. My analysis of collected data revealed how four mathematics teachers— through engagement with chosen texts and subsequent critical inquiries––came to their own unique understandings and implications of equity and intersectionality for their classrooms. Furthermore, my analysis showcased how participation in the critical friends group book club either reaffirmed or enhanced the participating teachers' curriculum and instructional praxis. Implications of these findings for stakeholders of mathematics education are outlined and discussed.

INDEX WORDS: Book Clubs, Critical Friends Group, Intersectionality, Equity, Mathematics Education, Teacher Professional Development

MATHEMATICAL VOICES FROM THE SOUTH: BOOK CLUBS AS A CONDUIT FOR INTERSECTIONAL INQUIRY AND PRAXIS WITHIN A HIGH SCHOOL MATHEMATICS TEACHER CRITICAL FRIENDS GROUP

by

RACHEL SEASHOLTZ

A Dissertation

Presented in Partial Fulfillment of Requirements for the

Degree of

Doctor of Education

in

Curriculum and Instruction

in

The Department of Middle and Secondary Education

in

the College of Education & Human Development

Georgia State University

Atlanta, GA
2023

DEDICATION

To the incredible mathematics teachers and students at Glenn-Aurand High School, thank you for allowing me to grow with and learn from each of you. The critical education each of you fostered sparked this doctoral journey and having the opportunity to know you all has been one of my life's biggest blessings.

ACKNOWLEDGEMENTS

I would like to first extend my gratitude to my wonderful committee. To my first chair, Dr. Junor Clarke thank you for taking me on as your student within the first few weeks of a global pandemic and thank you for continuously guiding me throughout these 3 years. Our conversations regarding improving mathematics teaching and considering the critical questions of what impedes our progress are some of my fondest memories in this program. To my second chair, Dr. Stinson thank you for affecting my life prior to even meeting me. Your critical mathematics research inspired me as an undergraduate in Athens, GA to reimagine possibilities of what teaching mathematics could be. Additionally, thank you for your thorough commitment to your students and for presenting me opportunities to work with fellow mathematics educators. To my program coordinator and final committee member, Dr. Sullivan thank you for teaching me how to be a doctoral student. Thank you for answering every nervous phone call and unsure email. Thank you for cheering on all your doctoral kids and reminding us to find the joy and community in what seems like never-ending journey toward a Doctor of Education.

Second, it is important that I honor the incredible mathematics educators of Glenn-Aurand High School. As documented elsewhere, I am truly amazed every day by the intelligence, support, collaboration, humor, and thoughtfulness in our mathematics department. Each of you are the reason it is easy to come to work each day. Your capacity to care for one another is inspiring, and I am thankful to have been a part of this department for 6 years. To Charles, Helene, Mitchell, and Windy, thank you for allowing me to hear and share your stories in this study. Each of your critical insights, collaboration, and friendship prior, during, and after this study has given me cherished memories forever.

Third, I want to thank the exceptional students of Glenn-Aurand High whom I had the pleasure of teaching. The opportunity to learn with and from you has had a profound impact on me as a mathematics educator. Specifically, to the illustrious classes of 2022 and 2023, having the opportunity to see your complexities and support you through mathematics to your next chapters is what inspired this work. Each of you is wholistically incredible and intersectionally impeccable.

Fourth, I want to thank the best friends who became family. Hollis, Quinn, and Sam, you taught me critical love and friendship before I knew what it was. Kendall, Amanda, Melissa, and Morgan you embody the power of female friendship as a mode to empower, comfort, laugh, call-in, and uplift. All seven of you helped me arrive to this point even before I joined the Ed.D. in 2020, and each of you has supported me on this doctoral journey through encouragement and faith. I love each of you dearly.

Fifth, I want to extend my thanks to my sister and parents. To my sister, thank you for consistently modeling what it meant to be successful as a woman in STEM. Our mutual love for math, and my childhood desire to be just like Rebecca, led me to seeing the joy of helping humans find their potential in the mathematics classroom. Yours and Geoff's consistent support through pictures of Athena and Greta and understanding of the required commitment of my doctoral program made this possible. I love you both. To my parents, thank you for instilling a love of learning into me. Thank you for your hard work and sacrifice to give me the opportunity to gain this terminal degree at the young age of 27. Mommy, thank you for your reminders to call and for always being willing to listen to my struggles along this journey. Papa, thank you for always providing me space to discuss my challenges at school and for your silly texts that

randomly brightened my days during this process. I would not possibly be here without your love and support. I love both of you to the ends of the earth.

Finally, I need to thank the love of my life and partner Marcus. Thank you for your patience, critical insight, support, and love along this journey. Thank you for being the calm in the storms that were presented throughout this doctoral journey. Thank you for being a rock of our relationship when I couldn't be. Thank you for being my cheerleader and thank you for reminding me that I am capable. Thank you for fostering critical discussions of the world around us. Thank you for allowing me space to say, "this reminds me of what we talked about in class…" or "go with me on this…" and allowing me to discuss critical education. Thank you for constantly bettering me as a person by inspiring me to find the common ground, good, and humanity in everyone. Thank you for bringing joy on the days that were filled with sadness and frustration via pictures of dogs, a quick phone call, or a text reminder that you love me so much. Doing over 750 miles long distance and a doctoral program is not ideal or easy, but with you, it was absolutely worthwhile. You are my best friend and words cannot do justice to how much I appreciate and love you.

Table of Contents

List of Tables

List of Figures

CHAPTER 1: INTRODUCTION

Background

In the 2018-19 school year, I taught non-accelerated freshmen Algebra I at an urban southeastern high school, Glenn-Aurand High School (GAHS)[1]. GAHS, like most public schools in the United States, places students into accelerated or non-accelerated mathematics tracks. Despite what some educators (defined in Table 1) may believe to be positive, this acceleration results in academic tracking that too often leads to a divide in race and socio-economic status (SES) between accelerated and non-accelerated Algebra I courses (Oakes, 1982). Within these non-accelerated Algebra I courses, there consistently is an overrepresentation of Black and Brown students and students from lower SES. Furthermore, this tracking provides students in the accelerated Algebra I courses the opportunity to take college credit mathematics courses such as Advanced Placement (AP) Calculus and AP Statistics prior to graduating high school whereas non-accelerated Algebra I students cannot earn eligibility. Within non-accelerated Algebra I classes, there is also inequitable access to resources such as textbooks and technology, higher student to teacher ratios, less advocacy for opportunities into advanced courses, and lower expected outcomes when compared to students in accelerated Algebra I classes.

Despite these persistent inequities that my students in the 2018-19 school year faced, my students and I tried to approach mathematics learning through equitable learning experiences such as problem-centered learning, collaborative and community-oriented learning activities, differentiated instruction, and culturally relevant pedagogy (Boaler, 1999, 2008, 2016; Ladson-Billings, 1995; Seda & Brown, 2021). By having my students approach Algebra with collective

[1] Glenn-Aurand High School is a pseudonym as are all proper names throughout to protect the identity of my research participants. I taught at GAHS from the academic years of 2017/18 to 2022/23.

mathematics knowledge and experience, we developed and honored my students' vibrancy, tenacity, and enthusiasm.

Regardless of these efforts to approach mathematics in a novel way, neoliberalism and standardization mark Algebra I both at state and localized levels. At the state-level, Algebra I requires an End of Course (EOC) Test at the end of the year that is a standardized exam evaluating the Algebra I standards (Georgia Department of Education, 2023). The EOC Test accounts for 20% of all students' grades, affects teacher evaluations,[2] and impacts overall yearly progress of the school.[3] Furthermore, due to the meticulous and comprehensive Algebra I standards, teachers' instruction must quickly move from one topic to the next. This rapid pace can cause students to not develop conceptual understanding, problem solving capabilities, and relevant real-world mathematical ties. The EOC Test did not uphold the personal experiences of my students within my classroom and was completely counterintuitive to the mathematics environment that the students and I had co-created. For many of my students, this test only served to reinforce the narrative that they are not capable of success in mathematics and, in turn, often produced student anxiety, doubt, and frustration.

At a more localized level, members of my collaborative team[4] during the 2018-19 school year wanted to leave the profession and/or school district, resulting in excessive absenteeism of my fellow Algebra I teachers. This persistent absence made many Algebra I students feel abandoned. Additionally, my collaborators adopted instructional practices such as lecturing,

---

[2] These evaluations are yearly assessments used to measure the effectiveness of teachers as well as consistency of teachers throughout the state.

[3] Yearly progress of a school is thought of as the yearly improvement measures set by the school and/or district to measure achievement regarding state standards of subject-level proficiency.

[4] A collaborative team is a group of educators who teach the same course during a school year, but do not necessarily teach together

algorithmic worksheets, and standardizing the curriculum within their classrooms in contrast to the collaborative and community-oriented learning activities, problem-centered learning activities, and culturally relevant and differentiated curriculum and instructional practices within my classroom. These curricular and instructional decisions of my colleagues could not accommodate their students' cultural experiences or needs, and many Algebra I students slowly became overwhelmed and confused. Furthermore, my colleagues' instructional and curricular decisions underserved and inequitably served their Algebra I students when compared to my students. All these frustrations and inequities came to a peak when one of these counterparts left the profession a month before the Algebra EOC Test. My administration then assigned these non-accelerated Algebra I classes in addition to my current teaching schedule to me.

Despite the difficult situation presented to both me and my new students, we persisted. I saw, just as with the students with whom I had taught all year, the wealth of imagination, creativity, and ability within these new students of mine. As I interacted with these students, most of them told me that for the first time they had felt like they learned something and that they could be successful in mathematics. All the students I taught in Algebra I that year persisted in an effort against the EOC Test that did not validate their unique personal and cultural experiences, and the majority even said they felt successful regardless of what their score may have communicated. We all left the 2018-19 school year with a feeling of hope for future mathematical success in the following years.

The next year of Geometry went well for these students until December 2019 hit. Two-thirds of the students from the class of 2022 were marked yet again with abandonment by another mathematics teacher's abrupt departure. Displacement into new classrooms, the inability to make relationships with a new teacher quickly, and the standardized curriculum of Geometry

continued to reinforce the idea that they were incapable of mathematical success. This second abandonment of a mathematics teacher compounded by the COVID-19 pandemic and resulting virtual learning only made the road to learning mathematics tougher on these students. Additionally, due to the disproportionate representation of Black and Brown students and students of lower SES, many of the students within these courses face other intersections of systematic injustices such as racism, food insecurity (i.e., hunger), and housing insecurity (i.e., homelessness).

Problem Statement and Rationale

The personal experience I have described, unfortunately, is all too common. Within the U.S. education system, but particularly within mathematics education, there is and always has been a standardization of knowledge that reveres and perpetuates the dominant hegemonic perspectives (defined in Table 1) of whiteness, patriarchy, Christianity, ableism, English-speaking, and/or nationalism (Battey & Leyva, 2015; Joseph, 1994; Martin, 2009; National Education Association of the United States, 1892; Stinson, 2004; see also Au, 2007/2017; Chan, 2006/2017; Love, 2019; Valenzuela, 2005/2017). This hegemonic perpetuation often leads those who are privileged (e.g., men, White people, English speakers, middle-to-upper-class people, able-bodied people, and other categorizations) to benefit from mathematics curriculum and instruction whereas traditionally marginalized and minoritized people (e.g., women, people of color, English-Language Learners, immigrants, the working poor, people with dis/abilities, and other categorizations) do not benefit to the same degree. Consequently, as educators, I recognize that these problems need to be solved in ways that serve each student and honor each of their experiences, but how?

How do mathematics educators (defined in Table 1) serve the unique experiences of each student, when mathematics curriculum is framed by standards that too often do not honor their personal and cultural experiences? How do we as mathematics educators honor each students' way of knowing when their brilliance is muddled by a curriculum that honors antiquated algorithms and repetitious procedures over problem-solving and innovation? How do we serve the individual student in a mathematics classroom when effectiveness of learning is measured by a standardized test? How do we serve the individual student when their score on a test that lasts 4 hours holds more weight for adequate progress than their collective experiences of 9 months? How do we serve the individual student when curriculum and instructional decisions lead to lack of resources and opportunities and devalue your culture, way of knowing, experience, and ultimately act as a barrier to success? How do we serve the individual student without recognizing and responding to the individual and intersecting injustices that they have experienced as well as our own?

Within critical mathematics education research there is clear evidence of mathematics educators who have responded to these questions, highlighted many forms of hegemony, and responded through practices that uphold equity for traditionally marginalized and minoritized students (Boaler, 1999, 2008, 2016; de Freitas, 2008; Frankenstein, 1990; Gutiérrez, 2002, 2009; Gutstein, 2003; Leyva et al., 2021; Seda & Brown, 2021). Although these responses are important strides toward equity in the field, too often issues of equity and injustices of domination (e.g., race, gender, class, etc.) in the literature are addressed in isolation or in parallel manner rather than in a compounding and intersecting manner.

Bullock (2018), however, noted, "attending to certain forms of domination while marginalizing others creates a false representation of how oppression works that reinstantiates

some of the very divisions targeted for change. The response to oppression cannot be any less complex than oppression itself" (p.124). In response to Bullock, I contend that it is necessary that mathematics classroom teachers and education researchers acknowledge that the inequities in the field form intersections, which exacerbate inequities and injustices. Mathematics education researchers therefore need to conduct research that carefully and strategically examine these intersecting realities within mathematics classrooms. In exploring the intersectionality of inequities and injustices, mathematics educators might find ways to alter the modes of dominance that exists in mathematics curriculum and instruction.

Purpose and Research Questions

Legal scholar Kimberlé Crenshaw (1989, 1991) introduced the term intersectionality into academia to acknowledge the injustices facing Women of Color because racism and sexism are too limiting in their recognition of how oppression affects them. Intersectionality recognizes the ways in which modes of hegemony oppress those who have intersecting, traditionally marginalized and minoritized identities in a multiplicative and compounding manner (Crenshaw, 1989, 1991). Collins and Bilge (2020) noted that intersectionality is both a form of critical inquiry and critical praxis. As a form of critical inquiry, intersectionality utilizes a variety of intersectional frameworks to study social phenomena. As a form of critical praxis, intersectionality signifies individuals or groups drawing on, producing, or applying intersectional frameworks to their day-to-day lives (pp. 38–39).

I believe that we, as mathematics educators (see Table 1), can utilize intersectionality as both a form of critical inquiry and a form of critical praxis to analyze, evaluate, and adjust our curriculum and instructional practices in pursuit of equity for all students. I therefore conducted research where intersectionality is used within a mathematics education context. My study used a

qualitative case study methodology (Esposito & Evans-Winters, 2022; Merriam, 1998; Stake, 1995) situated within a critical realist intersectional frame (Bhaskar, 1989/2010; Collins & Bilge, 2020; Corson, 1991; Crenshaw, 1989, 1991). This research project included creating a critical friends group (CFG) (Auslander et al., 2018; Burke et al., 2011; Curry, 2008; Moore & Carter-Hicks, 2014) composed of four high school mathematics teachers who participated in a book club (Burbank et al., 2010; Guerra & Nelson, 2008; Jacobs et al., 2011; Mensah, 2009; Reilly, 2008). In this study, the mathematics teachers read, responded to, and discussed a collection of preselected texts (identified later) to build their understanding of intersectionality and equity in mathematics education (Collins & Bilge, 2020; Freire, 1970/2018; Seda & Brown, 2021; Weissglass, 2002).

In this study, I aimed to investigate the ways that high school mathematics teachers' interaction with intersectionality as a method of critical inquiry and praxis through participation in a book club influences (or not) their curriculum and instructional decisions. Intersectionality within this study is defined as a way to analyze and act upon how categories such as race, ethnicity, class, gender, nationality, citizenship status, ability, language, and others mutually shape one another, intersect, and lead to power relations that influence the complex social relations and thus teaching and learning in mathematics classrooms (Collins & Bilge, 2020). Two research questions guide this study:

1. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do mathematics teachers negotiate the ideas of equity and intersectionality?

2. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do they perceive this influencing (or not) their curriculum and instructional praxis?

Summary and Overview of Chapters

During the 2018-19 school year, as a novice teacher, and perhaps less wise and less bold, I had wished for a way to address the inequities I saw day-to-day through the instructional choices enacted within all Algebra I classrooms. I wished for a way to actively reflect and analyze the intentions and outcomes of instruction in our classrooms, and I wished within this active reflection and analysis that faculty might put our students' brilliance and complexity at the forefront. Furthermore, I wished for more ways to support my students' personal and cultural experiences during this formative year of mathematics and not reflecting and regretting on what could have been. There was a need then, and there is still a need now, for every student to have teachers who look at how they construct their curriculum and instruction in a way where multiplicative realities and intersections are interrogated. I therefore intend to conduct research where, using a CFG book club, a group of diverse high school mathematics teachers interact with literature to build upon their understanding of intersectionality and equity in their own mathematics classrooms.

Before closing this chapter, I provide a selection of key terms that are used throughout this study. In Chapter 2, I provide my theoretical framework that guides this dissertation research. This chapter goes into my ontological and epistemological standpoints and describes thoroughly the undergirding theory of this study: intersectionality. In the discussion of my theoretical perspective, I detail the contributions of Women of Color and critical educators to the theory of intersectionality. I then describe where intersectional theory falls in relation to

mathematics education. Finally, I also explain the alignment between my ontological, epistemological, and theoretical perspectives. In Chapter 3, I review the literature that informs this research. This literature review is organized into three overarching categories: (a) hegemonic norms in education; (b) teacher practice in relation to equity of marginalized populations; and (c) intersectional mathematics education-related literature noting the need for equitable practice. Chapter 4 then describes my research study. Within this chapter, I provide explanations for my methodology and methods of data collection and analysis. I also describe the setting, participants, my positionality as the researcher, and different ways I have achieved trustworthiness and ethical research. Within Chapter 5, I present the results of my study. Specifically in this chapter, I describe the two overall findings of my study. The first finding indicated how the four mathematics teachers came to their own unique understandings and implications of equity and intersectionality for their classrooms. The second finding showcases how participation in the critical friends group book club either reaffirmed or enhanced the participating teachers' curriculum and instructional praxis. Finally, in Chapter 6, I discuss the overview and conclusions of this study. I also review the limitations and delimitations of this research as well as discuss implications for mathematics education stakeholders based on my findings.

Table 1
Key Terms

Term	Definition
Intersectionality:	A way to analyze and act upon how categories of race, ethnicity, class, gender, nationality, citizenship status, ability, language, and so on mutually shape one another, intersect, and lead to power relations that influence the complex social relations in mathematics classrooms (Collins & Bilge, 2020)
Equity (in mathematics education):	Rehumanizing curricular, instructional, or assessment practices within mathematics education that facilitate success within both critical and dominant mathematics for students of diverse intersectional backgrounds (Gutiérrez, 2002, 2009; see also Boaler, 1999, 2008, 2016; Seda & Brown 2021)
Critical praxis	Individuals or groups drawing on, producing, and applying critical frameworks so as to reflect and act upon their day-to-day practices (Collins & Bilge, 2020; Freire, 1970/2018)
Hegemony:	Systematic forms of dominance and oppression that impose ideals that homogenizes groups to the social, cultural, and ideological standards of the dominant group. Modes of hegemony include but are not limited to whiteness, patriarchy, heteronormativity, nationalism, ableism, middle-classness, English-language dominance, and so on (Leistyna et al., 1996)
Traditionally marginalized and minoritized populations:	Those people outside the hegemonic frame of reference that include but are not limited to those who are persons of color, members of the Lesbian, Gay, Bisexual, Transgender, Queer+ (LGBTQ+) community, women, English-language learners, immigrants, the working poor, people with disabilities, and other categorizations
Critical Friends Group:	A professional learning community consisting of three or more educators who voluntarily and regularly come together to discuss and collaborate to improve their practice (Auslander et al., 2018; Burke et al, 2011; Curry, 2008; Moore & Carter-Hicks, 2014)
(Mathematics Education) Book Club:	Reoccurring group discussions around selected text(s) that are pertinent to teaching and learning practices in mathematics classrooms (Mensah, 2009)
Educator:	An encompassing term to describe teacher educators, in-service teachers, administrators, counselors, and other education professionals who influence teaching practices and curriculum within K–16 classrooms.

CHAPTER 2: THEORETICAL FRAMEWORK

Throughout this study, I operate from a critical framework. I enter this work from a critical realist perspective, and ultimately come to this work through intersectional theory. The construction of this study, including the selection of literature reviewed, the selection of methodology and methods, as well as analysis of data, is informed by intersectionality. However, to provide a greater context into the theory driving this work, I first discuss my ontological and epistemological perspectives. I then describe the historical underpinnings to intersectional theory by detailing contributions to intersectionality from Women of Color and from critical educational scholarship. I then detail where intersectionality falls within paradigmatic moments of mathematics education. Finally, I explicitly describe where my research lens falls in mathematics education's paradigmatic moments by aligning my ontology, epistemology, and theoretical perspective.

Ontological Perspective

Bhaskar (1989/2010) described his critical realist perspective as being concerned with "emancipatory social practice" (see also Corson, 1991). Bhaskar's ontological perspective is one that is the combination of two perspectives: transcendental realism, a variety of scientific realism that sees science as an explanation of the structured but changing world; and critical naturalism, a version of human sciences that critiques specific structures within society that marginalize and calls for emancipation from and transformation of these structures (Corson, 1991). Critical realism has been used throughout numerous social sciences, and it has been argued that utilizing critical realism for education can result in critical responses to positivist thinking and encourage social change (Rafe et al., 2021). Bhaskar's ontological perspective draws many similarities to other theorists, but particularly in the work of John Dewey.

Both Dewey and Bhaskar note that the social world is within the scientific world (Corson, 1991; Dewey, 1929/2017, 1938/1997, 1902/1976). Additionally, both theorists recognized social sciences (and in the case of Dewey, education) as a means of understanding and transforming the world (Corson, 1991; Dewey, 1929/2017, 1938/1997, 1902/1976). Nevertheless, Dewey's pragmatism falls short for Bhaskar and for me as well. Unlike Dewey, Bhaskar's (1989/2010) ontological perspective argues that the only way we as social scientists can understand and change the social world is to identify the structures that work to enforce modes of hegemony (Corson, 1991). As such, there is a direct alignment between my ontological perspective, my epistemological stance, my theoretical framework, and the purpose of my research study.

Epistemological Perspective

Critical theory is defined as a way of approaching the social world by refusing "to identify freedom with any institutional arrangement or fixed system of thought. It questions the hidden assumptions and purposes of competing theories and existing forms of practice" (Bronner, 2011, p. 1). Emerging from Marxist thought, critical theory allows people to analyze, critique, and disrupt dominance (Crotty, 2003; Marx & Engels, 1848/2002; see also Wager & Stinson, 2012). Critical theory provides scholars both a way to name the oppression and dominance within society and offers scholars ways to analyze and dismantle those structures. For mathematics educators, critical theory provides both the tools to not only notice the "gates" within the mathematics education but also provides a way to re-envision mathematics education for equity and liberation.

Critical theory emphasizes the lived experiences of people and the oppressive structures and systems that influence those lived experiences (Crotty, 2003; Egbert & Sanden, 2019;

Kneller, 1984; Taylor & Medina, 2011). Using this theory, scholars not only have a desire to bring awareness to the oppressive and dominant structures influencing society, but also scholars desire to challenge, resolve, and/or eliminate the inequities and injustices affecting society order (Crotty, 2003; Egbert & Sanden, 2019; Kneller, 1984; Taylor & Medina, 2011). By approaching my research within a critical epistemology, my research provided the participants means to uncover and mitigate the marginalization that occurs within their mathematics curriculum and instruction practices. By engaging with the selected texts and participating in the CFG book club, the participants were given the opportunity to identify changes that they can and did make to their classroom and instructional practices to counteract this marginalization. This critical epistemology links directly to both my ontological underpinnings and my theoretical perspective.

Theoretical Perspective

This study is grounded by the theory of intersectionality. Collins and Bilge (2020) defined intersectionality as a way to analyze how categories of race, class, gender, nation, ability, and others mutually shape one another, intersect, and lead to power relations that influence the complex social relations in everyday life. Today, intersectional theory has a dual purpose as a form of critical inquiry and praxis. Intersectionality as a form of critical inquiry studies social phenomena using intersectional frameworks, whereas intersectionality as a form of critical praxis allows for individuals or groups to apply intersectional frameworks to their daily lives and subjects of study (Collins & Bilge, 2020). This theory emerged from the contributions of Women of Color and critical education scholars; thus, some of those contributions will be reviewed here.

Contributions by Women of Color

Even before the name intersectionality came into existence, there were intersectional movements occurring (Collins & Bilge, 2020). Throughout history, Women of Color engaged with other civil rights groups such as the Black Power movement, Chicano liberation movement, Red Power movement, and Asian American movements (Collins & Bilge, 2020). However, within these different groups, Women of Color were considered subordinate to men. Thus, the Women of Color within these groups experienced their own forms of gendered prejudice on top of racial prejudice (Collins & Bilge, 2020).

Additionally, the coalitions and collectives from Women of Color were formed because the second wave of feminism was typically focused on White women and regarded as the "white women's movement" (The Combahee River Collective, 1978/2014, p. 278; see also Collins & Bilge, 2020). Hence, these coalitions formed by Women of Color created their own feminist movements where political organization and action occurred. Additionally, these coalitions of Women of Color recognized and responded to the ways multiple oppressions occurred internally and externally of different social liberation movements (Collins & Bilge, 2020).

Sojourner Truth and the Combahee River Collective

Prior to the formation of coalitions between Women of Color in the late twentieth century, Sojourner Truth was one of the first Black Women to introduce intersectional concepts (Collins & Bilge, 2020; Robinson, 1851). Sojourner Truth considered herself both a feminist and an abolitionist. Within her 1851speech titled *Ain't I a Woman?,* Truth spoke to an entirely White female audience (Collins & Bilge, 2020). Truth made the point that within American society she, a formerly enslaved woman, was never viewed as a woman because her experiences as a Black woman in American were drastically different than those of White women. Despite giving this

speech without preparation, Truth's words highlighted the longstanding perception that feminism was only for White women. Additionally, Truth's speech called for collective activism amongst women of all races to gain rights as well as improve society (Robinson, 1851). Sojourner Truth's contributions ultimately influenced later coalitions of Women of Color: namely, the Combahee River Collective (Collins & Bilge, 2020).

The Combahee River Collective (CRC) was one of the main coalitions of Women of Color within the 1960s and 1970s (Collins & Bilge, 2020). Formed from a small group of Black lesbian socialist feminists, the CRC utilized some of the ideas of Truth to create a collective form of activism, which critically analyzed certain social movements (including the second wave of feminism in the 1960s and 1970s as well as civil rights movements). The CRC focused particularly on decolonization, desegregation, and feminism within their works, but none of these works would have as widespread of an impact as *A Black Feminist Statement* (The Combahee River Collective, 1978/2014). Within this statement, the collective discussed four things: (1) the origins of Black feminism by paying particular attention to early Black feminists such as Sojourner Truth; (2) their beliefs and specific politics, which noted how the different systematic oppressions of patriarchy, racism, and capitalism intertwine; (3) the problems with forming a collective of Black feminists and a history of the CRC; and (4) the issues and practices of Black feminists specifically detailing their inclusiveness of their politics for all marginalized populations. The critical analysis of the CRC as well as the activism the coalition exhibited in organizing for social justice for traditionally minoritized and marginalized people were instrumental to intersectional theory and model what intersectional praxis could be far before its naming (Collins & Bilge, 2020; The Combahee River Collective, 1978/2014).

Chicana and Latina Feminism and Anzaldúa

The Black feminists of the CRC were not the only Women of Color to contribute to intersectional theory. During the 1970s and 1980s, Chicana and Latina feminism came about through grassroots movements and through the writings of Chicana scholars (Collins & Bilge, 2020; Anzaldúa, 1987/2021; Moraga & Anzaldúa, 2021). Chicana feminists experienced similar struggles to Black women when striving for intellectual and political power and focused their activism to topics related to colonialism and nationalism (Collins & Bilge, 2020, p. 81).

One of the most influential Chicana feminists in this movement was Gloria Anzaldúa (Collins & Bilge, 2020). Described as a lesbian Chicana feminist, Anzaldúa's (1987/2021) *Borderlands/La Frontera* drew upon intersectional ideals when describing the experiences of her, as well as other Chicana women's, experiences growing up in the "borderlands". As described by Anzaldúa (1987/2021), the physical borderlands are the "Texas-U.S. Southwest/Mexican border" but all other types of borderlands occur when "two or more cultures edge each other, where people of different races occupy the same territory, where under, lower, middle and upper classes touch" (p. 49). Through storytelling and poetry, Anzaldúa highlights the complexity in which those in the borderlands, but particularly Chicana women, must navigate in order to gain liberation from a serpentine patriarchal, Anglo-Saxon, and colonizing society. This text was imperative to Chicana feminist theory, but by describing the borderlands as more than just a physical location, Anzaldúa helped create a more inclusive and complex way to envision feminism that has ultimately contributed to intersectionality (Collins & Bilge, 2020; Anzaldúa, 1987/2021).

Asian Feminism and Collective Feminist Works

In addition to the works of Chicana and Black feminists, Asian Women came together in collectives to challenge the hegemonic norms within mainstream society (Collins & Bilge, 2020; Lim et al., 1989). Emerging from university courses and programs, Asian American feminism can trace some of its roots back to San Francisco State and the University of California Berkley where the journal *Asian Women* was first published in 1971 due to the efforts of Asian women enrolled at both schools (Collins & Bilge, 2020). In addition to this work from Asian women, Asian women have also come together as a collective through works like the *Forbidden Stitch* (Lim et al., 1989). This anthology was composed of writings, short stories, poems, and artworks that highlighted the experiences of women from Pakistani, Japanese, Filipino, Chinese, Vietnamese, Indian, Korean, Hindi, and Malaysian ethnic backgrounds. By collecting stories across multiple lived experiences of Asian Women, the narratives provide a view of the complexity within their lived realities. These stories also highlight the need for multiple lenses to view Asian women experiences as more than simply a "homogenizing label" (Lim et al., 1989, p. 10). Furthermore, this text shows the variety of cross-pressures that are faced by Asian American women including racial, linguistic, cultural, sexual, and national pressures.

Beyond the *Forbidden Stitch*, Asian feminists, as well as other Women of Color, have come together as a community striving toward activism in *This Bridge Called My Back (*Moraga & Anzaldúa, 2021). Moraga and Anzaldúa (2021) edited this important collection of writings from Women of Color with diverse racial, national, ethnic, and colonial experiences. This collection of writings showcases the collective action of political, radical, feminist writings while also in itself being a stimulus for critical inquiry and praxis (Collins & Bilge, 2020; Moraga &

Anzaldúa, 2021). Hence, *This Bridge Called My Back* helped to contribute to the definition we have of intersectionality today.

Introduction of the word Intersectionality and Kimberlé Crenshaw

Perhaps one of the most pivotal contributions to intersectional theory as we understand it today was done by legal scholar Kimberlé Crenshaw. In her article *Mapping the Margins: Intersectionality, Identity Politics, and Violence Against Women of Color,* Crenshaw (1991) coined the term intersectionality. Through this law review, Crenshaw argued that the concept of intersectionality was needed in academic and legal contexts because concepts like racism and sexism are too limiting in addressing the multiplicative effects of the injustices facing Women of Color. Ultimately, Crenshaw (1991) asserted intersectionality affords legal scholars, as well as others, the ability to recognize and respond to the compounding ways modes of hegemony marginalizes those who have intersecting traditionally marginalized and/or minoritized identities.

Crenshaw (1991) indeed was the first to coin the term intersectionality, but the article drew upon the ideals of Women of Color feminists before her (Collins & Bilge, 2020). Thus, *Mapping the Margins* extends the long history of intersectional theory and exhibits how collective knowledge of Women of Color have contributed to intersectional inquiry. Nonetheless, Crenshaw's contribution was groundbreaking because the coining of intersectionality subsequently introduced intersectionality into academia, and this academic contribution has led to incorporation of intersectional inquiry and praxis into multiple fields of study inside and outside of the academy (Collins & Bilge, 2020).

Critical Education

In addition to the contributions of Women of Color, intersectionality as a form of critical inquiry and praxis has emerged out of critical education (Collins & Bilge, 2020). Critical

education has long been known as a place where those who are oppressed can be liberated through acts of social justice, critical reflection, and collective action (Collins & Bilge, 2020; Freire, 1970/2018; Dewey, 1929/2017, 1938/1997, 1902/1976). Thus, to understand intersectionality as a theory formed through critical inquiry and praxis, it is important to discuss some of the educators who have operated through a critical praxis.

Anna Julia Cooper and W. E. B. DuBois

Historically, Black scholars advocated for critical education as a form of social activism within education (Collins & Bilge, 2020; Watkins, 1993/2017). Anna Julia Cooper remains one of the most notable critical Black educators, feminists, and scholars. Cooper's (1892/2017) book *A Voice from the South* utilizes intersectional ideals to analyze her and other Black women's experiences as multiplicative and intersecting across race, class, and gender lines. Beyond this, Cooper was an educator who developed a night school in Washington D.C. for Black working-class and disabled adults (Collins & Bilge, 2020). By offering free education to those who were traditionally excluded or marginalized from typical school settings, Cooper's education served as a form of critical action and community activism.

W.E.B. DuBois was also one of the many Black scholars contributing to critical education and subsequent critical praxis (Collins & Bilge, 2020; Watkins, 1993/2017). As an advocate for participatory democracy, DuBois supported progressive politics and education (Watkins, 1993/2017). As a curricular scholar, DuBois consistently criticized inequities in the form of racism, classism, and imperialism and believed that education needed to foster change. In his essay, originally written for the commencement of the Fisk University 1924 graduating class, DuBois (1924) advocated for participatory action amongst alumni and argued that Fisk as an institution needed to "become a place of freedom, a place where our sons and daughters can

be developed as aggressive men and women and not atomical" (p. 11). Through his curricular mindsets and scholarship, DuBois saw education as a way to study the world and as a way to transform society, particularly for Black people.

Jane Addams and John Dewey

Jane Addams and John Dewey also viewed education critically (Collins & Bilge, 2020; Addams, 1908/2017). Through her work at Hull House, a social settlement on Chicago's west side, Addams fiercely advocated for the education of immigrants, lower class individuals, mothers, and others whose needs were not being met by public schools. Specifically, Addams advocated for curriculum and education that sustained the cultures of immigrant children rather than assimilating immigrant children into an Americanized society (Addams, 1908/2017). Through her advocacy for marginalized populations as well as her commitment to sustaining the culture and communities of these marginalized populations, Addams helped create a liberative education and participatory education for these groups.

John Dewey, like Addams, advocated for a valuing of children's experience and an active participation in learning (Collins & Bilge, 2020; Dewey, 1929/2017, 1938/1997, 1902/1976). As a scholar, Dewey (1929/2017) criticized the U.S. education system for "neglect[ing] this fundamental principle of the school as a form of community" (p. 35). Across his works and within his own Laboratory School at the University of Chicago, the scholar argued for and implemented authentic education experiences (Dewey, 1929/2017, 1938/1997, 1902/1976). By valuing and centering children and by promoting social and dialogic experiences, Dewey believed social transformation can occur. Consequently, Dewey's scholarship serves as a form of critical inquiry and his Laboratory school serves as a form of critical praxis.

