EXPLORING SECONDARY CLASSROOM ENGAGEMENT IN MATHEMATICS

by

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ABSTRACT

JESSICA MITCHELL CLINE. Exploring Secondary Classroom Engagement in Mathematics. (Under the direction of DR. REBECCA SHORE)

The term engagement appears in teacher effectiveness models as well as state and federal legislation, including the most recent reauthorization of the Elementary and Secondary Schools Act of 1965 (ESEA), known as the Every Student Succeeds Act (ESSA), enacted in 2015. Legislators and administrators have charged teachers with engaging all students in their classrooms as a way to improve student performance. Standard IV of the North Carolina Educator Effectiveness System rubric for evaluating educators calls for teachers to facilitate learning for their students. Specifically, Strand "b" explains, "Teachers plan instruction appropriate for their students... Teachers engage students in the learning process" (North Carolina Teacher Evaluation System Rubric, 2008). Stressing engagement in the accountability measures for teacher evaluations increases the eminent need for educators and administrators to understand the components of engaging students in classroom contexts. Multiple definitions and variables within the research have emerged in attempts to articulate a single definition of classroom engagement (Azevado, 2015). Yet, a widely agreed-upon definition and measurement of engagement does not exist.

Research has shown that students who fail algebra (Math 1) are significantly less likely to graduate on time (Heppen et al., 2017). This impact can have a ripple effect throughout schools and school report card ratings. Investigating how to define student classroom engagement more accurately in mathematics class may translate into improved

learning, increased graduation rates, improved school performance, as well as increased college and career readiness.

To determine how secondary Math 1 teachers understand student engagement in the classroom setting by exploring their lived experiences, the researcher utilized a constructivist paradigm to frame the phenomenological multiple case studies of one Southwestern North Carolina school district. The research intended to describe the understanding of the phenomenon of classroom engagement from the perspectives of high school Math 1 teachers. The researcher engaged in conversations with a purpose as characterized by Burgess (1984).

The study's findings emphasize participants' understanding of Cooper's (2011) Classroom Engagement Framework's "Connective Teaching" as the foundational entry point to engaging students within the Math 1 classroom setting. Furthermore, the findings present the unique challenges faced by Math 1 teachers as they teach freshmen students primarily in the Math 1 course who need to learn content as well as skills for success beyond the Math 1 classroom and in high school. The researcher also recognized the potential influences of some classroom delivery changes brought on by the Covid-19 global pandemic.

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To the study participants, thank you for your willingness to reflect on your understanding of best practices to engage students in the Math I classroom setting. It was a pleasure to co-construct knowledge with each of you.

Finally, a special thank you to Karen Smith Mitchell for partnering with me as a peer debriefer throughout this process. Your knowledge surrounding Cooper's (2011) Classroom Engagement Framework helped foster new ideas and findings. Thank you for your constant support.

DEDICATION

For the endless love and support, I dedicate this dissertation to my family. To my parents, Bob and Karen, who have always inspired hard work and the importance of making positive contributions to society. Your guidance and support are immeasurable. To my sister, Lee, Grandma Jerri "Bobo," and in-laws, Keith and Carolyn, thank you for spending time with Kaylee and Katherine while "Mama was working on her dissertation again." To my husband, Matthew, your encouragement means the world to me. I look forward to our next adventure! Finally, to Kaylee and Katherine, "Mama is done and ready to paint." I am so proud of you both and cannot wait to watch you grow and achieve your dreams!

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CHAPTER 1: INTRODUCTION

Overview

Research surrounding student engagement has shown that by the time students enter high school, as many as 60% of students have become chronically disengaged from school (Klem & Connell, 2004). The trend in disengagement is reflected in studies that report that students progressively disengage from the educational processes beginning in elementary school. The gradual trend of disengagement in secondary school was first studied in the early 1980s to help decrease student dropout rates and the problems associated with it (Natriello, 1984; Rumberger, 1983; Mosher, 1985).

To combat disengagement, teachers have been charged by legislators and administrators with engaging all students in their classrooms as a way to improve student performance. Standard IV of the North Carolina Educator Effectiveness System rubric for evaluating teachers calls for teachers to facilitate learning for their students. Specifically, Strand "b" explains, "Teachers plan instruction appropriate for their students... Teachers engage students in the learning process... Teachers make the curriculum responsive to cultural differences and individual learning needs" (North Carolina Teacher Evaluation System Rubric, 2008). Increasing the emphasis on the teacher's role in ensuring classroom student engagement may lead stakeholders in the educational process to search for ways to help educators facilitate engagement across the curriculum.

This research was conducted as a deeper investigation examining Cooper's (2011) Classroom Engagement Framework and Mitchell's (2020) study*, Expanding the conversation among secondary educators toward a shared understanding of student*

engagement. This research study specifically examined the Classroom Engagement Framework (Cooper, 2011) in relation to high school Math 1 classrooms.

Using phenomenological, multiple case studies framed in the constructivist paradigm, this study investigated the lived experiences of secondary Math 1 teachers to explore their understandings of classroom engagement through their own words and practices. This research aimed to describe the essence of the phenomenon of classroom engagement found in Math 1 classrooms across a single district that represents diverse populations of students. Teachers from two high schools, all of whom teach Math 1, are the subjects of this research study.

Statement of the Problem

Frequently used and commonly over generalized, the term "engagement" is found in teacher effectiveness evaluations, student self-assessments, and many interdisciplinary studies, including psychology and educational research (Azevedo, 2015). In an era of increasing accountability at all levels within the education profession, increased standardized testing, and rapidly growing heterogeneous student populations, researchers, politicians, and other stakeholders have sought to improve educational achievement through increasing student engagement (van Uden et al., 2013; Cooper, 2014). Furthermore, the realities of teaching students during a pandemic, when the ability to maintain a cohesive learning community is challenged by the delivery of the content, such as remote learning, hybrid learning, and in-person learning, may affect classroom engagement. While individually, these modes of learning have been a part of the content delivery during the twenty-first century, the pandemic has resulted in schools navigating

the potential movement within the modes to deliver the content cohesively within a single school year.

The term engagement appears in teacher effectiveness models as well as state and federal legislation, including the most recent reauthorization of the Elementary and Secondary Schools Act of 1965 (ESEA), known as the Every Student Succeeds Act (ESSA), enacted in 2015. Stressing engagement in the accountability measures for teacher evaluations increases the eminent need for educators and administrators to understand the components of engaging students in all classroom contexts.

Research has revealed that students who fail algebra are significantly less likely to graduate on time (Heppen et al., 2017). In the age of educational accountability, this impact may have a ripple effect throughout the schools and school report card ratings. Investigating how to define student classroom engagement more accurately in mathematics may translate into improved learning, increased graduation rates, improved school performance, as well as increased college and career readiness. Since 2016, North Carolina has recognized Math 1 as a replacement for the traditional Algebra 1 course (NCDPI, 2020). Participants in this study teach Math 1.

Recent exploration into the term "engagement" as used in educational settings has revealed that a disparity exists with regards to whether it is "the student's responsibility to actively engage or the teacher's responsibility to facilitate student engagement" (Mitchell, 2020, p.79). This disparity is characterized by findings that suggest teachers, regardless of school student population socioeconomic demographic, agreed it is the responsibility of students to engage in the educational processes. In contrast, the administrators suggested that it is primarily the responsibility of the teacher

to facilitate student engagement within their individual classrooms (Mitchell, 2020). Understanding the nuances of engagement may help practitioners plan lessons that facilitate cognitive, behavioral, as well as emotional engagement cohesively and thus potentially improve student learning.

Purpose of the Research

The purpose of this study was to investigate how secondary Math 1 teachers understand student engagement in the classroom setting through exploring the lived experiences of the educational professionals. All secondary students in North Carolina must take and earn a Math 1 credit to graduate with a College and Career Ready diploma. Since Math 1 is a compulsory course, the researcher wanted to explore practices to engage students in Math 1 because students did not have a choice in whether to to take the course and receive a traditional diploma (NCDPI, 2020).

Significance Statement

The research conducted in the current study has the potential to contribute to the existing literature and overall understanding by exploring classroom engagement practices through the discipline-specific core secondary Math 1 course. The researcher employed participants from two high schools within one school district to examine the similarities and differences in the understandings that educators use to define student engagement in their classrooms. The researcher intended to comprehend and describe the understanding of the phenomenon of classroom engagement from the perspectives of secondary Math 1 teachers through a multiple case study approach at two large, socioeconomically diverse, urban/suburban high schools in a single district in

Southwestern North Carolina. The researcher hopes to begin a dialogue about discipline-specific practices that may help to increase student learning outcomes across the Math 1 classrooms. In turn, this dialogue may translate into an increased four-year college and career-ready graduates.

Research Question

The researcher utilized phenomenological multiple case studies to develop a rich description that answers the question: How does teacher understanding of classroom engagement vary across secondary Math 1 classrooms?

Theoretical Framework

This qualitative research utilized Cooper's (2011) Classroom Engagement Framework to frame the phenomenological case studies. The three components of the Classroom Engagement Framework are "Connective Teaching," "Academic Rigor," and "Lively Instruction" (Cooper, 2011). Cooper (2011) explains that the Framework's components are not mutually exclusive and that teachers who utilize all three components simultaneously are likely to increase classroom engagement. Cooper describes the utility of the framework (2011), "Teachers and instructional leaders can use the Framework to identify particular dimensions of engagement on which they might need to focus and then determine strategies for targeting that particular dimension as an inroad to increasing engagement more broadly" (p.7). Utilizing Cooper's (2011) Framework allowed the researcher to investigate the discipline-specific practices within the Math 1 classrooms of schools serving either high or low poverty communities and whether approaches to classroom engagement are consistent across research sites.

Methodology and Data Collection

The investigator utilized phenomenological research to explore how secondary Math 1 teachers understand student engagement in classroom settings by examining the lived experiences of the participants. According to Mertens (2015), "The key characteristic of phenomenology is the study of how members of a group or community themselves interpret the world and life around them" (p. 248). Employing a constructivist paradigm to frame the study, the researcher was guided by the basic assumption that "knowledge is socially constructed by people active in the research process" (Mertens, 2015, p.16).

According to Finlay (2009), "Phenomenological research characteristically starts with concrete descriptions of lived situations, often first-person accounts, set down in everyday language and avoiding abstract intellectual generalizations" (p.10). The researcher utilized the Classroom Engagement Framework developed by Cooper (2011) to frame the research study and analysis of the data to develop a rich description of each participant's understanding of the classroom practices they utilize to engage students.