Paulo Freire's Pedagogy of the Oppressed

Critical education and subsequent critical inquiry and praxis was not confined to the United States. Brazilian educator Paulo Freire (1970/2018) argued that education can either disempower or empower those who are traditionally oppressed. Within his work, Freire criticized the education of domination (also known as *banking concept of education*) where teachers deposit curriculum and content into their students. The critical educator contended that the banking concept of education upholds oppression and hegemony in the world. However, Freire promoted and implemented a critical consciousness through critical dialogue and critical praxis, which he believed could lead to liberation of the traditionally oppressed. Freire's contributions to critical education embody intersectional ideals through his recognition that oppression is not within a single perspective, through his collective critical inquiry through dialogue, and through his ultimate empowerment of the oppressed through critical praxis (Collins & Bilge, 2020).

Intersectionality, Mathematics Education, and Aligning My Research Lens

Because the theory of intersectionality guides this study and because this study contributes to mathematics education research, it is important to highlight where intersectionality falls within the theoretical moments of mathematics education research. Likewise, mapping my research lens in these moments is also necessary. Since the 1970s there have been four overarching theoretical movements within mathematics education research: (1) the process-product moment; (2) the interpretivist-constructivist moment; (3) the social-turn moment; (4) and the sociopolitical turn moment (Stinson & Walshaw, 2017). According to Stinson and Walshaw (2017), the 1970s process-product moment was defined by teachers linking teaching practices to student outcomes as well as positivist and post-positivist theoretical orientations.

The interpretivist-constructivist moment of the 1980s was characterized by constructivist and interpretivist theoretical orientations (Stinson & Walshaw, 2017). The research within the interpretivist-constructivist moment wanted to understand learning and teaching in mathematics classrooms. In the mid 1980s, the social turn movement brought about recognition that thinking, reasoning, meaning, and understanding within mathematics classrooms were products of social interaction and activity (Stinson & Walshaw, 2017). The social turn movement found theoretical underpinnings in cultural psychology, cultural sociology, and anthropology.

Finally, at the turn of the new millennia, the sociopolitical turn brought about a critical shift in mathematics education research where identity, power, and emancipation were at the forefront of research (Stinson & Walshaw, 2017). Within this final moment, theories guided by critical and deconstructivist theories have grounded research. Intersectionality falls within the sociopolitical moment of mathematics education. Developed by Women of Color feminists as well as critical educators, intersectionality clearly has been driven by the same critical considerations of identity, power, and emancipation as the other mathematics education research within the sociopolitical turn.

My research lens, too, falls squarely within the sociopolitical turn. Ontologically, I come to my research through a critical realist perspective. I knew that within my research, as well as outside of it, for myself and the participants to understand and change mathematics curriculum and instruction, we all must identify the hegemonic realities within mathematics curriculum and instruction. Epistemologically, I came to this research through critical theory and offered the participants an opportunity, through selected critical texts and a CFG book club, to discover and mitigate the oppression within their own mathematics curriculum and instruction. Finally, theoretically, I expanded upon and applied intersectional theory when designing and conducting

this study. Intersectionality informed the selection of texts read in my literature review, the choice of methodology and methods, and data analysis. Moreover, through the CFG book club and critical texts of this study, participants negotiated ideas related to intersectionality and utilized these negotiations to respond to the hegemony in their mathematics classrooms.

Summary

Within this chapter, I detailed the ontological, epistemological, and theoretical perspectives grounding my work. To situate the theory guiding my research, I first discussed my ontological and epistemological perspectives. I then detailed the historical underpinnings to intersectionality by specifically describing the contributions from Women of Color and critical educators. I then explained where intersectionality fell within mathematics education's paradigmatic moments. Finally, I closed this chapter by explicitly describing where my research lens falls in mathematics education's paradigmatic moments through the alignment of my critical realist ontology, critical epistemology, and intersectional theoretical perspective. In the chapter that follows, I provide an overview of literature which informs my study.

CHAPTER 3: LITERATURE REVIEW

To support mathematics education research that pursued intersectionality as a form of critical inquiry and praxis, it was important to consider prior literature in relation to intersectionality and mathematics education. When compiling this literature review, I examined multiple articles, books, and book chapters in critical mathematics education literature. The review ultimately was organized into three major categories: (a) work that highlights the hegemonic norms in education, (b) research showcasing teachers' critical practices and work toward counteracting hegemony and achieving equity for marginalized populations, and (c) texts centering on intersectionality within mathematics education settings.

Hegemonic Norms in Education

Intersectionality requires an examination of how power relations affect society across racial, classist, gendered, abled, ethnic, linguistic, and national lines (Collins & Bilge, 2020; Crenshaw, 1989, 1991). Thus, it is important to consider literature that focuses on the effects that hegemonic dominance has had within general education and/or shows the evidence of privilege and hegemony in mathematics education. The literature presented falls into one of four categories: historical accounts of dominance and privilege in mathematics education, evidence of privilege and hegemony in education generally, sociopolitical factors of schooling and education, and evidence of privilege and hegemony in mathematics education specifically.

Historical Accounts of Dominance and Privilege in Mathematics Education

Due to the foundational effects on mathematics curriculum in the United States, I begin with a critical examination of The Report of the Committee of Ten (National Education Association of the United States [NEA], 1892). Within the NEA report, there is an inherent privileging of mathematics students who demonstrated more success with algorithms, arithmetic,

and procedures over students who demonstrated success with problem solving and conceptual knowledge. The NEA explicitly noted a desire to simplify curriculum to be the same for every student regardless of a student's outside needs (National Education Association of the United States, 1892, p. 17).

Numerous scholars throughout history, however, have argued that students need to receive education that is inclusive and differentiated by honoring students' lived experiences. These same scholars also have argued how so much of students' experiences are framed in culture (Addams, 1908/2017; Dewey, 1902/1976, 1929/2017, 1938/1997; Freire, 1970/2018; Gay, 2002; Ladson-Billings, 1995; Montessori, 1917/2017; Noddings, 1983/2017; Sleeter & Stillman, 2005/2017; Valenzuela, 2005/2017). Thus, when the Committee of Ten calls for standardization of curriculum, the call is in reality one for curriculum that ignores and devalues the diverse experiences, identities, and cultures of students.

Mathematics educators have also stated that mathematics curriculum framed in correct answers, algorithms, and arithmetic limits the scope of mathematics and bases it in lower-level cognitive demands (National Council of Teachers of Mathematics [NCTM], 2014, p.18). Therefore, when the NEA overvalued answers, algorithms, and arithmetic, one might infer that students are incapable in mathematics if their mathematical prowess resides in problem solving and social interaction. However, the opposite is true. All in all, The Report of the Committee of Ten, clearly illustrates how the curriculum for mathematics education is rooted in a hegemony that benefits one type of learner and marginalizes those outside of the established hegemonic norm.

Overall Evidence of Privilege and Hegemony in Education

It also important to consider literature that highlights the effects of hegemonic dominance within the current era of education. Education research reports that as high stakes testing, academic tracking, and other neoliberal ideals in schools are enacted there results curricular content change (Au, 2007/2017). Specifically, the curricular and instructional changes documented most often lead to teaching to the test. Moreover, researchers state that within science and mathematics education contexts teachers now approach these subjects from a procedural perspective rather than through conceptual understanding perspective or through problem-solving contexts (Au, 2007/2017). As detailed by NCTM (2014), procedural mathematics and too much weight on results from high stakes testing does not connect with authentic mathematics learning and ultimately is unproductive in achieving mathematics excellence systematically for all students.

Beyond the curricular and instructional changes occurring, scholars also are noting how through neoliberal initiatives like No Child Left Behind (2001), Common Core (Council of Chief State School Officers, 2010), and Race to the Top (2013), curriculum development and instructional practices are not attending to the diverse needs of students entering U.S. classrooms (Love, 2019; Noddings, 2015/2017; Sleeter & Stillman, 2005/2017). Additionally, scholars indicate that educators' instructional choices also point to a lack of value, respect, and awareness of cultures outside of their own (Chan, 2006/2017; Love, 2019; Valenzuela, 2005/2017).

Current curriculum and instruction practices in response to high stakes testing, academic tracking, and other neoliberal ideals too often result in instruction and curriculum developed within the sociocultural frameworks of teachers who are predominantly White, middle-class women (Au, 2007/2017; Love, 2019). The dominant narrative therefore is being upheld in

general education contexts, and this narrative often overlooks or does not use culturally relevant pedagogical practices (Ladson-Billings, 1995). This teacher-centered curriculum and instruction also result in few students from traditionally marginalized and minoritized contexts to be granted access to higher tracks, needed resources and well-prepared teachers, and genuine care and respect from educational institutions (Chan, 2006/2017; Love, 2019; Noddings, 2015/2017; Valenzuela, 2005/2017). Within general education contexts evidence of curriculum and instruction both privileging dominant perspectives but also granting access to more fortuitous opportunities stems from hegemonic dominant perspectives.

Sociopolitical Factors of Schooling and Education

In addition to considering the historical accounts of hegemony in education, it is necessary to acknowledge the sociopolitical factors that enact and support hegemonic norms. Anyon's (2014) work points to macroeconomic policies such as taxing structures, affordable housing and healthcare, and minimum wage that create conditions that lead schools to underperform academically, physically, and socially. Simply put, she stated, "failing public schools in cities are, rather, a logical consequence of the U.S. political economy—and the federal and regional policies and practices that support it" (Anyon, 2014, p. 5). Anyon claimed that to create more equitable outcomes for urban schools, macroeconomic policies must be put in place and these macroeconomic policies must be enhanced by education reform because education reform alone is insufficient.

Noguera (2003) took Anyon's (2014) claim a step further, contending that inequities within schools occur due to both the external macropolitical policies mentioned above and internal factors like educator turnover, teacher attrition, and inadequate physical spaces. He argued that for schools to achieve success schools need to hire and retain highly skilled and

dedicated professionals who believe in the capability of all students to learn at high levels. Additionally, he contended that particularly in urban settings, the more powerful residents of these communities need to invest in their community schools. Because urban schools disproportionately serve the poor and powerless, lack of investment ultimately leads schools to be severely weakened (Noguera, 2003, pp. 38–39).

Darling-Hammond (2010) agreed with the prior authors, stating that policy affects outcomes for students, but she highlighted how educational policy, and more specifically, educational funding is what leads to disparities between schools. She claimed that funding in urban school districts must go further than in suburban schools simply due to the higher amounts of instructional needs of the student population as well as the wider range outside-of-the-classroom costs in urban school schools (e.g., before- and after-school programs, security, building maintenance and repair, healthcare, and meal programs). Darling-Hammond also specified that there are disparities in urban schools due to the differences in teaching conditions in comparison to suburban schools. She reported that suburban schools have "higher salaries and better teaching conditions to attract the best-qualified and most experienced teachers. Higher-spending districts also have smaller classes, more specialists, and greater instructional resources, as well as better facilities" (p. 22). She in concurrence with Anyon (2014) believes that educators create more equitable outcomes for urban schools by ensuring the following: (a) secure food, housing, and healthcare; (b) supportive learning environments for students; (c) equity in district funding; (d) access to high-quality teachers, curriculum, and assessment; (e) prepared and supported educators; and, most importantly, (f) a teaching and learning system that supports in-depth learning for teachers and students.

Ladson-Billings (2006) and Love (2019) particularly recognized these aforementioned policies affecting education and used them to advocate for more accurate terminology within the field when ascribing cause or blame. In other words, both took issue with the dehumanizing and inequitable narrative spun regarding the "achievement gap,"[5] or the disparities in test scores and academic performance between minoritized and marginalized students and their White counterparts (Ladson-Billings, 2006; Love, 2019). Ultimately, this politicized and marginalizing narrative blames students for teacher shortcomings; historically and culturally mismatched curriculum; systematic inequities; and economic disparities between minoritized, working-poor communities and their affluent White counterparts. Ladson-Billings and Love offered terms like opportunity gaps and educational debts[6] as more accurate alternatives that note the true causes of differences in performance between traditionally marginalized and minoritized populations and their privileged counterparts—disproportionate taxing structures; access to affordable housing and healthcare; culturally relevant pedagogy; access to safe, welcoming, and well-equipped classrooms and teachers; and other sociopolitical factors.

Evidence of Privilege and Hegemony in Mathematics Education Specifically

Finally, here I highlight the contributions of critical mathematics education researchers who have documented the privilege and hegemony within mathematics education. Stinson (2004) discussed the "gatekeeping" aspect of mathematics education. He argued that the concept of mathematics serving as an access point to different opportunities traces back to the ancient Greeks and extends into modern mathematics classrooms. Stinson further noted that mathematics

[5] Here *achievement gap* is in quotes because as Dr. Bettina Love (2019) stated: the "achievement gap" is a fallacy that "conveniently never [mentions] America's role in creating the gap" through modes of hegemony and policy. I highlight this fallacy belief with quotes whenever the term is mentioned.

[6] Educational debts are the historical, economic, sociopolitical, and moral decisions, policies, and resources that could have been invested in schools that serve traditionally minoritized and marginalized students.

educators, mathematicians, and other educational stakeholders throughout U.S. education history have asked the question, “Who should be taught mathematics?” (Stinson, 2004, p. 10). This gatekeeping history coupled with the fact that mathematics is a point of access to economic, academic, and professional success has resulted in mathematics being a “privileged” subject throughout K–16 education in the U.S. and other parts of the world. This gatekeeping status, according to Stinson, too often unjustly denies access and opportunity to students from traditionally marginalized and minoritized populations.

Stinson’s (2004) claims about the gatekeeping status of mathematics aligns with work of Berry (2008) and Battey (2013). Berry, in his research, highlighted how historically, Black students experience lowered expectations from mathematics teachers that often resulted in a process of “gatekeeping” traditionally marginalized and minoritized students, but particularly Black students, denying them entry to higher mathematics courses. He also argued that there has been limited attention given to the success of Black students, particularly Black boys. Berry’s research with eight successful Black middle school boys provided counterstories to the deficit narratives of underachievement in the mathematics classroom and low-level course enrollment patterns in mathematics that perpetuate gatekeeping in mathematics education.

Similarly, Battey’s (2013) work built on the notion of gatekeeping within mathematics and highlighted how gatekeeping in mathematics has concrete effects on people. Battey argued that mathematics as a subject is disproportionately granting access academically, economically, and professionally to White men. Within his work, Battey described how the effects of academic tracking offer access to higher mathematics curriculum to some as it denies access to others. He also noted how deficit ideologies about students from traditionally marginalized and minoritized backgrounds affects their identities and learning environments and, in turn, their mathematics

achievement. Battey calculated the actual material cost of racism for a national data set within his work. These calculations mathematically demonstrated how differences in earnings are accounted for by previous mathematics coursework and how these differences in mathematics coursework advantage White students. Specifically, Battey highlighted that those who had completed advanced mathematics courses[7], which were disproportionately White students, were making an average of $39,681 to $42,625. However, students who only completed low and middle mathematics courses[8], which were disproportionately Black, Hispanic, and American Indian/Native Alaskan students, were making an average of $23,928 to $35,014[9] (Battey, 2013, p. 235).

Martin (2009) further supports the claims of mathematics privileging whiteness. Martin used a combination of critical social theories to analyze how race and racism has (and has not) been examined within mathematics education. Ultimately, he argued that there needs to be implementation of similar critical frames within mathematics education rather than relying on inadequate and impoverished approaches to race, racism, and inequality (p. 297). Martin, drawing from his own research as well as fellow mathematics educators, highlighted how race functions within mathematics education in a way that is color-blind and privileges whiteness. Martin, in the end, showcased how lack of critical analysis regarding race and racism has led to lack of research on the racialized nature of mathematics, which in turn leads to reifying a racial hierarchy within mathematics that privileges whiteness.

[7] In this article, advanced mathematics courses were categorized as Calculus and Trigonometry/Algebra III.

[8] In this article, middle mathematics courses were categorized as Algebra 2 and Algebra I/Geometry and low academic mathematics were categorized as no high school or college-level mathematics.

[9] Note these salary figures were calculated in 2010 dollar amounts.

Building from Martin (2009), Battey and Leyva (2015) specifically examined the role of whiteness in mathematics education. They developed upon the work of critical scholars and created a framework for assessing whiteness in mathematics education. Battey and Leyva (2015) asserted that mathematics education is framed in whiteness institutionally, through distribution of labor, and within the identities of students and teachers. They stated that institutionally, whiteness occurs through physical space, history, organizational logic, and ideologic discourse. Regarding distribution of labor, Battey and Leyva (2015) claimed that whiteness occurs in mathematics education contexts through cognition, emotion, and behavior. Finally, the two authors noted whiteness as a form of identity is reinforced through academic legitimization or academic delegitimization, co-construction of meaning, and agency and resistance.

Warburton (2015) continued to build upon the work of Martin (2009) and described mathematics as framed in whiteness by conducting a study that showcased seven preservice mathematics teachers grappling with teaching mathematics for social justice and how social justice mathematics counteracts the abstract nature of dominant mathematics within schools (Gutiérrez, 2002). By identifying the overlap in dominant mathematics discourses and whiteness discourse, Warburton (2015) too supported the idea that mathematics education privileges whiteness.

Warburton (2015) also drew on the history of mathematics, showing that dominant school mathematics in the U.S. favors Greek oriented mathematics, which upholds Western European abstraction and decontextualized problems. Given that dominant mathematics favors abstraction and decontextualized mathematics, practicality and contextual problems such as solving issues related to housing, food security and distribution, and architecture become undervalued or devalued in current school mathematics (Warburton, 2015; see also Gutiérrez,

2002). This overvaluing of dominant mathematics often results in a major challenge for teachers who want to disrupt the White privileged nature of the discipline through curriculum measures that incorporate practicality or sociopolitical contexts.

Warburton (2015)'s arguments were supported by the mathematics scholars Joseph (1994) and Ernest (1991). They, using philosophy, history, and theory, argued how schools have favored mathematics with abstract and Western European ideals. Joseph (1994) documented the lack of non-European mathematics within the curricula taught in schools, claiming that the incorporation of non-dominant mathematics could allow for a more tailored experience for students from different ethnic backgrounds. Ernest (1991), throughout his prolific body of work, challenged the absolutist view of mathematics; that is, the view that mathematics as certain and absolute. Ernest (1991) illustrated the privileging and dominant nature of mathematics by claiming that the discipline itself was established based on logical axiomatic "truths" without empirical evidence. This absolutist view continues to be the dominant ideology in mathematics classrooms today, too often relegating the practical and contextualized mathematics that benefit all students—including traditionally marginalized and minoritized—to the sidelines (Gutstein, 2003; Frankenstein, 1990; Peterson, 2012; Powell, 2012; Stocker, 2012; Wamsted, 2012; see also Boaler, 2016; Gutiérrez, 2002).

Finally, Weissglass (2002) highlighted the hegemony within the field of mathematics education. In his 2002 article specifically, Weissglass proposed questions to mathematics educators regarding inequity in mathematics education. Explicitly, he asked questions that highlight the role of hegemonic forces such as male European views in mathematics and the role of race, class, and gender (among other identity markers) in mathematics instruction, assessment, and curriculum development. Through this questioning, Weissglass (2002) not only brings to

light the perpetuation of whiteness, middle-to-upper-classness, and maleness, but also offers additional questions of "Is mathematics culture free?", "Would mathematics be different if male European culture had not become the dominant force in the world?", "How do teachers and curriculum developers present problems that are likely to become the students' problems?", "How do educators' culture, class, and gender affect their ability to develop and communicate problems so that students desire to solve them?", "How do we increase the percentage of people of color in curriculum development groups?", "How do racism and classism affect the school experiences of students?", "How much of the assessment system is driven by (unconscious) race and class bias?", and "Can we change racist/classist practices in schools and eliminate (or at least alleviate) the effects of racism and classism on students?" that might assist mathematics educators in reflecting on and responding to these and other forms of hegemony in the field.

The mathematics education researchers' and scholars' work cited throughout this section is a mere sampling of an increasingly growing body of knowledge that aims to dismantle the White hegemony of mathematics education. The ever-present privileging of whiteness that exists throughout the field of mathematics education negatively influences the curriculum and instruction within mathematics learning environments, destructively shapes the identities of students within those environments, and ultimately grants only some students access to professional, academic, and economic opportunities.

Teacher Practice in Relation to Equity of Marginalized Populations

On top of considering the hegemony and dominance within mathematics and mathematics education, it is also important to consider the curriculum and instructional moves made by mathematics educators to counteract those forms of dominance given the documented perpetuation of said dominance. In this section, therefore, I look at mathematics education

literature that showcases ways that mathematics educators have promoted equity while simultaneously critiquing the hegemonic nature of mathematics education.

Teacher/Staff Development Literature for Intersectional Equity

Within the education community, there has been research on how to engage teachers in professional development that leads them to reflect on practices within school buildings. Additionally, to support my research, it is necessary to review the professional development models that I used and review professional development literature that has modeled educators reflecting and acting upon practices that are marginalizing to students.

Critical Friends Groups

Critical friends groups (CFGs) are a well-known professional development model within education contexts. CFGs are known as professional learning communities made up of a group of educators who voluntarily and regularly come together to discuss and collaborate to improve their practices (Auslander et al., 2018; Burke et al, 2011; Curry, 2008; Moore & Carter-Hicks, 2014). CFGs are known to create collaborative environments for educators, enhance professional relationships between educators, have the potential to change educators' thinking and practice, support identity development, and have been shown to impact student learning for the better (Auslander et al., 2018; Burke et al, 2011; Curry, 2008; Moore & Carter-Hicks, 2014).

Research from Auslander and colleagues (2018) presented a case study where three CFGs were analyzed: (a) a CFG of cross-career educators at an urban school, (b) a CFG of first-year teachers in a master's degree cohort using a virtual format, and (c) a CFG of veteran literacy coordinators in a rural school district. Employing a mixed-methods approach, their study indicated that across contexts participants valued the process of the CFG as a professional development experience. Additionally, their findings indicated participants regarded CFGs as

focused professional developments that honored their time. Furthermore, their study highlighted how across all contexts the CFGs were helpful in creating a respectful and trusting environment where participants could grow both personally and professionally. Specifically, the participants indicated that through the CFG they were able to collaborate and find solutions to different classroom dilemmas such as classroom management challenges or instructional strategy development.

Moore and Carter-Hicks (2014), Curry (2008), and Burke and colleagues (2011) also contributed to literature around CFGs. Like Auslander and colleagues (2018), Moore and Carter-Hicks' (2014) study indicated that CFGs focused professional development, respected educators' time, facilitated collaboration between educators, and improved teaching. Curry's (2008) work showed that the CFGs promoted a more collaborative and collegial work environment and ultimately these professional communities motivated the staff participants to focus their efforts to pedagogical strategies and benefitting student learning outcomes. Burke and colleagues (2011) conducted a qualitative case study where researchers followed the 3-year long implementation of CFGs across one school district. Within their study, findings indicated that CFGs influenced teachers to try different instructional practices and focused attention on enhancing student achievement. CFGs are just one well-known professional development strategy shaping my research.

Book Clubs

Book clubs, like CFGs, are another familiar professional development strategy within education. Book clubs are a professional development strategy where peers come together to discuss a facilitator-selected text (Burbank et al., 2010; Jacobs et al., 2011; Kooy, 2006; Mensah, 2009; Reilly, 2008; White, 2016). Book clubs are often regarded as both an easily accessible

professional development strategy, but also as a professional development strategy that is focused on the needs of the peers involved and one that can generate discussion on pertinent topics (Burbank et al., 2010; Guerra & Nelson, 2008; Kooy, 2006; White, 2016).

White (2016) and Reilly (2008) presented their research on book clubs to highlight how this professional development strategy can influence teacher practice. White (2016) noted the importance of teachers having time to collaborate and reflect on their practices with other teachers. Through a triangulation of interviews, field notes, and focus groups, White (2016) discovered that "the book club readings and discussions helped [teacher participants] critically think about their interactions with individual students and how those interactions shaped children's learning and behavior" (pp. 30–31). Reilly's (2008) case study presented the use of book clubs within a graduate course comprised of in-service educators. Over the course of the graduate semester, the book club model influenced the in-service educators to view the book club as a "social collective" where teachers would come together as a collaborative group to interpret student interactions and revise instruction based on these collaborative interactions that stemmed from the common reading.

Additionally, book clubs are also professional development opportunities where student and teacher identity, culture, and experience are at the forefront of conversation. As noted by Guerra and Nelson (2008), book clubs are one way to begin to change deficit beliefs [10]about students from diverse backgrounds because they provide a learning experience where teachers reflect on how culture has affected their beliefs and experiences as well as those of their students. Guerra and Nelson stated that book club discussions "often trigger deep introspection about

[10] Deficit beliefs here are thought of as negative assumptions or biases educators may have about any student, but particularly students of traditionally marginalized and minoritized backgrounds. Deficit beliefs can be related to believing a student cannot access higher levels of academic courses, believing a student will underperform or fail, believing a student is lazy, disrespectful, or rude, or other things without truly having knowledge of a student.

beliefs and the influence of beliefs on classroom practice. This critical analysis leads teachers to make their practice more culturally responsive" (p. 43).

The research from Jacobs and colleagues (2011) and Mensah (2009) supported the statements from Guerra and Nelson (2008). By employing Freire's (1970/2018) critical consciousness as a theoretical framework, Jacobs and colleagues investigated how teacher educators who participated in a book club on English-language learners (ELLs) explored their beliefs and developed awareness as it pertained to preparing future teachers to teach in linguistically and culturally diverse schools. According to Jacobs and colleagues (2011), the book clubs led to the following: (a) participants reflecting on their lived experiences, which led to some participants developing a critical consciousness; (b) participants acting within their classrooms by implementing classroom strategies that highlight how to support ELLs and participants developing critical pedagogical practices; and (c) participants feeling tension and discomfort when reflecting on their own experiences and how to implement differing pedagogical strategies.

Mensah's (2009) research highlighted the implementation of a book study within a pre-service education course for elementary science teachers. Using the principle of ideology, critical pedagogy, critical reflective inquiry, multicultural education, and issues of diversity as a theoretical foundation, Mensah was able to draw five overarching themes from the data:

> (a) Relevancy, using a multicultural text in a science methods course; (b) Revelation, revealing assumptions and biases about issues of diversity and teaching science; (c) Responsiveness, forcing a response to issues of diversity in science education; (d) Reflection, developing critical and reflective science teachers; and (e) Reformation, gaining a deeper understanding of diversity by changing ideological beliefs. (p. 1055)

Mensah's findings indicated that a book club is an effective model for teacher professional learning regarding issues of equity, inclusion, and diversity particularly within urban education spaces. Nonetheless, book clubs are not the only form of professional development where educators have reflected and acted upon practices that are marginalizing to students.

Critical Teacher Professional Development

Beyond these two general professional development strategies, there exist models of critical professional development that model ways to counteract hegemony. Kailin (1994) presented literature that highlights ways that schools can develop opportunities for educators to reflect on their practice, which is actively anti-racist[11] and considers the race, class, and gender of teachers and students in the process. She discussed ways for teachers to work together to eliminate racism and even suggests ways to work toward the development of anti-racist curriculum.

Ohito (2016) and de Freitas (2008) offered their research to counteract the White supremacy found in in overall preservice teacher education and specifically in preservice mathematics teacher education. Ohito (2016) implemented a "pedagogy of discomfort" that aims to incite both teachers and students in the learning space to critically reflect upon hegemonic beliefs, actions, and practices (p. 458) to challenge whiteness in the classroom, and this ultimately led her preservice teachers to develop critical consideration of race and White supremacy in education. de Freitas (2008) employed the methods of auto-ethnography and critical discourse analysis to disrupt the dominant mathematics identity inherent in many

[11] Kailin (1994) defines anti-racist education "as a strategy of incorporating into the teaching practice a pedagogy that sensitizes teachers to the racist constructions of reality in their curricula and behavior" (p. 173). Dr. Ibram Kendi (2019) then further elaborates on this by claiming that to be anti-racist one must actively take a stand against racist ideologies rather than passively claiming non-racism.

mathematics educators as well as to bring to light the inherent power relations exhibited in mathematics education.

Kalinec-Craig and Prasad (2019) offered their work to reveal how whiteness appears in mathematics teacher professional development. By using critical discourse analysis, they were able to show how whiteness appears between mathematics educators. The scholars detailed how one educator, Wanda who is White, in their study consistently positioned herself as more knowledgeable and the "teacher" and repositioned her two Black colleagues, Deidre and Frances, as less-knowledgeable "students" in their mathematics professional development. Kalinec-Craig and Prasad explained that by investigating how mathematical identities and power operate for teachers within their own professionalization, teachers can then "learn to notice and address issues of status in their own practice and with their own students" (p. 552).

Finally, Gonzalez (2012) offered her research with one group of urban high school mathematics teachers to show the process of developing a Teaching Mathematics for Social Justice (TMfSJ) unit. Gonzalez provided an overview of the weekly sessions the group held and provided the goals, successes, and challenges that went into the process of developing a TMfSJ unit of study. Furthermore, she showed that the teachers within her study believed, "that engaging in TMfSJ lessons would result in increased awareness and social change" (p. 136). Gonzalez also provided a sample TMfSJ Program to use within other contexts. By doing so, Gonzalez highlighted how critical mathematics can be developed within other professional mathematics education contexts and how it can serve as a catalyst for needed change. On top of the literature that highlights ways teachers, teacher educators, and mathematics educators are working toward intersectional equity outside the elementary or secondary classroom, there is

literature that highlights the instructional and curricular strategies used within the elementary or secondary classroom.

Instructional and Curricular Practices for Intersectional Equity in K–16 Education

Beyond the research showcasing professional development that incites critical reflection and action, there also exists literature highlighting curricular and instructional practices that promote equitable outcomes for traditionally marginalized and minoritized students; it is therefore important to highlight the work of educators who highlight praxis toward intersectional equity. Specifically, it is important to note the foundational education research as well as the mathematics education research that showcase equity practices in K–16 Education.

Foundational Equity Practices

Foundational literature from Freire (e.g., 1970/2018), Gay (e.g., 2002), and Ladson-Billings (e.g., 1995) all highlight ways to promote success and equitable outcomes for all students and particularly for those from traditionally marginalized and minoritized backgrounds. Freire's (1970/2018) classic *Pedagogy of the Oppressed* highlights the conflict between the oppressors and the oppressed and notes how within classrooms this relationship can be seen between teachers and students. Ultimately, Freire (1970/2018) made the case that critical praxis or "reflection and action upon the world in order to transform it" (p. 51) and critical dialogue or "the encounter between men, mediated by the world, in order to name the world" (p. 88) can restore humanity toward liberation and humanization. Furthermore, he challenged his readers to consider their role and their leaders' roles in collective efforts for liberation and revolution. Freire argued that liberation cannot be accomplished through an education of domination (also known as *banking concept of education*) where teachers deposit information into their students. But rather, Freire presented the alternative, education for freedom to lead to liberation. Freire

described education for freedom to be problem-posing education as well as mutual student–teacher education.

By introducing culturally responsive teaching within her research, Gay (2002) built upon the critical pedagogical ideas of Freire (1970/2018) and worked to create rich educational experiences for diverse students. She defined culturally responsive teaching as,

> using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively. It is based on the assumption that when academic knowledge and skills are situated within the lived experiences and frames of reference of students, they are more personally meaningful, have higher interest appeal, and are learned more easily and thoroughly. (Gay, 2002, p. 106)

Ladson-Billings (1995) offered culturally relevant pedagogy to "produce students who can achieve academically, produce students who demonstrate cultural competence, and develop students who can both understand and critique the existing social order" (p. 474). She claimed that culturally relevant pedagogy occurs in multiple forms but specifically highlighted the nature of teachers' self versus others, social relations, and conceptions of knowledge in the classroom. Ladson-Billings exhibited multiple examples of culturally relevant teachers, but she specifically highlighted the need for a collaborative, community environment for culturally relevant teaching, the need for a critical view of knowledge, and the need for different forms of excellence or success in the classroom.

Mathematics Education Practices Highlighting Equity

The members of the mathematics education community build upon these foundational pieces just described. Specifically, Boaler (1999, 2008, 2016) offered models of creating a collaborative community-oriented classroom for students and provides examples of how doing

so promotes equitable mathematical outcomes for students of diverse cultural backgrounds as well as those of different genders. Additionally, Boaler (2016; see also Boaler 2013) presented how creating community-oriented classrooms and classrooms that are grouped heterogeneously by ability create increased success for students, but particularly female students.

Because there is a direct link to the foundational work of Freire (1970/2018), Gay (2002) and Ladson-Billings (1995), the research by Boaler (1999, 2008, 2013, 2016) is important when reflecting on mathematics educator practices that promote equitable outcomes for traditionally marginalized and minoritized students. Much of Boaler's (2013) work however focused strictly on gender marginalization and not multiple and compounding forms of marginalization. Additionally, in her research about relational equity (Boaler, 2008, 2013), she focused on creating respectful learning environments embodying support and commitment to community rather than a view of equity where justice and criticality are at the forefront.

More critical mathematics research related to equity has been conducted by Gutiérrez (2002, 2009), Rousseau and Tate (2003), Wager and Stinson (2012), and Seda and Brown (2021). Gutiérrez (2002) argued that currently educational equity through mathematics is of the utmost importance, but she also made the claim that because our goal of equity is ill-defined it is difficult for mathematics educators to work toward it. She claimed that currently in mathematics education, and education in general, there is a tension between educational excellence for the highest achieving students and educational equity for the lower performing students. She asserted that there is an inherent tension between traditional mathematics (algorithmic and formal) and reform mathematics (conceptual and problem solving).

Gutiérrez (2002) went on to argue that these two tensions are intertwined and ultimately fall under the umbrella of what is referred to "dominant mathematics" or mathematics that

reflects the status quo and is valued within neoliberal measures of high-stakes testing and teacher evaluations and mathematics that favors the abstract, decontextualized, and privileged form of mathematics. By defining dominant mathematics, Gutiérrez made the claim that equity within mathematics education rests on the tension between "dominant mathematics" and "critical mathematics," which is mathematics that "takes students' cultural identities and builds mathematics around them in such ways that doing mathematics necessarily takes up social and political issues in society, especially highlighting the perspectives of marginalized groups" (p. 151). Gutiérrez from here then defined equity as a process that is seen in three different stages:

1. Erasure of the ability to predict students' mathematics achievement and participation based solely on characteristics such as race, class, ethnicity, sex, beliefs and creeds, and proficiency in the dominant language
2. Erasure of the ability to predict among students the practice of mathematics to analyze, reason about, and especially critique knowledge and events in the world based solely on characteristics such as race, class, ethnicity, sex, beliefs and creeds, and proficiency in the dominant language
3. Erasure of inequities between people, mathematics, and the planet.

She then elaborated on related research of critical mathematics education, ethnomathematics, and social justice mathematics that showcases how to accomplish these stages through teacher practice.

Gutiérrez's (2002) research is foundational to intersectional equity and emphasized how to accomplish such equity through teacher instructional and curriculum practices. Although she never mentioned intersectionality directly or the compounding nature that different inequities can have on students, her work alludes to the necessary considerations of these multiple identities

and the compounding nature that they can have on student mathematical outcomes. Finally, by highlighting examples of curricular and instructional research for this critical mathematics, Gutiérrez noted the need for teacher practice as a critical component to the equity process.

As noted, Gutiérrez (2002) highlighted ways to accomplish these stages of equity by citing research related to critical mathematics education, ethnomathematics, and social justice mathematics. Specifically, the work of Frankenstein (1990), categorized as critical mathematics pedagogy, is used to deepen students understanding of critical societal issues. Frankenstein (1990) used data to change people's perceptions on societal structures that marginalize and minoritize oppressed people and groups. The work of Gutstein (2003) showed how, in a Latinx, urban school, dominant mathematics was reframed in social justice contexts. Using a teaching mathematics for social justice (TMfSJ) framework, Gutstein (2003) led his students to succeed not only by dominant mathematics measures but also led his students to succeed in critical mathematics. Both works are integral for Gutiérrez (2002), but also are important when considering how some critical mathematics educator practices have promoted equitable outcomes for traditionally marginalized and minoritized students. These critical pieces of research provide powerful ways of re-envisioning mathematics that promote equity of marginalized students while showing the empirical evidence of equity of marginalized students.

In addition to Gutstein's work with TMfSJ, Wager and Stinson's (2012) book compiled TMfSJ works of multiple critical mathematics educators. Wager and Stinson highlighted that within the many examples throughout their text there is one common theme: a belief in teaching mathematics about, with, and for social justice (p. 6). Their book is divided into five sections that encompass the need, history, and experiences with TMfSJ throughout recent history. The fourth

section of the book provides examples of TMfSJ within mathematics classrooms and includes the curriculum and instructional practices of four mathematics teachers that are described below.

Peterson (2012) described "mathematics across the curriculum" or cross-curricular mathematics in his elementary setting (p. 149). Stocker (2012) discussed a TMfSJ exploration where his middle-school students utilize mathematics to challenge domestic violence within Ontario, Canada. Wamsted (2012) provided lessons regarding teaching mathematics for social justice within the high school classroom. These lessons included descriptions of the shock of students disagreeing with teacher evaluations of injustices; the importance of people close to you disagreeing with your critical perspectives; unknowing peoples challenging your beliefs; a lack of excitement of students in relation to social justice; and "it is better to ask for forgiveness than permission" perspective (Wamsted, 2012, p. 183). Finally, Powell (2012) noted her experiences with teaching mathematics for social justice within her post-secondary context. Her chapter highlighted one of the projects she uses in her college classes regarding minimum wage in the United States, and she described smaller ways teachers can implement TMfSJ outside of major classroom projects. All these exemplars provide ways to use mathematics as a tool for equity of traditionally marginalized and minoritized students. Additionally, these exemplars provide a critical view of mathematics that highlights how mathematics can be used for transformation and social justice.

This TMfSJ critical view of equity is further elaborated on by Rousseau and Tate (2003) as they provided suggestions to promote equity in the classroom through teacher practice. Rousseau and Tate parallel aforementioned educators as they enacted a method of critical teacher reflection in one secondary mathematics department. Based on their results, which showed that the department viewed equity as equal treatment rather than equity in terms of outcomes or

results, there is a need for more research related to mathematics teacher reflection with respect to equity. Rousseau and Tate also developed a series of questions that serve as a beginning framework for educators to implement equity in school mathematics instructional practice. Although the framework and their research were solely from a race perspective, the responses to the questions of "Is the goal of equal treatment of students an appropriate standard to guide mathematics instruction?", "Is a color-blind perspective on classroom practice an appropriate view to guide mathematics instruction?", "How do students' linguistic, ethnic, racial, and socioeconomic background influence learning of mathematics?", and "What is the role of mathematics in society and why is this important for students of various cultural backgrounds?" can be employed in further research that takes on an intersectional perspective.

Gutiérrez (2009) further elaborated on the critical stance of mathematics equity by pointing to the need for teachers to embrace the tensions that are inherent within the process of practicing equity. She claimed that to work toward equity, mathematics educators need to accept the three forms of tension: (a) doing everything to know students but knowing students perhaps will never be known; (b) doing all in one's power to welcome students to participate but know that students' participation is up to them; and (c) teaching mathematics and teaching students and knowing that both are important and cannot be sacrificed for the other. The crux of her argument focuses on educators recognizing their position with respect to their students; such recognition is in direct agreement with the equity arguments of Rousseau and Tate (2003) as well as Boaler (1999, 2008, 2013, 2016), Freire (1978/2018), Gay (2002), and Ladson-Billings (1995).

Finally, Seda and Brown (2021) built upon all the previously cited scholars' understanding of equity from a critical stance. Within their book, they developed the equity framework for the mathematics classroom that they call ICUCARE:

- Include others as experts
- be Critically conscious
- Understand how relationships improve learning
- use Culturally relevant curricula
- Assess, activate, and build on prior knowledge
- Release control
- Expect more (pp. 15–16).

Seda and Brown provided explanation for each of the seven principles within their framework for equity in the mathematics classroom by elaborating on the hegemonic inequities that persist if teachers do not attend to ICUCARE. They also described how to enact each principle into mathematics classrooms through curriculum and instructional practices. Seda and Brown noted these suggestions are just some of the ways to counteract the inequities that exist in mathematics classrooms and encourage the use of other strategies that uphold ICUCARE. Despite their framework not explicitly taking an intersectional perspective, the numerous examples provided as well as the framework itself lend to being easily adapted to be intersectionally minded.

Intersectional Mathematics Education Related Literature

It is important to review some of the mathematics-related literature that highlights intersectionality. Bullock (2018) argued that intersectional analysis should be used by critical mathematics researchers as a mechanism to look at the ways marginalization occurs within mathematics education. Furthermore, Bullock argued that intersectionality would offer a way for critical mathematics education professionals to come together in a unified way whilst also abandoning the silos of oppression that critical mathematics educators typically analyze from.

Jones (2019) used intersectional analysis in her research regarding the ways undergraduate students of color navigate their experiences and negotiate their identities as science, technology, engineering, and mathematics (STEM) majors. Using critical discourse analysis and intersectional analysis, Jones uncovered ways that these students built new cultural models, built solidarity and agency, and resisted structures that negated their racial, ethnic, and cultural identities. Within her work, she claimed that further research should be done to understand how educational experiences throughout K–16 education shape the identities and experiences of students. Intersectionality as a form of critical praxis would allow mathematics educators to critically reflect on the ways that their curriculum and instruction has influenced student identity and contributed to and/or detracted from equity among traditionally marginalized and minoritized students. Furthermore, intersectionality as a form of critical praxis would allow for mathematics educators to institute intersectional frameworks into their curriculum and instruction to promote equity. Jones' implications regarding the need for further research highlight the need for mathematics education research that utilizes intersectionality as a form of critical praxis.

Hoard's (2017) dissertation also discussed the need to further her work with intersectional inquiry and praxis within educational contexts.[12] By utilizing a qualitative case study methodology where four diverse science teachers engaged with intersectional texts and critical science education literature, Hoard highlighted how the professional development book club led her participants to critically reflect on their own experiences in science classrooms as well as uncover the ways that sexism and racism worked together to create inequitable

[12] I would be remiss if I did not explicitly state the influence that Dr. Hoard's dissertation had on my work. Her rigorous, intelligent, thoughtful, and intentional study gave me numerous pieces of inspiration for my work. I am eternally grateful to see a similar study done in a different context before embarking on my dissertation.

experiences in their science classrooms. Ultimately, this realization resulted in her participants identifying "oppressive structures in the sciences and reported taking steps to dismantle these structures as they taught in the classroom" (Hoard, 2017, p. 141). Specifically, Hoard showed that the teachers indicated that they took steps to make classrooms more student-centered by instituting both culturally relevant curricula and re-centering lessons such that students provided their knowledge and expertise, not simply teachers. Hoard (2017) and Jones (2019) concur that further research is needed to be done at all levels of education to understand how interconnected oppressive structures like racism and sexism affect achievement, success, and opportunities of students within the sciences.

Leyva's (2016) work also demonstrates the need to examine educational practice of mathematics educators. Within his research, Leyva presented case studies about undergraduate mathematics experiences of both women and men of color. By intersectional analysis, he saw how students made meaning of their experiences and negotiated their success in mathematics in relation to the intersections of race and gender. He, like Jones (2019) and Hoard (2017), noted the importance and significance of K–12 teachers' practice in shaping the experiences of traditionally marginalized and minoritized students (Leyva, 2016).

Leyva and colleagues (2021a, 2021b) further contributed to the growing body of literature regarding intersectionality and mathematics education. Both studies explored how different aspects of undergraduate precalculus and calculus instruction are perceived as marginalizing or supportive among students across race and gender lines. Analysis through critical race and feminist perspectives (Leyva et al., 2021a) or frameworks to evaluate patriarchy and whiteness (Leyva et al., 2021b) were used. The results from both studies indicated the way that inequity is communicated and perpetuated in undergraduate mathematics courses via

racialized and gendered instructional mechanisms of limiting support and participation due to racial and gendered stereotypes as well as through the power dynamics of instructor's inherent authority related to knowledge of mathematics and influence on student academic achievement. In both studies, the research teams detailed the need for further work that investigates the critical reflection of instructional experiences that may influence minoritized and marginalized populations mathematics experiences. Similar to the other studies reviewed, these studies showed the need for mathematics education research that examines how intersectionality as a form of critical praxis promotes equity among all students, but particularly traditionally marginalized and minoritized students.

Closing Thoughts

As I have shown in this chapter, the U.S. education system, but particular mathematics education, has continuously upheld hegemonic perspectives of whiteness, patriarchy, Christianity, ableism, English-speaking, and/or nationalism, and this hegemony has too often resulted in those who are historically at the margins to not benefit from mathematics curriculum and instruction to the same level as those who are privileged. Although there have been important strides in the field to counteract this hegemony and pursue equity for these traditionally marginalized and minoritized populations, mathematics education literature has lacked necessary consideration of the compounding nature that multiple forms of dominance can have on students within mathematics education. In other words, there has been a lack of prior research where intersectionality has been used a form of critical inquiry.

Nevertheless, the literature reviewed here has shown a consistent call for equitable mathematics practice, teacher reflection upon curriculum and instructional practices, and instructional and curricular strategies to promote success of traditionally marginalized and

minoritized students. Furthermore, the limited literature highlighting intersectionality within mathematics contexts had definitive requests for research that employs intersectionality as both a form of critical inquiry and a form of critical praxis (Collins & Bilge, 2020). Indeed, there is a gap in existent literature: mathematics education research that addresses the need for intersectionality both as a form of critical inquiry and praxis. My research intended to address this gap.

CHAPTER 4: METHODOLOGY

As mentioned in chapter one, my qualitative case study investigated the ways that high school mathematics teachers' engagement with intersectionality as a method of critical inquiry and praxis via participation in a critical friends group book club influences (or not) their curriculum and instructional decisions. The research questions guiding this study were:

1. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do they negotiate the ideas of equity and intersectionality?
2. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do they perceive this influencing (or not) their curriculum and instructional praxis?

In this chapter, I describe the research design of my study, the context of my study, my researcher positionality, my methods of data collection, my methods of data analysis, and considerations regarding trustworthiness of my study.

Study Design

My guiding framework of intersectionality is embedded within all considerations of this study, and this included my study design. As noted by Esposito and Evans-Winters (2022), "qualitative inquiry typically encompasses an intentional contemplation of meaning making in the examination of human behavior and interactions across and within social contexts" (p. 6); intersectionality too is concerned with intentional identification of and examination of social structures and categorizations that influence people (Collins & Bilge, 2020; Cho et. al, 2013; Choo & Ferree, 2010). Therefore, my research necessitated a qualitative research design.

Furthermore, qualitative research is emergent in nature meaning that within the research process the design itself must be flexible and adaptable to what happens throughout the research process and with the participants in the research (Baxter & Jack, 2008; Creswell, 2009; Egbert & Sanden, 2019; Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021). As stated by Cho and colleagues (2013), intersectional methodologies conceive "categories not as distinct but as always permeated by other categories, fluid and changing, [and are] always in the process of creating and being created by the dynamics of power" (p. 795). Additionally, intersectional research is collaborative and responsive to participants because intersectional research is an opportunity to learn from and with those who are different in intersectional backgrounds (Esposito & Evans-Winters, 2022). Hence, qualitative methodologies were necessitated by intersectional considerations.

Case Study

My critical realist intersectional theoretical frame could have lent itself to numerous qualitative methodological strategies including critical ethnography, narrative inquiry, and autoethnography (Creswell, 2009; Egbert & Sanden, 2019; Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021). Nevertheless, due to my theoretical underpinnings, research questions, purpose of my study, and specific, bounded context, it was most appropriate for me to approach this research by conducting a case study. Case studies involve studying a specific and bounded context in depth by utilizing many data sources over a sustained period (Baxter & Jack, 2008; Esposito & Evans-Winters, 2022; Merriam, 1998; Stake, 1995; Yazan, 2015). According to Baxter and Jack (2008), case studies are an appropriate methodology when answering how or why questions; thus, because my research supports questions that were about how mathematics

teachers define equity and intersectionality and how they perceive or do not perceive intersectionality influencing their practice, case study was an appropriate choice.

Beyond this sound reasoning, case studies also are employed if researchers want a better understanding of a particular context by examining how the behaviors, relationships, policies, physical environments, and other people within the case influence participants (Esposito & Evans-Winters, 2022; Merriam, 1998; Stake, 1978, 1995; Yazan, 2015). Specifically, within this research, I pursued an instrumental, exploratory case study. Because I investigated the use of a CFG book club as a medium for intersectional inquiry and praxis, this case study would be considered exploratory (Baxter & Jack, 2008; Yazan, 2015). Furthermore, because this study may provide insight to the broader issue of marginalizing structures within mathematics education and the use of intersectionality and equity within mathematics education, this case study could be considered instrumental (Baxter & Jack, 2008; Yazan, 2015). Thus, this methodology was also supported by the purpose of my study.

Ultimately, case study methodology was aligned with my theoretical underpinnings, purpose, and research questions, but this methodology was also supported based on my context. The research I am conducting was bounded to the specific context of the high school mathematics department within Glenn-Aurand High School. The specified, bounded context not only was crucial when conducting research using the case study methodology but also designated the choice of this methodology (Baxter & Jack, 2008; Esposito & Evans-Winters, 2022; Merriam, 1998; Stake, 1978, 1995). Hence, a case study methodology was the most appropriate for my research.

Context of Study

The context of this study was important to consider when designing this intersectional project. Choosing literature intentionally for use in the book club as well as noting the complex setting where this project took place is essential for intersectional research. The following section details the literature that was read as well as the timeline for the book club, the field setting and participants, and my role as a researcher within this space.

Overview of Texts and Readings

Four texts were used throughout the book club: (1) chapters from *Pedagogy of the Oppressed* (Freire, 1970/2018), (2) the article *Inequity in Mathematics Education: Questions for Educators* (Weissglass, 2002), (3) chapters from *Intersectionality* (Collins & Bilge, 2020), and (4) the entirety of *Choosing to See: A Framework for Equity in the Math Classroom* (Seda & Brown, 2021). From the first text, *Pedagogy of the Oppressed* (Freire, 1970/2018), chapters 1 and 2 were read to introduce participants to the concepts of critical pedagogy, critical praxis, and the banking concept of education. Additionally, *Pedagogy of the Oppressed* has natural intersectional and educational links; thus, it was additive to the discussion related to intersectionality.

The second text, *Inequity in Mathematics Education: Questions for Educators* (Weissglass, 2002), is an article that poses important questions related to inequities and sociopolitical realities as well as categorizations such as race, class, gender, and others that influence the complexities within mathematics classrooms. This text allowed participants to consider how critical praxis interacts with sociopolitical factors and hegemonizing structures that influence mathematics education. Furthermore, this article provided a more focused view of

critical praxis within the field of mathematics education and helped connect critical pedagogy and praxis to this idea of complex structures intersecting (i.e., intersectionality).

Within the third reading *Intersectionality* (Collins & Bilge, 2020), the participants read chapters 1, 2, and 7. Chapter 1 introduces intersectionality, which provided participants with an overview of the terminology and theory of intersectionality. Chapter 2 dives deeper into the nuances of intersectionality and specifically distinguishes between intersectional inquiry and intersectional praxis; thus, this second chapter helped participants locate the differences between inquiry and praxis when considering intersectionality. Chapter 7 details intersectionality within educational contexts. This chapter notes the contributions of numerous critical educators, but it particularly highlights the contributions of Freire (1970/2018). By reading this chapter, participants had the opportunity to see how intersectionality has been used in educational contexts, and this chapter yielded discussion about intersectionality in their personal educational contexts.

Finally, the entirety of Seda and Brown's (2021) *Choosing to See: A Framework for Equity in the Math Classroom* was used. This book provides a framework for equity for mathematics classrooms, which the authors call ICUCARE.[13] Within the text, Dr. Seda and Dr. Brown (2021) provide explanation for each principle within ICUCARE and discuss how inequities continue when educators do not attend to ICUCARE. The book also offers practical

[13] As a reminder, ICUCARE is an acronym to describe the equity framework of *Choosing to See.* The acronym stands for the following:

- Include others as experts
- be Critically conscious
- Understand how relationships improve learning
- use Culturally relevant curricula
- Assess, activate, and build on prior knowledge
- Release control
- Expect more (Seda & Brown, 2021, pp. 15–16).

and tangible guidance for implementation of this framework, curricular and instructional strategies to promote each aspect of the framework, and relatable scenarios found within the mathematics classroom where ICUCARE can be instituted (Seda & Brown, 2021). By interacting with this text, participants had the opportunity to see how to carry out equitable practices in their classrooms. Furthermore, participants had opportunities to engage in critical and reflective discussion related to their own practice after considering the equity framework presented in *Choosing to See*. Finally, by combining this text with the others within the CFG book club, participants began to develop a critical and intersectional approach to equity issues within their own classrooms.

The entire research study took place over a total of 15 weeks and included a variety of activities that included an introductory questionnaire, individual reading, group discussions, individual reflections, and individual exit interviews. Prior to the book club discussions convening, participants and I got together to discuss the reading schedule, expectations related to interviews and reflections, and a convenient and consistent time to meet. Following this initial planning meeting, participants were given a week to complete an introductory questionnaire. Participants and I then came together eight times over the course of ten weeks to discuss the selected texts. Following our eight book club meetings, participants had individual follow-up exit interviews that were scheduled within 3 weeks of the book club ending. Throughout this 15-week period, participants were encouraged to bring any curriculum documents that they believe showed a shift in their instruction or curriculum due to engagement in the book club. Table 2 presents an overview of the book club timeline as well as activities.

Table 2

Overview of CFG Book Club Timeline

Week Number	Book Club Meeting Number	Readings	Activity	Participant Time Required
1	n/a	n/a	Planning Meeting	30 minutes
2	n/a	n/a	Introductory Questionnaire	30 minutes–1 hour
3	1	Chapters 1 & 2 *Pedagogy of the Oppressed*	Establishing Group Norms Reading Reflection	2–3 hours
4	2	Weissglass Article and Chapter 1 of *Intersectionality*	Reading Reflections; Participants may bring Documents	2–3 hours
5	3	Chapter 2 of *Intersectionality*	Reading Reflections; Participants may bring Documents	2–3 hours
6	4	Chapter 7 of *Intersectionality*	Reading Reflections; Participants may bring Documents	2–3 hours
7	n/a	n/a	None: School Break	0 hours
8	5	Preface, Introduction, & Chapter 1 of *Choosing to See*	Reading Reflections; Participants may bring Documents	2–3 hours
9	6	Chapters 2 & 3 of *Choosing to See*	Reading Reflections; Participants may bring Documents	2–3 hours

Week Number	Book Club Meeting Number	Readings	Activity	Participant Time Required
10	7	Chapters 4 & 5 of *Choosing to See*	Reading Reflections; Participants may bring Documents	2–3 hours
11	n/a	n/a	None: Each participant could not attend	0 hours
12	8	Chapters 6, 7, & Conclusion of *Choosing to See*	Final Reflection; Participants may bring Documents	2–3 hours
13	n/a	n/a	Charles' and Mitchell's Exit Interviews; Participants may bring Documents	45 minutes–1 hour (each)
14	n/a	n/a	None: School Break	0 hours
15	n/a	n/a	Windy's and Helene's Exit Interviews; Participants may bring Documents	45 minutes–1 hour (each)
Totals		n/a	n/a	17 hours and 45 minutes–26 hours and 30 minutes

Field Setting

This study took place within the single mathematics department within Glenn-Aurand High School. As a member of this department, I have seen and experienced the micro- and macro-political realities that might shape the sociopolitical environment of the book club. Furthermore, I have participated in, constructed, and reflected upon endeavors that have contributed to equity in this high school. To begin, it is important to note the equity centered occurrences within the setting. First, the school district leadership team and community encourage equity initiatives that support paying back educational debts and closing opportunity gaps that exist within our school system (Ladson-Billings, 2006; Love, 2019). Furthermore, within the school system, educators have participated in professional development sessions devoted to addressing racism within both the immediate community and in the larger macropolitical contexts as well. Specifically, there has been mandatory training regarding talking about race and developing anti-racist pedagogy. Additionally, at different school sites across the district, there has been targeted anti-racist professional development for each primary and secondary school context. At the high school, myself and others have formerly developed book clubs, podcast clubs, and movie/television watch clubs where faculty discuss different equity oriented subject matters. These activities not only highlight the familiarity with equity professional development but also highlight the support from the participants of the study. Thus, participants did not need preparation or motivation to enter into this study.

In contrast, it is equally as important to detail the discouraging aspects of this field setting. During the time that I have been a faculty member at GAHS, educators have seen perpetuations of systematic injustices through neoliberal regimes of high stakes testing and academic tracking within mathematics and other academic classrooms. Furthermore, there has

often been notable and documented resistance to equity professional developments by the majority White faculty. Moreover, within the school community there has been overt hegemonic occurrences that have shaped the community. Some of these overt occurrences include racist videos circulating throughout the community where former and current White students have used racist and xenophobic epithets toward people of color, memorial statues of the confederacy recently existing within the local community, and gentrification of the physical and social community that has resulted in working class, Black, and immigrant families to be overtaken and pushed out by White, middle- and upper-class families. Additionally, one month prior to the study beginning, a White male staff member within a different academic department at GAHS uttered a racial epithet while teaching in his classroom. All, of these occurrences, but particularly the last one mentioned have caused there to be tensions induced in our community due to these hegemonic acts. Hence, when constructing this study, all these complex factors were taken into consideration as the participants themselves have been shaped by these socio-cultural and -political contexts.

Finally, as the study is dealing with the more focused context of high school mathematics teachers engaging in a CFG book club, I needed to discuss the professional development participants formerly experienced that were related to book clubs. When faculty formerly engaged with book club professional development opportunities, there was varied engagement across faculty, but for most, outcomes of the book clubs “fell flat”. This undesired outcome, I believe, is due to a few reasons. First, these book clubs were done as disjointed efforts where consistent and continuous engagement did not occur. Second, many faculty members remarked how the book club offerings were not related to their specific fields of practice but rather took a general macropolitical lens or a general educational lens rather than one that was focused of their

field of interest (e.g., administration, counseling, leadership, literacy education, mathematics education, social studies education, etc.). Finally, the book club discussions, as well as other equity initiatives, were focused from the single axis of racial equity without discussions of intersectionality. This lack of intersectionality, I believe, is problematic twofold. First, by not highlighting the different marginalizations that play into inequities, the limited single-faceted experiences of inequity are underscored. Additionally, by not considering how multifaceted categorizations place people in power in some contexts versus in oppression in others (Bullock, 2018; Cho et al., 2013; Choo & Ferree, 2010; Collins & Bilge, 2020; Crenshaw, 1989, 1991), faculty of color always were most often marginalized within these professional developments. Because of this unintended marginalization, many faculty members of color noted the burden they felt as they were pressured to "speak up" in these professional development spaces. Moreover, many mentioned feeling as though they were placed in a harmful and vulnerable situation because they were compelled to share their experiences without hearing the experiences from others. These unintended contexts have shaped the study and were important considerations as the study emerged.

Sampling Methods and Participants

Participation in this research study was open to all mathematics teachers and special education mathematics teachers within the high school mathematics department at Glenn-Aurand High School. Ultimately, four mathematics teachers were selected using convenience and purposeful sampling (Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021; Roulston, 2010). The process of convenience sampling entails selecting participants who are easily accessible to the researcher (Esposito & Evans-Winters, 2022; Roulston, 2010). As a member of the

mathematics department for the last 5 years, I had easy access to the mathematics teachers, having developed collegial professional and personal relationships with many.

In addition to convenience sampling, I used purposeful sampling. As noted by scholars, most qualitative researchers make deliberate selections in inviting participants into their studies due to the participants meeting specific criteria—this is known as purposeful sampling (Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021; Roulston, 2010). Because this case study aimed to investigate how participants' engagement with intersectionality through participation in a CFG book club affects (or not) their curriculum and instructional decisions, it was important to invite participants (a) who are willing to engage with issues of equity within mathematics education contexts, (b) who not only teach mathematics but also teach a diverse set of students across categories of race, gender, sexual orientation, ability, nationality, and other categories, and (c) who not only teach but themselves represent the diversity of faculty across categories of race, gender, sexual orientation, ability, nationality, and other categories in the department.

Commitment and Recruitment

Following receiving Institutional Review Board approval both from my university and school district, the high school mathematics teachers and high school special education mathematics teachers at Glenn-Aurand High School were recruited in this study utilizing two methods. Two months prior to the study beginning, the potential participants were recruited via an announcement during a mathematics department meeting at the high school. Then immediately following this meeting, I sent a follow-up email to all potential participants. A copy of the recruitment email can be seen in Appendix A.

Within this study, each of my four participants had an approximate 26 hour and 30-minute time commitment for the duration of the study. Participation entailed attending a 30-

minute planning meeting to discuss overall expectations as well as a consistent time to meet for book club, the completion of an introductory questionnaire that took 1 hour time, 2 hours weekly for reading and reflections (this lasted for 8 weeks), 1 hour weekly for book club meetings (this lasted for 8 weeks), and 1 hour for an individual exit interview. This added up to a total of 26 hours and 30-minutes in total. Table 2 presents an overview of the book club timeline, time commitment, and activities.

Overview of Participants

Utilizing the recruitment methods detailed, all twenty members of the Glenn-Aurand High School mathematics department were invited to participate. Ultimately four participants, Charles, Helene, Mitchell, and Windy, joined this CFG book club. To highlight the intersectional identities and experiences of the four participants, Table 3 presents an overview of the four participants.[14]

In terms of participant identity, two identified as female and two identified as male and all participants considered themselves cis-gendered. Three participants identified as middle class and one identified as upper middle class. One participant was between the ages of 20 to 29, two participants were between the ages of 40 to 49, and one participant was between the ages of 60 to 69. Two participants identified as heterosexual, one participant identified as homosexual, and one participant identified as bisexual. All but one of the participants identified themselves racially and culturally as White, but one participant viewed themselves culturally as Indigenous and Italian.[15]

---

[14] Please note that the participants are reported as a group to intentionally conceal identities. This was done to uphold ethical considerations and protect the four participants within this study.

[15] Within both the introductory questionnaire as well as the exit interview this participant identified themselves racially as human. In accordance with honoring this stance of this participant, I am representing them solely culturally.

In addition to these identifiers, participants had an array of educational learning experiences. Despite all participants being certified mathematics or special education mathematics teachers, the route to become a mathematics educator was different for all participants. Only one teacher had a bachelor's and master's degree in mathematics or mathematics education. One member teacher had a bachelor's and master's degree in special education.[16] Two members had bachelor's and master's degrees in non-education and non-STEM majors.[17] Finally, of these four participants, one held a Specialist degree in Instructional Technology.

As teachers, the participants also had a variety of experiences in classrooms. Currently, two participants are classified as general mathematics educators and two are classified as special educators. Additionally, all four participants teach two mathematics courses. These mathematics courses are either categorized as a college preparatory[18] or a college level[19] course. All four participants teach at least one college preparatory course, and two of the participants teach a college level course.

[16] This degree includes the majors of Collaborative Special Education as well as Severe Disabilities.

[17] These majors included English, History, Political Science, American Studies, Environmental Design and Ecology, and Urban Planning.

[18] In this study, college preparatory courses are prerequisite courses to college level mathematics classes. Examples of college preparatory courses include Algebra I, Geometry, Algebra II, and Advanced Mathematical Decision Making (AMDM).

[19] In this study, college level courses are courses that are equivalent college level mathematics courses and can have the ability to earn college credit. Examples of college level courses include Advanced Placement (AP) Calculus AB, AP Calculus BC, AP Statistics, International Baccalaureate (IB) Analysis and Approaches, or IB Applications and Interpretations.

Table 3

Participant Overview

Identifier/Categorization	Number of Participants
Gender Identity	
Female	2
Male	2
Class Identity	
Middle Class	3
Upper Middle Class	1
Age	
20 to 29	1
40 to 49	2
60 to 69	1
Racial/Cultural Identity	
White	3
Two or More Cultural Identities	1
Sexual Orientation	
Homosexual	1
Bisexual	1
Heterosexual	2
Bachelor's Degree	
Mathematics/Mathematics Education	1
Special Education	1
Non-Education and Non-STEM	2
Master's Degree	
Mathematics/Mathematics Education	1
Special Education	1
Non-Education and Non-STEM	2
Specialist Degree	
Instructional Technology	1
Mathematics Course Teaching	
College Preparatory	4
College Level	2
Educator Status	
Special Educator	2
General Educator	2

As stated, the diversity of participants' intersectional identities and experiences was not only intentional but also necessary to this study. However, to authentically represent the study, it is important to highlight that initially five mathematics teachers at GAHS requested to join the

book club. One mathematics teacher who requested to join ultimately dropped out due to the racial slur uttered by the aforementioned White male staff member. In a personal conversation, this colleague, who is a member of a traditionally marginalized population, said they did not feel safe and comfortable talking about the critical topics in the book club. This colleague stated that they trusted me as a colleague, researcher, and friend and stated that they had no personal grievances with other members of the book club. Nevertheless, this mathematics teacher had a feeling of betrayal and mistrust because of the external department colleague who uttered the racial slur. Therefore, this mathematics teacher did not want to risk the feeling of betrayal, discomfort, and mistrust happening again. I as the researcher of this study, dear friend to this teacher, and fellow colleague completely understood. Additionally, one participant, Helene, had to step back from the study starting after week 6 due to outside commitments, and this inevitably influenced the book club. Despite these realities, all participants involved in the book club were imperative to this study, but it is as important to note how I influenced this study.

Role of Researcher

Beyond the participants and setting, it is important to address how I as the researcher have influenced this study. By taking the time to detail my role in this study, I will provide greater context into how my professional and educational experiences influenced this study formation. Furthermore, in this section I reflect on and describe how my personal positionality and subjectivities have influenced the research process in an effort to uphold ethical considerations (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012).

Influence of Professional Teaching Career

I am a White, female, young, English-speaking, cis-gendered, heterosexual, able-bodied, upper-middle-class, mathematics educator. Despite neither of my parents having beyond an associate's degree, both my mother and father instilled into myself and my sister the value of education, sacrifice, and hard work to attain goals and to better the world. These values from my parents ultimately translated into me pursuing and finishing three degrees, two bachelor's degrees and one master's degree,[20] in my first four years of post-secondary education. Following this, I become a full-time mathematics teacher at Glenn-Aurand High School. During my first three years teaching, and in the three years since then, I have devoted myself to a pursuit of equity and social justice inside my mathematics classroom and within general education spaces. Within my personal classroom, I have collaboratively developed, instructed, and presented on equity-oriented and socially just curricular and instructional strategies for a demographically diverse group of students in the college preparatory courses of Algebra I and Algebra II and in the college level courses of International Baccalaureate Analysis and Approaches, Accelerated Precalculus, and Calculus.

Outside of my classroom, I have served on multiple school and district committees dedicated to addressing some of the many opportunity gaps within education. Specifically, I was a part of the GAHS equity team from the 2017/18 school year to the 2021/22 school year. On this equity team, we developed numerous professional developments related to addressing inequities within our school. One of these professional developments was equity book clubs, podcast clubs, and movie/television watch clubs where faculty discussed different equity-oriented subject matters. When helping develop the choices for these clubs, I found myself

[20] I earned a B.S. in Mathematics, a B.S.Ed. in Mathematics Education, and an M.Ed. in Mathematics Education.

excited about the opportunity to talk critically with colleagues about pursuits for equity rather than simply presenting to them about pursuits for equity. Additionally, as I participated in these clubs, I consistently felt the desire of wanting to learn more through these focus texts, audios, or audiovisuals. However, when I received feedback from staff regarding these clubs, I received feedback that despite liking the concept of these clubs, they were not focused on individual academic curricula and were not consistent enough to be very beneficial to teachers. Likewise, staff particularly critiqued most equity professional developments for their lack of curricular focus and consistency.

Ultimately, this experience of developing, implementing, participating, and reflecting on book clubs has influenced this study for multiple reasons. First, I was able to see and feel what it was like to learn with book club members and engage in critical reflection on our teaching practice, and this experience influenced the choice of pursuing a critical friends book club as the context of this study. Second, I learned valuable lessons of focusing to specific curricular content (mathematics in the case of this study) and meeting consistently, and these have influenced the book choices and the sampling of participants in this study.

Influence of Educational Experience

In addition to my professional career influencing this study, my educational experience within my doctoral program has deeply influenced this study. Entering my doctoral program as a third-year mathematics teacher, I had only truly experienced critically viewing education in terms of a single-perspective or, at best, a parallel perspective. Some of these perspectives included viewing students, teachers, curricula, or instruction through the individual or parallel lenses of race, gender, academic ability/experience, socioeconomic status, or past education perspective. However, when I entered my doctoral program, I knew that these single and/or

parallel perspectives were not representative of the complexity of the system of education generally or mathematics education specifically. Furthermore, I knew that viewing the complex lives of students and teachers from a single or parallel perspective without accounting for how these perspectives interact within the complex sociopolitical space of education was harmful and inaccurate. Therefore, I wanted to learn ways to name, account for, and respond to the complex realities of education. This desire to learn lead me to reading and reflecting. Within that reading and reflection I was led to Bettina Love (2019) who stated so perfectly that,

> Theory is my North Star: it is a steadfast tool to explain without fluff or gimmicks what I am experiencing first as a human being…Theory helps explain and examine our reality and our students' realities. The context (i.e., their block, neighborhood, community, city) in which students learn in 2019 is not the world they created or chose... Theory is a "location for healing," like the North Star. Theory does not solve issues—only action and solidarity can do that—but theory gives you language to fight, knowledge to stand on, and a humbling reality of what intersectional social justice is up against. (p. 132)

I read these profound words from Dr. Love my first semester of my doctoral program, and they put me on a pursuit of my "North Star". In that pursuit, I read texts from critical theorists and found my "North Star" in intersectionality theory. Specifically, Collins and Bilge's (2020) definition of intersectionality has served as my guide throughout this study. This guiding theory was then enhanced when I read Paulo Freire (1907/2018) and saw how his critical praxis is how I approach my teaching. Furthermore, this pursuit of knowledge lead me to read critical mathematics texts from Gutiérrez (2002, 2009), Gutstein (2003), Stinson (2004), Boaler (1999, 2008, 2016), Seda and Brown (2021), and Weissglass (2002). These critical mathematics educators, and many others, allowed me to reimagine equity pursuits in mathematics education

as opportunities to rehumanize our subject. Additionally, through critical reflection and action with colleagues, mentors, and classmates I began creating new possibilities for students to belong and succeed in my own mathematics classrooms.