Case study qualitative research was employed by the researcher to further explore the experiences of secondary Math 1 teachers at two large, socioeconomically diverse, urban/suburban high schools. According to Creswell (2013), a case study is understood to be bounded by both time and place. This allowed the investigator to explore the lived experiences of these educators in the constraints of their current teaching assignments. According to Yin (2018), determining the number of cases in a study is not prescribed; instead, the researcher must use their own judgment to determine the number of replications based on the level of certainty one is looking to

attain (Yin, 2018). This study included replications at each of the high schools for a total of two cases that included four investigations and 16 interviews to promote certainty within the data collected (Yin, 2018).

The researcher used semi-structured interviews as a means of data collection. A total of 16 interviews with four Math 1 teachers were conducted. Brinkmann and Kvale (2015) define an interview as "a conversation that has a structure and purpose" (p. 5). The seven-stage process of conducting an interview investigation includes: thematizing, designing, interviewing, transcribing, analysis, verifying, and reporting (Brinkmann & Kvale, 2015, p.23). Chapter Three will define each of the seven stages and describe how the researcher implemented each stage within the study. The lived experiences of the content area professionals generated descriptions of engagement in their Math 1 classrooms.

The researcher employed the process outlined by Seidman (2006) for completing iterative interviews. The interviews were conducted, transcribed, and analyzed. The first series of interviews were conducted to build relationships between the researcher and participants. The researcher collected demographic information and a basic understanding of the participants' views regarding classroom engagement. The second series of interviews were an extension of the initial conversation regarding classroom engagement. Prior to the third interview, participants completed a google form where they ranked Cooper's (2011) instructional practices. The third interview provided an opportunity for the researcher to engage in deeper conversations centered on the participant's experiences in promoting student classroom engagement as well as a time to discuss the participant's ordinal rankings of the teaching practices (Seidman, 2006). The final interview allowed

the participants and the investigator to explore further the phenomenon of student classroom engagement in the virtual setting and reflect upon their experiences with student engagement.

The researcher utilized reduction, bracketing of information through chunking, and analyzing connections within the data to analyze the data (Seidman, 2006). A priori and in vivo codes were employed throughout the data analysis process. Cooper's (2011) Classroom Engagement Framework of Connective Teaching, Academic Rigor, and Lively Instruction were used as administrative a priori codes before breaking down the themes in the interviews to determine the essence of Math I teachers' perceptions of the phenomena of classroom engagement.

Delimitations, Limitations, Assumptions

The current research is comprised of phenomenological multiple case studies that are bounded by time and place. Thus, the qualitative research findings are not generalizable and represent only the current participants and their understandings of classroom engagement through their own words and lived experiences. Participants in the study were comprised of only Math 1 teachers, and the findings are not generalizable to the other math courses taught by the participants. The study also assumes that participants engaged truthfully in the process of iterative interviews with the researcher to co-construct the phenomenological understanding of classroom engagement.

A second limitation of the case study is that it only represents one district in southwestern North Carolina. However, examining two socioeconomic patterns within one school district may help foster discussion of the diverse practices within the single district and the varied understandings of what engagement means to teachers. Utilizing

phenomenological multiple case studies allowed the researcher to obtain rich descriptions of the classroom engagement practices evident at the current research locations.

In addition, the study dealt with the fact that the Covid-19 pandemic and the resulting state and local procedures altered the initially proposed research protocol. Participant observations were replaced by the ranking of Cooper's (2011) Instructional Practices since the researcher could only conduct virtual interviews with participants at School A. While the researcher continued to utilize dialogues with a purpose (Burgess, 1984) during the iterative interviews at both locations, the researcher was not privy to observing the participants at School A in relation to their classroom setting.

Subjectivity Statement

In the fall of 2017, the researcher began her tenure as a lead teacher at a diverse, urban/suburban high school. The researcher has ten years of classroom experience ranging from inclusion history to Diploma Programme International Baccalaureate courses, completion of a local teacher leadership cohort, and doctoral course work from a southeastern research university. Tasked with improving student learning by providing professional development to a secondary high school staff, individual coaching of teachers, and creating a professional working environment that supports learning from each other, the researcher was prompted to find strategies that would increase students' learning as quickly as possible. Thus, more deeply exploring student engagement became a focus of the researcher's interest.

This new opportunity offered the researcher the chance to observe and develop relationships with teachers across the school building. Through discussions with teachers and administrators, the researcher found a wide variety of definitions and understandings

of the phrase "classroom engagement." It became apparent that developing a tangible definition of "classroom engagement" and practices to promote engagement was essential to opening a clear line of communication surrounding the expectations of engagement within my school building.

Effective educational leaders recognize that without meeting the basic needs of the stakeholders, schools are unlikely to meet student learning objectives. Stakeholders must trust that educators are all in this work together as a professional learning community. Creating a common dialogue around different perceptions of engagement may build trust between stakeholders by creating clearer expectations, and educational leaders may benefit from a more concrete definition of engagement for all students. Therefore, this qualitative research explored the understanding of secondary Math 1 teachers' understandings of the phrase "classroom engagement."

Summary and Introduction to Chapter 2

Chapter 1 includes the statement of the problem, the purpose of the research, the significance of the study, the research question, the theoretical framework, as well as the delimitations, limitations, and assumptions of the study. The statement of the problem explored the importance of gaining a more specific understanding of what classroom engagement looks like as the term has gained in popularity and usage over the last four decades. Utilizing Cooper's (2011) Classroom Engagement Framework as a theoretical lens allowed the researcher to explore engagement more deeply within discipline-specific practices of Math I through a common language: "Connective Teaching," "Lively Instruction," and "Academic Rigor" (Cooper, 2011). This research aims to begin a more specific dialogue with teachers about discipline-specific identified practices to help better

define and ultimately encourage improved classroom engagement across the curriculum. The chapter concludes with a look at the delimitations, limitations, and assumptions of the current research study to help with the transparency of the research process.

Chapter 2 is comprised of a literature review that begins by exploring North Carolina's shift from Algebra 1 to Math 1 as the graduation requirement, the history of the importance of Algebra 1, and summarizing the history of research regarding engagement beginning in the 1980s up to the present. The review then explores the three most common forms of classroom engagement: emotional, cognitive, and behavioral (Fredericks et al., 2004). This is followed by an exploration of Cooper's Classroom Engagement Framework (2011), identity development, and the role of community and the environment in engagement. Next, the literature review explores the current, common understanding of engagement practices in STEM and Humanities education. Chapter 2 ends with an overview of the research exploring the role of socioeconomic status in schools.

CHAPTER 2: LITERATURE REVIEW

Summary and Introduction to the literature

The following literature review explores the three most widely accepted forms of engagement: emotional, cognitive, and behavioral engagement (Fredericks et al., 2004). This chapter focuses on the Classroom Engagement Framework (Cooper, 2011) followed by an exploration of identity development and the important roles that various communities, collaboration, and environments play in engagement. Chapter 2 presents a brief history of the research regarding the phenomena of classroom engagement and the importance of Algebra 1. The chapter concludes with the current status of engagement depicted through STEM and Humanities education as well as the current research regarding the role of socioeconomic status in schools.

NC Shift from Algebra 1 to Math 1

In December 2015, the most recent reauthorization of the 1965 Elementary and Secondary Education Act (ESEA) took effect, now known as the Every Student Succeeds Act (ESSA). Under this reauthorization, the U.S. Department of Education had to approve North Carolina's plan to support student learning through continuous innovation and individualized instruction for all students (NCDPI, 2018). Since 2016, the state of North Carolina Board of Education has recognized Math 1 as a replacement for the traditional Algebra 1 course (NCDPI, 2020). The current standards for Math 1, 2, and 3 were adopted in 2016 as a part of North Carolina's Standard Course of Study.

History of Research on the Importance of Algebra 1

As truancy and dropout rates have continued to dominate the national educational agenda and increasingly diverse populations are evident, particularly in urban settings,

researchers have searched for ways to open access for the success of all students (Stetser & Stillwell, 2014; Allensworth &Easton, 2005; Heppen, et al., 2017). Algebra 1 is often seen as a gateway course to open doors for diverse students. It is also seen as a course that provides post-secondary opportunities that could close the gap between various populations as it exposes students to higher-level math concepts and reasoning skills (Fennell, 2008). Districts nationwide have focused on preparing students for post-secondary education by increasing enrollment and access to Algebra 1 coursework (Rickles et al., 2017). Studies have shown that the increased focus on growing enrollment in algebra has resulted in rising failure rates, particularly in freshman algebra courses (Heppen et al., 2017). The American Institutes for Research found that "less than half of the students (43%) who failed Algebra 1 in ninth grade recovered the course credit by their fourth year of high school" (Rickles et al., 2017). This phenomenon is reflective of the research that indicates students are three to five times more likely to fail a class in ninth grade than any other grade (Allensworth & Easton, 2005). Studies have also shown that students who fall behind in ninth grade have a graduation rate 59% lower than that of students who could earn their credits and stay on track for graduation during their freshmen year of high school (Allensworth & Easton, 2007). Helping teachers understand the importance of how to engage students in their freshmen algebra coursework may translate into increased graduation rates and increased post-secondary access for all students.

History of Research on Classroom Engagement

Research regarding the role of classroom engagement began in the early 1980s. The focus of early research emphasized engaging students to prevent absenteeism. The

research concentrated on the factors associated with causing students to become disengaged and the problems that result from dropping out of school (Natriello, 1984; Rumberger, 1983; Mosher, 1985). The findings from these studies suggest that engagement is dependent on multiple factors and is often linked to factors of motivation. Over the last four decades, educational researchers and reformers have continued to focus on motivation as a way to combat student disengagement. With the increased pressure to engage students, educators may find themselves overwhelmed with a task that has little tangible instruction for success. Azevedo (2015) explored the eminent need for researchers, educators, and parents to understand the construct of engagement before the term loses its meaning and utility in scientific research. Exploring classroom engagement through the discipline-specific content areas may help educational professionals improve their planning and instructional practices to best engage their students.

Types of Engagement

Engagement can be characterized into three major categories: emotional, cognitive, and behavioral. All three depictions of engagement help develop a rich definition that characterizes feelings of belonging, regulation, and participation. Understanding the three components can help develop an understanding of the individual factors that create the meta-construct of engagement (Fredericks et al., 2004). Fredericks et al. (2004) argue that "Defining and examining the components of engagement individually separate students' behavior, emotion, and cognition. These factors are dynamically interrelated within the individual; they are not isolated processes" (Fredericks et al., 2004, p. 61). Understanding the three paradigms and their interdependencies may help create a more concrete description and meaning of the term

engagement. This awareness should help educators create and maintain classroom environments where students are continuously behaviorally, emotionally, and cognitively engaged.

Emotional Engagement

Fredericks et al. (2004) state that emotional engagement "encompasses positive and negative reactions to teachers, classmates, academics, and school and is presumed to create ties to an institution and influence willingness to do the work" (Fredericks et al., 2004, p. 60). Van Uden et al. explain that students are "emotionally engaged when they are enthusiastic about school, are interested in going to school and identify themselves with school and demonstrate a positive learning attitude" (van Uden et al., 2013, p. 44). Emotional engagement can be characterized through a student's enthusiasm for attending school. This enthusiasm may lend itself to a particular course or activity that the student is involved in within the educational context.

In a study over a period of eight months, twenty-four students at a Danish school for vocation education and training (VET) conducted by Jonasson (2012) found that students and teachers had differing perspectives of engagement related to "distancing of goals of obtaining specific vocational skills in a restaurant context from the goals of school processes" (Jonasson, 2012, p.733). The study found that misconceptions and misinterpretations of engagement led to increased drop-out rates. These findings demonstrate that students' perceptions of engagement outcomes can influence their willingness to engage in the classroom setting and completion of the course work. This response is mirrored in the research of Davies et al. (2013), which focused on the engagement of young people within their community. Davies et al. (2013) found, "Young

people, therefore, may engage if, depending on their circumstances, they think that positive effects can be achieved" (Davies et al, 2013, p. 333). This understanding of emotional engagement and the importance of belonging emphasize the later themes of the importance of community and collaboration. Students who feel an increased sense of belonging should have better classroom engagement than those students who feel isolated. Co-constructed knowledge may promote new learning for all those involved. Teachers who create classrooms that facilitate learning for students by promoting taking risks and contributions of individual student understanding may help to promote an environment built on student prior knowledge and may translate into new learning (Gallavan & Kottler, 2012).

Cognitive Engagement

Where emotional engagement emphasizes belonging, the construct of cognitive engagement centers on self-regulation and understanding. Fredericks et al. explicate, **"**Cognitive engagement draws on the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills" (Fredericks et al., 2004, p. 60). Cognitive engagement can be demonstrated in the classroom when students persist through challenging or difficult tasks.

A study investigating interactive engagement methods (IE) by Tlhoaele et al., (2014) involved 158 second semester engineering students in Gauteng, South Africa. Data was collected through a questionnaire at the beginning and end of the semester. The students were randomly split into three groups for the semester: self-assessment, collaborative learning, and the control group. All students had the opportunity to attend

weekly 40-minute lectures and had access to an online platform with content available to all groups. In addition, the self-assessment group participated in self-assessment activities for six weeks that served as weekly homework and allowed for open discussion with the professor and peers as well as immediate feedback. The students in the self-assessment group had to rework problems for accuracy before advancing. This required a level of mastery progression that was not mandated in the collaborative learning or control groups. Results of the study revealed, "Post-test mean scores showed that the self-assessment group performed significantly better than the collaborative and the control groups, equally, the collaborative group also performed significantly better than the control group" (Tlhoaele et al., 2014, p.1027). The results also indicated that these students in the self-assessment group had higher attendance rates and spent more time studying and participating in learning tasks outside of class.

Self-regulated learning was also at the center of a study conducted by Sullivan and Downey (2015) that focused on an alternative learning program for diverse learners. The study targeted an alternative program, part of a single high school serving over 1,900 students. The program was enacted as part of a competency-based Model (CB) that is scaffolded and driven by an individualized learning plan. According to the study, "learning is driven by set standards and is demonstrated through authentic application of knowledge and skills. Assessments ranged from short, concise activities to long-term multifaceted projects" (Sullivan & Downey, 2015, p. 6). Through semi-structured interviews, the researchers found that teachers reported that "students are no longer able to fly under the radar" (Sullivan & Downey, 2015, p. 15). It was also reported that "students had begun to take ownership of their own learning and had taken steps toward

peer teaching" (Sullivan & Downey, 2015, p. 15). The emphasis on self-regulation supports the idea that cognitive engagement can increase learning outcomes and even foster a sense of community while promoting individualized instruction. Students who are invested in their learning may engage with challenging content and material more intentionally than those students who feel that they can easily blend into the larger group. Teachers that create environments that promote both individual and group accountability may see evidence of high cognitive engagement. These practitioners likely employ both divergent and convergent thinking practices in their classrooms that promote both creativity in the learning process while also allowing for the demonstration of content mastery.

Behavioral Engagement

"Behavioral engagement draws on the idea of participation; it includes involvement in academic and social or extracurricular activities and is considered crucial for achieving positive academic outcomes and preventing dropping out" (Fredericks, 2004, p. 60). Developing relationships can be beneficial in fostering behavioral engagement. In the classroom, students can demonstrate engagement through rapport with their peers and with the teacher. The importance of building rapport was reflected in Jonasson's work in 2012, where results of divergent perceptions between students and teachers showed that students "where constantly trying to make sense of teachers' evaluations of their engagement in school processes" (Jonasson, 2012, p. 736). For example, "Some of the students could be observed socializing with each other instead of paying attention to teachers' instructions about the day's lesson. The teachers interpreted this behavior as a lack of interest and serious attitude toward ongoing school activities,

and thereby toward education" (p. 731). These perceptions by teachers resulted in low evaluations of student performance which often led to student confusion. "One student responded to the evaluation of 'immature' by explaining the discussion with peers was about how to make good sauce" (p. 731). The lack of transparent and frequent communication between student and teacher can influence perceived negative understandings of student willingness to participate in the classroom.

"For students in primary education, negative teacher-student relationships have a greater effect on engagement than positive relationships, whereas the opposite is true for secondary education" (van Uden et al., 2013, p. 45). In other words, the positive relationship between teacher and students at the secondary level is critical to student success. Van Uden et al., (2013) examined teachers' perceptions of student engagement in relation to their own opinions about: their motives, role of different competences, per self-efficacy and their own interpersonal behavior. One hundred ninety-five teachers ranging from one to 40 years of experience responded to a digital questionnaire about the different constructs. The results revealed that "Participating teachers chose the profession most based on altruistic motives... the highest important score was found for pedagogical competence ...Teachers perceived self-efficacy as relatively high" (van Uden et al., 2013, p. 48). Teachers overwhelmingly reported that they would choose the profession again. Thus, suggesting that they viewed their work as important to fostering student engagement and relationships that could translate into success for students in and out of the classroom. Teachers that see a value in their role in increasing student learning outcomes through engagement may promote individual student contributions to increase student engagement through involvement.

Classroom Engagement Framework

According to Connell (1990), classroom engagement is dependent on an active state of responding to a class through focused behavior, emotion, and cognition. Teachers must develop practices that foster an active state while simultaneously developing and nurturing the individual needs of all students. An emphasis on knowing one's students and building relationships to help establish the success of all lays a foundation for Cooper's (2011) Framework. The Classroom Engagement Framework can provide educators with a tangible structure to begin addressing the problem of disengagement while simultaneously developing a common language for the dialogue between stakeholders.

Cooper (2014) assessed the roles of the Classroom Engagement Framework with respect to identity development through a mixed-methods case study. Quantitatively the study addressed the question: What are the main and interactive effects of these practices on engagement? Then qualitatively addressed the question: How and why do these types of classroom practices individually and collectively engage students? The study involved 1,132 racially and economically diverse Riley High School students in the ninth through twelfth grades in Riley, Texas. Students were asked to complete surveys for each class they were enrolled in at the time of the study. Across the 6,842 student responses: 11 academic and elective subjects were represented. To obtain a richer depiction of teaching and engagement at Riley High School, Cooper (2014) embedded five case studies of individual courses that represented a variety of teaching practices that were present in the classes at the school.

Survey results analyzed by Cooper (2014) indicated that "students were more engaged on average in electives, particularly in the arts, athletics, career, life skills, and shop/agricultural courses. Through the survey responses, Cooper identified eight varieties of classes at Riley High School by calculating the mean scores for engagement, connective instruction, academic rigor, and lively teaching. Variety 1 is an exemplary case that combines expertise with relevance and humor. Classes that fell into the category of variety 1 demonstrated high connective teaching, high academic rigor, and high lively instruction. The variety 1 case study classroom helped students connect to the content, the teacher, and learning experiences. "This led students to report exceedingly high levels of perceived learning and engagement" (Cooper, 2014, p. 386). Gaining a deeper understanding of student perceptions of classroom engagement across different content environments can help practitioners to create classrooms that promote learning for all types of students.

Connective Teaching

With an emphasis on student identity, connective teaching aims to emphasize the individual needs of each student. With this in mind, Martin and Dowson coined the term connective instruction to explain the underlying factors that encourage student-centered instruction. "To the extent that relationships are a vital underpinning of student motivation, engagement, and achievement, teachers who frame practice in relational terms are more likely to foster motivated, engaged, and achieving students" (Martin & Dowson, 2009, p. 344). According to Copper (2014), "connective instruction is a category of teaching practices in which teachers help students to make personal connections to a class" (Cooper, 2014, p. 366). These connections may foster student

participation and personal understanding of the content through relevant and meaningful work. Cooper (2014) articulates the importance of connective teaching, honoring *whom* the students are when facilitating appropriate classroom instruction. Cooper (2014) operationalized the construct of connective teaching in her study through "six teaching practices: promoting relevance, conveying care, demonstrating understanding of students, providing affirmation, relating to students through humor, and enabling self-expression" (p. 368). The regression analysis demonstrated that the perceptions of teacher care had the strongest correlations with student engagement, demonstrating the importance of fostering relationships to engage students in each of the content disciplines.

In agreement with the concept of connective instruction, Jones et al. investigated the ENGAGING Framework created by Dr. Paul Vermette (Vermette, 2008). The ENGAGING framework provides teachers with opportunities to entice effort and build community, negotiate meaning, group collaboratively, active learning and authentic assessment, graphic organizers, intelligence interventions, note-making, and grade wisely (Jones et al., 2009, p. 2). In applying Vermette's framework in the classroom setting, researchers found that the teacher, Cindy Kline, provided students with not only memorable experiences, known as "minds-on" cooperative instruction, but also meaningful feedback while learning a foreign language, which is often perceived as a daunting task (Jones et al., 2009). Teachers who individualize instruction and feedback may foster engagement in the classroom by promoting personal connections to the content.

Academic Rigor

Academic rigor promotes productive academic struggle to perpetuate learning. Academic rigor emphasizes the cognitive dimensions required to master skills and content of a particular course. The academic demands of a particular course may vary across content areas. Cooper defines academic rigor through three practices - "providing challenging work, pushing students through academic press, and conveying passion for content" (Copper, 2014, p. 368). These components of academic rigor can promote cognitive dissonance to produce learning outcomes. Unlike the highly individualized and personal practices of connective teaching, academic rigor is likely to be class-encompassing. Cooper's mixed-methods study found that challenging work had the weakest correlation with engagement, something that Cooper said could be attributed to Shulman's 1986 theory of *pedagogical content knowledge* - "knowing how to teach the content so well that students understand it easily" (Cooper, 2014, p. 385).