Hence, my education and the learning through reading critical texts, finding theory, finding scholars who affirm and inspire my practice, and reflecting and acting with colleagues, mentors, and classmates have influenced this study tremendously. First, intersectionality is how I come to this work, and it is the theory I have considered in all aspects of my study. Second, through the process of reading critical scholars and the subsequent action of reflecting and acting with others, I have seen the benefit of literature serving as a medium for and precursor to equity in mathematics. Thus, I knew when pursuing this research, I wanted the opportunity to engage with critical texts related to mathematics education, equity, and intersectionality. Additionally, I knew when pursuing this research, I wanted the opportunity for mathematics teachers to discuss critically together. Therefore, the ultimate choice of as CFG book club with the four texts of Freire (1970/2018), Weissglass (2002), Collins and Bilge (2020), and Seda and Brown (2021) were influenced by my educational experiences.

Influence of Positionality

Beyond the influence of my professional and career experience, I know as a researcher, I must also detail how my positionality influenced this study. I am a White, female, young, English-speaking, cis-gendered, heterosexual, able-bodied, upper-middle-class, mathematics educator. After finishing my bachelor's degrees (Mathematics Education and Mathematics) and master's degree (Mathematics education), I entered the teaching profession eager to help all students feel as though they belong and are capable in the mathematics classroom. Following three years of teaching both college preparatory courses and college level mathematics courses, I

decided to pursue a Doctor of Education in Curriculum and Instruction concentrating in mathematics education at Georgia State University. Coming into my doctoral program, I was wanting to figure out how to extend my pursuit of all students belonging and having capability in mathematics classrooms beyond my own mathematics classroom.

Through my professional experiences that led me to my doctoral program, I found a way to reimagine equity and I found intersectionality theory. Both this reimagined equity and intersectionality have influenced the choices of this study, but for me personally, this reimagination of equity and intersectionality prove to be imperative in how I view my mathematics classroom and world. I believe that it is necessary that intersectional inquiry and praxis is applied throughout mathematics and general education, as well as many other systems, because without it we are not honoring the complexity of experiences. Furthermore, I believe that to achieve equity in mathematics and general education, as well as many other places, we must rehumanize our practices because if not we will not set every student, teacher, or person up for success. However, I recognize that not all people, including the participants may view, intersectionality and equity, with the same regard or with the same definition as I do. Thus, I acknowledge my bias with seeing the benefits of intersectional perspectives and equity in mathematics and know that my perspective on both did influence how I approached this work.

On top of this, as a researcher, I must also consider how my relationships affects the participants. As mentioned, I am a current member of the GAHS mathematics department and have been a member of this mathematics department since 2017/18. This has provided me a direct personal connection with the participants. Roulston (2010) claimed that researching those who you have personal connections with tends to mean that there already exists a level of rapport. As a member of this department, I have created collegial relationships and lifelong

friendships with my colleagues. Amongst all 20 members of the GAHS mathematics department, there is both a mutual respect, appreciation, and lauding of our capabilities as content specialists and pedagogues. Furthermore, with the four participants in my study, I have had the honor of collaborating and co-planning different mathematics courses with each participant throughout the six years I have been in the GAHS mathematics department. Even prior to this study, each of these participants have challenged me to be a better educator and person through our critical friendships. Despite these amazing relationships, I acknowledge this may have influenced participants' responses and engagement to be biased in favor of my beliefs to support me.

In contrast, Roulston (2010) also argued that researchers must also consider the negative implication of prior relationships. She stated that there may be topics of discussion that are difficult to discuss, and there may be ethical issues related to study data and preserving anonymity of both participants and those mentioned. Throughout this study, I consistently was aware of how data may identify participants as well as the critical nature of our conversations. Thus, to ensure protection of identifying data, I made the decision to hold a short planning meeting prior to the book club beginning (see Table 2) to discuss a meeting time and place for the book club. This decision for a planning meeting was done to ensure that participants felt safe having critical discussions in our meeting location. Moreover, throughout the book club when we met in our meeting location (my personal classroom at GAHS), I made sure to wait to start our meeting after hallways were cleared. Also, I made sure to shut my classroom door, so conversations were not heard within the hallway outside my classroom. Finally, I always paused conversation whenever someone outside the book club entered the room. Additionally, pseudonyms were used for all proper names throughout the study to protect the identity of my research participants.

To prepare for the critical conversations that were inevitable in the book club, I made sure to reserve time in our first book club meeting for participants to create group norms[21] on how to proceed with conversation in the book club. Additionally, each week when we met to discuss a text (see Table 2), I asked participants if they had any norms they wanted to add to our list.[22] By collectively establishing these norms, it was my intention to foster an inclusive environment and a differentiated learning environment according to the participants' needs (Merriam & Bierema, 2015). Additionally, throughout the book club I was both taking field notes and I intently listened to the participants as they discussed the readings and their experiences. Thus, when these critical conversations led to a disagreement with participants, I interjected the discussion stating a need for clarification in my field notes but really this was a tactic to clarify disagreements as merely approaching curricular and instructional issues in different ways.[23]

Furthermore, throughout the book club process, as we discussed these sometimes difficult and uncomfortable conversations, I brought my own experience and insights related to our readings and the conversations that ensued to show my humanity in these conversations. As a White, female, young, English-speaking, cis-gendered, heterosexual, able-bodied, upper-middle-class, mathematics educator, I am consistently reflecting on my intersectional identities as researcher and practitioner. As a person who is a member of the majority teaching force in the United States (Au, 2007/2017; Love, 2019), I recognize that my experience as a teacher is

---

[21] The two norms created were (a) listen generously and (b) what is said here stays here

[22] Note, no extra norms were created besides the two established in our first meeting.

[23] As an example, I would say, "I want to make sure I am hearing you both correctly and recording this correctly for my field notes. Participant A is saying _____, and Participant B be is saying _____. This sounds to me like Participant A you are approaching this issue in this X Way whereas Participant B you are approaching this issue in this Y Way. Does this seem correct?"

consistently reflected throughout classroom experiences, curriculum, instruction, and even in education research. Additionally, I acknowledge that I too have had moments where I have imposed White, English-speaking, able-bodied, upper-middle-class, heteronormative, and cis-gendered perspectives within my own educational contexts and have upheld inequitable practices. In contrast to these experiences, as a young woman in mathematics education spaces, I have had experiences where my stories, experiences, insights, and opinions, were subjected to ridicule, minimized, and disregarded because I am/was a young woman within the hegemonic field of mathematics education. Intersectionality allows me to recognize and respond to how I occupy both spaces as the oppressor and the oppressed (Bullock, 2018; Cho et al., 2013; Choo & Ferree, 2010; Collins & Bilge, 2020; Crenshaw, 1989, 1991), and intersectionality affords me a means to counteract the hegemony that I have benefitted from and may succumb to due to my own biases. When appropriate, I brought my intersectional perspective on my experiences forward. This was intended to hopefully balance some of the dynamics of power that are inevitable with being both the book club facilitator and project researcher (Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021). By reflecting on my intersectional positioning here and throughout my study, I have hopefully minimized the inevitable biases that will be forever present throughout the study.

Methods of Data Collection

Within this study, I used a variety of data collection methods that occurred both during and following the book club meetings. The primary methods I used were book club discussions that functioned as participant observations and individual semi-structured exit interviews (Creswell, 2009; DeWalt & DeWalt, 2010; Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021; Roulston, 2010; Vogt et al., 2012). Supplemental methods of data collection that I used

were reading reflections that functioned similarly to semi-structured interviews, questionnaires, and documents (Bowen, 2009; Esposito & Evans-Winters, 2022; Miller & Alvarado, 2005; Prior, 2003; Ravitch & Carl, 2021; Vogt et al., 2012). Each method of data collection, in turn, is discussed below.

Questionnaires

At the beginning of the book club, participants responded to a questionnaire that I have designed (see Appendix C). This questionnaire was conducted via a privately shared Google form where I was the only one who could access the data. This data was stored on a private Google drive that is password protected.

I used the introductory questionnaire to gain background information of participants. Particularly, in this introductory questionnaire, I asked for participants personal and educational background, experience teaching mathematics, and five terms that they believe describe their identities. Participants self-ranked these terms as most influential to least influential (1 to 5) to them. This background provided me with more specifics to who the participants were coming into this study. Furthermore, the five terms, which they self-selected and ranked, were utilized at the end of the study within their exit interview. Specifically, within this exit interview, I reminded participants of their self-selected terms and the initial rankings, and I asked participants if they would like to change any of their self-selected terms and/or if they would like to change their rankings. This supplemental data helped showcase how participants' mindsets shift (or do not shift) throughout this study (Hoard, 2017). Ultimately, this introductory questionnaire took participants up to one hour to complete.

Book Club Discussions and Field Notes

During the 15-week period of the book club, reading discussions served as a primary data source. Each week participants read one or more texts (see Table 2), and we met as a group after school hours for one hour within my classroom at GAHS. Most weeks we had at least one participant missing due to their various commitments as partners, parents, coaches, teacher leaders, case managers and others. However, within these meetings, present participants discussed their thoughts, feelings, insights, and actions during and following reading these texts. Prompts were provided to participants to generate discussion as during our meetings. These prompts were projected at the front of my classroom where all participants could easily read them. A copy of these prompts is provided in Appendix E. These book club discussions were a form of participant observation, which is a method where the researcher takes part in the activities and events of a group of participants to learn more about their tacit and explicit culture (DeWalt & DeWalt, 2010; Vogt et al., 2012).

During each book club discussion, I read through the book club discussion data by first taking notes in a written notebook on the occurrences within these discussions (DeWalt & DeWalt, 2010). Immediately following each book club meeting, I sat down and thought through my data from each book club meeting by adding to my fieldnotes through audio recordings of my initial thoughts and feelings following each meeting as well as audibly expanding on the occurrences within each meeting (DeWalt & DeWalt, 2010). I then uploaded these audio recordings and transcribed them utilizing a password-protected transcription software (Otter.ai, 2023). Following the transcription process, I wrote through my data from the book club meeting by combining my written notes and personal transcribed reflection into weekly expanded field note summary documents (DeWalt & DeWalt, 2010). These weekly expanded field note

summary documents were then coded according to criteria that were informed by my study's purpose and research questions. Ultimately, following the coding process, these coded summary documents, original summary documents, audio files, and written field notes were all either scanned in or uploaded to this private password-protected Google drive.

Reading/Discussion Reflections

Additionally, every week participants were encouraged to respond to a reading/discussion reflection. Rather than doing traditional written reflections, however, participants were offered the option to respond to reflections through a private Flipgrid that was shared among book club members. Flipgrid is an educational applet that has users record short videos (less than five minutes) of themselves in response to a prompt. Because the Flipgrid was private, this meant that I as the facilitator was the only person able to see a participant's response and participants could see their own responses, but fellow participants could not see the responses of fellow participants. This decision to use a private Flipgrid was made to respect participants busy teaching schedules. However, participants preferred written reflections.

Despite the mode of reflection, each weekly reflection related to the reading and/or discussion of each book club meeting. To generate thoughts for participants, I offered participants prompts to respond to in their reflections (Appendix F). However, most participants opted to respond to the weekly readings and discussions in their reflections with their own thoughts, feelings, and questions that were not necessarily tied to the prompts. Although I had intended each reflection prompt to be the subject of participant reflections, I decided it was more authentic to participants to have them respond to either the prompt or generate their own reflection independent of the weekly prompt. Furthermore, due to their various commitments, some participants were unable to engage in reflections weekly. Because these reflections were

intended to be in response to a reflection prompt (Appendix F), but eventually resulted in open responses related to weekly readings, this reflection data functioned more similarly to an individual semi-structured interview (Roulston, 2010; Vogt et al., 2012).

Throughout the study, these reflection data were either transcribed and coded, if they were videos, or just simply coded, if they were written, according to criteria that are informed by my study's purpose and research questions. The transcriptions, written reflections, and coded data were then transferred to this private password-protected Google drive. These reflection transcriptions and coded data were then stored as separate files under an individual folder for each participant.

Interviews

Following book club meetings, participants had an individual follow-up exit interview that was scheduled within three weeks of the book club ending. I conducted individual 45- to 60-minute, semi-structured exit interviews. All exit interviews took place via Google meets. These individual exit interviews took place over a privately shared link and were recorded. These exit interview recordings are stored on the same private Google drive that is password protected. These exit interview transcriptions and recordings were stored as separate files under an individual folder for each participant.

Following completion of the exit interviews, the audio of each exit interview was transcribed using a password-protected transcription software (Otter.ai, 2023). I then downloaded these transcriptions and simultaneously listened and revised the transcriptions to ensure their accuracy. These revised transcriptions were then coded according to criteria that are informed by my study's purpose and research questions.

In these interviews, I instituted a semi-structured interviewing (see Appendix D) process to facilitate data emerging in a co-constructive way, to motivate a "natural flow" of conversation, and to permit flexibility within the interviews while also having a guide to cover the most important questions (Creswell, 2009; Esposito & Evans-Winters, 2022; Ravitch & Carl, 2021; Roulston, 2010). These individual interviews provided insights to the participants' experiences, opinions, and beliefs while participating in the CFG book club. As previously mentioned, during the exit interviews, participants were reminded of their self-selected and -ranked terms, and participants were asked if they would like to change any of their selected terms or if they would like to change their rankings. Participants were also encouraged to bring or detail any documents that they felt were influenced by the book club.

Documents

Finally, throughout the study, but particularly during the exit interview, participants were encouraged to bring in any curriculum, instructional, or assessment documents or materials that they feel have been influenced by the book club. These documents provided data as to how participants' praxis shifted or was affirmed by interacting with intersectionality within the CFG book club (Bowen, 2009; Miller & Alvarado, 2005; Prior, 2003). When these documents were presented throughout the study, they were coded according to criteria that are informed by the purpose and research questions of the project. Additionally, this document data that participants shared was uploaded as a pdf to the same private password protected Google drive. The data was stored as separate files under an individual folder for each participant.

Data Analysis

I have outlined some of the overarching aspects of my research design and have spoken to a few elements of data analysis. Here, I detail more in depth my decisions regarding my data

analysis methods and how I executed my chosen analysis methods. By combining the methods of inductive qualitative content analysis (Kohlbacher, 2006; Mayring, 2000; Mostyn, 1985) and analysis of narrative (Clandinin et al., 2009; Connelly & Clandinin, 1990; Connolly, 2007; Keats, 2009; Polkinghorne, 1995), I analyzed and synthesized across my varied data collection methods while uncovering the experiences of the participants.

Content Analysis

Content analysis is analyzing multiple forms of text and communication methods to form data (Mayring, 2000; Mostyn, 1985). Emerging from quantitative content analysis, qualitative content analysis is "empirical, methodological controlled analysis of texts within their context of communication, following content analytical rules and step by step models, without rash quantification" (Mayring, 2000, para. 5). Qualitative content analysis is concerned with identifying specific regularities and irregularities across these different types of communication through words, themes, or concepts to setup categories that will be continuously reformulated throughout the analysis process. In contrast, quantitative content analysis is a methodological analytical approach where quantitative measures are used within content analysis. Because both quantitative and qualitative content analysis can be applied to a variety of communication texts and because I used five communication texts—questionnaires, participant observations of reading discussions, individual semi-structured exit interviews, individual reflections, and documents—content analysis is an appropriate choice for my study.

Qualitative versus Quantitative Content Analysis

Because content analysis can be done quantitatively or qualitatively, highlighting the arguments for each type of content analysis can ensure alignment in my research design. Quantitative analysts argue that unlike qualitative content analysis, quantitative content analysis

upholds rigor and reliability through quantitative measures such as reliability coefficients (Mostyn, 1985). Qualitative analysts however contend that counting and application of other quantitative measures to social science does not guarantee rigor and does involve qualitative judgements in the determination of categories (Mostyn, 1985, pp. 120–121). Furthermore, while quantitative researchers are concerned more with the interpretations and quantifications within texts, qualitative researchers are more concerned with intentions, qualities, and underlying content as well (Kohlbacher, 2006; Mayring, 2000; Mostyn, 1985). Because I am not concerned with my interpretations of the data from my different data collection methods, but rather because I am concerned with the participants' experiences that point to their intentions, qualities, and underlying stories, qualitative content analysis was a better fit than quantitative content analysis. I therefore utilized qualitative content analysis.

Inductive versus Deductive Qualitative Content Analysis

Qualitative content analysts state that their method could lend itself to inductive or deductive measures (Kohlbacher, 2006; Mayring, 2000). Inductive measures require formulating criteria, which are related to the research question or theoretical framework, to focus in on the text, then working through the text with these criteria to develop categories that are tentative and deduced from text. In inductive models, researchers then use a feedback loop and checks for reliability, and then data categories are revised to develop main categories (Mayring, 2000). Deductive coding on the other hand requires applying an already formulated criteria related to the study's theoretical framework to the same described process (Mayring, 2000). Because I do not have an already established framework that I wanted to apply and because the inductive approach is more emergent in design and in line with typical qualitative research, inductive qualitative content analysis better aligns with my design.

Scholars Informing my Qualitative Content Analysis

Within my study, I particularly leveraged two qualitative content analysis scholars: Mayring (see, e.g., 2000) and Mostyn (see, e.g., 1985). Both methodologists contend one of the benefits of qualitative content analysis is that it preserves the advantages of quantitative content analysis: having a controlled step-by-step process and employing a procedure that is guided by theoretical frameworks (Mayring, 2000; Mostyn, 1985). Furthermore, both methodologists highlight the importance of checks for trustworthiness throughout the study and allowing these ongoing checks to inform the future aspects of the study whether that be through the data collection methods used or data analysis categories developed (Mayring, 2000; Mostyn, 1985). The two differ however in the complexity they provide regarding their qualitative content analysis process. Mayring's (2000) process includes fitting the data into a model of communication or criteria, following step-by-step analysis processes that are informed by the rules of the procedure, developing categories and then having these categories be the center of analysis (feedback loops), and having methods of reliability or validity (para. 7). Mostyn (1985) presents a 13-step "recipe book" that includes the processes of briefing, sampling, associating, hypothesis development, hypothesis testing, immersion, categorization, incubation, synthesis, "culling", interpretation, writing, and rethinking (pp. 133–144).

Mayring's (2000) model provides more flexibility in the design, but the specific steps of Mostyn's (1985) provide more nuance and detail. Both attend to ethical considerations by recommending time to review data through member checks (found within Mostyn's hypothesis testing phase, and Mayring's feedback loops). Additionally, both recognize the benefits of triangulating data and utilizing informed analytical models that are inductive in design. Both are therefore important contributors to my study. Despite the imperative contributions these scholars

have provided, I recognize that neither scholar discusses in depth how to analyze texts and forms of communication to better understand experiences of participants. As my study purpose was to investigate how engaging in a book club influences (or not) participants' curriculum and instructional praxis, I needed a method of data analysis that explicitly leverages participants' experiences.

Narratives within Qualitative Research

Narratives within qualitative research are defined as discourse that combines stories or experiences to describe human actions (Clandinin et al., 2009; Connelly & Clandinin, 1990; Connolly, 2007; Keats, 2009; Polkinghorne, 1995). As noted by Clandinin and colleagues (2009), narrative researchers "understand experience as a storied phenomenon. Lives are composed, recomposed, told, retold, and lived out in storied ways on storied landscapes" (p. 82).

Narratives in qualitative research have been used across many social science settings but particularly within education (Clandinin et al., 2009; Connelly & Clandinin, 1990). Connelly and Clandinin (1990) stated that they "see teachers' narratives as metaphors for teaching-learning relationships. In understanding ourselves and our students educationally, we need an understanding of people with a narrative of life experiences. Life's narratives are for making meaning of school situations" (p. 3). Additionally, narratives in qualitative research have been deemed a co-constructive, caring, and collaborative experience where participants and researchers work together to tell stories of the research (Clandinin et al., 2009; Connelly & Clandinin, 1990; Connolly, 2007; Keats, 2009; Polkinghorne, 1995).

Furthermore, narratives in qualitative research require the use of empirical data. Scholars highlight that because contexts of participants and the settings of research are complex it is beneficial to use a variety of data sources such as field notes of participant observations,

interviews, oral histories, documents, pictures, and video recordings (Connelly & Clandinin, 1990; Keats, 2009). Keats (2009) highlighted how using multiple texts and sources of narrative can create a richer understanding of experiences of participants and ultimately can influence the development of other data sources.

Because the purpose of my study necessitated leveraging a method of data analysis that honored lived experiences, narrative analysis was imperative in my study design. Additionally, because the context of my study was in educational spaces, narrative analysis was useful given the clear alignment to qualitative research within education. Furthermore, as I will be the CFG book facilitator, a colleague of the participants, a participant observer, and the researcher, it was imperative for me to choose an analysis method where co-construction occurs. Ethically, I believe co-construction of the research results in more dependable findings (Marshall et al., 2021). Therefore, narrative analysis aligns well to this consideration. Finally, as I used multiple data collection methods to benefit the credibility and richness of my study (Marshall et al., 2021), I needed an analysis method that not only supports these data collection methods but also views these methods as an asset to the analysis itself. Narrative analysis therefore aligned well with my other research design choices.

Narrative Analysis or Analysis of Narrative

In qualitative research there are two types of narrative inquiry: paradigmatic and narrative (Polkinghorne, 1995). Polkinghorne made further distinctions according to the process of analysis and describes the narrative inquiry that uses paradigmatic reasoning in data as analysis of narrative whereas the narrative inquiry that uses narrative reasoning as narrative analysis (p. 12). Because I leveraged an analysis method that was in line with narrative inquiry, describing the differences in each type of analysis assists the alignment of my research design.

Analysis of narrative "seeks to locate common themes or conceptual manifestations among the stories collected as data" (Polkinghorne, 1995, p. 13). This method of analysis utilizes the stories that exist across a study's entire dataset and is employed to not only uncover categories or occurrences but also to highlight relationships across data categories (p. 14). Polkinghorne stated that analysis of narrative can support deductive or inductive methods of analysis.

Narrative analysis researchers need to combine elements from the study to create a story that gives meaning to the data, study goals, and purpose (Polkinghorne, 1995, p. 15). Within narrative analysis data methods are used to compose a story, and the analysis aims to provide an explanation of how and why something occurred. Finally, within narrative analysis, the analysis of the final story may happen during the study process, but the ultimate data analysis necessary happens after story composition (p. 19).

Within my research study, it made more sense to employ the analysis of narrative rather than narrative analysis. Because I did want to locate common or disagreeing themes across my data, given that I used inductive analysis techniques and detailed the relationships of the experiences across my different data methods, there was alignment between analysis of narrative and my research design. Contrastingly, narrative analysis was misaligned with my research design because I did not necessarily want to produce a story as the outcome of the study. Additionally, because my research questions and purposes did not support an explanation of how and why something occurred, narrative analysis was misaligned with my research design. Finally, I, a White, able-bodied, heterosexual, English-speaking, upper-middle-class, early-career, cis-gendered, woman mathematics educator, ethically did not want to be the writer of the

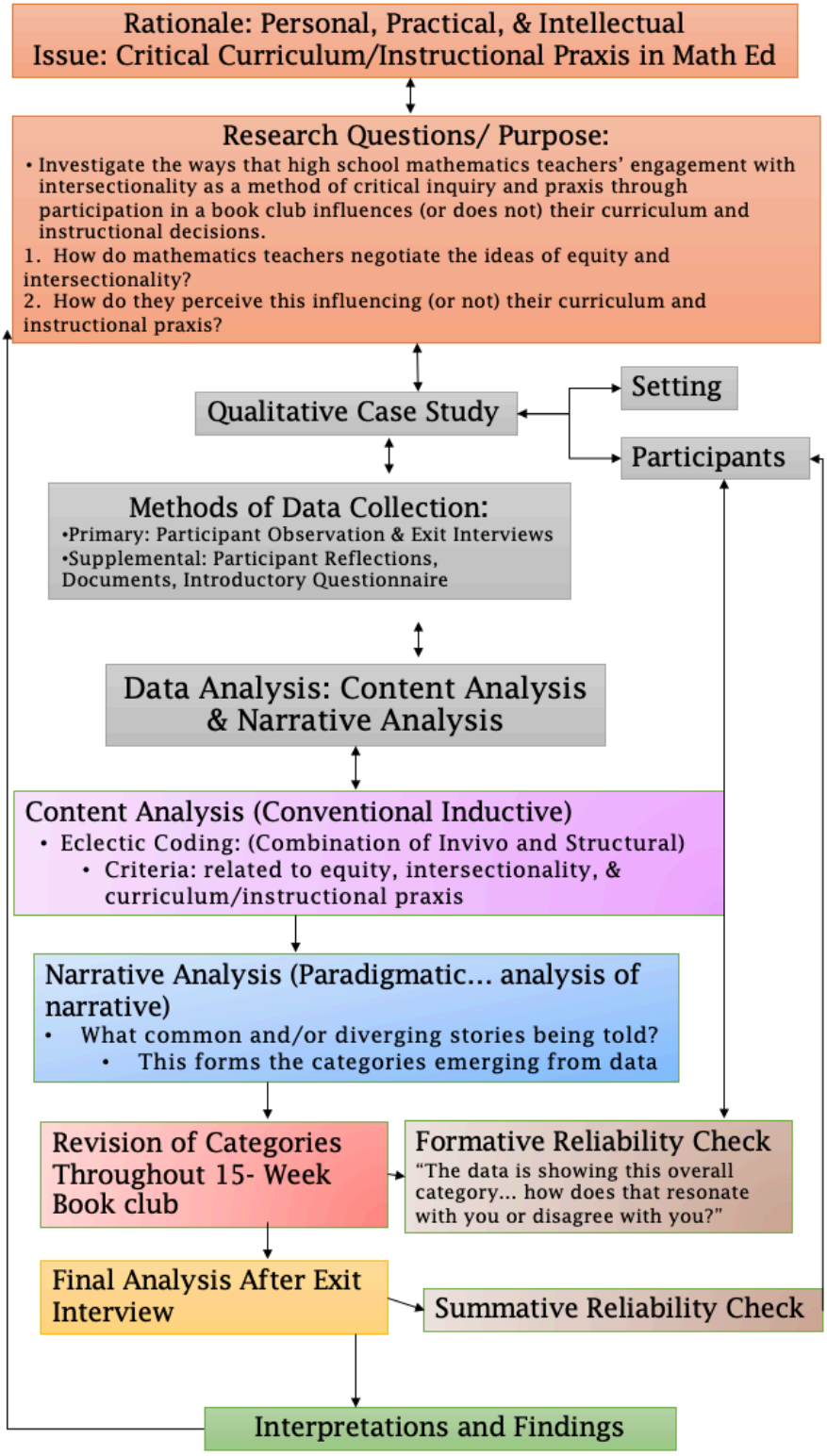
participants' stories. Narrative analysis therefore was misaligned with my research design grounded in intersectionality.

Bringing the Two Data Analyses Together

My research design and conceptual framework required an analysis framework that could analyze and synthesize varied data collection methods, that could potentially attend to the theoretical frameworks within my study, and that could reveal the lived experiences of the participants. By combining the methodical approach of inductive qualitative content analysis (Mayring, 2000; Mostyn, 1985) and the co-constructive approach of analysis of narrative, I aligned my conceptual framework and research design to my analysis. Adapted from Mayring's (2000) step model of inductive category development (para. 11), Figure 1 provides and overview of my data analysis design.

Figure 1

Overview of Data Analysis Design



As shown in Figure 1, both aspects of my research methodology and data analysis stemmed from main aspects of my conceptual framework (i.e., my rationale, purpose, and research questions). These aspects of my conceptual framework influenced the choice of case study, the setting and participants, and the methods of data collection. These research methods and conceptual framework then fed into my data analysis methods of inductive qualitative content analysis and analysis of narrative.

Analysis Process

As my research study progressed, I applied my recursive and step-by-step design of data collection and analysis. After going through the process of gathering my data from questionnaires, field notes, reflections, exit interviews, and documents, I then began my data analysis process by coding using Quirkos (2022). Quirkos was recommended by a fellow doctoral student as a qualitative coding resource. After researching Quirkos as well as going through the company's free online video trainings, I chose to use the resource for a few reasons.

The first reason I chose this software was Quirkos is secure and password protected. This ensured that all of the participant data I was coding was protected. Second, Quirkos was available to use both offline on a computer where it was downloaded and online via a secure web connection. As a teacher, having the ability to code during my planning periods, lunch, and before and after school hours allowed me the opportunity to work on coding my data even without my personal computer. My third reasoning for Quirkos was Quirkos has the capability to export coded data to Word documents. This feature allowed for easy upload to my secured Google drive. Additionally, the option to export my data as a word document has allowed me to insert line numbers that has made it easy to find where across my data sources different themes appeared. Fourth, Quirkos easily supported different data sources including written sources like

my summary field notes, participant reflections, and exit interviews but also structured responses like the participant questionnaires. Finally, Quirkos' embedded capabilities made the coding resource extremely valuable. Using Quirkos allowed me to color-code my data, and I could drag and drop texts into "Quirks" or criteria that grew larger with more codes. Additionally, I was able to invivo code all of my data using Quirkos' memo feature. Finally, I was able to analyze my codes even further by using the Quirkos' overlap feature. This overlap feature allowed me to see the relationships between categories as well as where they showed up in my data. Figure 2 below provides a visual of some of my coded data that utilized these embedded Quirkos capabilities.

Figure 2

Visual of Imbedded Quirkos Capabilities

As outlined, I utilized a two types of data analysis within this study. First, I went through a process of qualitative content analysis and then I completed an analysis of narrative, I completed my inductive qualitative content analysis by coding my data using an eclectic coding process (Saldaña, 2013). According to Saldaña (2013), eclectic coding is selecting and applying two or more compatible coding methods that have been purposefully chosen (p. 188). Ultimately, I combined invivo and structural coding methods (Saldaña, 2013). However, this was not my initial plan going into my qualitative content analysis.

Initially, I planned to code all my data solely utilizing invivo coding while following the defined focus criteria: words and phrases related to equity, intersectionality, and/or curriculum and instructional praxis (Mayring, 2000; Mostyn, 1985; Roulston, 2010; Saldaña, 2013). I made this initial choice to invivo code according to these focus criteria because with qualitative content analysis criteria are needed to focus the data and because the criteria within qualitative content analysis must relate to the conceptual framework (Mayring, 2000; Mostyn, 1985). Additionally, invivo coding was selected because "coding with [participants'] actual words enhances and deepens [the researcher's] understanding of [the participants'] cultures and worldviews" (Saldaña, 2013, p. 91). However, after invivo coding my questionnaires, I found that the codes formed were not rich enough to form themes for me to analyze my data with an analysis of narrative. Thus, I sought out a second coding method that complimented the analysis method of qualitative content analysis, allowed me to form richer themes for analysis of narrative, and complimented the invivo coding process as I felt it was still important to the study.

My search for a secondary coding method led me to structural coding or coding that "applies content-based or conceptual phrase representing a topic of inquiry to a segment of data that relates to a specific research question used" (Saldaña, 2013, p. 84). As I read into this coding

method, I found that structural coding aligned to my qualitative content analysis by allowing me to reframe my focus criteria of equity, intersectionality, and/or curriculum and instructional praxis to be now initial structural categories. Additionally, by starting with these three initial categories, I was better able to inductively work through my data to develop more specific subcategories, which helped lead me to a rich formation of themes. Furthermore, structural coding allowed me to categorize and subcategorize my data in a way that allowed me to see across my data what common and diverging relationship existed between the participants' experiences, which enhanced my analysis of narrative. Finally, this structural coding process complimented my invivo coding process because the invivo codes allowed me to have an idea of the different stories the participants were telling, but the structural coding allowed me to see how these participant stories led to a negotiation of ideas about equity and intersectionality as well as how these participant stories indicated changes and affirmations to their curricular and instructional praxis.

After this change to coding process, I then was able to use analysis of narrative to come to themes. Within this analysis of narrative, I was trying to uncover the following: (a) the common and diverging stories regarding negotiating ideas of equity and intersectionality, and (b) how curriculum and instructional praxis is influenced across my data. This analysis was done both intertextually or across common data collection methods and intratextually or across data from different participants (Keats, 2009, p. 191). By doing this analysis intertextually and intratextually, I aim to reveal the relationships that existed among the participants lived experiences and the relationships that exist among the data categories (Connelly & Clandinin, 1990; Keats, 2009; Polkinghorne, 1995). To help in the intertextual and intratextual analysis of narrative, I utilized Quirkos' overlap feature. Using concentric circles where more related

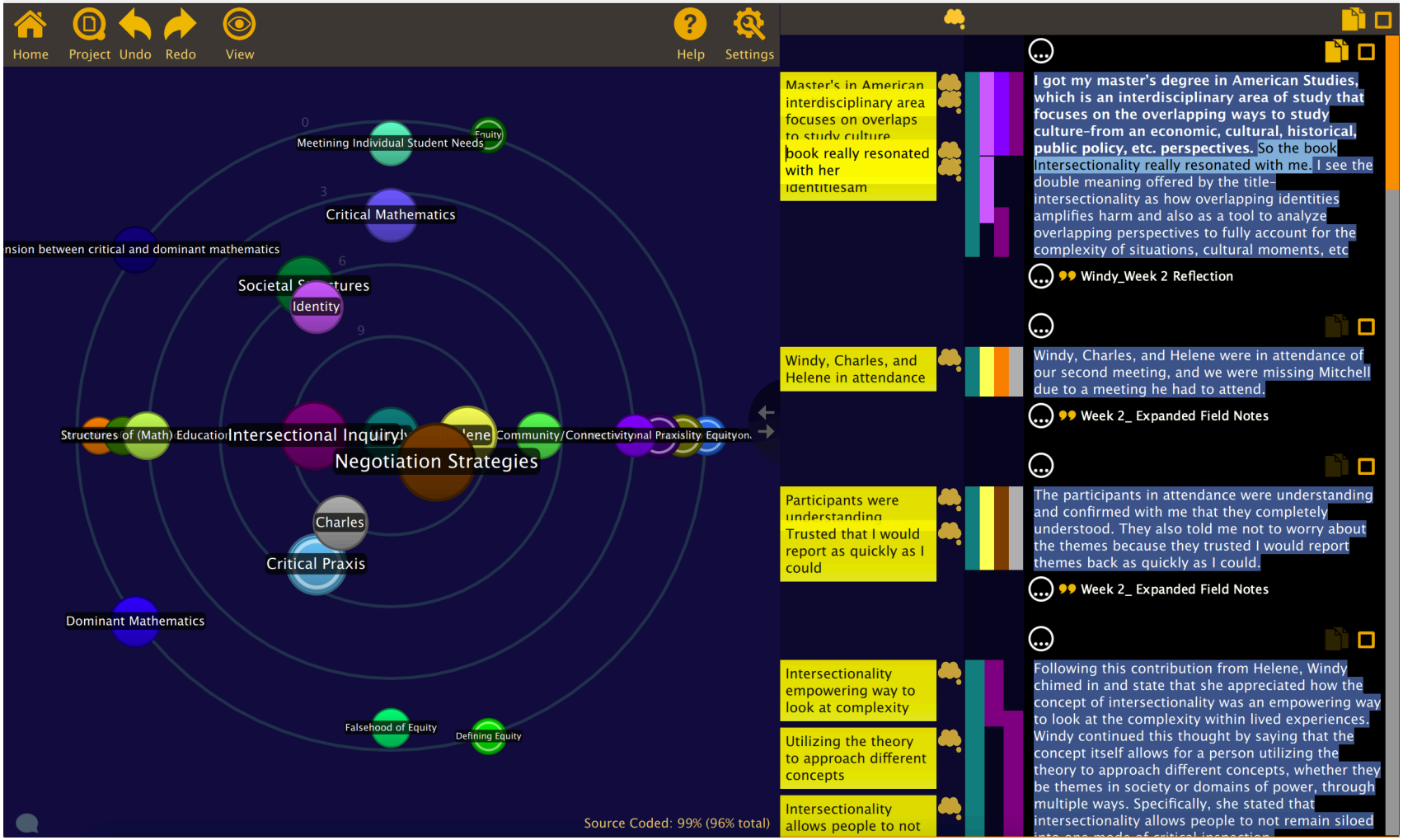
categories are more closely together and less related categories are further apart, this feature allowed me to see what categories were most interconnected. Furthermore, this feature made it easy for me to see where these overlapping categories occurred in each individual data source as well as across all data sources and allowed me to see how categories appeared for each individual participant. Figure 3 below shows an example of the overlap feature used for intertextually and Figure 4 below shows an example of how this was done intratextually.