In a study completed at an institution of higher education near Bangkok, Thailand, researchers employed convenience sampling with volunteer participants in the first year as undergraduate students to help determine the relationship between perceptions of classroom climate and institutional goal structures, student motivation, engagement, and intention to persist in college. Lerdpornkulrat et al., (2018) concluded that perceptions of involvement, autonomy, and meaningful learning in the classroom were positively associated with institutional identification and intention to persist in college (Lerdpornkulrat et al., 2016, p.105). A balance of academic press and support may guide student learning through difficult content as well as challenging assignments.

Lively Instruction

The third component of Cooper's (2011) Classroom Engagement Framework is lively instruction and is hypothesized as teaching practices that encompass and highlight active learning opportunities. Lively instruction is an approach to the delivery of course content. Cooper utilizes three practices to encompass the approach: games and fun activities, collaborative learning or working in groups, and assigning projects (Cooper, 2014). Lively instruction shifts the focus of learning from teacher-centered instruction, which tends to be passive, to student-centered instruction, which tends to be active. Some teachers utilize problem-based learning or jigsaw activities when planning lively instruction to increase classroom engagement. Using a regression analysis of survey data collected, Cooper found that the lowest correlations between teacher practices and engagement in lively instruction were games/fun activities and group work. The Jones et al. study mirrors this sentiment. "Kline is quick to point out that just because projects are 'hands-on' does not guarantee that deep meaningful thinking and learning is taking place" (Jones et al., 2009, p. 4). According to Kline, "'Hands-on' is doing something and 'Minds-on' focuses on essential understandings" (p.4). When facilitating cooperative instruction, students need assigned individual work that is connected to a larger cooperative learning assignment. This helps foster individual accountability and learning within the collaborative learning context.

Identity Development: Understanding Critical Youth Voice

While acknowledging the importance of understanding engagement as a meta-construct, Yonezawa et al., (2009) offer three additional components to furthering our understanding of student engagement: setting, identity, and critical youth voice. In

consideration of setting, teachers "must pay attention to positive adult-youth relationships and peer relationships among youth by deliberately allowing youth to collaboratively create respectful rules, norms, and tasks" (Yonezawa et al., 2009, p. 10). To effectively engage students in the classroom, teachers should invest in learning who their students are and where they are coming from, to support building positive adult-youth relationships. Identity evolves throughout one's life and is not interchangeable with one's background. Keeping this in mind, Yonezawa et al. explain, "While one's gender, race, and (to a lesser degree) language remain fairly static over time, identity changes and develops, sometimes rapidly, over time across various contexts and as individuals engage with different communities" (Yonezawa et al., 2009, p.12). Remembering that identity is fluid may help teachers improve classroom engagement by increasing their understanding of how students' interactions within different classrooms or groups of peers may influence their willingness to engage with the content presented. The last additional component presented by Yonezawa et al. is critical youth voice. Critical youth voice promotes an education agenda that fosters youth voice across settings to help shape identity and ownership of decisions. Students "are afforded access to new knowledge, skills, and relationships that empower them and simultaneously ready them for post-secondary work" (Yonezawa et al., 2009, p.14). Utilizing these three components that help to nurture identity development may increase students' classroom engagement. In cooperation with knowledge of connective teaching, lively instruction, and academic rigor, teachers may have the necessary information to make informed decisions to facilitate classroom engagement. Teachers must remember to keep student identity at the forefront of their planning for engagement. What may be engaging to students in one

context or course may not produce the same results in another setting or context (La Serna, 2020).

Emphasis on Community

Community or systems of support allow stakeholders to see connections between achievement and the larger society. Communities provide opportunities for collaboration within the classroom, school, and larger society. Research involving classroom engagement has largely focused on one group of stakeholders at a time. This has largely left students out of the conceptualization and neglected multiple perspectives of various settings (Jonasson, 2012). This has also led to misunderstandings about what constitutes engagement and the varying perceptions between faculty and students. Learning about community may allow the development of teams that foster the success of all stakeholders. Learning about the theme of a community, whether in the context of the classroom or society at large, and the importance of collaboration reflects the principles of both the constructs of emotional and behavioral engagement (Kudlats, 2022; Walls & Kudlats, 2021).

The Classroom as Community

Van Uden et al. concluded that "teachers matter in fostering engagement" (2013, p. 44). Echoing van Uden, Tlhoaele et al. explain that classrooms that promote relationships, opportunities for leadership, and challenging learning tasks can foster student engagement (Tlhoaele et al., 2014). Creating spaces for students to voice their interests, opinions, and concerns may increase engagement across the content areas and allow for a place of productive discourse between peers and teacher. Allowing students to develop individual and class identities can help to foster productive citizens in and

outside the classroom. These identities may help students take ownership of their learning and translate into decreased drop-out rates. Opportunities for classroom collaboration place an emphasis on support from a community of peers and shared ownership of learning. (Jones et al., 2009; Tlhoaele et al., 2014) Research conducted by Cooper (2014) echoed the findings suggesting that "students who felt a stronger sense of belonging with peers were significantly more engaged and perceived significantly more connective instruction, academic rigor, and lively teaching" (Cooper, 2014, p. 379). Building rapport with classroom stakeholders may encourage increased engagement for students.

Societal Engagement as Community

Societal and community engagement can be an extension of engagement that takes place in the classroom setting. Student participation in the community can foster a sense of pride and discourse about the values of a community. Research conducted by Davies et al. (2013) synthesized empirical evidence that revealed that if a "young person feels that they can make a difference, then it would not be unreasonable to expect engagement to follow" (p. 333). Traditional curriculum on civic education has rarely provided students the opportunity to actively participate in their communities. To increase engagement, schools could implement service-learning programs that provide opportunities for students to lead and make decisions that can foster a need for participation that lasts into adulthood. This emphasis on active collaboration can build communities that encourage active participation and inspire individual and group action to promote success. When teachers help students understand the importance of individual contributions to the larger society, one may expect to see an increase in student willingness to participate and engage within the community.

Environmental Impacts on Engagement

The classroom environment has the potential to play a significant role in student engagement in the classroom. While teachers cannot control many peripheral factors related to environment, for example, student socioeconomic status, they do have control over factors such as relationship building within their classrooms and demonstration of the relevance of their content to students. According to Corso et al., (2013), there are three categories of classroom environmental factors that have the most influence on student engagement in the classroom: the student within him or herself, the student's interactions with others, including the teacher and their peers, and the student's interaction with the academic content (Corso et al., 2013). Understanding each of these factors has the potential to help teachers build classrooms that emphasize engagement.

Research conducted by Corso et al. (2013) found that "students may be inclined to think, feel, and act in typical ways in different settings according to their personalities, but the degree to which they actually think, feel, and act in a given setting will vary based on what and who they encounter in that particular setting" (p. 53). When teachers consider the environmental factors within the student, they must honor who the individual student is in relation to the tasks they are being asked to complete. Whereas, when contemplating students' interactions with others, the teacher must ensure that they have created a classroom environment that promotes respectful relationships between all stakeholders. The final factor, which is students' interaction with academic content, speaks to the importance of relevance. It is imperative that teachers demonstrate for their students why their course is pertinent to their student's current and future success, as well as consider who their students are and how they work together. (Corso et al., 2013).

Engagement through STEM

Science, Technology, Engineering, and Mathematics curriculum is known for an inter-discipline approach to teaching and learning. Currently, STEM-based teaching methods encourage simulations, labs, and modeling to engage in inquiry learning for STEM topics (Jong, 2019). It is also important to note that instruction should support inquiry learning to make it an effective method. In other words, handing students a task without igniting prior knowledge or laying the foundation can leave students without enduring understandings that are needed for true engagement (Shore et al., 2015). According to Jong (2019):

> Many scholars and instructional designers seek to solve the problem of a lack of deep conceptual knowledge by introducing methods of engaged learning. In traditional, direct instruction, students may also interact deeply with the domain, such as when they practice solving problems after the direct instruction has been delivered, but in engaged forms of instruction, the involvement in the content is at the core of the approach. Engaged learning can be seen as a form of learning in which students perform meaningful activities with the content offered (p. 154).

Engaged learning assumes that students go beyond the ideas and concepts presented directly to them and allows for creativity in the learning process. In fact, Jong purposes that "engaged learning can involve drawing inferences from and adding commentaries to the material offered, found, or shared, as often occurs in problem-based or collaborative learning" (p.155). This freedom in the learning process may promote individual accountability in the collaborative learning process.

Teachers that plan inquiry-based instruction must balance inquiry and instruction by maximizing scaffolding to ensure the proper processes are carried out. Utilizing computer-based technology can help scaffold both instruction and inquiry as well as carefully planned scaffolded lessons that promote student inquiry in a structured fashion. Student reflection, collaborative inquiry, and blended learning can all be utilized to enhance active student learning and participation (Jong, 2019). Teachers may be able to utilize inquiry-based learning to increase classroom engagement effectively, especially in STEM content instruction when particular attention has been paid to ensuring that students have sufficient prior knowledge to be successful in the activity.

Engagement through the Humanities

Like current exercises in STEM education, the Humanities disciplines have increasingly focused on student-centered practices that promote creative problem solving as opposed to concrete right or wrong answers. For example, researchers Gallavan and Kottler (2012) explored the emerging emphasis of incorporating divergent thinking in social studies education as a way for social studies educators to meet the request from the National Council of the Social Studies and the Partnership for 21st Century Skills, who called for students to engage in contextual leaning skills, information and media literacy skills, critical thinking and problem-solving skills, creativity and innovation skills, communication skills, and collaboration skills (Gallavan & Kottler, 2012). This emphasis on developing skills forces teachers to consider how to cover their required content while incorporating the skills necessary to create engaged, productive citizens.

Unlike traditional convergent thinking, that results in a single conclusion, divergent thinking, as devised in the 1950s by J.P. Guilford, emphasizes deconstruction

of complex topics to find multiple creative solutions (Gallavan & Kottler, 2012). Gallavan and Kottler (2012) explain that "a balance of divergent and convergent thinking is highly recommended so students have opportunities to create, connect, reflect, evaluate, and demonstrate their knowledge" (Gallavan & Kottler, 2012, p.166). Ten guidelines (See Table 1) are recommended for successful incorporation of divergent thinking, as well as ten divergent thinking strategies (See Table 2). By incorporating a balance of convergent and divergent thinking skills in the humanities classroom, teachers create learning environments that are individualized while promoting critical and creative thinking.

Table 1

Incorporating Divergent Thinking

Guideline	***Description***
Thinking should be conducted by the students not dictated by the teacher	Students can process information and contribute their thoughts more comfortably.
Opportunities to think must be facilitated in safe welcoming environments where students' contributions are encouraged and respected	Teachers assess and scaffold or build upon their students' prior knowledge to co-construct new learning.
Students must be allowed time to think	Time enables students to develop and process their thoughts.
Students respond best when given purposed or reasons to think in ways that are authentic	Strategies help students to remember the new knowledge and skills.
Thinking should be infused into all instruction in ways that are holistic, not just added onto a lesson	Thinking can be used to enhance and enrich all of the standards so curriculum is more cohesive.
Students must explore concepts and practices in myriads ways that are natural and fun;	Thinking strategies captivate students' interest immediately.
Thinking must be connected to a variety of contexts	Students explore multiple contexts comfortably.
Students must be provided a multitude of resources so they are encouraged to generate and pursue their own resources	Empowers students to seek more information.
Students must be allowed to interact with peers throughout the instruction and to share outcomes through assessments	Ideas must be expressed with peers for affirmation and constructive feedback.
Thinking will inspire more thinking	New ideas will activate more thinking and new ideas.

Adapted from Gallavan & Kottler, (2012)

Table 2

Divergent Thinking Strategies

Strategy	***Description***
Analogy: following a communication pattern to show likeness or similarities	How do two specific sets of items relate to each other in the same way?
Attributes, qualities, or characteristics: identifying both common and rare qualities	What makes this item ordinary or usual? What makes this item unique or special?
Creativity: contributing to one's own imaginary ideas	What would you add to the situation?
Discrepant events: providing tentative explanations based on seemingly unrelated information or beliefs	What do you think is the explanation?
In-depth open-ended questioning: probing various aspects of a situation	Why do you think that happened? What examples can you provide?
Inventions: devising new objects or processes	How would you describe your new idea? How would it work?
Origin analyses: retracing events to determine possible beginnings	What if we started at the end and worked backward toward the beginning?
Paradox: delineating perception versus reality	Do you see the picture or do you see the space around the picture?
Sensory clues: using seeing, hearing, smelling, tasting, and feeling or touching as ways of collecting data to inform and possibly express thinking	What do you see? What do you hear? What do you smell?
Unfinished solutions: developing responses to open-ended questions	How would you answer the question or solve the problem?

Adapted from Gallavan & Kottler, (2012)

Socioeconomic Status

The National Center for Education Statistics (2012) defines *socioeconomic status* (*SES)* as "one's access to financial, social, cultural, and human capital resources". The NCES conducted a longitudinal study beginning in 2002 that followed a cohort of students representing various socioeconomic groups throughout their high school and post-secondary schooling (NCES, 2015). The study found that "A smaller percentage of students of low socioeconomic status (SES) than students of middle SES attained a bachelor's or higher degree within eight years of high school completion (14 vs. 29 percent), and percentages for both groups were smaller than the percentage of high-SES students who attained this level of education (60 percent)" (NCES, 2015). Understanding the influence and impact that access to resources can have on student achievement over time may help educators to plan for student engagement in the classroom to ensure access to resources is not a hindrance to educational achievement regardless of whether the students attend schools that serve high poverty communities or low poverty communities (Nesbitt-Johnston, 2021).

Summary

Chapter 2 began with an explanation of the transition in North Carolina from Algebra 1 to Math 1, the importance of student success in freshmen algebra courses, and the implications for the four-year graduation rate. The literature review then explored the history of research surrounding classroom engagement beginning in the early 1980s when the term disengagement first appeared in the literature as a way to curb increasing deviant behavior that was harmful to the educational processes. The literature review then examines the three most common forms of engagement in the current research;

emotional, cognitive, and behavioral engagement to reflect the major facets of the phenomena (Fredericks et al., 2004). Next, the literature review investigated the Classroom Engagement Framework (Cooper, 2011), identity development, the roles of community, collaboration, environment, and current practices of engagement in STEM and Humanities education. The chapter concluded with the important influence that SES can play in student engagement and achievement.

A review of the literature presented qualitative, quantitative, as well as mixed methods studies in the investigation of educational engagement. While many studies focused on the factors associated with motivating engagement in students through classroom practices, only one focused solely on the role of engagement in secondary classrooms. This review suggests a need for additional research concerned with how teachers understand classroom engagement in secondary disciplines, specifically Math 1. Chapter 3 will discuss the proposed methods and research design for the qualitative, phenomenological, multiple case study.

CHAPTER 3: METHODOLOGY

Constructivist Paradigm

The purpose of the study was to investigate teacher understanding of classroom engagement in Math 1 classrooms in socioeconomically diverse secondary schools. Since 2016, the state of North Carolina has recognized Math 1 as a replacement to the traditional Algebra 1 course (NCDPI, 2020). As such, the Math 1 course is required of all students. Utilizing a constructivist paradigm to frame the study, the researcher was guided by the basic assumption that "knowledge is socially constructed by people active in the research process" (Mertens, 2015, p.16). The researcher's intent was to describe the understanding of the phenomenon of classroom engagement from the perspectives of high school Math 1 teachers. The researcher engaged in conversations with a purpose which is characterized by Burgess (1984) as a conversational dialogue that is achieved through active engagement by interviewer and interviewee around a relevant issue.

Research Design: Phenomenological Multiple Case Study

The investigator utilized phenomenological research to explore how secondary Math 1 teachers understand student engagement in classroom settings by examining the lived experiences of the participants. In other words, the researcher studied how teachers think about, plan for, and interact with their colleagues and students to support engagement within the classroom. According to Mertens (2015), "The key characteristic of phenomenology is the study of the way in which members of a group or community themselves interpret the world and life around them" (p. 248).

Phenomenology was a reasonable research design for the study as it allowed the

participants to explain their personal understandings of classroom engagement through their own words and experiences while allowing the researcher to identify general themes about the essence of the phenomenon of classroom engagement across each of the teachers' perspectives. According to Finlay (2009), “Phenomenological research characteristically starts with concrete descriptions of lived situations, often first-person accounts, set down in everyday language and avoiding abstract intellectual generalizations” (p. 10). The researcher utilized the Classroom Engagement Framework developed by Cooper (2011) to frame the research study and analysis of the data in order to develop a rich description of each participant’s understanding of the classroom practices they utilize to engage their students.

Case study qualitative research was employed by the researcher to further explore the experiences of secondary Math 1 teachers at two large, socioeconomically diverse, urban/suburban high schools. According to Creswell (2013), a case study is understood to be bounded by both time and place. This allowed the investigator to explore the lived experiences of these educators in the constraints of their current teaching assignments. More specifically, the research was conducted through a multiple case study approach to allow for an in-depth look into the social phenomenon of classroom engagement practices (Yin, 2018). According to Yin (2018), determining the number of cases in the study is not prescribed; instead, the researcher must use their own judgment to determine the number of replications based on the level of certainty one is looking to attain (Yin, 2018). The proposal for this study included six cases to represent three schools serving a high poverty community and three schools serving a low poverty community. The proposed study included teachers from the

middle and high school-level within each feeder pattern. Due to the impact of Covid-19 on teacher availability, interest, and course offerings, the investigator amended the parameters of the research. While there are still two cases within the study, the researcher amended the protocol to include only high school teachers. The resulting study included replications at each of the high schools for a total of four investigations to promote certainty within the data collected (Yin, 2018).

Research Question

The researcher utilized phenomenological multiple case studies to develop a rich description that answers the question: How does teacher understanding of classroom engagement vary across secondary Math 1 classrooms?

Site of Research and Participant Selection

The researcher conducted the qualitative study at two large, socioeconomically diverse, urban/suburban high schools from one southwestern North Carolina district. Both high schools exceeded overall academic growth for the 2018-2019 school year on the NC School Report Card Ratings System (NC School Report Card, 2019). According to newly released data by the North Carolina Department of Public Instruction and the district, both schools once again exceeded growth during the 2020-2021 school year (NC School Report Card, 2021). The state did not report Education Value-Added Assessment System (EVAAS) data for the 2019-2020 school year due to the Covid-19 pandemic and the fact that End of Course (EOC) tests were not administered during the Spring 2020 semester.

The researcher utilized purposeful sampling with the goal of identifying cases that allowed for an in-depth look at the various levels of Math 1 courses taught across

both schools. Specifically, the investigator employed key stakeholders, including administrators and department heads, to identify educators that have in-depth knowledge and experience with engaging students. The researcher began with each principal to identify potential participants. These informants were uniquely positioned to make meaningful referrals. These individuals were contacted via email by the researcher. After potential participants agreed to participate, the researcher conducted the first of four semi-structured interviews using a sequence process outlined by Brinkmann and Kvale (2015).

The researcher is employed as a Social Studies teacher and lead mentor at one of the two high schools used in the study. Throughout the study, the researcher's high school is referred to as School B. At the site, the researcher is tasked daily with supporting beginning teachers in their first three years of employment within the district, facilitating professional development, and supporting beginning teachers' mentors during the process. This lead mentor position may have helped facilitate a level of trust between the participants and the researcher and may have helped facilitate dialogues of conversations with a purpose. For example, the researcher was able to investigate the lived experiences of teachers with at least three years of teaching experience. All participants completed the three-year probationary evaluation cycle and had time to reflect on their classroom practice formally and informally. These participants achieved at least a proficient rating on the North Carolina Teacher Evaluation Rubric and were awarded a Continuing Professional License. Since the participants completed the probationary cycle, none of them worked directly with the researcher through her role as the lead mentor at the research site.

The research sites were selected because they allowed for access to teachers that teach a variety of students. Table 3 provides comparisons of the research sites.

Table 3

Schools Comparisons and Demographic Information

School Identification	% Economically Disadvantaged	SES	2018-2019 Academic Growth	2019 Math I Proficiency
School A	10.3%	High	Exceeded	75%
School B	51.3%	Low	Exceeded	39%

Adapted from the NC School Report Card, (2019)

School A

Background

School A is one of ten traditional high schools in the southwestern North Carolina district where the study was conducted. School A opened its doors to 900 students in 2009, and by 2021, enrollment had grown to over 1,800 students. Until the 2020-2021 school year, it was the newest high school in the district. School A has been under the leadership of its current principal since the beginning of the 2018-2019 school year. He is the second principal to lead School A since its inception.

School A is a low-poverty school. Study participants describe School A as a "traditional public high school" centered in an upper socioeconomic area "with no technology issues" where "students come from middle to upper-income homes." Students do not have to rely on school resources to provide technology. They emphasized that students are post-secondary focused and can maintain high academic rigor because students are "competitive with one another." They describe a learning environment that

values community and systems of support within their building, stating, “we are always helping one another and sharing resources.” Table 4 below reflects these ideas and statistics from the NC School Report Card data.