Figure 3

Example of Intertextual Analysis of Narrative in Quirkos

Figure 4

Example of Intratextual Analysis of Narrative in Quirkos



Following these intratextual and intertextual analyses, weekly themes were recorded. The coded data sources were then exported to Word documents and line numbers were inserted to easily find where across my data sources different themes appeared. Associated line numbers of different codes were then uploaded to intertextual and intratextual code sheets that were housed on Google sheets within my password protected Google drive. Pictures of one week of my intertextual and intratextual code sheets are given in Appendices G and H respectively.

This process of inductive qualitative content analysis and then analysis of narrative occurred at three points during the book club: (a) immediately following introductory questionnaires during Week 2, (b) at the book club's halfway point during Week 7, and (c) following exit interviews after Week 15 (see Table 2 for this timeline). Furthermore, the analysis of narrative process of collaborating with participants (Clandinin et al., 2009; Connelly & Clandinin, 1990; Connolly, 2007; Keats, 2009; Polkinghorne, 1995) and the inductive qualitative content analysis process of recursively reviewing the data (Kohlbacher, 2006; Mayring, 2000; Mostyn, 1985) occurred in Week 3 and Week 8, and following Week 15. In Week 3 and Week 8, reading discussions opened with an open dialogue of stating the current theme I have reduced to and asking the participants as a group, "How do these categories resonate or disagree with you?"

Although I had intended for this review process to occur weekly, it was evident from our third week into this 15-week process that not every participant could attend every meeting due to their various commitments as partners, parents, coaches, teacher leaders, case managers and others, and thus, weekly input of themes was not possible. Additionally, had this process of review been weekly, some participants who were absent would have either needed to be caught up on prior week's themes or would have missed out on giving input to each week of themes, and this would have stalled the important conversation points related to the current week's

readings. This decision to change the review process was discussed with all participants, and all four participants agreed that the change from weekly to only three reports was beneficial to the flow of discussion in book club as well as valued their outside commitments.

Finally, following the exit interview, I enlisted participant review by providing my final data categories to my four participants. I then interpreted and reported these final themes as findings with careful consideration to my research questions, purpose, and rationale. To attend to ethical considerations of credibility in the finale of this study, I provided participants my interpretations and findings prior to official reporting (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012).

Trustworthiness of Study

Throughout this study, ethical considerations were at the forefront of every decision. I believe that trustworthiness must be at the heart of all sound qualitative research (Creswell, 2009; Marshall et al., 2021; Ravitch & Carl, 2021; Roulston, 2010; Vogt et al., 2012). Furthermore, it is my belief, as well as that of established intersectional scholars, that trustworthiness and ethics also ground intersectional research endeavors (Esposito & Evans-Winters, 2022). It was my intention to build trustworthiness through multiple modems.

First, by providing rich descriptions of the field setting, participants, data collection and analysis methods, and findings, this enhanced transferability (Marshall et al., 2021; Geertz, 1973). By painting a picture through thick description, future researchers can determine the extent this study can be applied in other contexts (Marshall et al., 2021; Geertz, 1973). Furthermore, through supplementing and engaging with field notes, I was able to enhance my descriptions and improve transferability (DeWalt & DeWalt, 2010; Marshall et al., 2021; Vogt et al., 2012).

Second, I enhanced dependability by gaining Institutional Review Board (IRB) approval both from my university and school district and by using informed consent (Marshall et al., 2021). Following IRB approval and recruitment, a consent form was sent out to participants via email for them to sign and return to me prior to our first book club meeting (Appendix B). The recruitment announcement and email took place during mid-November, and upon a mathematics teacher showing interest, a consent form was shared with them. The book club began in early January, so consent was obtained fully prior to the beginning of the study. Additionally, as detailed both in the consent form and the recruitment email, the participants could ask any questions or raise concerns to the principal investigator or the co-principal investigators in this study.

Dependability also occurred via participant collaboration (Marshall et al., 2021). Participant collaboration occurred when constructing group norms during week 3 of the book club (Table 2). Participant collaboration also occurred when gathering data from participants as the stories they told through their questionnaires, discussions, reflection, documents, and interviews helped determine results. Finally, participant collaboration happened when determining when it was best to report themes to everyone.

Moreover, I enhanced dependability through inclusion of the diverse mathematics teacher voices (Esposito & Evans-Winters, 2022). Furthermore, dependability occurred through perseverance of anonymity by utilizing pseudonyms, by concealing identities through reporting demographics of participants as a whole group rather than on an individual basis, and by critically debriefing with peers and mentors on how to uphold anonymity when reporting intermittent themes and final results (Creswell, 2009; Marshall et al., 2021; Ravitch & Carl, 2021).

Finally, I sustained credibility via triangulation (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012) using two primary data sources (book club discussions and interviews) as well as three supplementary data sources (reading reflections, questionnaires, and documents). Member checks or participant review (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012) built upon ethical considerations related to credibility and confirmability, and both procedures happened throughout the data collection process by asking participants if they are agreeing with the themes.

Credibility also occurred through persistent reflexivity and observation during the data collection process (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012). By intratextually and intertextually transcribing, coding, and analyzing reading reflections, book club discussions, and interviews, I found emergent data that informed the study process. Moreover, by iteratively engaging in field notes, data emerged to inform the study process and this provided me the space to reflect on my process as the researcher. Prolonged engagement within this study also established credibility (Marshall et al., 2021; Ravitch & Carl, 2021). Lastly, transparently stating my positionality in this research process not only establishes both who I am within this context, but also highlights how my biases, beliefs, and values influence this study (Creswell, 2009; Esposito & Evans-Winters, 2022; Marshall et al., 2021; Ravitch & Carl, 2021; Vogt et al., 2012).

Closing Thoughts

In this chapter, I described the methodological underpinnings of my research study. Employing a qualitative exploratory and instrumental case study design, I facilitated and engaged as a participant observer in a CFG book club where four mathematics teachers from the

high school mathematics department at GAHS engaged with four critical, equitable, and intersectional texts. I used the primary methods of book club discussions and interviews and the secondary methods of questionnaires, reading reflections and documents; I then analyzed this data by combining methods of inductive qualitative content analysis and analysis of narrative.

To upheld trustworthiness within my study, I enhanced transferability, dependability, and credibility (Marshall et al., 2021). Through rich descriptions of the field setting, participants, data collection and analysis methods, and findings and by engaging with field notes, I enhanced transferability. By collaborating with the participants, preserving anonymity, and critically debriefing with peers, I enhanced dependability. Triangulation of data methods, member checks, persistent reflexivity and observation, prolonged engagement, and transparently noting my positionality are how I enhanced credibility.

CHAPTER 5: FINDINGS

Here I report findings from the critical analysis of the questionnaires, field notes, reflections, documents, and interviews of the four secondary mathematics teachers involved in the critical friends group (CFG) book club. First, I discuss the role critical inquiry had on participants' understandings of and utilization of equity and intersectionality in their mathematics classrooms. I describe how participants negotiated and ultimately defined the terms of equity and intersectionality for themselves individually and as a group.[24] Additionally, I detail how the critical inquiries within the book club reaffirmed and/or enhanced the curricular and instructional praxes of all four participants.

Finding One: Critical Inquiries to Negotiate Definitions of Equity and Intersectionality

Data analysis revealed that participants negotiated the definition of equity by dialogue and storytelling that critically or intersectionally analyzed structures which impede equity. Through the critical dialogue and storytelling, Charles, Helene, Windy, and Mitchell each understood how they define equity within their own mathematics classrooms. Additionally, the four mathematics educators detailed how their definitions of equity intertwined with each of their understandings of intersectionality.

Negotiation of Equity

Throughout the CFG book club, participants came together in group and individual discussions that resulted out of the chosen texts. Within these discussions, participants highlighted their understandings of equity by critically analyzing ways in which equity is impeded. Inductive qualitative content analysis and analysis of narrative revealed that the

[24] Participant identities are reported as a composite to conceal the identities of Charles, Helene, Mitchell, and Windy. Additionally, the data highlighting my experiences in the book club are not included here due to alignment with my research questions and to bring the stories and experiences of the four participants to the forefront.

participants believed equity is impeded when: (a) those in power superficially use the term to justify decisions that counteract equity experts;[25] and (b) there exists a deprofessionalizing or apathetic view toward mathematics teachers and their varied responsibilities.

Superficial Uses of Equity that Counteract Equity Experts

All participants agreed that within GAHS and the wider school district, those in power make decisions with an improper or superficial definition of equity that often is in direct opposition with equity experts. Within our discussions, Windy, Mitchell, and Charles noted that the school district officials use an "equity rubber stamp" to make decisions regarding curriculum offerings as well as instructional resources, but the reasoning behind these decisions were rarely ever clarified (Field Notes #1, January 19, 2023). The participants noted that leaders within our district rationalize decisions by stating that certain curricular and instructional decisions benefitted traditionally marginalized or minoritized groups and/or a decision was made because it benefits teachers or students. Nevertheless, the decisions counteracted research and personal professional expertise.

Mitchell, throughout the book club, emphasized how there are mathematics curricular changes occurring in the district starting next school year, and with these curricular changes, new mathematics courses will be offered. Mitchell explained that the new mathematics course offerings at the state level do not offer tracked courses, but district leaders as well as administration have opted to offer tracked mathematics course offerings in the name of equity (Field Notes #1, January 19, 2023; Field Notes #3, February 2, 2023). As he detailed, this

[25] Here, equity experts is an inclusive term to refer to GAHS mathematics educators who are working toward equity, post-secondary mathematics educators who have worked towards equity, mathematics education research entities like NCTM, and the state department of education.

decision by the district was in clear opposition to equity views of mathematics research entities like NCTM, the state department of education, and GAHS mathematics teachers.

According to Mitchell, those in power justified tracked mathematics course offerings because the district wanted to provide the highest ceilings of achievement for students. District leadership ultimately gave the opportunity to all families to have their children enroll in either an advanced or general mathematics course (Field Notes #3, February 2, 2023). Yet, Mitchell highlighted how this decision by leadership has yielded a stark underrepresentation of Black students into our advanced courses and a stark underrepresentation of White students in our general course offerings for the 2023-24 school year just as mathematics education research and experience within GAHS would have predicted.

Windy built on the sentiments of Mitchell and commented that parents and teachers who are from traditionally minoritized and marginalized groups have commented to her personally and within larger public spaces in the district that some school policies such as curriculum, grading, discipline, and course offerings are not beneficial to students from traditionally minoritized and marginalized groups. However, district leaders have claimed that these policies are "equity oriented" without truly listening to minoritized voices (Field Notes #1, January 19, 2023). As Windy indicated in her reflection,

> I see the danger of not having Black voices leading the way—how the language of "equity" is colonized by White administrators to justify their own agendas—even if those agendas are in direct opposition to what research tells us is in the best interest of our students of color. (Windy, Reflection #1)

The book club readings, discussions, and subsequent critical inquiries led Windy and Mitchell to negotiate how superficial decisions and not listening to experts is harmful particularly to students

of color. Thus, emphasizing that equitable mathematics classrooms need to center the success of students and truly meet their needs.

Unaware of these realities, Charles and Helene inquired why this tracked curricular decision was occurring and why there were so few Black students enrolling in our advanced course options for next year (Field Notes #3, February 2, 2023). Windy explained that this curricular decision, as well as many other school wide decisions, was made because providing everybody the same choice "sounds really democratizing" as it allows all voices to be heard (Field Notes #3, February 2, 2023). However, Mitchell explained providing two choices to all families does not recognize the ways tracking provides students in advanced courses more access to real-world, investigative, and critical mathematics. He explained that by removing the choice all together all students receive high quality and equitable mathematics, and by choosing tracked classes rather than heterogeneous classes, the district actively chose not to be equitable (Field Notes #3, February 2, 2023). Hence, those in power utilized a superficial definition of equity and trivialized the issue of equity to providing equal choice without recognizing the sociopolitical realities of tracking.

By bringing this issue up in the book club discussions, Charles and Helene both recognized the larger implications of access and opportunity for students based on these decisions. Charles compared this decision to track students to other equity decisions in our district. Specifically, Charles elaborated that since he has been a teacher at GAHS he has wanted to offer more in-school supports for students to develop conceptual understanding, pre-requisite skills, and confidence in mathematics (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023).

Charles explained, when GAHS hired him, he wanted to create a mathematics lab or a mathematics support center where students could receive extra in-school help on pre-requisite skills (Field Notes #1, January 19, 2023; Field Notes #4, February 9, 2023). Charles described the mathematics lab of his former school district as an opportunity to have students feel they are supported and that they can feel successful in current and future mathematics classes (Field Notes #4, February 9, 2023). Despite clearly explaining the benefits of this equity-oriented practice, Charles has yet to be granted the opportunity to create a mathematics lab at GAHS (Field Notes #1, January 19, 2023; Field Notes #4, February 9, 2023). Charles indicated that both the decision to track and the lack of creation of the mathematics lab show evidence of those in power impeding equity by not listening to the expertise of experts. Additionally, by Charles connecting his former experiences, he elaborated that he believes equity centers on meeting students' individual needs and building their mathematical reasoning.

Like Charles, the tracking decision of the district reminded Helene of her former experiences. Helene argued that the choice to offer tracked courses, specifically, connected to her experiences in school where students who were identified as "gifted" were given opportunities to do interesting real-world activities whereas those not identified as gifted were within more rote classes (Field Notes #3, February 2, 2023). Helene then negotiated her lived experience with tracking and this district-made curricular decisions enforcing tracking, and she recognized that a more equitable practice was needed.

Helene recognized that those students who find themselves in general mathematics education courses tend to be the ones who have the least opportunity to engage with critical mathematics. Yet this population of students, according to Helene, would be the ones who would benefit the most. She argued that changing our practice to offer these opportunities to all students

is necessary (Field Notes #3, February 2, 2023). This connection of Helene's personal lived experiences and lived experiences of our students suggests that the negotiation of the superficial justifications of equity led her to recognize the equitable practice of instituting relevant curricula for students.

Deprofessionalization and Apathy toward Mathematics Teachers

In addition to counteracting equity experts and superficial definitions of equity, Charles, Helene, Windy, and Mitchell agreed that equity was also impeded when those in power deprofessionalized and exhibited apathy toward mathematics teachers. Over the course of the book club, Windy emphasized that equity felt hindered when the focus of equity work shifted to the sole responsibility of teachers rather than larger sociopolitical realities (Field Notes #1–8; Windy, Exit Interview, April 11, 2023).

To highlight an example of this focus, when reading *Choosing to See: A Framework for Equity in the Math Classroom* (Seda & Brown, 2021), Windy desired to find more critical mathematics curricula for her geometry students (Field Notes #5, February 23, 2023; Windy, Reflection #5). Despite devoting planning time and outside of contract time to find resources, Windy unfortunately could not find student-friendly and critical curriculum resources for her students. This ultimately led her to bringing up her frustrations in the book club where she indicated that this equity work yet again falls on the teacher alone. With this sentiment, Windy reflected that since working within the school district she has felt that the district has not provided her (or any mathematics teacher) meaningful professional learning experiences related to mathematics curriculum development (Field Notes #5, February 23, 2023). Windy expressed that this lack of professionalization makes her feel like the district is not offering support and merely delivering professional development that is unnecessary. By going through the readings

and subsequent critical inquiry, not only did Windy realize that she had not been supported as a professional in the district, but she also recognized that relevant curriculum is necessary for equity.

Mitchell also communicated feeling the responsibility of equity fell solely upon teachers. Mitchell suggested that within our district he felt that there has been limited support from administration or district leadership for equity-oriented and mathematics-specific curricular professional development (Field Notes #5, February 23, 2023). Mitchell confirmed Windy's sentiments regarding internal professional learning focused on mathematics curriculum. Mitchell stated that he could not remember the last time a professional learning experience like the book club occurred with the school district. Additionally, Mitchell commented that most professional trainings on mathematics curricula is outsourced and tends to be related to college-level mathematics courses only. This discussion by Mitchell indicates he also recognized that relevant curriculum is necessary for equity, and he has not been provided needed professional development opportunities.

Despite both Mitchell and Windy's frustrations with the lack of professional development opportunities provided by the district, the two definitely reflected on the pride they felt toward their mutual planning team's commitment to build critical mathematics curriculum for the sake of student success and high-quality learning (Field Notes #5, February 23, 2023). Both Windy and Mitchell explained that the work to develop critical mathematics curriculum is often difficult, as there are little resources to build upon. The two also agreed that they each have a long list of professional duties that all seem "vital" (Field Notes #5, February 23, 2023; Windy Exit Interview, April 11, 2023).

Mitchell compared accomplishing his duties professionally as “triaging” what he can at the current moment (Field Notes #5, February 23, 2023). Mitchell indicated that his job as mathematics teacher is particularly difficult because he chooses to implement critical mathematics practices of dialogue, developing and instituting equitable and socially just curriculum, and valuing student errors rather than opting to simply institute the “banking concept” or dominant mathematics practices into his classroom (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023). Windy agreed that she too finds herself to be going nonstop as a mathematics teacher because she opts to get to know her students’ experiences and “make students feel seen” by providing extra supports through tutoring, differentiated curricula, or relevant curricula. (Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Windy, Reflection #6; Field Notes #7, March 16, 2023). Both teachers believed their critical work as well as day-to-day professional tasks regularly aggregate to feel like a Sisyphean task edging toward burnout and fatigue (Field Notes #6, March 2, 2023). Additionally, Windy and Mitchell also argued that the critical mathematics work they do frequently goes unseen. Thus, some administrators, district leaders, and other community members show little support or empathy for the work they do as mathematics teachers (Field Notes #5, February 23, 2023).

The two teachers elaborated on how they felt neglected as professionals by discussing the ways administrators have failed to support them when interacting with challenging parents. Specifically, Windy indicated that there have been instances when she has disagreed with parents and required administrative backup in meetings. In these meetings with challenging parents Windy often felt that parents undermined her as a professional through triggering statements that

indicate she is a "bad teacher" (Field Notes #6, March 2, 2023).[26] In these conversations, the administrator in the room did not defend her as a teacher and often took a sense of neutrality in these situations (Field Notes #6, March 2, 2023).

Mitchell agreed that he too has been "sandbagged" by administration citing an instance where he had to meet with parents about their child cheating (Field Notes #6, March 2, 2023). Mitchell contended that rather than the administrator trusting him as a professional to follow policies related to discipline and restoration of students after they cheated on an assessment, this administrator insisted Mitchell defend his practices related to the cheating incident. Mitchell described this administrator's action as undermining to his professionalism. This deprofessionalizing action also allowed the parents within this meeting to question Mitchell as an effective mathematics teacher (Field Notes #6, March 2, 2023).

Charles conveyed in book club discussions that he similarly has felt deprofessionalized as a mathematics teacher at GAHS. He argued that deprofessionalization often stems from a disconnect between district or teacher policy and the classroom. Charles revealed that district leaders have entered his classroom for brief moments and have commented on how they disapproved of how some students are engaging in his mathematics class differently (Charles, Exit Interview, March 30, 2023). Charles expressed that the district leaders questioning his practice after only interacting in his classroom for a moment felt like district leaders were merely checking boxes. Charles highlighted that checkbox comments like these were offensive to him as a professional because they failed to consider the research and experience backing up his practice

[26] Windy explained that often parents would say variations of "I don't think you are a bad teacher but…" or "I don't think you are a bad person but…" and then follow these stems with challenges to her as a mathematics teacher or even a person.

and the relationships he has built with students in his classroom to offer differentiation (Charles, Exit Interview, March 30, 2023).

Charles also indicated that fellow mathematics teachers have called into question his practices. Throughout the book club, Charles repeatedly advocated for developing students' pre-requisite and conceptual mathematical knowledge to ensure success in future classes (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023). However, Charles stated that some of his mathematics teacher colleagues and leaders outside of the book club have pushed back on his suggestions of instituting remedial practice during class time or advocacy for more time during school hours to work with students who need supports. Charles cited that this push back often coincided with teachers feeling as though they needed to prepare students for the high stakes End of Course Tests in mathematics and/or fellow teachers believing it was not their professional responsibility to help students with pre-requisite skills. Nevertheless, Charles argued those who push back against his practices do not realize how refusing to build pre-requisite knowledge eventually leads to "students feeling stupid" in future mathematics classrooms. Charles also described that by not supporting student individual needs students lose confidence in their abilities as they advance in mathematics course sequences, which is truly a dehumanizing experience for them (Field Notes #1, January 19, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #6, March 2, 2023).

Helene also suggested ways that disconnected educational leadership and community members lead to a lack of empathy for mathematics teachers. Helene at different points in the book club indicated that administrators, district leaders, and other community members sometimes forget that mathematics teachers have a "million things" to do as teachers and that

teachers strive to consider the complex realities of the students in the process (Helene, Exit Interview, April 12, 2023; Helene, Reflection #2). Nevertheless, mathematics teachers also are complex people outside of their jobs and often there is an expectation for mathematics teachers to "give space and support for the intersectionality of all of those around me and stay one dimensional myself [sic]" (Helene, Reflection #2; Helene, Exit Interview, April 12, 2023). Helene explicitly stated that apathy toward mathematics teachers as complex humans is unsustainable (Helene, Reflection #2).

Defining Equity

Data analysis of the participants' discussions, interviews, reflections, and questionnaires revealed that participants formed their definitions of equity out of the critical conversations regarding hindrances to equity. Ultimately, all four mathematics teachers highlighted that they defined equity as: (a) meeting mathematics students' individual needs; (b) promoting student agency through students' taking ownership of the mathematics being taught and learned; (c) developing and instituting curriculum and instruction where relevance and reasoning are connected; (d) creating communities and connectivity in mathematics classrooms and in school communities amongst educators, students, parents, and community members; and (e) creating and upholding high expectations for mathematics students.

Charles

Charles entered the book club by defining equity as "meeting each student where they are and empowering them to be their best" (Charles, Questionnaire). Throughout the study, however, Charles expanded this definition. Charles indicated that he believed equity is defined by meeting students' individual needs. Numerous times throughout the book club, Charles offered his sentiments that he believed it was necessary to meet students' individual needs. Specifically,

Charles was a fierce advocate for developing students' pre-requisite and conceptual mathematical knowledge to ensure success in future courses (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023).

By highlighting this desire to meet individual needs, Charles confirmed he helped students develop confidence and begin to generate mathematics reasoning skills (Charles, Exit Interview, March 30, 2023), demonstrating how Charles' definition of equity included developing mathematical reasoning. Furthermore, by taking the time to meet students' individual needs he had the opportunity to value the whole student, build connections with students through getting to know students, and leverage these connections to hold them to high expectations of success (Field Notes #8, March 23, 2023; Charles Exit Interview, March 30, 2023). Charles however did explain that equity for him meant that success for a student is also individualized and does not have to fit traditional forms of success such as academic achievement or obtaining the right answer, but rather is about the student understanding the logic behind mathematics and learning it for themselves (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023; Charles, Exit Interview, March 30, 2023). Thus, through our critical discussions within the book club, Charles clearly showed how he expanded upon his original definition and applied these new definitions to his praxis.

Helene

At the start of the book club, Helene explained that equity in mathematics education is about access (Helene, Questionnaire). But by the end of the book club, Helene described that equity in her mathematics classroom was "giving everyone what they need to have an equal

chance" (Helene, Exit Interview, April 12, 2023). Helene elaborated that this description meant providing accessible materials, multiple opportunities, and differentiated instruction according to the specific individual needs of students (Helene, Exit Interview, April 12, 2023). Furthermore, by giving everyone what they need, she could hold high expectations of her students even if those expectations are different (Helene, Exit Interview, April 12, 2023).

Throughout the book club, Helene also revealed that she recognized the importance of building relevant curriculum as an equitable practice for her students. Specifically, Helene indicated that she strives to create connections between her classroom mathematics and the mathematics in the real world, so her students find relevance (Field Notes #2, January 26, 2023; Helene, Reflection #2). Furthermore, Helene suggested that relevant mathematics allows students to take ownership of their learning, resulting in them to feeling more comfortable and community oriented in the classroom and fostering high expectations (Field Notes #2, January 26, 2023).

Windy

In the introductory questionnaire, Windy described equity in the mathematics classroom "as a place where everyone feels successful, valued, and challenged" (Windy, Questionnaire). Throughout the book club, Windy emphasized this definition by detailing how she strives to incorporate as much critical, culturally relevant, and socially just curricula she can find (Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Windy, Reflection #6). Windy indicated that using critical mathematics resources creates relevant connections for students and shifts the classroom to be more student centered (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7).

Windy's ending definition of equity was "all kids getting what they need" in the mathematics classroom, which underscored her desire to meet students' individual needs (Windy, Exit Interview, April 11, 2023). Windy's discussions in the book club highlighted how she created classroom communities by knowing and honoring students (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7). Additionally, Windy's experience in the book club showcased that she leveraged the interests, realities, and experiences of students to build her classroom instruction and curriculum in a way to uphold high learning expectations (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023; Windy, Exit Interview, April 12, 2023).

Mitchell

Mitchell's described equity at the start of the study as "providing each student what they need to be successful" (Mitchell, Questionnaire). This definition was similar to his final definition of equity in mathematics education as "giving every kid a chance to be good at math and have a good experience with math" (Mitchell, Exit Interview, March 29, 2023). Both descriptions emphasize a commitment to recognizing students as individuals and meeting their needs, but over the course of the study, Mitchell expanded on what this meant for his personal practice.

Mitchell indicated throughout the book club that he tries to implement critical mathematical practices as often as he can because these center student learning and agency (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023). Through the strategies of incorporating socially just and

culturally relevant curricula, engaging in dialogic classrooms, valuing errors, allowing multiple opportunities to demonstrate success, and showcasing clever student teaching, Mitchell often argued that these critical practices are how students truly learn mathematics despite the work required of educators to implement them (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023; Mitchell, Exit Interview, March 29, 2023). Throughout this consistent sentiment, Mitchell illustrated that instituting these critical practices create high expectations of students' mathematics learning. Furthermore, Mitchell suggested that the critical mathematical practices he uses, particularly valuing errors, creating dialogue, and offering multiple opportunities to students, values students as people and allows community to grow in his classroom (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023; Mitchell, Exit Interview, March 29, 2023).

Defining of Intersectionality

In addition to the participants defining equity, they also came to understandings of intersectionality. Across all four participants, data analysis revealed that they believed that the relationship between equity and intersectionality is intertwined. Helene stated in her exit interview that intersectionality for her is being able to look at the identity markers such as "gender, sex, and sexuality" of people and recognizing how these shape experience. Helene however also recognized "there's connection between them, and they are affected by each other" (Helene, Exit Interview, April 12, 2023). Helene also discussed that intersectionality in her mathematics classroom is understanding how students' and teachers' prior knowledge, prior experiences with mathematics teachers, prior experiences with classmates, and prior outside experiences are interconnected and influence how one enters the mathematics classroom (Helene

Exit Interview, April 12, 2023). Helene revealed throughout the book club that she has to navigate intersectionality to foster community, create opportunities for her students to see relevance, and meet individual needs of students (Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Helene, Reflection #2). Hence, Helene showcased how through intersectionality, whether as generally defined or as defined specific to mathematics education, she sees equity and intersectionality as interconnected.

Charles explicitly stated that he does not see the difference between intersectionality and equity (Charles, Exit Interview, March 30, 2023). Charles commented throughout the book club that equity for him is about recognizing and responding to a student's individual needs (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023). He indicated that to meet students' individual needs, one must take the time to look at the "whole child" and honor the different aspects of their mathematical identity as well as experiences (Charles, Exit Interview, March 30, 2023). Charles explicitly linked intersectionality and equity by noting that you cannot have one without the other.

Mitchell, too, found connections between equity and intersectionality. According to Mitchell, intersectionality is understanding that individuals are colored by all the different components that intersect to make an individual who they are (Mitchell, Exit Interview, March 29, 2023). Mitchell explained components as both personal identities and experiences—whether those be mathematical or otherwise (Mitchell, Exit Interview, March 29, 2023). Mitchell directly linked this definition to how he viewed equity in mathematics education and stated that the best teaching practices in the mathematics classroom are tiered down to the individual, so that the student is capable within the mathematics classroom (Mitchell, Exit Interview, March 29, 2023).

These sentiments of individualizing mathematics experiences and allowing students to see themselves in the mathematics classroom resonated throughout Mitchell's book club experiences as he described equitable mathematics practices of (a) including critical curricula in mathematics classrooms (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023); (b) building student ownership in the mathematics classroom through dialogue, valuing errors, and highlighting student thinking (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023); and (c) building student mastery by allowing multiple chances (Field Notes #4, February 9, 2023). Subsequently, Mitchell acknowledged the interconnected relationship between intersectionality and equity.

Finally, Windy also interrelated equity and intersectionality. Windy defined intersectionality as "all the different identities that we bring with us that impact how we see the world around us, how we see others, how we see the math, how we see self, and that those things need to be honored" (Windy, Exit Interview, April 12, 2023). Windy indicated throughout the book club that equity for her meant creating mathematics communities and how she achieved these communities was by knowing her students and honoring their complex realities (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7). Additionally, Windy's experiences in the book club suggested that she leveraged the interests, realities, and experiences of students to build her classroom instruction and curriculum in a way that leveraged those realities to uphold high expectations and centered student voice (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023; Windy, Exit Interview, April 12, 2023). Lastly, during book club meetings, Windy stated that intersectionality being at the core of diversity work, critical inquiry,

and critical praxis resonated with her (Field Notes, Week #3, February 2, 2023). She explicitly expressed that intersectionality as both critical inquiry and praxis was beautiful, empowering, and true to who she was as a teacher (Field Notes, Week #3, February 2, 2023). Thus, Windy saw intersectionality and equity as intertwined.

Finding Two: Critical Inquiries Influences on Participants' Praxes

Beyond negotiation of equity and intersectionality through critical inquiries, data analysis revealed that all participants agreed the critical friends book club served as a valuable learning experience for them as mathematics educators. Consequently, the curricular and instructional praxes of all four participants were either reaffirmed or enhanced. For Charles, Mitchell, and Windy, the critical friends book club and the subsequent critical inquiries reaffirmed their praxes. For Helene, participation in the critical friends book club resulted in a shift in her praxis that ultimately enhanced her mathematics teaching.

Value of Critical Friends Book Club

Opportunity to Center Equity, Criticality, and Mathematics.

All participants indicated that the book club was worthwhile for them as professionals because it centered equity, criticality, and mathematics. Windy stated that she enjoyed the book club as it provided a professional learning experience centering equity that was explicitly focused on mathematics education. Windy reported that she enjoyed *Choosing to See* (Seda & Brown, 2021) because it provided "examples of equity in the math classroom" and how to use equity as a way to find connections with students (Windy, Exit Interview, April 11, 2023). Windy argued that equity-oriented professional development is typically done within literary and history perspectives, so it was "helpful to see examples" of how to implement and engage students in equitable mathematics instruction (Windy, Exit Interview, April 11, 2023).

Paralleling Windy, Mitchell argued that "creating a space where the focus of the conversation is math and mathematics education" does not happen enough (Mitchell, Exit Interview, March 29, 2023). He went on to claim that his favorite part of the book club was the opportunity to discuss critical concepts such as the banking concept of education and intersectionality with mathematics practioners who are really involved and really care about their work (Mitchell, Exit Interview, March 29, 2023). Additionally, Mitchell explained that centering equity and criticality in mathematics education is important to prioritize because if mathematics educators wait for these conversations to occur organically, "they never will" (Mitchell, Exit Interview, March 29, 2023).

Charles concurred with Mitchell that these critical conversations in mathematics education need to continue. Charles claimed that the critical conversations stemming out of the book club should be "mandatory for everyone [mathematics educators and general educators] to have these conversations" (Charles, Exit Interview, March 30, 2023). As he explained, these conversations give educators an opportunity to look in the mirror and critically reflect on what their students' experiences when they are in mathematics classrooms and how we as educators reinforce traditional views of success (Charles, Exit Interview, March 30, 2023). Charles expressed that students at GAHS tend to believe that success is high academic achievement and following a "traditional route of going into white collar jobs, going to college, a four-year institution" or other conventional routes of success (Charles, Exit Interview, March 30, 2023). Nevertheless, through critical conversations, Charles believes that we can re-envision what opportunities for success are in mathematics education as well as general education. Hence, Charles contended that centralizing criticality and equity in the book club served as a valuable takeaway for him.

Helene also valued the book club space because of the centering of equity and mathematics. In her exit interview, Helene stated that within the book club the opportunity to discuss "equity and mathematics" with fellow mathematics educators was her biggest takeaway (Helene, Exit Interview, April 12, 2023). Helene detailed that the conversations brought awareness to the inequity in knowledge about critical mathematics resources and how ultimately this limited awareness leads to an inequity in mathematics opportunities for students (Field Notes #3, February 2, 2023). As she explained, the book club gave her an opportunity to learn about critical mathematics strategies from her fellow mathematics teachers who currently teach or have taught college level mathematics courses in the school and then incorporate some of those critical strategies into her mathematics classroom (Helene, Exit Interview, April 12, 2023).

Opportunity to Build Community and Collaborate with Others

In addition to the book club centering equity, criticality, and mathematics, participants found value in the book club due to the community and collaboration with others. Windy stated, although at times her fellow participants came from different perspectives, she felt as though the mathematics teachers "were negotiating [ideas of equity, mathematics, and criticality] together" (Windy, Exit Interview, April 11, 2023). Windy indicated that it was enjoyable to hear from her colleagues' different perspectives of how they institute different equity-oriented practices into their mathematics classroom. Windy claimed that even when these viewpoints challenged each other, it felt as though the group was trying to fix problems of equity by attacking the problem together but perhaps at different ends (Windy, Exit Interview, April 11, 2023). Furthermore, Windy expressed that when discussing her mathematics practices she felt taken care of in the book club space (Windy, Exit Interview, April 11, 2023). Mitchell's pride in his and Windy's mutual equitable mathematical work highlighted this feeling of care (Field Notes #5, February

23, 2023). The opportunity to laugh and learn about different mathematics resources also showcased this feeling of care for Windy (Field Notes #2, January 26, 2023; Field Notes #4, February 9, 2023).

Windy's experiences in the book club also demonstrated how she fostered the growth of the other three participants. Throughout the book club, Windy discussed with fellow participants the following critical mathematical practices she utilizes to build equity within her mathematics classroom: (a) incorporating and seeking out socially just and culturally relevant curricula in mathematics classrooms (Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Windy, Reflection #6); (b) building connections with students by recognizing the complex realities of students, recognizing your biases and experiences as a teacher, and finding ways to create relevant mathematical ties (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7); and (c) allowing students to own the mathematics learning in providing students ways to engage actively within the mathematics classroom (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #7, March 16, 2023; Windy, Reflection #1). Windy's experiences in the book club pointed to mutual collaboration and support within this critical mathematics educator community.