Table 4

Comparison of Demographics of School A to the District

	School A	**District**
4-year Graduation Rate	93.7%	88.9%
Access to Technology	.67/device	.67/device

Note. The statistic reported for Access to Technology illustrates that School A has more than one device available to accommodate the number of students enrolled at School A. Adapted from the NC School Report Card, (2019)

Interview Process

The researcher conducted four remote semi-structured interviews beginning in mid-March 2021 and concluding in early May 2021. The interviews were scheduled during the participants planning block at mutually agreed times and dates. Due to Covid-19 pandemic restrictions, interviews as well as the signing of the University of North Carolina Adult Informed Consent Document (See Appendix A) were conducted remotely and through digital platforms. The researcher met with participants from School A through the district-approved platform of Microsoft Teams. Interview audio was recorded on the researcher’s cell phone and not through Microsoft Teams to ensure privacy of the participant. The University of North Carolina Adult Informed Consent document was electronically shared through a Google form and was reviewed with the participant prior to the beginning of the first interview. The researcher answered questions about the

study. Then, the participant completed the Google form, which collected their agreement and a time-stamped email address as certification of consent. Each round of interviews was completed with all participants for both sites to ensure consistency of implementation of the interview protocol before the next round proceeded. Interviews varied in length from 30- 45 minutes.

Participants

Participant One self-described her journey into education as "a nontraditional but traditional route into the classroom." As an undergraduate student, she studied graphic design and communications. After graduation, she decided that she was not interested in pursuing a long-term career in marketing. While simultaneously working in marketing, Participant One pursued her special education degree from the University of Georgia. She completed her degree as a lateral entry candidate in the state of Georgia and went on to earn her master's in mathematics grade 6-8, followed by her National Boards certification in Intermediate Mathematics. Participant One explained that she has high expectations for all students, and while it may take some longer than others, "all of them are going to rise to the expectations." Her philosophy revolves around the idea that respect is mutual and that students need to know "you're on their side." She believes that her students are successful because "I give them boundaries and make them clear ahead of time."

Participant One has been teaching for sixteen years. Prior to beginning her role as a Math 1 teacher at School A, she taught 8th-grade math and Math 1 at the feeder middle school for ten years.

Participant Two was a North Carolina Teaching Fellow, a scholarship program in North Carolina designed to develop teacher leaders out of high school. Her teacher

preparation program and employment have given her experience at the elementary, middle, and high school levels. Participant Two double majored in mathematics and elementary education, and she recently completed her master's degree in mathematics education from North Carolina State University. She is currently in the process of completing her National Board Certification. Participant Two believes that classroom engagement boils down to "building trust with the students first and letting them know I care." In Math, she explains, "many come in with a pre-notion that 'I hate this class,'" so she concentrates on breaking down those barriers first and foremost and "building confidence." Table 5 presents the demographics of the participants from School A.

Table 5

Demographics of the Participants- School A

Role	Experience	Experience at School A	Degree(s)	Advanced Degrees	Lateral Entry	National Boards	Middle School Experience
P1	16 years	3 years	Graphic Design, Communication, Special Education	Masters Mathematics Grades 6-8	Yes	Yes	10 years
P2	7.5 years	4.5 years	Mathematics, Elementary Education	Masters Mathematics Education	No	In progress	3 years

School B

Background

With its inception dating back to the 1890s, School B is the oldest high school in the southwestern district of North Carolina. The current location of School B was opened in 1967, with an additional building added in the 1990s. The most recent renovations,

including a new auxiliary gym, weight room, and Public Safety Academy building, were finished in 2021. School B is designated as a Title 1 high school and houses three magnet programs. It is home to the International Baccalaureate Program, the Public Safety Academy, as well as the Academy of Hospitality and Tourism. The front foyer of School B proudly displays a plaque announcing that the school exceeded growth scores on the state's testing program for the 2018-2019 school year. The walls are covered in student artwork and trophy cases display academic achievements and the "Wall of Champions" Hall of Fame outside in the gym lobby. The "Wall of Champions" display recognizes School B's student-athletes who excelled athletically and meet the criteria determined by the Hall of Fame committee.

The principal has been at School B for six years and transitioned to the position after serving as an elementary school principal within the district for five years. The participants from School B describe a school culture rooted in pride and tradition, explaining that while there is a "handful of new staff, we have a lot of teachers with experience." Some teachers have spent their entire teaching career at School B, including Participants Three and Four. Participants of School B described teachers and administrators as involved in the lives of their students, pushing them to be successful in and outside of the classroom. Teachers attend concerts, plays, and athletic events regularly.

The students at School B are very diverse, as noted by their thriving magnet programs and an English Language Learner-Newcomers program. School B offers a variety of courses from inclusion, honors, Advanced Placement, and International Baccalaureate curriculums. Many students at School B rely on technology resources

provided by the school and district. Once the Covid-19 pandemic began in March of 2020, the district quickly adopted a one-to-one technology initiative where students could access their school-issued device at home. Each student was issued a technological device to receive instruction and complete school assignments. This transition to remote learning posed challenges as many families needed district-provided "hot spots" to connect to the internet. Table 6 displays the demographics of School B in comparison to the district.

Table 6

Comparison of Demographics of School B to the District

	School B	**District**
4-year Graduation Rate	83.1%	88.9%
Access to Technology	.64/device	.67/device

Note. The statistic reported for Access to Technology illustrates that School B has more than one device available to accommodate the number of students enrolled at School B. Adapted from the NC School Report Card (2019)

Interview Process

The researcher is employed at School B; thus, she was not bound by all the Covid-19 district protocols. The researcher conducted four semi-structured interviews beginning in mid-March 2021 and concluding in early May 2021. The interviews were scheduled during the participants planning blocks at mutually agreed upon times and dates. Interviews were held in the participant's classroom for the convenience of the participant. Each round of interviews was completed with all participants to ensure consistency of implementation of the interview protocol before the next round proceeded.

Prior to beginning the first interview, the researcher answered questions about the study, and The University of North Carolina Charlotte Adult Informed Consent document (See Appendix A) was shared through a Google form, which was reviewed with the participant and signed electronically. The electronic signature was collected through the Google form with their agreement to participate and a time-stamped email address as certification of consent. Interviews varied in length from 30-45 minutes each across each of the four conversations.

Participants

Participant Three holds a bachelor's degree in Middle Grades Mathematics and Science. As an undergraduate student, she was president of the education honors society as well as a supplemental math instructor for Math 1100 and Stats 1222. She recalled a successful final exam review session she led in which over 450 students attended in an auditorium designed for 150 people. She remembers proudly that she "taught something so well that kids specifically wanted to attend my review." Since her background is in middle grades education, she describes her classroom as a "middle grade classroom in a high school." She emphasizes the use of "small grouping" and "differentiating." Participant Three stated that she knows she is doing something right because students call her a "very fair teacher." She explains that her priority in engaging students in Math I is figuring out how to help students with a fixed mindset realize that they can be successful in Math 1.

Participant Four explained that engagement occurs when building relationships coincide with building their math skills. With a bachelor's degree in mathematics and a secondary concentration, Participant Four prides herself on her advocacy for Math 1

students. She fought hard for teachers in her department to teach Foundations of Math 1 and Math 1 every day to the same set of students for the entire school year. She is a National Board-Certified teacher and has taught at school B for eleven years. She has observed that many students lacked the "background skills" necessary to be successful in Math 1 and high school math. Thus, she argued that students could build a strong foundation of skills and a strong relationship early on that would help when students encountered the more challenging material of Math 1. Participant Four is known to be passionate about her students and the content she teaches and is willing to "fight" for what she believes is best for her classroom and her students. Table 7 presents the demographics of participants from School B.

Table 7

Demographics of the Participants- School B

Role	Experience	Experience at School B	Degree(s)	Advanced Degrees	Lateral Entry	National Boards	Middle School Experience
P3	4 years	4 years	Middle Grades Math & Science	--	No	No	Student Teaching
P4	11 years	11 years	Mathematics, Secondary Concentration	--	No	Yes	--

Data Collection

The researcher used semi-structured interviews as the means of data collection. The originally proposed study included participant observations as an additional data point. However, due to Covid-19 and the protocols enacted by the district, classroom

observations were not allowed. Brinkmann and Kvale (2015) define an interview as "a conversation that has a structure and purpose" (p. 5). The seven-stage process of conducting an interview investigation includes: thematizing, designing, interviewing, transcribing, analysis, verifying, and reporting (Brinkmann & Kvale, 2015, p. 23). The lived experiences of the content area professionals generated descriptions of engagement in their particular Math I classrooms.

Pre-Interview Stage

Thematizing

The first stage of the interview process is thematizing. During this stage, the researcher formulates the purpose and theme that will be investigated (Brinkmann & Kvale, 2007). Brinkmann and Kvale (2007) explain, "The why and the what of the investigation should be clarified before the question of how - method - is posed" (p.40). This research was conducted as a deeper investigation examining Cooper's (2011) Classroom Engagement Framework and Mitchell's (2020) study titled *Expanding the conversation among secondary educators toward a shared understanding of student engagement*. By exploring the history of research surrounding engagement, the researcher determined that a gap exists between practitioners' and stakeholders' understandings of what engagement looks like in the classroom and who is responsible for engaging students within the classroom setting.

Designing

The second component of the pre-interview stage is designing. During the design phase, the researcher plans the study with consideration for all seven stages (Brinkmann & Kvale, 2007). Brinkmann and Kvale (2007) describe an effective study design as one

where the researcher incorporates both the intended knowledge and the moral implications of the study. The researcher determined that the intended knowledge would focus on the lived experiences of secondary Math 1 teachers to explore their understandings of classroom engagement through their own words and practices. The purpose of this research was to describe the essence of the phenomenon of classroom engagement found in Math 1 classrooms. The moral implications of the study suggest that understanding the phenomenon of classroom engagement through the lived experiences of Math 1 teachers may promote additional understanding of how to best engage students in the critical content of Math 1 and assist with identifying strategies to support students' success in high school.

Interview Stage

Interviewing

According to Brinkman & Kvale (2007), the researcher must "conduct interviews based on an interview guide with a reflective approach to the knowledge sought and the interpersonal relations of the interview situation" (p.40). The researcher conducted a total of 16 interviews with the four Math 1 teachers. The interviews were conducted, transcribed, and analyzed. The researcher used the process outlined by Seidman (2006) for completing iterative interviews. The first series of interviews were conducted to build relationships between the researcher and participants to collect data on the subject's history, teaching experience, and knowledge of classroom engagement. The protocol for the first series of interviews is found in Appendix B. The second series of interviews were an extension of the initial conversation regarding classroom engagement. Participants shared their experiences and understandings of the phenomenon of student

engagement in traditional face-to-face instructional settings (Seidman 2006). The protocol for the second series of interviews is located in Appendix C. Prior to the third interview, participants completed a Google form where they ranked Cooper's (2011) instructional practices. The third interview provided an opportunity for the researcher to engage in deeper conversations centered on participants' experiences in promoting student classroom engagement as well as a time to discuss the participant's ordinal rankings of the teaching practices (Seidman, 2006). The third interview protocol and ranking of instruction practices are located in Appendices D and E. Although not included in the original proposal, the fourth interview was added to gain a deeper understanding of the challenges posed by remote learning. The protocol for interview four is located in Appendix F. This final interview gave the participants and the investigator the opportunity to explore further the phenomenon of student classroom engagement in the virtual setting and to reflect upon their experiences with student engagement. Table 8 displays participant data collection.

Table 8

Participant Data Collection

Location	**School A**		**School B**		**Totals:**
Level	High School		High School		
SES	High		Low		
Participant	#1	#2	#3	#4	
# of Interviews	4	4	4	4	**16**

The semi-structured interviews with the participants from School A were conducted virtually through Microsoft Teams in compliance with the southwestern North Carolina district's Covid-19 protocols. Interview audio was recorded via an iPad and iPhone. School B interviews were conducted in person as the researcher is a staff member in the building and could comply with the district's no visitor guidelines. At both schools, interviews were scheduled and held during prearranged dates and times selected by the participants. The interviews typically lasted between 30 and 45 minutes. The investigator chose to conduct the first interview each of the participants before moving to the second interview protocol. This process allowed the researcher to facilitate the identification of potential themes before moving to the next protocol. This process was used across all four interviews. Following this schedule, the researcher completed the 16 interviews between the end of March and the beginning of May 2021.

Data Analysis

Throughout the study, the researcher was guided by Merten's (2015) basic assumption that "knowledge is socially constructed by people active in the research process" (p.16). This sentiment is supported by Brinkmann and Kvale 's (2007) conclusion that "research is an inter-view where knowledge is constructed in the inter-action between the interviewer and interviewee" (p.2). To analyze the data, the researcher utilized reduction, bracketing of information through chunking, and analyzing connections within the data (Seidman, 2006). A priori and in vivo codes were employed throughout the data analysis process.

Post-Interview Stage

Transcribing

In accordance with Brinkmann & Kvale's (2007) stage four of qualitative analysis, transcribing, the researcher prepared the interview material for analysis by creating a written transcription from the oral interviews. To begin the data analysis process, the researcher recorded interviews using a recording app on her iPad and iPhone. These interview audio files were uploaded to the University of North Carolina Charlotte password-protected Google Cloud and deleted from the device within forty-eight hours of the completion of the interview. Next, the researcher utilized NVivo software for initial verbatim transcription of the interviews. The researcher then edited the transcriptions manually by listening to the recording and manipulating the transcription to reflect the actual recording. The final manual transcriptions were downloaded from the NVivo transcription site and uploaded to the University of North Carolina Charlotte password-protected Google Cloud.

Analyzing

The researcher utilized reduction, bracketing of information through chunking, and analyzing connections within the data (Seidman, 2006). Using highlighters and hard copy transcriptions, the researcher began to highlight initially for administrative codes and then for emerging themes. A priori and in vivo codes were employed throughout the data analysis process. Cooper's (2011) Classroom Engagement Framework of Connective Teaching, Lively Instruction, and Academic Rigor were used as administrative a priori codes or using Brinkman and Kvale's (2007) terminology "concept driven coding" (p.121) before breaking down the themes in the interviews. While listening to the

interviews and reading the transcription, the researcher began to identify the emerging descriptive patterns.

First, the researcher chunked the transcripts and labeled each component to identify the overall meaning for each segment utilizing the process known as "meaning coding" (Brinkman & Kvale, 2007). As defined by Brinkman and Kvale, "meaning coding involves attaching one or more keywords to a segment in order to permit later identification" (p.121). This allowed the researcher to derive in vivo descriptive codes, also referred to as "data-driven coding" by Brinkman and Kvale (2007). These descriptive codes were about who and what the data contained from the language of the participants developed by the researcher during the analysis process. Next, the researcher generated interpretive codes to delineate meaning from the original descriptive codes. In the final phase of the iterative process, the researcher established pattern codes that aimed at narrowing the data into 5-7 overall themes (Creswell, 2013). Appendix G contains the codes that were layered with the initial administrative codes to determine the essence of teachers' perceptions of the phenomena of classroom engagement.

The researcher utilized "meaning condensation" and "meaning interpretation" to compress longer statements into briefer statements to rephrase the essence of participant understanding in a few words as well as identify relations of meaning not immediately apparent in the transcript (Brinkman & Kvale, 2007, p.123). See Table 11 for the Overview of Dominant Themes found within the data.

Strategies for Quality

With consideration of Brinkmann and Kvale's (2007) final two stages of conducting qualitative interviews, the researcher verified and reported the findings

utilizing strategies for quality to ascertain the validity, reliability, and generalizability of the semi-structured iterative interviews (p.41).

Post Interview Assurances

Verifying and Reporting

Elliott et al., (1999) explain that ensuring transparency across all sections of a research output is a subtle process of forming a rationale, selecting a method, and explaining the findings. The current research study was a follow-up investigation to a phenomenological study investigating the definition of classroom engagement. The researcher of the current study worked with the researcher of the initial study to complete peer debriefs and evaluations. This process helped the researcher of the current study to utilize a member checking system given that the researcher of the initial study is experienced with investigating the topic of classroom engagement and has a wide range of understanding of Math 1. The member checking conversations allowed the researcher to confirm that the initial investigator was hearing the same emerging themes.

To ensure transparency across the research processes and iterative interviews, the researcher began each semi-structured interview by providing the opportunity for participants to ask questions concerning the previous interview as well as providing a summary of themes gathered during the previous interview. For example, “this is what I heard... is this consistent with your understanding?” This allows for the instrumental dialogue and co-construction of knowledge between the researcher and participants to continue (Brinkmann, 2018). Over the course of the study, each participant was interviewed four times.

The originally proposed study included participant observations as a method of member checking throughout the study. Observations were to take place after interviews two and three for a total of eight observations. As Spradley (1989) explained, participant observations allow researchers to become active agents of data collection by being a part of the lived experience. The participant observations were to follow the interviews and give the researcher the opportunity to witness the participants' understanding of their own classroom engagement practices. However, these observations were not feasible due to the Covid-19 pandemic and the district restrictions, and the researcher was unable to conduct site visits. The researcher included the ranking of Cooper's (2011) 13 instructional practices between interviews two and three as a means of member checking and quality assurance of the emerging understanding of the essence of the phenomena of teachers' perceptions regarding classroom engagement from the semi-structured interviews (See Appendix E). Each participant was asked to rank the thirteen instructional practices in order of importance ordinally. One equaled the most prevalent practice, with 13 being the least important practice to promoting classroom engagement.

Risks, Benefits, and Ethical Considerations

Participants may benefit from engaging in reflection on their teaching practices. This reflection may allow participants to qualify their practices and begin to understand how the pedagogical choices they make influence their students' classroom engagement and ultimately their learning outcomes. Participation in this study may provide teachers with the opportunity to improve and reflect on their practice without evaluative implications. This new understanding of their instructional practices and facilitation of engagement may eventually translate to higher evaluations on engagement criteria. Some

participants may have experienced some mild or emotional discomfort because they were asked reflective questions on their teaching practice. On the informed consent document and prior to the first interview, the researcher explained that should the participant experience mild emotional discomfort, they have the option to not answer. The researcher also kept the telephone contact information for mental health services of the North Carolina State Health Plan ready to share with any participant needing the extra support.

One other important ethical consideration for the researcher concerns her position at high school B. The researcher currently serves as lead teacher and mentor at the school where the research was conducted. At the time of the study, the researcher served as the lead mentor. The role involved supporting beginning teachers and other faculty members with incorporating various learning strategies and routines into their classrooms. None of the participants of the study were a part of the beginning teacher support program at school B. The lead teacher position is not an evaluative position as she spends half of the instructional day teaching in her own classroom. Ensuring that teachers have instructional support in their classrooms and being a non-administrative confidant are the main concerns of the lead teacher. Acknowledging the role of the researcher at school B during the interview process was necessary to building trust and rapport with each participant at the site.

Summary

The current qualitative study used phenomenology to co-construct knowledge through conversations with a purpose between the researcher and participants. Through this dialogue, the researcher hopes increased understanding of how teachers engage students in Math I may help to support the students' achievement and, in turn,

lead to high four-year cohort graduation rates. This increase may allow students to benefit from post-secondary opportunities that would not be accessible without a high school diploma.

In Chapter 3, the research methodology was presented. The study allowed the researcher to comprehend and describe the understanding of the phenomenon of classroom engagement from the point of view of secondary Math I teachers through a series of iterative interviews that allowed practitioners the opportunity to identify key factors of classroom engagement to support increased student learning outcomes. Chapter 4 will present the findings and analysis of the data collected through the semi-structured interviews of the phenomenological study.

CHAPTER 4: ANALYSIS OF FINDINGS

Introduction

Chapter 4 presents the findings of the phenomenological case studies of the two socioeconomically diverse secondary schools used in the study. The researcher investigated Math 1 classrooms and explored teacher understanding of student classroom engagement. The case studies represent two high schools within one southwestern district in North Carolina. Both high schools exceeded overall academic growth for the 2018-2019 and 2020-2021 school years on the NC School Report Card Ratings System (NC School Report Card, 2019, 2020). Participants One and Two teach at School A, which is described as serving a low poverty community. Participants Three and Four teach at School B, which is described as serving a high poverty community (Nesbitt-Johnston Writing Center, 2021). Participants signed an informed consent document approved by the UNC Charlotte IRB (Appendix A), which outlined the procedures for ensuring confidentiality during and after the study. The researcher utilized identification distinctions to ensure privacy of the site locations and the identity of the participants.