Like Windy, Mitchell's experiences in the book club pointed to a fostering of community and mutual learning. Mitchell communicated that during his time in the book club he felt most challenged by Charles, who had "a very different viewpoint on what works best" in a mathematics classroom (Mitchell, Exit Interview, March 29, 2023). Mitchell specified that Charles views on not introducing technology such as graphing calculators until students have conceptual mastery was in opposition to his views (Mitchell, Exit Interview, March 29, 2023).

Mitchell however explained that hearing Charles' different perspective about this topic, as well as other topics, was thought provoking and valuable as it allowed Mitchell to reflect on why he was disagreeing (Mitchell, Exit Interview, March 29, 2023). Mitchell detailed that learning from different perspectives allowed him to reflect on his "own personal experience and bias" and how it differed from Charles; nevertheless, this caused Mitchell to recognize the equitable practices Charles institutes in his own mathematics classroom and affirming that Charles "has really good instincts" on how to meet the needs of his students (Mitchell, Exit Interview, March 29, 2023).

Mitchell's experiences in the book club also suggest how he fostered the growth of his fellow participants. Throughout the book club, Mitchell thoroughly detailed mathematics curriculum and instructional practices and research he knows and uses to build equity within his mathematics classroom. Specifically, over the course of the book club Mitchell discussed the following with fellow participants: (a) incorporating socially just and culturally relevant curricula in mathematics classrooms (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023), (b) building student agency by allowing students to engage in critical dialogue, valuing errors, and showcasing clever student thinking (Field Notes #1, January 19, 2023; Field Notes #5, February 23, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023); and (c) building student mastery by allowing multiple chances (Field Notes #4, February 9, 2023). Mitchell's contributions in the book club point to a mutual respect, community building, and collaboration.

Charles, agreeing with Windy and Mitchell, believed that the book club provided a space to become a more critical learner and educator. Charles described that he did not necessarily feel "challenged by [his fellow participants]," but rather the discussion in the book club brought awareness to different realities happening both within the school and the district and

mathematics education more broadly (Charles, Exit Interview, March 30, 2023; Field Notes #3, February 2, 2023). Furthermore, Charles asserted that book club discussions allowed him to see how his colleagues agreed with some of the concerns he has regarding equity and mathematics education at GAHS (Charles, Exit Interview, March 30, 2023). Additionally, Charles' own criticality highlighted how he fostered growth amongst participants (Mitchell Exit Interview, March 29, 2023; Field Notes #3, February 2, 2023). Charles provided his peers critical considerations to benefit their teaching by explaining how he meets students' individual needs through providing students concrete mathematical supports of taking extra time to tutor or time to build conceptual and prerequisite knowledge (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #4, February 9, 2023; Field Notes #7, March 16, 2023). Charles furthered his contributions through his consistent critical views on how systematic opportunity gaps are engineered in mathematics education (Field Notes #1, January 19, 2023; Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Field Notes #6, March 2, 2023; Field Notes #7, March 16, 2023; Charles, Reflection #2). Thus, Charles' experiences in the book club point to fostering critical collaboration and community building.

Helene believed that the camaraderie created in the book club allowed her to feel supported and welcomed despite her different lived realities as a mathematics teacher. Helene stated that sometimes she feels "uncomfortable" or "at odds" in mathematical spaces because she does not have the same depth of knowledge as her peers (Helene, Exit Interview, April 12, 2023). Furthermore, Helene explained that she has thorough knowledge of the courses that she has experienced in teaching, but the book club allowed her to connect with the fellow mathematics teachers because the conversation was "reading first" and the mathematical

practices folded in (Helene, Exit Interview, April 12, 2023). Helene also expressed that the ideas of the group not only allowed her to introduce more equitable mathematics resources into her classroom (Field Notes #2, January 26, 2023; Helene, Exit Interview, April 12, 2023) but also inspired her to become more critical of structures in general and mathematics education in particular (Field Notes #3, February 2, 2023).

Reaffirmed Participants' Praxes

Charles, Mitchell, and Windy agreed that the CFG book club reaffirmed their praxes. Charles detailed in his exit interview that he had not changed much of his practice. But "what the book club did was affirm what [he is] doing is what [he] should be doing" to support his student's individual needs (Charles, Exit Interview, March 30, 2023). Charles reported that he believed education generally, and mathematics education specifically, should be really individualized to support students' mathematical learning (Charles, Exit Interview, March 30, 2023). Charles described that his equitable practices of taking the time to understand where students need help, and then helping students develop pre-requisite mathematics skills of pre-algebra and numeracy while in higher level courses as meeting these individual needs (Charles, Exit Interview, March 30, 2023).

Mitchell agreed with the sentiment of reaffirming practices in his exit interview as he indicated that the texts read in the book club as well as the discussions with participants "reinforced" that his viewpoints on equity in the classroom were correct (Mitchell, Exit Interview, March 29, 2023). Mitchell specified that his following practices were reinforced: (a) showing compassion to students and practicing kindness, (b) allowing students to have multiple chances to demonstrate mastery of mathematics content in order to provide access and opportunity to all of his students, and (c) allowing his students to engage in "good [mathematics

classroom] chaos" or energetic dialogue and movement throughout his classroom to develop mathematical argumentation (Mitchell, Exit Interview, March 29, 2023).

Windy concurred that the professional learning space of the book club reaffirmed her practices as well. Although Windy recognized that the book club did not "change her" per se, she said the book club did remind her to centralize student voices and allow students to discover their own mathematics learning (Windy, Exit Interview, April 11, 2023). Windy also revealed that the book club readings emphasized why equitable mathematics practices of centering student voice, incorporating real-world relevancies, and allowing students to discover their own mathematics learnings are "vital" (Windy, Exit Interview, April 11, 2023). Windy argued that these practices allowed students to engage with mathematics as active learners rather than passive learners (Windy, Exit Interview, April 11, 2023).

Enhanced Participant's Praxis

Unlike her fellow participants, the CFG book club enhanced Helene's praxis. As shown in her exit interview, book club participation led to Helene increasing the number of project-based assessments and including more critical and equitable mathematics resources in her classroom (Helene, Exit Interview, April 12, 2023; Appendix I). Furthermore, Helene said based off conversations within the book club she "introduced a lot more choice in assessments and [class]work" (Helen, Exit Interview, April 12, 2023; Appendix I). Helene indicated that the readings within the book club, specifically *Pedagogy of the Oppressed* (Freire, 1970/2018) and the opening chapters of *Intersectionality* (Collins & Bilge, 2020), allowed her and her peers to consider: "What is our personal pedagogy? And what things can we do to help support that personal pedagogy?" (Helene, Exit Interview, April 12, 2023).

As revealed through data analysis, the critical questions related to developing and supporting personal pedagogy led to mutual collaboration and sharing of personal pedagogies that resulted in enhancements to Helene's praxis. During week 2 of the book club meetings, participants met to discuss *Inequity in Mathematics Education: Questions for Educators* (Weissglass, 2002) and the opening chapter of *Intersectionality* (Collins & Bilge, 2020). Through the discussions and reflections sparked by these pieces of literature, the participants began to negotiate how to attend to the tensions between teaching traditional or dominant mathematics concepts that are reflected in high school mathematics standards and meeting the needs of students by relating to the mathematics seen in the real world (Field Notes #2, January 26, 2023; Helene, Reflection #2). In this discussion, Helene expressed that she struggles to meet the needs of some of her learners in her geometry classroom. Helene stated that she and her students discuss how they see mathematics in real life by watching the news in her classroom and this helps the class to see where mathematics is in their immediate realities. Nonetheless, Helene explained that she finds it difficult to teach typical geometry standards such as trigonometry because she found it was hard to connect real world and classroom mathematics (Field Notes #2, January 26, 2023).

This sentiment caused Windy to offer Helene a piece of mathematics history that could be of interest. In that conversation, Windy recalled that the Pythagorean theorem was discovered in Alexandria, Egypt, and because of this origin, Egyptians utilized the Pythagorean theorem throughout Egyptian tiles and when building bridges (Field Notes #2, January 26, 2023). Furthermore, Windy offered Helene the suggestion of creating connectivity to the mathematics by detailing a real-life project within one of her courses. Windy indicated that this project offered students a way to build connection with mathematics by allowing them to choose data that they

found interesting. Windy went on to explain that she felt students were successful in their learning of this topic (Field Notes #2, January 26, 2023).

Throughout the book club, Helene established her vulnerability in mathematics spaces, particularly as someone who described herself as not necessarily having the same knowledge base as some of her fellow mathematics educator colleagues (Helene, Exit Interview, April 12, 2023). However, the collegial relationship between Helene and her fellow book club participants within this particular book club meeting, and those that followed, helped foster a shift for Helene (Field Notes #2, January 26, 2023; Field Notes #3, February 2, 2023; Helene Exit Interview). Helene ultimately constructed a project where she evaluated students' knowledge of the Pythagorean theorem by having students actively build accessibility ramps (see Figure 5) and consider how to create a design strategy for the school and community to accommodate people with physical disabilities (Appendix I).

In fact, due to Helene's pride in this project, she willingly provided pictures during the book club[27] (Figure 5). Moreover, Helene happily shared her project document with me following her exit interview (Appendix I). As indicated in her exit interview, Helene felt learning from fellow participants allowed for collaboration about curricular and instructional ideas that she was unaware of as these ideas were not discussed in her typical collaborative planning meetings (Helene, Exit Interview, April 12, 2023). The sharing of ideas via the critical friends group book club led Helene to construct a learning opportunity where she offered students choice and real-world ties. The project also inherently required critical inquiry and dialogue amongst

[27] Helene shared the pictures of her ramp project with me at the halfway point during book club. I was in the process of analyzing data from the prior week's book club and saw within my data that Helene was receptive to Windy's commentary on Egyptians using the Pythagorean theorem to build bridges. I then recalled Helene mentioning a project she was working on for her geometry students where they were using the Pythagorean theorem to build ramps. I immediately reached out to Helene via text message and clarified if this project was connected to the conversations in book club, and she confirmed this was indeed the case. Within the same clarifying conversation, Helene immediately sent me pictures of her students building ramps.

students within her classroom as students needed to consider social justice and mathematics at the same time (Appendix I for project details).

Figure 5

Students engaging in Helene's Ramp Project

Explicitly within this project, Helene required students to consider critical questions of accessibility and talk with peers about how differences in physical abilities promote challenges in the world. Helene also asked students to consider ways to make their community and school more accessible to those with physical disabilities. Helene then built on these critical questions by asking students to detail the process of finding lengths of right triangle legs and hypotenuses using the Pythagorean theorem to lend to the creation of these accessibility ramps. Helene subsequently helped students to create their accessibility ramps by asking students to use their prerequisite knowledge of calculating area and volume as well as current geometry knowledge of the Pythagorean theorem. Helene required students to find the following: (a) the cross-sectional

area of the right triangle creating the ramp; (b) the length on the ramp (i.e., the hypotenuse of the right triangle); and (c) the overall volume of the right triangular prism. Students then proceeded to work with peers to build models of these ramps using tape, glue, string, plastic cups, and popsicle sticks (Figure 5). Finally, Helene promoted student reflection in this project by asking students to reflect on the length of their ramps and how this ramp length ties into accessibility for those with physical disabilities as well as physical space of the design. This learning opportunity for students highlights a clear enhancement to Helene's curricular and instructional praxis.

Closing Thoughts

Within this chapter, I described the two overall findings revealed through data analysis. The first finding described the role of critical inquiries on participants' unique understandings of and implications of equity and intersectionality in their classrooms. Throughout the book club, Charles, Helene, Windy, and Mitchell negotiated definitions of equity by critically analyzing the structures that hinder equity. The data analysis revealed that the four participants considered equity to be impeded when those in power superficially use the term to justify decisions that counteract equity experts and when there exists a deprofessionalizing or apathetic view toward mathematics teachers and their varied responsibilities.

This critical inquiry of obstructions to equity within mathematics classrooms led to the four participants defining equity in the mathematics classroom as: (a) meeting mathematics students' individual needs; (b) promoting agency through students taking ownership of the mathematics being taught and learned; (c) developing and instituting curriculum and instruction where relevance and reasoning are connected; (d) creating communities and connectivity in mathematics classrooms and in school communities amongst educators, students, parents, and community members; and (e) creating and upholding high expectations for mathematics

students. Furthermore, data analysis indicated that the four participants understood equity and intersectionality to be intertwined.

The second finding highlighted how each participant found value in the book club, which led to reaffirmed or enhanced curricular and instructional praxes of the participants. Data analysis stressed the benefit of the CFG book club as a necessary professional development opportunity that focused on mathematics education. Charles, Helene, Windy, and Mitchell agreed that the book club centered equity, criticality, and mathematics and this centering led to connection and community with fellow mathematics educators across different mathematics disciplines.

The value of the book club ultimately led to reaffirmed or enhanced praxis. Windy, Charles, and Mitchell did not indicate a shift in their praxis per se but rather the data analysis revealed that the book club reaffirmed their current curricular and instructional strategies they each institute to uphold equity for their mathematics students. Helene's praxis, however, was enhanced. According to Helene, the book club gave her insight to equitable mathematics curricular and instructional strategies. Data analysis indicated that as a reaction to critical inquiry within the book club, Helene offered a more student-centered and real-world curricular and instructional opportunities within her mathematics classroom.

CHAPTER 6: CONCLUSION AND DISCUSSION

Overview of Study

Throughout history, hegemonic perspectives have been upheld within mathematics education (Battey & Leyva, 2015; Joseph, 1994; Martin, 2009; National Education Association of the United States, 1892; Stinson, 2004). The preservation of hegemonic ideals has led traditionally marginalized and minoritized groups to not benefit from mathematics curriculum and instruction to the same extent as those who are privileged. Despite the growing critical mathematics education researchers who identify these forms of hegemony and suggest practices to support equity of traditionally marginalized and minoritized populations, there exists little research addressing inequities and injustices in an intersecting and compounding matter rather than in parallel or isolation (Boaler, 1999, 2008, 2016; de Freitas, 2008; Frankenstein, 1990; Gutiérrez, 2002, 2009; Gutstein, 2003; Leyva et al., 2021; Seda & Brown, 2021). Hence, I argued to address issues of inequity and injustice in an intersecting and compounding manner, mathematics teachers need to use intersectionality as both a form of critical inquiry and a form of critical praxis to analyze, evaluate, and adjust mathematics education curricular and instructional practices in pursuit of equity for all students (Collins & Bilge, 2020; Bullock, 2018).

In this study, I used a qualitative and exploratory case study design within a critical realist intersectional frame to investigate the ways that four high school mathematics teachers' engagement with intersectionality as a method of critical inquiry and praxis via participation in a critical friends group book club influenced their curriculum and instructional decisions. The four participants in this study read, responded to, and discussed four preselected texts to build their understanding of intersectionality and equity in mathematics education (Collins & Bilge, 2020; Freire, 1970/2018; Seda & Brown, 2021; Weissglass, 2002).

Within this case study, I used the primary methods of book club discussions and interviews and the secondary methods of questionnaires, reading reflections, and documents. Book club discussions and interviews provided me with insights to how the participants were negotiating the concepts of intersectionality and equity and ultimately highlighted how participants instituted these concepts into their mathematics classrooms. Furthermore, these discussions and interviews presented how the four mathematics teachers' curricular and instructional praxis was reaffirmed or enhanced. The secondary method of questionnaires provided me necessary background information on all four participants prior to the book club beginning. Reading reflections afforded me the opportunity to see how each individual participant regarded the readings as the book club proceeded throughout the total 15-week process. Finally, supplemental documents provided by participants allowed me to highlight how curriculum and instruction of participants was influenced by the book club.

I then analyzed this data by combining methods of inductive qualitative content analysis and analysis of narrative. These analysis methods allowed me to analyze and synthesize the varied data collection methods and attend to my intersectional underpinnings as well as reveal the stories of the participants. Data analysis revealed how mathematics teachers came to their own understandings and implications of equity and intersectionality in their own mathematics classrooms. Additionally, the findings of this study showcase how participation in the critical friends group book club either reaffirmed or enhanced the four secondary mathematics teachers' curriculum and instructional praxis.

Findings Revisited and Conclusions

Finding One Overview

Of the two overarching findings, the first finding highlights how Charles, Helene, Windy, and Mitchell negotiated the definition of equity via critical inquiries of the structures that impede equity. Data analysis revealed that the four participants believed equity was impeded when: those in power superficially use the term equity to justify decisions that counteract equity experts and deprofessionalize mathematics teachers and overlook their varied responsibilities.

Furthermore, data analysis identified that through this critical inquiry, the four participants defined equity in the mathematics classroom as: (a) meeting mathematics students' individual needs; (b) promoting students' agency through students taking ownership of the mathematics being taught and learned; (c) developing and instituting curriculum and instruction where relevance and reasoning are connected; (d) creating communities and connectivity in mathematics classrooms and in school communities amongst educators, students, parents, and community members; and (e) creating and upholding high expectations for students. Moreover, data analysis highlighted that Charles, Helene, Windy, and Mitchell understood equity and intersectionality to be intertwined. The data from the four mathematics teachers indicated that for all the defined aspects of equity, intersectional inquiry is necessary. Likewise, the participants concurred that by instituting an intersectional perspective in the mathematics classroom vital aspects of equity are met.

Finding Two Overview

The second finding showcases how the personal curricular and instructional praxes of Windy, Mitchell, and Charles were reaffirmed and how the personal curricular and instruction praxis of Helene was enhanced. The exit interviews of Windy, Mitchell, and Charles and the

subsequent data analysis revealed that the CFG book club offered a much-needed professional learning space that focused on mathematics education. According to Windy, Mitchell, and Charles the book club offered an opportunity to discuss best practices and connect across different mathematics disciplines about critical curriculum and instructional strategies. Although the three mathematics teachers did not indicate a shift in their praxis, the data analysis revealed that the book club reaffirmed their current curricular and instructional strategies they each institute to uphold student agency, meeting mathematics students' individual needs, creating relevant and reasoning driven mathematics curriculum, creating connectivity, and maintaining high expectations for their students.

Data analysis indicated that Helene's praxis, however, was enhanced. Through discussions in the book club meetings, Helene commented how she gained needed insight to research-based, effective, and equitable mathematics curricular and instructional strategies. Data analysis indicated that as a reaction to critical inquiries within the book club, Helene offered a more student-centered and real-world curricular opportunity for her geometry students. Helene also centered more real-world and dialogic teaching within her geometry classroom.

Conclusions related to Critical Friends Groups and Book Clubs

The existing literature highlighted CFGs as spaces to create collaboration and enhance relationships among educators, influence educators' thinking and practice, and improve student learning (Auslander et al., 2018; Burke et al, 2011; Curry, 2008; Moore & Carter-Hicks, 2014). Research describes book clubs as professional development strategies that influence teacher curricular and instructional strategies as based on collaborative and reflective interactions stemming from common readings (Reilly, 2008; White, 2016). Furthermore, book clubs have

been known to be effective professional learning spaces for issues of equity, inclusion, and diversity within education (Mensah, 2009; Guerra & Nelson, 2008; Jacobs et al., 2011).

This study's critical friends book club centered the concepts of critical mathematics, equity, and intersectionality. Through the centering of these concepts, Charles, Helene, Windy, and Mitchell constructed their own meanings of equity and intersectionality but did so by forming relationships with peers and engaging with peers in a collaborative learning environment. Furthermore, the critical inquiry stemming from book club readings led to the four mathematics teachers reflecting on their practice. This reflection led participants in continuing with their critical and equitable mathematics curriculum and instruction practices with more confidence or actually promoted shifts in their praxis. In the end, the four participants reported that they believed students fared well due to these affirmations and/or shifts in their praxis (Mitchell Exit Interview; Charles Exit Interview; Helene Exit Interview; Windy Exit Interview). All in all, the findings of this study reinforced the effectiveness of book clubs and critical friends groups as professional development strategies to generate collaborative teacher environments, improve educator relationships, influence educators' reflection and praxes, improve student learning, and center equity.

Conclusions related to Intersectionality

The outcomes of the critical friends book club also added to the literature regarding intersectionality within mathematics education and STEM fields more broadly. The existing literature highlighted the usefulness of intersectional inquiry to identify the ways complex structures of oppression within mathematics education and STEM education marginalize students and educators (Bullock, 2018; Jones, 2019; Hoard, 2017; Leyva, 2016; Leyva et al.,

2021a; Leyva et al., 2021b). Nevertheless, this existing literature lacked the discussion of how intersectional inquiry turns into intersectional praxis within mathematics education spaces.

The critical friends book club and the four chosen texts (Collins & Bilge, 2020; Freire, 1970/2018; Seda & Brown, 2021; Weissglass, 2002) promoted critical inquiries amongst participants as well as formation of personal understandings and implications of equity and intersectionality for their classrooms. Perhaps more importantly though, engaging with the critical texts and subsequent critical inquiries within the book club fostered a reaffirmation or adoption of critical mathematics practices amongst participants (Boaler, 1999, 2008, 2016; de Freitas, 2008; Frankenstein, 1990; Gutiérrez, 2002, 2009; Gutstein, 2003; Leyva et al., 2021; Seda & Brown, 2021). In the end, the intersectional underpinnings of the study promoted critical inquiries within the book club, and these critical inquiries yielded critical praxes from the mathematics teachers. The renewed or enriched critical praxes of participants support the need of intersectional frameworks within mathematics education research and highlights how creating critical friendship and implementing intersectional analyses encourages a "praxis towards justice" within mathematics education spaces (Bullock, 2018, p. 141).

Delimitations and Limitations

Limitations within any research study are described as any "potential weaknesses that are usually out of the researcher's control and are closely associated with the chosen research design" (Theofanidis & Fountouki, 2018, p. 156). Nonetheless, there is a distinguishable difference between unconscious limitations, or limitations, and conscious limitation, or delimitations. Researchers describe delimitations as boundaries, decisions, or limits set by a researcher so that the aims or purposes of a study do not become impossible to achieve (Theofanidis & Fountouki, 2018, p. 157). Whereas researchers describe limitations as restrictions

to a research study that are imposed from the study or out of a researcher's control (Theofanidis & Fountouki, 2018, p. 156).

Delimitations

Delimitations of this study include the frequency of reliability checks. Prior to the study beginning, I had intended for reliability checks of weekly themes to occur immediately in the following book club discussion. Over the course of the book club however the participants' teaching responsibilities as well as responsibilities outside of their classroom resulted in inconsistent participant attendance at weekly book clubs. Although at every book club discussion there were at least two book club members present (besides myself), I made the decision to have reliability checks at only three points during the book club: following the introductory questionnaires in Week 2, during the book club's halfway point in Week 7, and succeeding exit interviews in Week 15 (see Table 2 for timeline). This decision was made after discussing this change with participants and agreeing that the decision allowed for more time to discuss the weekly readings. Also, this decision allowed for all members of the book club to receive information at the same time rather than needing to be caught up on weeks they missed.

Limitations

Limitations of this study include the timing of each book club, participant fidelity to book club commitments, the limited number of racially diverse participants, and my dual role as both a colleague and researcher. Prior to the study, I had intended for the book club to run for a continuous 8-week period followed up with a 2-week period of exit interviews. As to be expected (or anticipated), due to the complex lives of the four participants, there were a few weeks where the group opted to postpone a meeting due to factors such as attending IEP and 504 meetings, needing to take care of relatives, taking necessary breaks from school commitments,

and so on. Thus, rather than advancing with the book club as planned, I made the decision with participants to honor their intersectional realities and postpone book clubs during school breaks and when only one participant could attend meetings (see Table 2).

Additionally, at the beginning of the book club, I asked participants to commit to: the completion of an introductory questionnaire, weekly readings and reflections, attendance at weekly book club meetings, and an individual exit interview (see the recruitment email, Appendix A). As previously mentioned however over the course of the book club, the participants' teaching responsibilities as well as responsibilities outside of their classroom resulted in inconsistent participant attendance at weekly book club meetings as well as differing levels of fidelity to reading texts week-to-week and responding to reading reflections. Throughout the book club, Mitchell mentioned how during Week 5 and Week 12 his responsibilities inside and outside of school led him to not having a chance to read before meetings (see Table 2). Furthermore, Helene's commitments as a coach resulted in her not participating after Book Club Meeting 4,[28] except for completing an exit interview (see Table 2). Whereas Charles' responsibilities inside and outside of school led him to not having a chance to read before our final book club meeting (see Table 2).

The four participants various responsibilities also resulted in varied levels of interaction with reading reflections. Windy completed reflections for book club discussions 1, 2, 3, 5, and 6; Helene completed reflections for book club discussions 1 and 2; Charles only completely a reflection for only book club discussion 2; and Mitchell was unable to complete any reflections (see Table 2). Regardless of the reading or reflection completions, I encouraged each participant to attend book club discussions because the reading served as conduit for the critical

[28] When Helene brought forth the need to step away from the book club, she verbally consented to including her data in the book club and happily agreed to complete an exit interview.

conversations and collaboration. Therefore, even if participants could not read due to their various commitments, attendance at book club discussions still provided an opportunity for useful professional learning.

In addition to these realities, having limited racial diversity among participants within the study served as a limitation of this study. With my undergirding intersectional framework, it was intended for this work to invite participants who represent the diversity of faculty across categories of race, gender, sexual orientation, ability, nationality, and other categories in the department (Esposito & Evans-Winters, 2022). Unfortunately, due to the mathematics teachers of color's various commitments and/or the personal feelings regarding injustice and inequity at GAHS, only one participant considered themselves to not be a member of the dominant White race. As an intersectional researcher, I recognize the limited number of participants of color influenced the outcomes of the research to be unintentionally skewed toward dominant perspectives (Esposito & Evans-Winters, 2022; Cho et al., 2013; Choo & Ferree, 2010; Collins & Bilge, 2020). Consequently, it is imperative to continue intersectional research and professional development pursuits in mathematics education where we not only include more racially diverse teachers but also consider questions of why teachers from traditionally minoritized and marginalized backgrounds do not consider joining equity-oriented mathematics education studies and professional learning.

Finally, my role as a colleague and researcher served as a limitation of this study. Because of this dual role as well as my prolonged engagement within Glenn-Aurand High School, participants may (or may not) have freely expressed and shared their insights, thoughts, and reflections throughout the CFG book club. This study extended my collegial relationship to the participants, and thus, this collegial relationship may have influenced the level to which

discussion occurred. Furthermore, due to the documented power dynamics that exist between researchers and participants (Esposito & Evans-Winters, 2022; Vogt et al., 2012), I know that this may have limited contributions of participants. Finally, in my role as a White, able-bodied, heterosexual, English-speaking, upper-middle-class, early-career, cis-gendered, woman mathematics educator, I recognize that these categorizations (and others) occupy both spaces as the oppressor and the oppressed (Bullock, 2018; Cho et al., 2013; Choo & Ferree, 2010; Collins & Bilge, 2020; Crenshaw, 1989, 1991). Therefore, I know that these categorizations may have limited contributions of participants because they do affect the power dynamics of the research.

Implications for Mathematics Education Stakeholders

The conclusions of this study revealed implications for stakeholders within mathematics education. I first discuss implications within the specific field of mathematics education for both inservice and preservice K–12 mathematics teacher education. I then focus on implications for the wider fields of educational policy, curriculum development, and research.

Implications for Inservice and Preservice Mathematics Teacher Education

The conclusions of the study reinforced the effectiveness of critical friends groups and book clubs as professional development strategies to center equity and to engage mathematics teachers in intersectional inquiry and praxis. Hence, inservice and preservice mathematics educators deserve and desire more professional learning opportunities where equity is centered for and with mathematics teachers. Furthermore, gatekeeping aspects of mathematics education demand that inservice and preservice teachers have equity-oriented learning opportunities (Stinson, 2004; Berry, 2008; Battey, 2013; Leyva et. al, 2021a). This study offers an example of how to implement equity-oriented, intersectional, and mathematics education-focused professional development for inservice and preservice mathematics teachers.

Furthermore, the data analysis within the study and the personal stories of Windy, Mitchell, and Helene highlight the need for time to develop equity-oriented curricula in mathematics education. Throughout the book club Windy indicated that for her, the lack of critical mathematics curricula as well as the lack of time to develop said curricula served as an impediment to implementing more critical mathematics strategies in her mathematics classroom (Windy Exit Interview; Week 5 Field Notes; Windy Week 5 Reflection). Helene's implementation of more student-centered and real-world curricular opportunities for her students showcases how when inservice mathematics teacher are given professional learning opportunities to collaborate on critical mathematics curricula, students gain a more equitable learning environment (Helene Exit Interview; Week 2 Field Notes; see Figure 5).

This study offers a starting point for the development of this equity-oriented curricula, but inservice mathematics teachers need further supports in the form of tangible mathematics education equity-oriented resources, devoted contractual time to develop these equity-oriented mathematics curricula, and advocacy for equity-oriented mathematics curricula from administration and district leaders. Likewise, preservice mathematics teachers also need program officials, professors, and partnering teacher mentors willing to devote time and efforts to developing equity-oriented and critical mathematics curricula. Attending to the tensions of critical and dominant mathematics for all mathematics teachers is necessary for an equitable mathematics education future (Gutiérrez, 2002).

Implications for Educational Policy and Educational Companies

In a time where state legislation blocks criticality and hegemonic norms infiltrate the access points to the curricular and instructional strategies within K–12 classrooms (Protect Students First Act, 2022), it is imperative that policy makers and political educational entities

advocate for and construct opportunities for socially just, critical, culturally relevant, and equitable mathematics education curricular and instructional supports. Similarly, privatized educational companies have an opportunity to work with critical mathematics educators as co-conspirators in construction of equitable mathematics resources for the benefit of mathematics teachers and the students whom they teach. The findings of the study indicated that to achieve equity in mathematics education, intersectionality of complex systems must be considered (Collins & Bilge, 2020). Hence, larger sociopolitical realities outside of preservice and inservice mathematics teachers need to be considered for mathematics education become more equitable (Weissglass, 2002).

Implications for Future Mathematics Education Research

Despite the limited intersectional research within mathematics education spaces (Bullock, 2018), the conclusions of the study indicate the effectiveness of intersectional frameworks and offer a beckoning call to further intersectional pursuits in mathematics education. Specifically, further research should be conducted where more mathematics teachers of color are included as participants. A similar research study where more racially diverse mathematics teachers are included could foster a different kind of critical praxis and institute new questions to consider for critical inquiry and equity amongst secondary mathematics educators.

Furthermore, this study focused solely on how participants negotiated the ideas of equity and intersectionality and how engagement with equity and intersectionality subsequently influenced their mathematics curriculum and instructional praxis—there was not a focus on the success of students within mathematics classrooms as a result of mathematics teacher engagement with equity and intersectionality. Thus, there needs to be future mathematics

education research pursuits connecting student success to mathematics teacher professional development focused on the topics of intersectionality and equity.

Closing Thoughts

Altogether, the findings from this study showed the potential that intersectionality and equity professional development opportunities have in advancing critical praxes amongst mathematics teachers. The critical friendships cultivated in the book club offered a space where mathematics teachers considered, negotiated, and came to understand equity and intersectionality for themselves. The work presented here provides evidence of what it means to build a coalition of co-conspirators for the betterment of the learners of mathematics, whether they be children or adults. In particular, the rehumanizing efforts of Charles, Helene, Windy, and Mitchell serve as evidence for the necessary empathy required of educators and for educators who pursue equity and social justice, particularly in these politicized times.

As this research journey ends and a new critical education journey begins, I am left with the words of Helene: “I am intersectional myself” (Helene, Reflection #2). As mathematics educators, we must recognize and utilize intersectional frameworks to not only identify the ways hegemony, power, and oppression affect our curricular and instructional praxis but also how hegemony, power, and oppression affect mathematics educators and students. Therefore, mathematics educators must be vigilant and bold in our pursuits of social justice and equity and know that the work we face is often challenging. However, to better mathematics education, education in general, and society as a whole, mathematics educators must intersectionally persevere in the face of opposition and co-conspire inside and outside of mathematics classrooms to achieve equity for all.

References

Addams, J. (2017). The public school and the immigrant child. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 55–57). Routledge. (Original work published in 1908)

Anyon, J. (2014). *Radical possibilities: Public policy, urban education, and a new social movement* (2nd ed.). Routledge.

Anzaldúa, G. (2021). *Borderlands/La Frontera* (R. F. Vivancos-Pérez & N. E. Cantú, Eds.). Aunt Lute Books. (Original work published 1987).

Au, W. (2017). High-stakes testing and curriculum control: A qualitative metanalysis. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 295–312). (Original work published in 2007)

Auslander, S. S., Meyers, B., Schafer, N., Kavanagh, K., & Haardoerfer, R. (2018). Becoming critical friends: Developmental portraits of three professional learning communities. *National Teacher Education Journal, 11*(2), 23–39.

Battey, D. (2013). Access to mathematics: "A possessive investment in whiteness". *Curriculum Inquiry, 43*(3), 332–359

Battey, D., & Leyva, L. (2015). *Developing a framework for assessing the impact of whiteness in mathematics education* [Conference paper]. Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. East Lansing, MI, United States.

Baxter, P. & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544–559.

Berry, R. Q. (2008). Access to upper-level mathematics: The stories of successful African American middle school boys. *Journal for Research in Mathematics Education, 39*(5), 464–488.

Bhaskar, R. (2010). *Reclaiming reality: A critical introduction to contemporary philosophy*. Taylor & Francis. (Original work published in 1989)

Boaler, J. (1999). Participation, knowledge and beliefs: A community perspective on mathematics learning. *Educational Studies in Mathematics, 40*(3), 259–281.

Boaler, J. (2008). Promoting 'relational equity' and high mathematics achievement through an innovative mixed-ability approach. *British Educational Research Journal, 34*(2), 167–194.

Boaler, J. (2013). Ability and mathematics: The mindset revolution that is reshaping education. *Forum, 55*(1), 143–152.

Boaler, J. (2016). Designing mathematics classes to promote equity and engagement. *The Journal of Mathematical Behavior, 41*, 172–178.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27–40.

Bronner, S. E. (2011). *Critical theory: A very short introduction*. Oxford University Press.

Bullock, E. C. (2018). Intersectional analysis in critical mathematics education research: A response to figure hiding. *Review of Research in Education, 42*(1), 122–145.

Burbank, M. D., Kauchak, D., & Bates, A. J. (2010). Book clubs as professional development opportunities for preservice teacher candidates and practicing teachers: An exploratory study. *The New Educator, 6*(1), 56–73.

Burke, W., Marx, G. E., & Berry, J. E. (2011). Maintaining, reframing, and disrupting traditional expectations and outcomes for professional development with critical friends groups. *Teacher Educator, 46*(1), 32–52.

Chan, E. (2017). Teacher experiences of culture in the curriculum. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 323–336). Routledge. (Original work published in 2006)

Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of Women in Culture and Society, 38*(4), 785–810.

Choo, H. Y., & Ferree, M. M. (2010). Practicing intersectionality in sociological research: A critical analysis of inclusions, interactions, and institutions in the study of inequalities. *Sociological Theory, 28*(2), 129–149.

Clandinin, D. J., Murphy, M. S., Huber, J., & Orr, A. M. (2009). Negotiating narrative inquiries: Living in a tension-filled midst. *The Journal of Educational Research, 103*(2), 81–90.

Collins, P. H., & Bilge, S. (2020). *Intersectionality* (2nd ed.). Polity Press.

Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. *Educational Researcher, 19*(5), 2–14.

Connolly, K. (2007). Introduction to Part 2: Exploring narrative inquiry practices. *Qualitative Inquiry, 13*(4), 450–453.

Cooper, A. J. (2017). *A voice from the south: By a Black woman of the south.* DocSouth Books Edition. (Original work published 1892)

Corson, D. (1991). Bhaskar's critical realism and educational knowledge. *British Journal of Sociology of Education, 12*(2), 223–241.

Council of Chief of State School Officers. (2010). *Common core state standards for mathematics.* https://learning.ccsso.org/wp-content/uploads/2022/11/Math_Standards1.pdf

Crenshaw, K. W. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum, 1989*, 139–167.

Crenshaw, K. W. (1991). Mapping the margins: Intersectionality, identity politics and violence against Women of Color. *Stanford Law Review, 43*, 1241–1299.

Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches.* (3rd ed.). Sage.

Crotty, M. (2003). *Foundations of social research: Meaning and perspectives in the research process.* Sage.

Curry, M. W. (2008). Critical friends froups: The possibilities and limitations embedded in teacher professional communities aimed at instructional improvement and school reform. *Teachers College Record, 110*(4), 733–774.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. Teachers College Press.

de Freitas, E. (2008). Troubling teacher identity: Preparing mathematics teachers to teach for diversity. *Teaching Education, 19*(1), 43–55.

DeWalt, K. M. & DeWalt, B. R. (2010). *Participant observation: A guide for fieldworkers* (2nd ed.). AltaMira Press.

Dewey, J. (1997). *Experience & education.* (Original work published 1938)

Dewey, J. (2017). My pedagogic creed. In D. J. Flinders & S.J. Thornton (Eds.) *The curriculum studies reader.* (5th ed., pp. 33–40). Routledge. (Original work published in 1929)

Dewey, J. (1976). The child and the curriculum. In J. A. Boydston (Ed.), *Essays on logical theory 1902-1903: The middle works of John Dewey 1899-1924* (Vol. 2, pp. 271–291). Carbondale: Southern Illinois University Press. (Original work published 1902)

DuBois, W. E. B. (1924). *Diuturni Silenti.*

Egbert, J., & Sanden, S. (2019). *Foundations of education research: Understanding theoretical components* (2nd ed.). Routledge.

Ernest, P. (1991) *The philosophy of mathematics education.* The Falmer Press.

Esposito, J., & Evans-Winters, V. (2022). *Introduction to intersectional qualitative research.* Sage.

Flinders, D. J., & Thornton, S. J. (Eds.). (2017). *The curriculum studies reader* (5th ed.). Routledge.

Frankenstein, M. (1990). Incorporating race, gender, and class issues into a critical mathematical literacy curriculum. *Journal of Negro Education, 59*, 336–347.

Freire, P. (2018). *Pedagogy of the oppressed* (M. B. Ramos, Trans.; 50th ann. ed.). Bloomsbury Publishing. (Original work published 1970)

Gay, G. (2002). Preparing for culturally responsive teaching. *2001 AACTE Outstanding Writing Award, 53*(2), 106–116.

Geertz, C. (1973). Thick description: Toward an interpretative theory of culture. In C. Geertz (Ed.), *The interpretation of cultures: Selected essays* (pp. 3–30). Basic Books.

Georgia Department of Education. (2023). *Mathematics Georgia standards of excellence (GSE) algebra I.* https://www.georgiastandards.org/Georgia-Standards/Frameworks/Algebra-I-Standards.pdf

Gonzalez, L. (2012). Valuing the process: Working with teachers around mathematics for social justice. In A. A. Wager & D. W. Stinson (Eds.), *Teaching mathematics for social justice: Conversations with educators* (pp. 127–143). National Council of Teachers of Mathematics.

Guerra, P. L., & Nelson, S. W. (2008). Use book studies to generate frank talk about beliefs and practices. *The Learning Professional, 29*(3), 43.

Gutiérrez, R. (2002). Enabling the practice of mathematics teachers in context: Toward a new equity research agenda. *Mathematical Thinking & Learning, 4*(2-3), 145–187.

Gutiérrez, R. (2009). Embracing the inherent tensions in teaching mathematics from an equity stance. *Democracy & Education, 18*(3), 9–16.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37–73.

Hoard, A. B. (2017). *A Black feminist book club as a multicultural professional development model for inservice secondary science teachers* (Publication No. 10273421) [Doctoral dissertation, Columbia University]. ProQuest Dissertations Publishing.

Jacobs, J., Assaf, L. C., & Lee, K. S. (2011). Professional development for teacher educators: Conflicts between critical reflection and instructional-based strategies. *Professional Development in Education, 37*(4), 499–512.

Joseph, G. G. (1994). The politics of anti-racist mathematics. *European Education, 26*(1), 67.

Jones, T. C. (2019). Creating a world for me: Students of color navigating STEM identity. *Journal of Negro Education, 88*(3), 358–378.

Kailin, J. (1994). Anti-racist staff development for teachers: Considerations of race, class, and gender. *Teaching and Teacher Education, 10*, 169–184.

Kalinec-Craig, C., & Prasad, P. V. (2019). *An exploratory case study of positioning and whiteness in a secondary mathematics teacher professional development* [Conference Paper]. Proceedings of the 41st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. St. Louis, MO, United States.

Keats, P. A. (2009). Multiple text analysis in narrative research: Visual, written, and spoken stories of experience. *Qualitative Research, 9*(2), 181–195.

Kendi, I. (2019). *How to be an antiracist*. One World Publishing.

Kneller, G. (1984). *Movements of thought in modern education.* Wiley.

Kohlbacher, F. (2006). The use of qualitative content analysis in case study research. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, 7*(1), 1–30.

Kooy, M. (2006). The telling stories of novice teachers: Constructing teacher knowledge in book clubs. *Teaching and Teacher Education, 22*(6), 661–674.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal, 32*, 465–491.

Ladson-Billings, G. (2006). From the achievement gap to the education debt: Understanding achievement in US schools. *Educational Researcher, 35*(7), 3–12.

Leistyna, P., Woodrum, A., & Sherblom, S. A. (Eds.). (1996). *Breaking free: The transformative power of critical pedagogy*. Cambridge, MA: Harvard Educational Review.

Leyva, L. A. (2016). *'Mapping the margins [in mathematics]': Examining the gendered and racialized intersectionality of mathematics experiences among African American and Latina/o undergraduate students in a large, predominantly White university* (Publication No. 10291929) [Doctoral dissertation, Rutgers the State University of New Jersey]. ProQuest Dissertations Publishing.

Leyva, L. A., McNeill, R. T., Marshall, B. L., & Guzmán, O. A. (2021a). "It seems like they purposefully try to make as many kids drop": An analysis of logics and mechanisms of racial-gendered inequality in introductory mathematics instruction. *The Journal of Higher Education, 92*(5), 784–814.

Leyva, L. A., Quea, R., Weber, K., Battey, D., & López, D. (2021b). Detailing racialized and gendered mechanisms of undergraduate precalculus and calculus classroom instruction. *Cognition and Instruction, 39*(1), 1–34.

Lim, S. G., Tsutakawa, M., & Donnelley, M. C. (Eds.). (1989). *The forbidden stitch.* Calyx Books.

Love, B. (2019). *We want to do more than survive: Abolitionist teaching and the pursuit of educational freedom.* Beacon Press.

Marx, K. & Engels, F. (2002). *The Communist manifesto with an introduction by Gareth Stedman Jones.* Penguin Classics. (Original work published in 1848).

Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record, 111*(2), 295–338.

Marshall, C., Rossman, G. B., & Blanco, G. L. (2021) *Designing qualitative research* (7th ed.). Sage.

Mayring, P. (2000). Qualitative content analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 1*(20). https://doi.org/http://nbn-resolving.de/urn:nbn:de:0114-fqs0002204.

Mensah, F. M. (2009). Confronting assumptions, biases, and stereotypes in preservice teachers' conceptualizations of science teaching through the use of book club. *Journal of Research in Science Teaching, 46*(9), 1041–1066.

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. Jossey-Bass.

Merriam, S. B., & Bierema, L. L. (2015). *Adult learning: Linking theory and practice*. Jossey-Bass.

Miller, F. A. & Alvarado, K. (2005). Incorporating documents into qualitative nursing research. *Journal of Nursing Scholarship, 37*(4), 348–353.

Montessori, M. (2017). A critical consideration of the new pedagogy in its relation to modern science. In D. J. Flinders & S. J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 99–32) Routledge. (Original work published in 1917)

Moore, Jur. A., & Carter-Hicks, J. (2014). Let's talk! Facilitating a faculty learning community using a critical friends group approach. *International Journal for the Scholarship of Teaching & Learning, 8*(2), 1–17.

Moraga, C., & Anzaldúa, G. (Eds.). (2021). *This bridge called my back: Writings by radical Women of Color* (40th ed). SUNY Press.

Mostyn, B. (1985). The content analysis of qualitative research data: A dynamic approach. In M. Brenner, J. Brown, & D. Canter (Eds.), *The research interview* (pp. 115–145). Academic Press.

National Council of Teachers of Mathematics (2014). *Principles to actions: Ensuring mathematical success for all.* Reston, VA: National Council of Teachers of Mathematics

National Education Association of the United States, Committee of Ten on Secondary Education. (1892). *Report of the Committee [of Ten] on secondary schools.*

No Child Left Behind Act of 2001, 20 U.S.C. § 6301 *et seq.* (2001). https://www.congress.gov/bill/107th-congress/house-bill/1/text

Noddings, N. (2017). The false promise of the Paideia: A critical review of the Paideia proposal. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 197–205). Routledge. (Original work published in 1983)

Noddings, N. (2017). The common core standards. In D. J. Flinders & S. J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 449–460). Routledge. (Original work published in 2015)

Noguera, P. A. (2003). *City schools and the American dream*. Teachers College Press.

Oakes, J. (1982). The reproduction of inequity: The content of secondary school tracking. *The Urban Review, 14*(2), 107–120. https://doi.org/10.1007/BF02174647

Ohito, E. O. (2016). Making the emperor's new clothes visible in anti-racist teacher education: Enacting a pedagogy of discomfort with white preservice teachers. *Equity & Excellence in Education, 49*(4), 454–467.

Otter.ai. (2023). *Otter pro plan* [Computer Software]. Otter.ai. https://otter.ai

Peterson, B. (2012). Numbers count: Mathematics across the curriculum. In A. A. Wager & D. W. Stinson (Eds.), *Teaching mathematics for social justice: Conversations with educators* (pp. 147–159). National Council of Teachers of Mathematics.

Polkinghorne, D. E. (1995). Narrative configuration in qualitative analysis. *International Journal of Qualitative Studies in Education, 8*(1), 5–23.

Powell, G. C. (2012). Teaching mathematics for social justice: The end of "When are we ever going to use this?". In A. A. Wager & D. W. Stinson (Eds.), *Teaching mathematics for social justice: Conversations with educators* (pp. 187–197). National Council of Teachers of Mathematics.

Prior, L. (2003). *Using documents in social research*. Sage.

Protect Students First Act, O.C.G.A. § 20 (2022). https://www.legis.ga.gov/legislation/61477

Quirkos for MacOS. (2022). *Quirkos qualitative software* (Version 2.5) [Computer Software]. Quirkos. https://www.quirkos.com/get.html

Race to the Top Act of 2013, H.R. 426, 113th Cong. (2013). https://www.congress.gov/bill/113th-congress/house-bill/426

Rafe, M. M., Noaparast, K. B., Hosseini, A. S., & Sajadieh, N. (2020). An examination of Roy Bhaskar's critical realism as a basis for educational practice. *Journal of Critical Realism, 20*(1), 56–71.

Ravitch, S. M., & Carl, N. M. (2021). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (2nd ed.). Sage.

Reilly, M. A. (2008). Occasioning possibilities, not certainties: Professional learning and peer-led book clubs. *Teacher Development, 12*(3), 211–221.

Robinson, M. (1851, June 21). Women's rights convention – Sojourner Truth. *Anti-Slavery Bugle*. https://chroniclingamerica.loc.gov/lccn/sn83035487/1851-06-21/ed-1/seq-4/

Roulston, K. (2010). *Reflective interviewing: A guide to theory and practice*. Sage.

Rousseau, C., & Tate, W. F. (2003). No time like the present: Reflecting on equity in school mathematics. *Theory Into Practice, 42*(3), 210–216.

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). Sage.

Seda, P., & Brown, K. (2021). *Choosing to see: A framework for equity in the math classroom.* Dave Burgess Consulting.

Sleeter, C., & Stillman, J. (2017). Standardizing knowledge in a multicultural society. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 279–294). Routledge. (Original work published 2005)

Stake, R. E. (1978). The case study method in social inquiry. *Educational Researcher, 7*(2), 5–8.

Stake, R. E. (1995). *The art of case study research.* Sage.

Stinson, D. W. (2004). Mathematics as "gate-keeper" (?): Three theoretical perspectives that aim toward empowering all children with a key to the gate. *Mathematics Educator, 14*(1), 8–18.

Stinson, D. W., & Walshaw, M. A. (2017). Exploring different theoretical frontiers for different (and uncertain) possibilities in mathematics education research. In J. Cai (Ed.), *Compendium of research in mathematics education* (pp. 128–155). National Council of Teachers of Mathematics.

Stocker, D. (2012). Toys for boys? Challenging domestic violence using mathematics. In A. A. Wager & D. W. Stinson (Eds.), *Teaching mathematics for social justice: Conversations with educators* (pp. 161–174). National Council of Teachers of Mathematics.

Taylor, P. C., & Medina, M. (2011). Educational research paradigms: From positivism to pluralism. *College Research Journal, 1*(1), 1–16.

The Combahee River Collective. (2014). A Black feminist statement. *Women's Studies Quarterly, 42*(3-4), 271–280. https://doi.org/10.1353/wsq.2014.0066 (Reprinted from "A Black Feminist Statement", 1978, *Capitalist Patriarchy and the Case for Socialist Feminism.*)

Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing, 7*(3), 155–162.

Valenzuela, A. (2017). Subtractive schooling, caring relations, and social capital in the schooling of U.S.-Mexican youth. In D. J. Flinders & S.J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 267–278). Routledge. (Original work published 2005)

Vogt, W. P., Gardner, D. C., & Haeffele, L. M. (2012). *When to use what research design.* Guilford Press.

Wager, A. A., & Stinson, D. W. (Eds.). (2012). *Teaching mathematics for social justice: Conversations with educators.* Reston, VA: National Council of Teachers of Mathematics.

Wamsted, J. O. (2012). Five things you should probably know about teaching mathematics for social justice. In A. A. Wager & D. W. Stinson (Eds.), *Teaching mathematics for social justice: Conversations with educators.* (pp. 175–185). National Council of Teachers of Mathematics.

Warburton, T. T. (2015). *Solving for irrational zeros: Whiteness in mathematics teacher education* (Publication No. 10010629) [Doctoral dissertation, The University of Utah]. ProQuest Dissertations Publishing.

Watkins, W. H. (2017). Black curriculum orientations: A preliminary inquiry. In D. J. Flinders & S. J. Thornton (Eds.), *The curriculum studies reader* (5th ed., pp. 219-234). Routledge. (Original work published 1993)

Weissglass, J. (2002). Inequity in mathematics education: Questions for educators. *The Mathematics Educator, 12*(2), 34–39.

White, K. M. (2016). Professional development that promotes powerful interactions: Using teacher book clubs to reflect on quality in teacher-child relationships. *Dimensions of Early Childhood, 44*(3), 28–34.

Yazan, B. (2015). Three approaches to case study methods in education: Yin, Merriam, and Stake. *The Qualitative Report, 20*(2), 134–152.

Appendices

Appendix A

Recruitment Email

Georgia State University
Department of Middle and Secondary Education

Hello Colleague,

I hope this email finds you well. As you may be aware, I am currently in the final year of my Ed.D. program at Georgia State University. This means that I have defended the first three chapters of my dissertation, and I am beginning the research process associated with my program. Over the last two years, I have learned a great deal and I am hoping to have the opportunity to share some of this experience with you through my dissertation research. This is ultimately why I am reaching out.
Currently, I need research participants for my dissertation. The current title of my research and purpose and research questions are below:
Title
Mathematical Voices from the South: Books Clubs as a Conduit for Intersectional Inquiry and Praxis with a High School Mathematics Teacher Critical Friends Group

Purpose and Research Questions
This proposed study aims to investigate the ways that high school mathematics teachers' engagement with intersectionality as a method of critical inquiry and praxis through participation in a book club influences (or not) their curriculum and instructional decisions. Intersectionality within this study is defined as a way to analyze and act upon how categories of race, ethnicity, class, gender, nationality, citizenship status, ability, language, and others mutually shape one another, intersect, and lead to power relations that influence the complex social relations in mathematics classrooms (Collins & Bilge, 2020). Two research questions will guide this proposed study:

3. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do mathematics teachers negotiate the ideas of equity and intersectionality?
4. As secondary mathematics teachers participate in a professional development book club on equity and intersectionality in mathematics classrooms, how do they perceive this influencing (or not) their curriculum and instructional praxis?

Due to my beliefs and personal experiences regarding mathematics education as well as being a member of this mathematics department over the last five years, I believe it is necessary for mathematics teachers to have experiences where they have equity focused professional learning experiences within our discipline. Also, I believe mathematics teachers (and all teachers for that matter) need equity focused professional learning where we respond to the multiple complexities and intersecting inequities (e.g., race, class, gender, etc.) in education rather than focusing on one form of inequity in isolation. This research project has the potential to be very valuable for the

education community, but particularly the mathematics education community, as there is very limited research which exists that looks at educational equity from an intersectional lens. Hence, participation in the research has the potential to be groundbreaking and causing more equitable practice beyond our school district. If you would like more information regarding my current thoughts and the literature I am drawing from, I will gladly forward you my first three chapters of my dissertation.

If you choose to participate in the research study, your participation will include the following:

1. Completion of an introductory questionnaire detailing demographic information such as education, upbringing, socioeconomic status, race, language, etc. and experiences in mathematics education. This questionnaire will take place outside of school prior to the book club readings and meetings beginning. (Approximate time: 1 hour).

2. Completion of weekly book club readings and eight short weekly Flipgrid reflection prompts regarding weekly readings. I will provide the necessary books and readings and I will moderate the Flipgrid for reflections. The Flipgrid you will be posting to will be private meaning you and I as the moderator will be the only people able to see your responses. Both the reflections and reading will take place outside of school prior to the weekly book club meeting. (Approximate time: 2 hours per week).

3. Participation in an eight-week book club where you will read, discuss, and reflect upon weekly reading. We will meet in my classroom following a school day once a week. The day in which we meet will be what works best with participants. (Approximate time: 1 hour per week).

4. One individual 45-to-60-minute exit interview. The interview will occur during an agreed upon day within one month following the completion of the book club meetings. The interview will occur virtually over the video platform Google Meets and will be recorded. (Approximate time: 1 hour).

5. Providing any curriculum and instructional documents that you think may have been influenced by participation in this book club. Documents may include pacing guides, lesson plans, assessment documents, classroom activities, and other curriculum documents.

Please know that all information will be confidential. Both Georgia State University and City Schools of Decatur required my completion of a rigorous process of approving research. Both educational entities do this rigorous process to maintain high ethical standards with research participants. Moreover, please know that all names involved including participants, school, district, state, etc. will be covered through a process of group reporting and by using pseudonyms. Additionally, I hope it is clear, but all of you, my wonderful department colleagues, truly are some of my biggest blessings, and I will never allow anything which causes harm or embarrassment to be included in data reporting. Furthermore, to ensure that this does not happen, I will have participant review of data throughout the book club and prior to completion of my final chapters. Finally, to uphold ethics and to ensure that I receive proper guidance throughout

this research process, I have three members of my doctoral committee who all will hold me to the highest standards. Below are their titles so that you are familiar:

Dr. David W. Stinson, Professor of Mathematics Education
Dr. Pier A. Junor Clarke, Clinical Professor of Mathematics Education
Dr. Caroline S. Sullivan, Professor, Director of Initial Teacher Preparation, and Director of the Ed.D. in Curriculum and Instruction

I know as teachers, partners, friends, parents, coaches, and the numerous other titles you carry, you are very busy. Thus, if you can participate in this research study, please anticipate an approximate 20-hour commitment over a two-month period. Below is a table to describe the time necessary each week.

Week	Readings	Activity	Time Required
Week 0	n/a	Introductory Questionnaire	30 minutes–1 hour
Week 1	Chapter 1 and 2 Pedagogy of the Oppressed	Establishing Group Norms Reading Reflection	2 hours–3 hours
Week 2	Weissglass Article and Chapter 1 of Intersectionality	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 3	Chapter 2 of Intersectionality	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 4	Chapter 7 of Intersectionality	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 5	Preface, Introduction & Chapter 1 Choosing to See	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 6	Chapter 2 & Chapter 3 Choosing to See	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 7	Chapter 4 & Chapter 5 Choosing to See	Reading Reflections; Participants may bring Documents	2 hours–3 hours
Week 8	Chapter 6, Chapter 7 & Conclusion Choosing to See	Final Reflection; Participants may bring Documents	2 hours–3 hours

Weeks 9 - 12	n/a	Individual Follow-Up Exit Interviews; Participants may bring Documents	45 minutes–1 hour
Totals	n/a	n/a	17 hours and 15 minutes–26 hours

I anticipate starting this book club during the first few weeks of January, and I hope that you can participate, but if you cannot, I completely understand. Whether or not you can participate, please either reach out via email, connect with me via text or call, or come chat with me! My number and email are below.

Hope to hear from you soon!

Rachel Seasholtz

Cell: (404)-863-0222

GSU Email: rseasholtz1@student.gsu.edu

Appendix B

Informed Consent Form

Georgia State University
Department of Middle and Secondary Education
Informed Consent

Title:	Mathematical Voices from the South: Books Clubs as a Conduit for Intersectional Inquiry and Praxis with a High School Mathematics Teacher Critical Friends Group
Principal Investigator:	Dr. David W. Stinson
Co-Principal Investigator:	Dr. Pier A. Junor Clarke
Secondary Investigator:	Rachel Seasholtz

I. Purpose:

We invited you to participate in a research study. This proposed study aims to investigate the ways that high school mathematics teachers' engagement with intersectionality as a method of critical inquiry and praxis through participation in a book club influences (or not) their curriculum and instructional decisions. We invited you to participate in this study because you are a member of the high school mathematics department. Participation will entail an eight-week book club. This book club will require completion of an introductory questionnaire, two to three hours weekly to read, discuss, and reflect on book club readings, one 45-to-60 minute follow up exit-interview, and access to curriculum and instructional document data.

II. Procedures:

If you decide to participate, you will engage in a weekly book club where the secondary investigator, fellow participants, and yourself will be discussing and reflecting upon book club readings. During these weekly book club meetings, the secondary investigator will be taking field notes and participants will respond to reflection prompts via short videos on Flipgrid. Following the eight-week book club, you will be asked to complete a follow-up exit interview. This exit interview will occur for a one-hour time block on an agreed upon day within one month following the completion of the book club meetings. The interview will occur virtually over the video platform Google Meets. Additionally, throughout and following the book club, you are encouraged to bring any curricular and instructional documents in the forms of curriculum pacing guides, lesson plans, assessment documents, and other curriculum documents. Document data will be analyzed.

III. Risks:

In this study, you will not have any more risks than you would in a normal day of life.

IV. Benefits:

Participation could provide insight to how intersectional inquiry and praxis, critical friends groups, and/or book clubs influence mathematics curriculum and instruction which could be beneficial for future mathematics education research. Additionally, through participation in this study, improvements to your personal curricular and instructional practice can occur.

V. Voluntary Participation and Withdrawal:

Participating in this research is voluntary. You may skip any question and/or stop participating at any time. Regardless of your participation, your treatment in your workplace and any benefit to which you are entitled to will not be compromised.

VI. Contact Persons:

Contact Dr. David W. Stinson at dstinson@gsu.edu, Dr. Pier A. Junor Clarke at pjunor@gsu.edu, or Rachel Seasholtz at 404-863-0222, rseasholtz@csdecatur.net, or rseasholtz1@student.gsu.edu if you have questions, concerns, or complaints about this study.

VII. Copy of Consent Form to Participant:

We will give you a copy of this consent form to keep.

If you are willing to volunteer for this research and be audio and video recorded, please sign below.

_____ _____

Participant Date

_____ _____

Principal Investigator or Researcher Obtaining Consent Date

Appendix C

Background Questionnaire Questions

Family Background

1. What is your name?
2. What pseudonym would you like to use for this research study?
3. What is your age range?
    a. 20 – 29
    b. 30 – 39
    c. 40 – 49
    d. 50 – 59
    e. 60 – 69
    f. 70 +
4. Where were you born and raised?
5. How much education did/do your parents (guardians) have?
6. How much education do you have? Please detail degree(s) and major(s).
7. What five categories of your identity are most important to you or most influenced your life? Examples include: race, class, gender, sexual orientation, religion, etc. Please rank them from most important/influential to fifth most important/influential.

Primary and Secondary Education

8. Describe your elementary and middle schools. How would you describe your classmates, and your teacher (in terms of race, class, gender, socioeconomic status, and other categories)?
9. Describe your high school. How would you describe your classmates, and your teacher (in terms of race, class, gender, socioeconomic status, and other categories)?
10. What were the primary ways you learned mathematics in your primary and secondary schools?
11. During your primary and secondary schooling, what did success look like in mathematics? What did these successful mathematics students have access to?
12. In what ways did you primary and secondary teachers incorporate your background into mathematics learning?
13. During your primary and secondary schooling, did your mathematics teachers seek to know you as a person? Did you connect with mathematics teachers outside of class?
14. When you were learning mathematics during primary and secondary school, what forms or categories of your identity were most important to you or most influenced your learning? Examples include: race, class, gender, sexual orientation, religion, etc.

College Education

15. Describe the college you went to for your undergraduate degree. Approximately what percentage of your classes would be considered STEM (science, technology, engineering, mathematics) or STEM education courses?
16. How would you describe your STEM classmates and your teachers (in terms of race, class, gender, socioeconomic status, and other categories)?

17. How would you describe your STEM education classmates and your teachers (in terms of race, class, gender, socioeconomic status, and other categories)?
18. What were the primary ways you learned mathematics in your college?
19. During your undergraduate schooling, what did success look like in mathematics? What did these successful mathematics students have access to?
20. In what ways did you undergraduate teachers incorporate your background into mathematics learning?
21. When you were learning mathematics during college, what forms or categories of your identity were most important to you or most influenced your learning? Examples include: race, class, gender, sexual orientation, religion, etc.

Equity and Mathematics Education

22. Describe the classes that you teach. How would you describe your students (in terms of race, class, gender, socioeconomic status, and other categories)?
23. What are the primary ways you teach mathematics in your classroom?
24. How do you plan meaningful mathematical activities? How do you plan to teach math?
25. What is your experience with equity in educational contexts?
26. How do you define equity in mathematics education?
27. How do you plan and teach mathematics to students of diverse backgrounds?
28. How do you plan to attend to issues of equity in your mathematics classroom?

Adapted from "A Black Feminist Book Club as a Multicultural Professional Development Model for Inservice Secondary Science Teachers," by A. B. Hoard, 2017, pp. 192-194. Copyright 2017 by ProQuest.

Appendix D

Exit Interview Questions

Mathematical Voices from the South: Books Clubs as a Conduit for Intersectional Inquiry and Praxis with a High School Mathematics Teacher Critical Friends Group

Date…….
Time…….
Location……..
Interviewer…….
Interviewee Identifier……

This interview is being conducted during the week of _____ to_____. This interview will help us better understand how engagement with intersectionality as a method of critical inquiry and praxis through participation in a book club has influenced (or has not) your curriculum and instructional decisions. You have received a consent form to sign at the beginning of this study, which indicates your consent to the interview. The interview is being audio recorded.

Questions and Probes

1. Throughout this book club we have discussed many topics from critical pedagogy, equity in mathematics education, and intersectionality. Can you please share what were some of your biggest takeaways from this book club?

    a. In what ways were you challenged or supported by your colleagues in this book club?

2. Based on your participation in this book club, what changes were made to your practice?

    a. What were some of the consistencies or affirmations to your practice after engaging in this book club?
    b. Do you have any documents you would like to share that highlight these changes?
    c. How do you think students fared based on these changes/consistencies in curriculum and instruction?
    d. Is there anything you learned in this book club that you believe enhanced your practice? Is there anything you learned in this book club that you believe did not enhance your practice?

3. During this book club we paid specific attention to equity and intersectionality. How do you define equity and intersectionality within your mathematics classrooms?

    a. You mentioned (reiteration of topic) what has that done for your practice?

4. At the beginning of this study, you were asked to the self-identify and self-rank five terms which describe your identity. These are the five terms: ____, ____, _____, _____, and ____ ranked from most influential to least influential. Would you like to change any of these selected terms and/or would like to change any of these rankings? Please explain your choices.

5. I appreciate you coming in and talking to me today. This has been very helpful. Are there any other final thoughts you'd like to share regarding your experiences with this book club?

    a. If you were to give guidance to other mathematics teachers regarding equity and intersectionality, what would it be?
    b. Were there any questions or topics related to book clubs, equity and intersectionality, or curricular/instructional practice you wish were included in this interview?

Appendix E

Book Club Discussion Prompts

1. The current categories I have reduced my data to are _____. How do these categories resonate or disagree with you?

2. This week we read _____. What were initial thoughts, feelings, or insights that you had related to this reading?

3. Was there any portion of the reading that challenged you or made you rethink?

    a. What implications do you think this will have or has this had on your teaching practice?

4. Was there any portion of this reading that stood out to you? Why?

5. Was there any portion of this reading that you feel connects to prior readings? What portion and how does this connect to our prior readings?

6. I appreciate you attending this week's book club. Are there any other final thoughts you'd like to share regarding the reading this week?

Appendix F

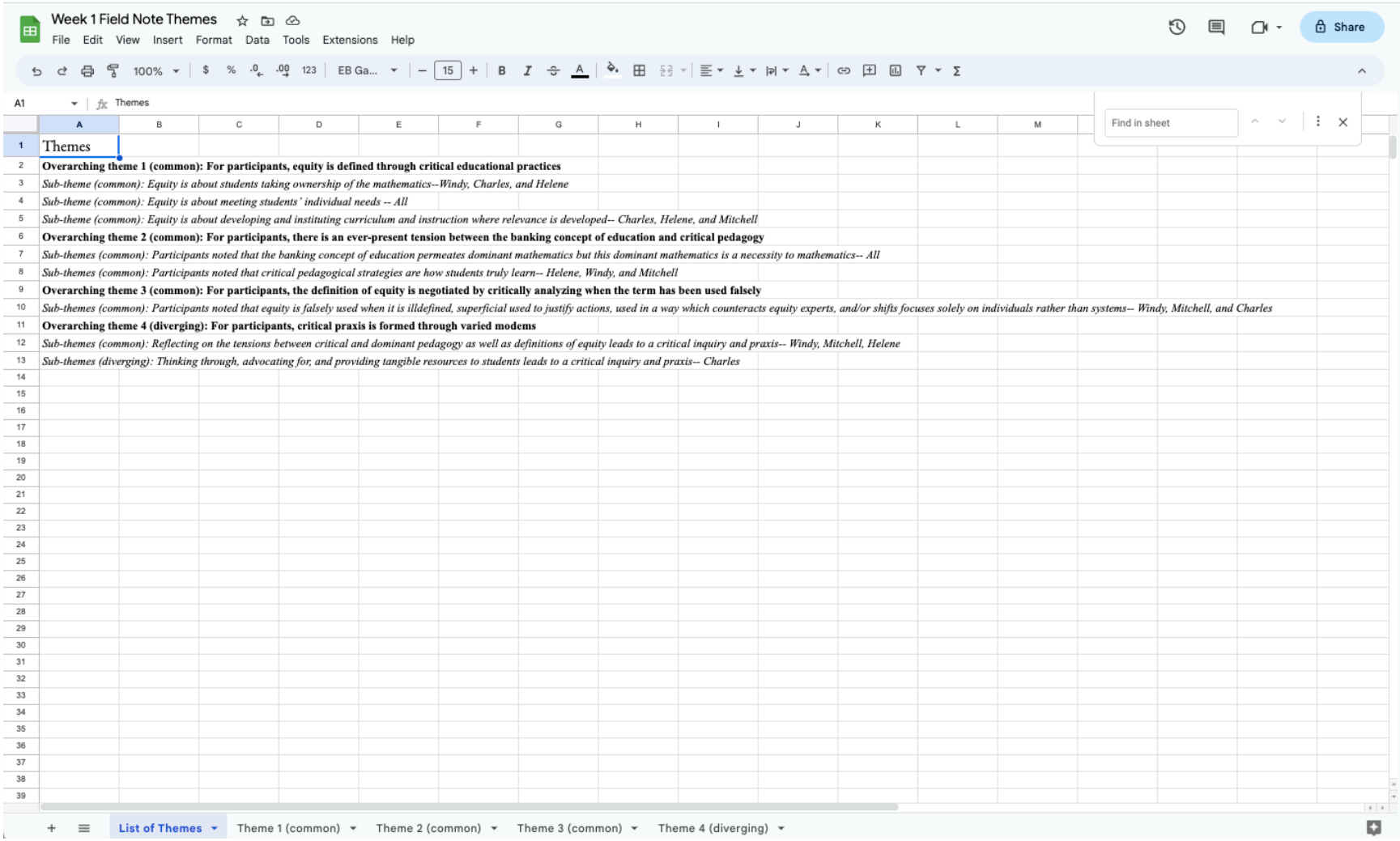
Reading/Book Club Discussion Reflection Prompts

Week	Readings	Reading/Discussion Reflection Question
1	Chapter 1 and 2 *Pedagogy of the Oppressed*	What aspects of Freire's ideas related to equity pedagogy and critical praxis resonated with you? How can these ideas still be relevant today?
2	Weissglass Article and Chapter 1 of *Intersectionality*	This week we discussed both Weissglass' article and the first chapter of *Intersectionality*. What aspects of Weissglass' article connect to the key ideas of *Intersectionality*? In what ways do these connecting ideas play out in your math classroom?
3	Chapter 2 of *Intersectionality*	In chapter 2, Collins and Bilge (2020) state, "when people imagine intersectionality, they tend to imagine one of the other, either inquiry or praxis, rather than seeing the interconnections between the two" (p. 39). After reading this chapter as well as our other readings, what interconnections do you see between intersectional inquiry and praxis? Which do you think is more challenging? How does this relate to your teaching practice, if at all?
4	Chapter 7 of *Intersectionality*	In chapter 7, we read and discussed how intersectionality has been applied into educational contexts. What is an idea shared in our discussion today, detailed within the chapter, or that you have thought through independently that could apply intersectionality into your immediate educational context?
5	Preface, Introduction & Chapter 1 *Choosing to See*	Seda and Brown introduce the ICUCARE framework to attend to equity in the mathematics classroom. What aspect of the framework for equity in the mathematics classroom do you feel will be the most challenging for you? Why?
6	Chapter 2 & Chapter 3 *Choosing to See*	In chapters 2 and 3, Seda and Brown discuss being critically conscious and understanding your students well as ways to work towards equity in the mathematics classroom. How do these key concepts connect to the ideas presented by Freire, Weissglass, and/or Collins and Bilge from our prior readings? How do these two forms of equity pedagogy appear in your practice?

7	Chapter 4 & Chapter 5 *Choosing to See*	Throughout chapters 4 and 5, Seda and Brown give numerous strategies of how to include more equitable curriculum and instruction in mathematics classrooms. Is there any one strategy that stood out to you? Why is this?
8	Chapter 6, Chapter 7 & Conclusion *Choosing to See*	We began this book club discussing the ideas of Freire, Weissglass, and Collins and Bilge and we have ended by exploring Seda and Brown's equity framework. What aspects from which authors have interconnected the most for you? Which authors' ideas are the most meaningful for your mathematics curriculum and instruction?

Appendix G

Example of Intertextual Code Sheet



Week 1 Field Note Themes

File Edit View Insert Format Data Tools Extensions Help

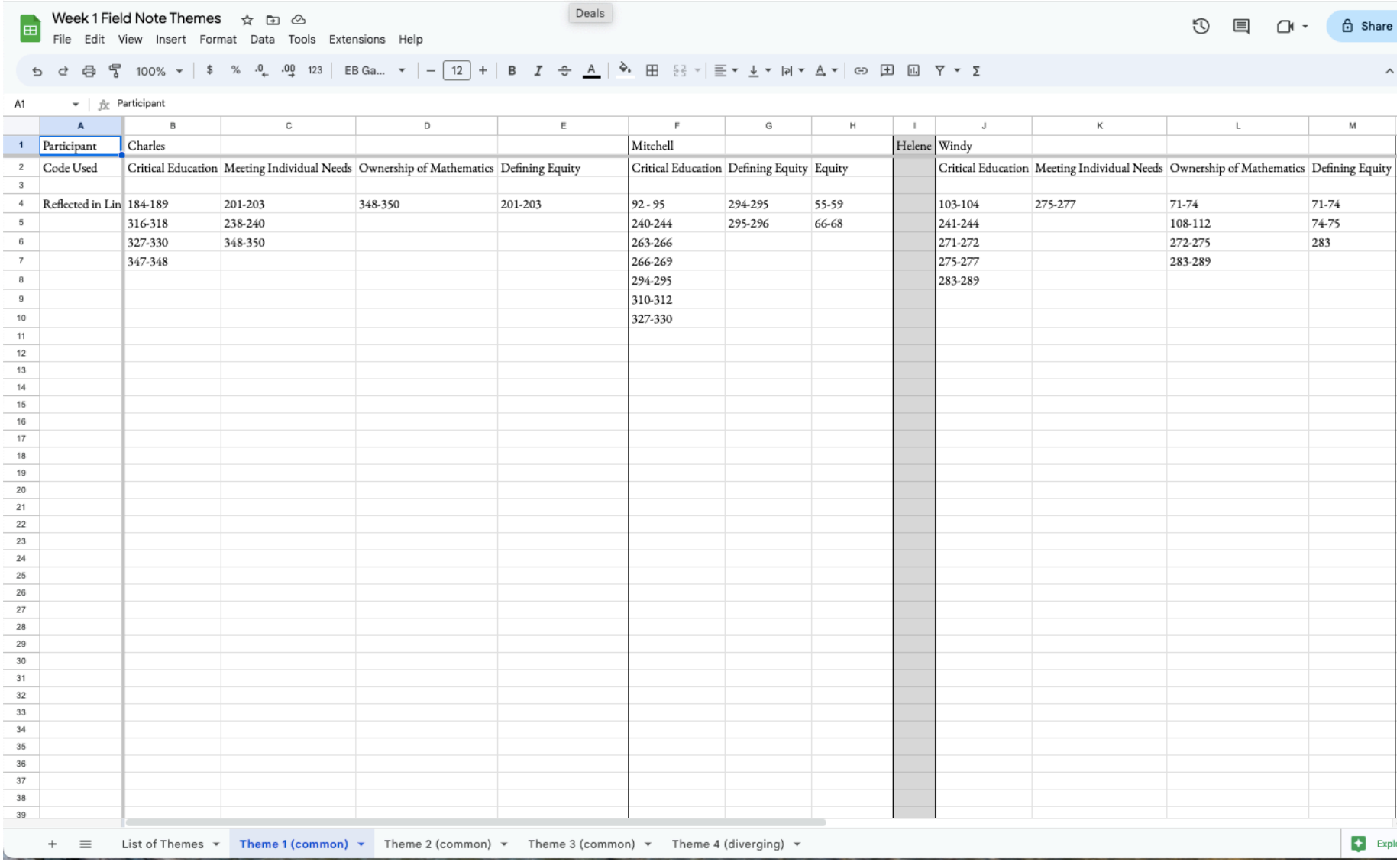
Share

A1 | Themes

Find in sheet

	A
1	Themes
2	**Overarching theme 1 (common): For participants, equity is defined through critical educational practices**
3	*Sub-theme (common): Equity is about students taking ownership of the mathematics--Windy, Charles, and Helene*
4	*Sub-theme (common): Equity is about meeting students' individual needs -- All*
5	*Sub-theme (common): Equity is about developing and instituting curriculum and instruction where relevance is developed-- Charles, Helene, and Mitchell*
6	**Overarching theme 2 (common): For participants, there is an ever-present tension between the banking concept of education and critical pedagogy**
7	*Sub-themes (common): Participants noted that the banking concept of education permeates dominant mathematics but this dominant mathematics is a necessity to mathematics-- All*
8	*Sub-themes (common): Participants noted that critical pedagogical strategies are how students truly learn-- Helene, Windy, and Mitchell*
9	**Overarching theme 3 (common): For participants, the definition of equity is negotiated by critically analyzing when the term has been used falsely**
10	*Sub-themes (common): Participants noted that equity is falsely used when it is illdefined, superficial used to justify actions, used in a way which counteracts equity experts, and/or shifts focuses solely on individuals rather than systems-- Windy, Mitchell, and Charles*
11	**Overarching theme 4 (diverging): For participants, critical praxis is formed through varied modems**
12	*Sub-themes (common): Reflecting on the tensions between critical and dominant pedagogy as well as definitions of equity leads to a critical inquiry and praxis-- Windy, Mitchell, Helene*
13	*Sub-themes (diverging): Thinking through, advocating for, and providing tangible resources to students leads to a critical inquiry and praxis-- Charles*

List of Themes | Theme 1 (common) | Theme 2 (common) | Theme 3 (common) | Theme 4 (diverging)



Week 1 Field Note Themes

File Edit View Insert Format Data Tools Extensions Help

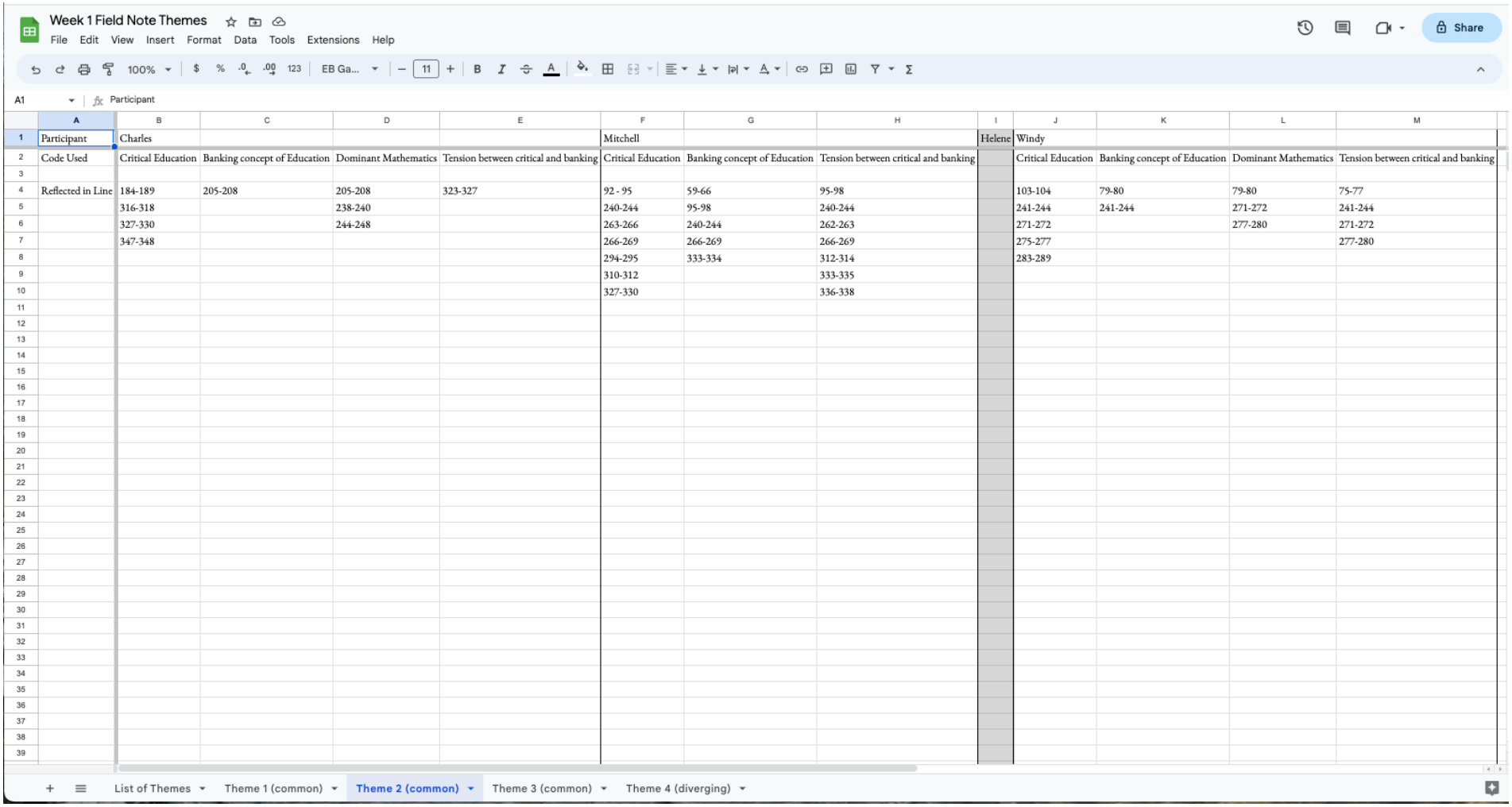
Deals

Share

A1 Participant

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Participant	Charles				Mitchell			Helene	Windy			
2	Code Used	Critical Education	Meeting Individual Needs	Ownership of Mathematics	Defining Equity	Critical Education	Defining Equity	Equity		Critical Education	Meeting Individual Needs	Ownership of Mathematics	Defining Equity
3													
4	Reflected in Lin	184-189	201-203	348-350	201-203	92 - 95	294-295	55-59		103-104	275-277	71-74	71-74
5		316-318	238-240			240-244	295-296	66-68		241-244		108-112	74-75
6		327-330	348-350			263-266				271-272		272-275	283
7		347-348				266-269				275-277		283-289	
8						294-295				283-289			
9						310-312							
10						327-330							

List of Themes | Theme 1 (common) | Theme 2 (common) | Theme 3 (common) | Theme 4 (diverging)



Week 1 Field Note Themes

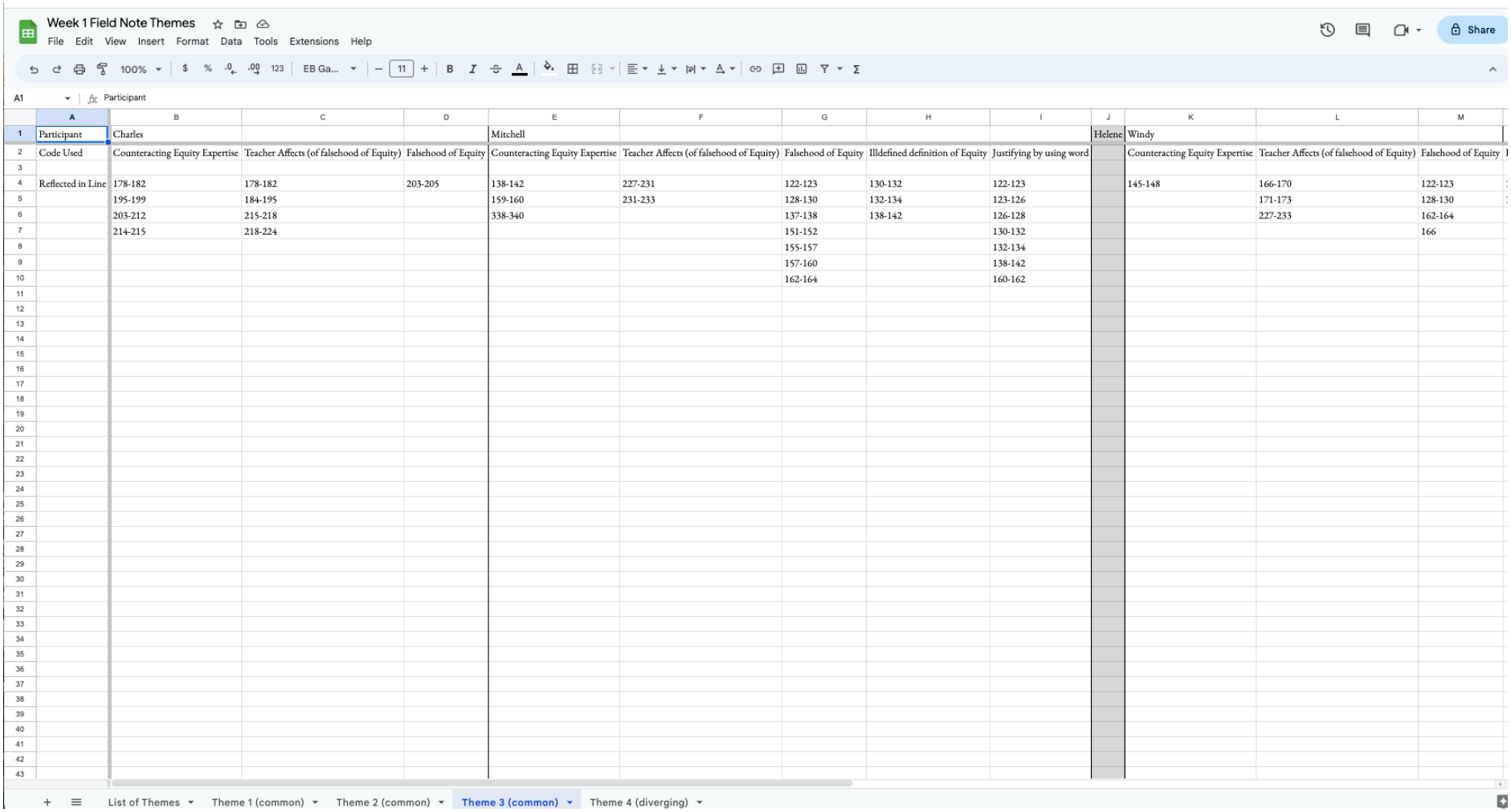
File Edit View Insert Format Data Tools Extensions Help

Share

A1 | Participant

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Participant	Charles				Mitchell			Helene	Windy			
2	Code Used	Critical Education	Banking concept of Education	Dominant Mathematics	Tension between critical and banking	Critical Education	Banking concept of Education	Tension between critical and banking		Critical Education	Banking concept of Education	Dominant Mathematics	Tension between critical and banking
3													
4	Reflected in Line	184-189	205-208	205-208	323-327	92 - 95	59-66	95-98		103-104	79-80	79-80	75-77
5		316-318		238-240		240-244	95-98	240-244		241-244	241-244	271-272	241-244
6		327-330		244-248		263-266	240-244	262-263		271-272		277-280	271-272
7		347-348				266-269	266-269	266-269		275-277			277-280
8						294-295	333-334	312-314		283-289			
9						310-312		333-335					
10						327-330		336-338					

List of Themes | Theme 1 (common) | Theme 2 (common) | Theme 3 (common) | Theme 4 (diverging)



Week 1 Field Note Themes

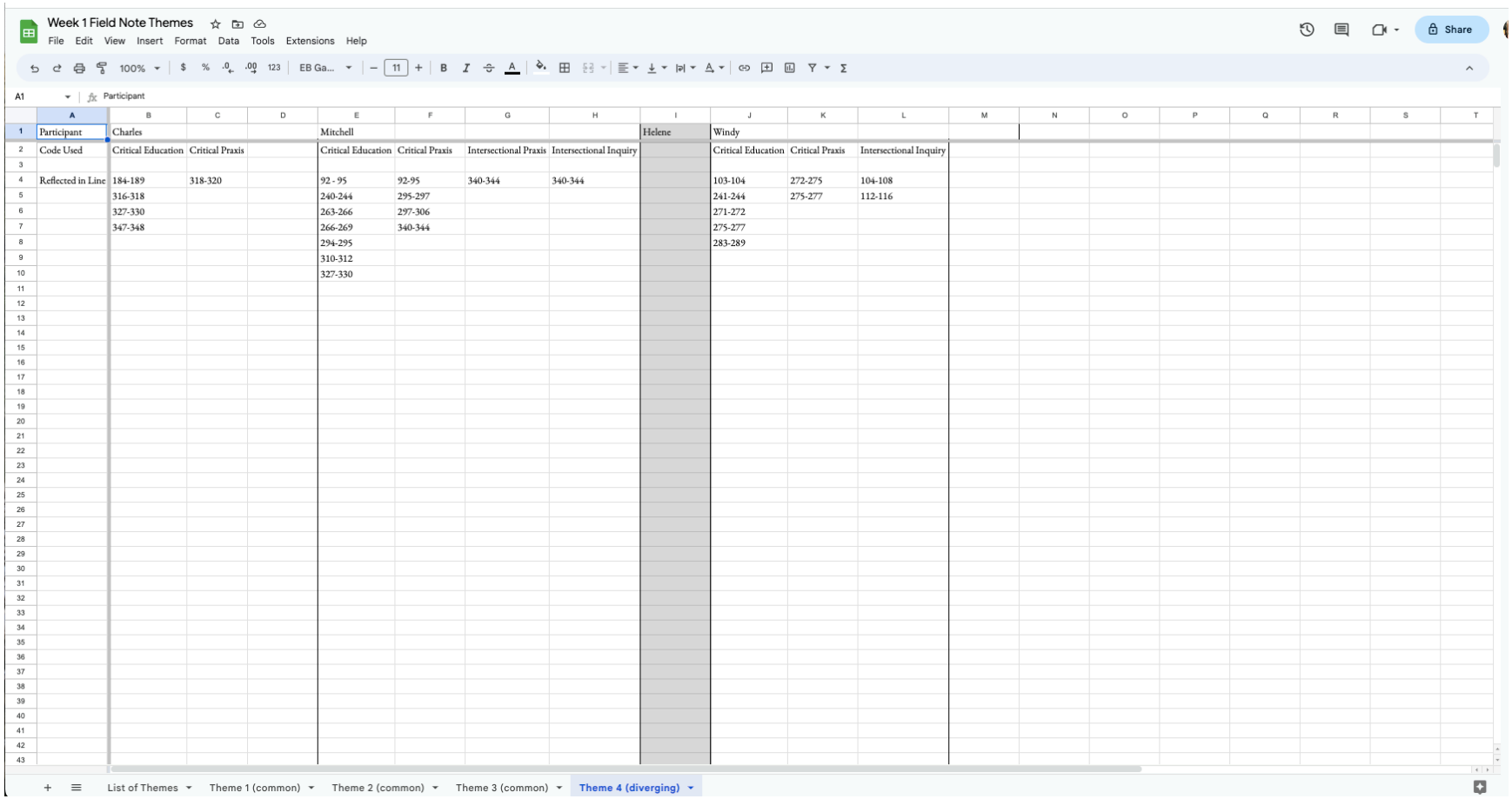
File Edit View Insert Format Data Tools Extensions Help

Share

A1 Participant

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Participant	Charles			Mitchell					Helene	Windy		
2	Code Used	Counteracting Equity Expertise	Teacher Affects (of falsehood of Equity)	Falsehood of Equity	Counteracting Equity Expertise	Teacher Affects (of falsehood of Equity)	Falsehood of Equity	Illdefined definition of Equity	Justifying by using word		Counteracting Equity Expertise	Teacher Affects (of falsehood of Equity)	Falsehood of Equity
3													
4	Reflected in Line	178-182	178-182	203-205	138-142	227-231	122-123	130-132	122-123		145-148	166-170	122-123
5		195-199	184-195		159-160	231-233	128-130	132-134	123-126			171-173	128-130
6		203-212	215-218		338-340		137-138	138-142	126-128			227-233	162-164
7		214-215	218-224				151-152		130-132				166
8							155-157		132-134				
9							157-160		138-142				
10							162-164		160-162				

List of Themes | Theme 1 (common) | Theme 2 (common) | Theme 3 (common) | Theme 4 (diverging)



Week 1 Field Note Themes

File Edit View Insert Format Data Tools Extensions Help

Share

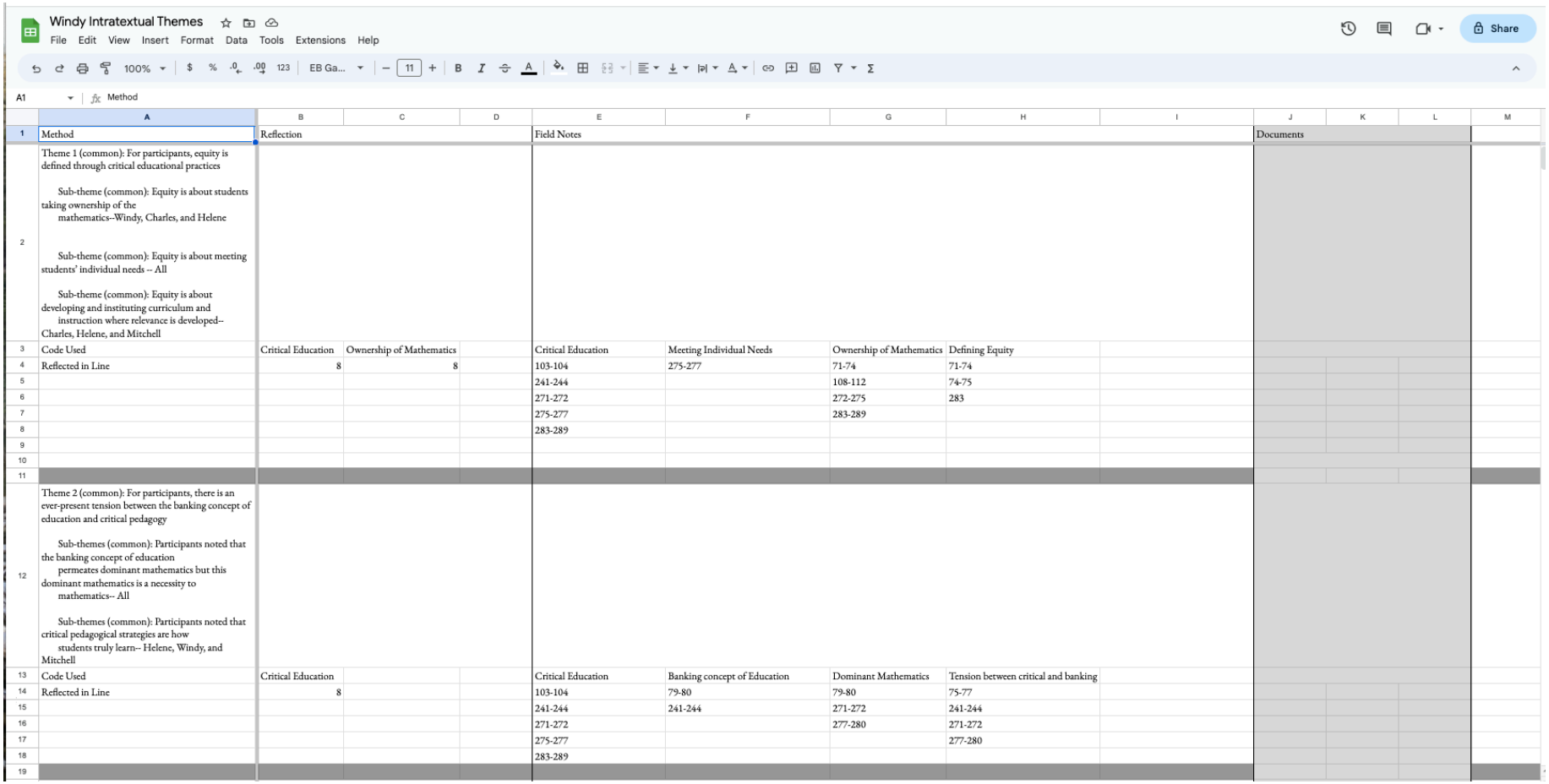
A1 Participant

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Participant	Charles			Mitchell				Helene	Windy										
2	Code Used	Critical Education	Critical Praxis		Critical Education	Critical Praxis	Intersectional Praxis	Intersectional Inquiry		Critical Education	Critical Praxis	Intersectional Inquiry								
3																				
4	Reflected in Line	184-189	318-320		92 - 95	92-95	340-344	340-344		103-104	272-275	104-108								
5		316-318			240-244	295-297				241-244	275-277	112-116								
6		327-330			263-266	297-306				271-272										
7		347-348			266-269	340-344				275-277										
8					294-295					283-289										
9					310-312															
10					327-330															
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28																				
29																				
30																				
31																				
32																				
33																				
34																				
35																				
36																				
37																				
38																				
39																				
40																				
41																				
42																				
43																				

List of Themes | Theme 1 (common) | Theme 2 (common) | Theme 3 (common) | Theme 4 (diverging)

Appendix H

Example of Intratextual Code Sheet



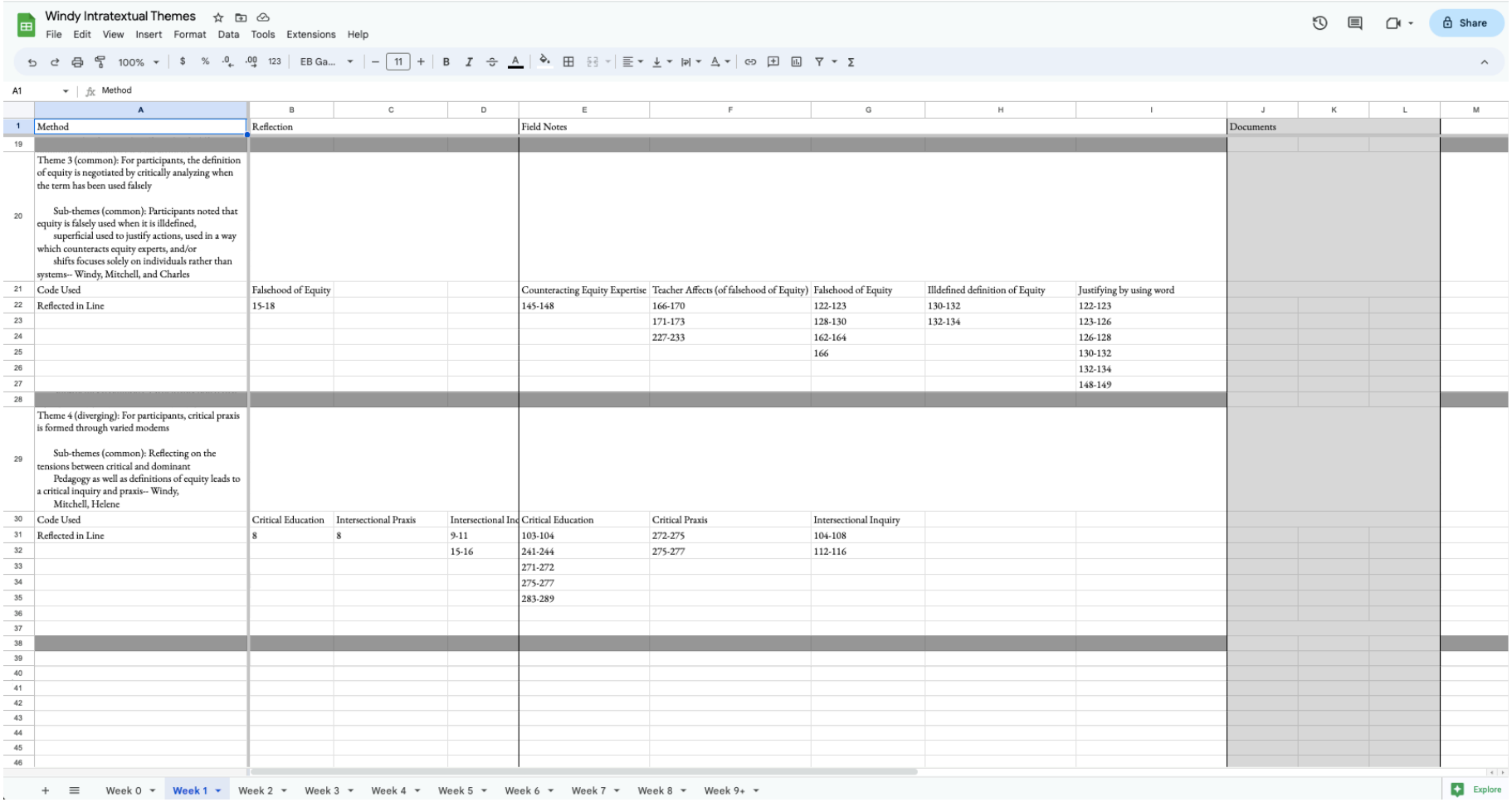
Windy Intratextual Themes

File Edit View Insert Format Data Tools Extensions Help

Share

A1 | Method

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Method	Reflection			Field Notes					Documents			
2	Theme 1 (common): For participants, equity is defined through critical educational practices Sub-theme (common): Equity is about students taking ownership of the mathematics--Windy, Charles, and Helene Sub-theme (common): Equity is about meeting students' individual needs -- All Sub-theme (common): Equity is about developing and instituting curriculum and instruction where relevance is developed--Charles, Helene, and Mitchell												
3	Code Used	Critical Education	Ownership of Mathematics		Critical Education	Meeting Individual Needs	Ownership of Mathematics	Defining Equity					
4	Reflected in Line	8	8		103-104	275-277	71-74	71-74					
5					241-244		108-112	74-75					
6					271-272		272-275	283					
7					275-277		283-289						
8					283-289								
9													
10													
11													
12	Theme 2 (common): For participants, there is an ever-present tension between the banking concept of education and critical pedagogy Sub-themes (common): Participants noted that the banking concept of education permeates dominant mathematics but this dominant mathematics is a necessity to mathematics-- All Sub-themes (common): Participants noted that critical pedagogical strategies are how students truly learn-- Helene, Windy, and Mitchell												
13	Code Used	Critical Education			Critical Education	Banking concept of Education	Dominant Mathematics	Tension between critical and banking					
14	Reflected in Line	8			103-104	79-80	79-80	75-77					
15					241-244	241-244	271-272	241-244					
16					271-272		277-280	271-272					
17					275-277			277-280					
18					283-289								
19													



Windy Intratextual Themes

File Edit View Insert Format Data Tools Extensions Help

Share

A1 | Method

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Method	Reflection			Field Notes					Documents			
19													
20	Theme 3 (common): For participants, the definition of equity is negotiated by critically analyzing when the term has been used falsely Sub-themes (common): Participants noted that equity is falsely used when it is illdefined, superficial used to justify actions, used in a way which counteracts equity experts, and/or shifts focuses solely on individuals rather than systems-- Windy, Mitchell, and Charles												
21	Code Used	Falsehood of Equity			Counteracting Equity Expertise	Teacher Affects (of falsehood of Equity)	Falsehood of Equity	Illdefined definition of Equity	Justifying by using word				
22	Reflected in Line	15-18			145-148	166-170	122-123	130-132	122-123				
23						171-173	128-130	132-134	123-126				
24						227-233	162-164		126-128				
25							166		130-132				
26									132-134				
27									148-149				
28													
29	Theme 4 (diverging): For participants, critical praxis is formed through varied modems Sub-themes (common): Reflecting on the tensions between critical and dominant Pedagogy as well as definitions of equity leads to a critical inquiry and praxis-- Windy, Mitchell, Helene												
30	Code Used	Critical Education	Intersectional Praxis	Intersectional Ine	Critical Education	Critical Praxis	Intersectional Inquiry						
31	Reflected in Line	8	8	9-11	103-104	272-275	104-108						
32				15-16	241-244	275-277	112-116						
33					271-272								
34					275-277								
35					283-289								
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													
46													

Week 0 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9+ | Explore

Appendix I

Helene's Project Based Assessment

Pythagorean Theorem Project
We will be doing this project together in class. The areas that you are supposed to respond to are in blue

Only
Total:

1	2	3	4	5	6	7
19	20-38	39-55	56-60	61-65	66-71	72-76

Section 1: Engage

What are 2-3 things you noticed that are challenging if you are left handed

1.
2.
3.

Not graded yet :)

Think about experiences you've had that are not designed for certain people. Here are some examples

- Video games mostly are not designed for those with visual impairments
- Women's pants pockets are not designed to be useful
- High kitchen cabinets are not designed for people who are shorter

Think of 2-3 other experiences

1.
2.
3.

Not graded yet :)

List 2-3 other experiences that your classmates thought of.

1.
2.
3.

Not graded yet :)

ONLY- Final total points (12) No numbers

Section 2: Explore

After watching the video list 5 things you experience at school, on the way to school, or at home that would be more difficult with a physical disability.

1.
2.
3.
4.
5.

Not graded yet :)

What are some ideas that could fix the problems you listed above?

Not graded yet :)

ONLY- Final total points (8) No numbers

Section 3: Explain

Geometry and Pythagorean Theorem are essential to designing ramps- we are going to be using the following questions before we dive deeper. Please describe the following in words, to the best of your ability.

How can we use the Pythagorean Theorem to solve for the hypotenuse of a right triangle?

Not graded yet :)

How do we use Pythagorean Theorem to solve for the side lengths in a right triangle?

Not graded yet :)

How do we calculate the area of a right triangle?

Not graded yet :)

ONLY- Final total points (12) No numbers

Section 4: Elaborate

You can work on your own or in groups. We will be designing a ramp somewhere in the school.

Locate a place in the school where a ramp would be beneficial. Either describe the location (hallways, what it is near, etc.) or take a picture.

Between the 2.5 and 3000 level hallways

Not graded yet :)

What is the vertical height of the ramp needed (ground to where the ramp needs to end). In inches.

60 inches

Not graded yet :)

The maximum slope of a ramp is 1 inch or rise for every 12 inches of horizontal distance. **Multiply** the vertical height by 12 to get the horizontal distance of your ramp. Please type out all the steps as you put them in your calculator, or insert an image of your work.

60 x 12 inches

Not graded yet :)

Knowing the height and the horizontal distance of your ramp, calculate what the hypotenuse will be, using Pythagorean Theorem. Please type out all the steps as you put them in your calculator, or insert an image of your work.

Not graded yet :)

Calculate the area of your ramp (triangle side). (height x distance) divided by 2. Please type out all the steps as you put them in your calculator, or insert an image of your work.

Not graded yet :)

The ideal width of a ramp is 48 inches. Given this information, calculate the volume of your ramp (area x 48). If you were building your ramp, this is how much concrete you would need. Please type out all the steps as you put them in your calculator, or insert an image of your work.

Not graded yet :)

ONLY- Final total points (24) No numbers

Section 5: Evaluate

Please answer the following with complete sentences (2-3 sentences per question)

What did you notice about the horizontal length of the ramp you designed?

Not graded yet :) Not graded yet :)

When constructing/designing anything, why is it important to think about accessibility in our design?

Not graded yet :)

Why does representation matter when it comes to designing solutions?

Given how long the ramp has to be, what are some other ways to design ramps to use less horizontal space?

Not graded yet :)

ONLY- Final total points (16) No numbers

Section 6: Extension

Watch the following clip. Using 4-6 sentences reflect why designing with accessibility in mind benefits everyone?
When we design for accessibility, we all benefit

Not graded yet :)

ONLY- Final total points (4) No numbers