Findings

Findings Among Participants

The investigator utilized deductive and inductive analysis associated with phenomenological research to investigate the question: How does teacher understanding of classroom engagement vary across secondary Math 1 classrooms? The analysis of the semi-structured interviews and the participant rankings of instructional practices delineated previously in Chapter 3 yielded findings that suggest that regardless of the socioeconomic distinction associated with the research site, teacher understanding of the

phenomena of classroom engagement is consistent across participants (Appendix H). Participant reflections on their understanding of the phenomena of classroom engagement demonstrate an awareness of the significance of the findings of Cooper's (2011) Classroom Engagement Framework; "Connective Teaching," "Academic Rigor," and "Lively Instruction" as instructional points of entry to engagement in the classroom setting. This finding supports Cooper's (2011) and Mitchell's (2020) belief that the Classroom Engagement Framework provides a common vocabulary to support understanding of student classroom engagement. A second common theme that emerged was participant awareness of the unique circumstances surrounding teaching ninth grade students. Additional findings suggest that participants believe that trust and feedback are essential to students actively engaging in the classroom. A final theme centered on the challenges presented during remote learning as a result of the Covid-19 pandemic and the subsequent protocols enforced at the state and local levels. Table 9 illustrates the dominant themes that emerged during the analysis of participants' semi-structured interviews.

Table 9

Key to Dominant Themes

Themes:	Identifications:
"Connective Teaching"	A
"Academic Rigor"	B
"Lively Instruction"	C
Teaching 9th graders	D
Teaching freshmen to do high school/modeling expectations	D'
Maturity level	D''
Cognitive ability	D'''
Student's responsibility to engage	E'
Teachers' responsibility to engage students	E''
Building trust between teacher and students	F'
Building trust between student and student	F''
Immediate feedback	G'
Immediate feedback in remote instruction	G''
Feedback to facilitate student analysis of performance	G'''
Feedback to support mastery of the content	G''''
Not logging on, camera off	H'
Creating relationships in remote/hybrid setting	H''
Hybrid learning	H'''
Student engagement	H''''

Table 10 illustrates the themes that were found within each participant's responses to the interview protocols (See Appendices C, D, F, & G). The table highlights the distinctions between the participants and their understanding of the nuances of the themes that emerged during the conversations with a purpose (Burgess, 1984).

Table 10

Coding of Dominant Themes

School:	Dominant Themes:
School A	
Participant One	A, B, C, D, D', D'', D''', E', E'', F', G', H', H'', H''', H''''
Participant Two	A, B, C, D, D', D'', D''', E', E'', F', G'''', H'', H''', H''''
School B	
Participant Three	A, B, C, D, D', D'', E', E'', F', F'', G', G'', G''', H', H'', H''', H''''
Participant Four	A, B, C, D, D', D'', D''', E', E'', F', G', G'', G''', G'''', H'''

Table 11 uses the participant's own words and everyday language to describe each theme identified within the data. The researcher used rich descriptions to identify themes and shared understandings to help develop the essence of the phenomena of teacher perceptions of classroom engagement. As explained in chapter three, the researcher utilized a prior and in vivo codes to identify emerging themes within the data.

Table 11

Overview of Dominant Themes

Theme	Dominant Themes within Interviews
"Connective Teaching"/A	• Reaching every student at their level • Making yourself available • Real Conversations • I will let them get to know me • Sharing personal experiences • Breaking down walls • Explaining why you want them to be successful • Using real data
"Academic Rigor"/B	• High Expectations for students • Competition between students • Expectations and Accountability • Academic press; procedural fluency
"Lively Instruction"/C	• Get them talking • Humor • Playing games • Discovery activities • Group work; partners
Teaching 9th graders/D	• Teacher must be firm but fair • Teaching them how to do high school; modeling • Being sensitive to them still being kids • Maturity level • Setting students up for long term success • Physical Activity • Structure; consistency • Self-advocacy • We are not teaching to the test; you want to teach them character tools
Students as active participants/E	• Picking up their pencil • Movement • Focused conversations with peers and teacher • Teachers anticipate misconceptions • Content is accessible for all students

Table 11 (continued)

Trust/ F	• Environment promotes self-expression and learning • Students engage because they don't want to disappoint you • Classroom is a community • Building confidence • Preconceived about math ability • Students don't care how much you know, until they know how much you care.
Feedback/G	• If the final answer does not match, it's a signal to (student) to see where a mistake was made • The whole point of learning is that, if you mess up, why did you mess up? • *Desmos* provides immediate feedback to what they know • Homework is becoming an issue, so we start in class to identify problematic areas
Obstacles posed by remote learning/ H	• Finding ways in this environment to make sure that they're staying connected and involved in their learning • Talking to a blank screen is unfortunately our reality • *Dyknow* lets me see from my screen each individual screen even though we are nowhere near each other • Defined roles for breakout rooms, evaluation of groups

The Classroom Engagement Framework

The three components of Cooper's (2011) Classroom Engagement Framework are "Connective Teaching," "Academic Rigor," and "Lively Instruction." Personal experience and an in-depth review of the literature led the researcher to conclude that stakeholders need a common dialogue when discussing engagement. The lack of a concrete definition of classroom engagement has left many stakeholders looking for a common vocabulary to discuss practices that support engagement in the classroom.

Cooper (2011) explains that the Framework's components are not mutually exclusive and that teachers who utilize all three components simultaneously are likely to increase classroom engagement.

A substantial finding in this study was that Cooper's (2011) Classroom Engagement Framework provides stakeholders with a structure to begin to understand successful practices to engage students in the traditional classroom setting and the various modes of remote learning. The researcher found that participants described engagement practices that promote emotional "Connective Teaching," cognitive "Academic Rigor," as well as behavioral "Lively Instruction" engagement in their Math 1 classrooms (Cooper, 2011). Participants often discussed Cooper's (2011) "Academic Rigor" and "Lively Instruction" within the context of "Connective Teaching." The researcher found that Cooper's (2011) engagement entry point of "Connective Teaching" was the thread that linked directly to the a priori and in vivo codes that emerged from the participants' own words and lived experiences describing engagement; teaching ninth graders, students as active participants, trust, feedback, and obstacles to remote learning.

Connective Teaching

"Connective Teaching" is defined as practices that promote understanding students, demonstrating care, affirming student success, self-expression, and relevance (Cooper, 2011). A significant finding within the current study reveals that participants described and ranked "Connective Teaching" practices as the foundation of classroom engagement. This finding is supported by the research findings of Martin & Dowson (2009), which emphasize that relationships are the key to fostering student motivation. In this study, participants at both schools emphasized the importance of creating

relationships that promote high expectations for all students. Participant One from School A explained, “I put a lot of weight into student relationships and buy-in.” Participant Four from School B described “Connective Teaching”:

> I think caring about students and pushing students, having high expectations is the number one way to build relationships. This is the best way to build buy-in for your class. Lessons can be super fancy, but if the students don't think you care about them as individuals, or if they are successful, it really does not matter.

Participant Three at School B stated, “I let them get to know me; we talk about our interests, football, video games, etc. I use this information to help me with examples and pulling them in. This sentiment of developing relationships to promote engagement and students’ success was echoed at School A, as Participant Two described the importance of investing in students:

> I feel very passionately that students don't care how much you know until they know how much you care. I truly believe that. I think students who I invested in and who I've shown that I cared, and I truly wanted them to succeed and affirmed their success and showed that not only am I passionate about the subject, but I am passionate about them learning and growing, I feel like that is going to be the greatest indicator of them being successful in my classroom.

These findings support the research of (Yonezawa et al., 2009) that explains how “we must pay attention to positive adult-youth relationships” (p.10). Frederick et al., (2004) stated that “Defining and examining the components of engagement individually separate students’ behavior, emotion, and cognition. These factors are dynamically interrelated within the individual; they are not isolated processes” (p. 61). Participants’ descriptions

of their lived experiences reflect emotional engagement, Cooper's (2011) "Connective Teaching" is the substructure to their understanding of classroom engagement.

Academic Rigor

Cooper's (2011) Framework explains that "Academic Rigor" is evidenced by assigning challenging work, academic press, using time efficiently, and demonstration of passion. Cooper's (2011) practices for "Academic Rigor" align with the definition of cognitive engagement. **"**Cognitive engagement draws on the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills" (Fredericks et al., 2004, p. 60). Participants in this study noted that high rigor is demonstrated when students persist through challenging or difficult tasks. The participants explained the importance of meeting students where they are mathematically and challenging them to master the content. Participant One at School A explained:

> You learn a lot about a student when you give unlimited attempts on an assignment, and the kid stops at ninety, or the kid stops at ten. You learn a lot about the student that doesn't compete with themself or doesn't take advantage of unlimited opportunities.

Participant Four at School B echoed the sentiment of taking the individual student and their needs into account when encouraging students and implementing rigor into the Math I curriculum. She explained:

> Some of my students struggle in math because they haven't necessarily always been held to high expectations or had someone that is really pushing them or has explained why they want them to be successful. In my classroom, the expectation

> is for everybody to do the work and try their best. I adjust my teaching when I am helping students individually.

Despite the similarities regarding the role of "Academic Rigor" in engagement, one distinction in the findings between School A and School B was identified. There were differences between the participants in School A and School B regarding the perceived foundational skills of Math I students. Participants' understanding of their students and their abilities demonstrated a nuance between the focus of the Math I classrooms in School A and School B. School A's participants emphasized mastery of content and pushing students to apply multiple skills, whereas School B emphasized building foundational math skills for student success in Math I and future Math courses. Participant One at School A explained:

> A lot of students come to us knowing a lot of skills in math, but we really push them towards mastery of concepts in a different way. The problems that we're doing are not just like you must use this one skill. You might have to use the Pythagorean theorem and then find the midpoint and then find another distance or something where they're applying it to a little bit more or applying it to a real-life situation.

Cooper's (2011) Classroom Engagement Framework and definition of "Academic Rigor" promotes the idea of teacher investment as a means of challenging students within the classroom context regardless of initial student ability level.

Lively Instruction

The final component of Cooper's (2011) Classroom Engagement Framework "Lively Instruction" supports research surrounding behavioral engagement. Participants

emphasized the importance of "getting students to talk about Math 1 content" as well as "discovery activities," "group work," and "physical movement." Research regarding behavioral engagement explains that "Behavioral engagement draws on the idea of participation; it includes involvement in academic and social or extracurricular activities and is considered crucial for achieving positive academic outcomes and preventing dropping out" (Fredericks et al., 2004, p. 60).

The participants' descriptions of "Lively Instruction" in their perspective classrooms depict active environments where students are comfortable expressing themselves creatively and articulating their questions and learning in settings that promote cooperation between themselves and the teacher. At both School A and B, participants explained how partnering students, group work, and small grouping can elicit active learning environments for schools. Participant Three shared that "I use humor when I teach; I am really excited about Math 1, as nerdy as it sounds." Participant Two describes an active classroom:

> I do a lot of discovery-type things like where they are discovering the properties or activating prior knowledge in some way through a Desmos activity or GeoGebra where they can write down what they notice, what they wonder and those kinds of things.

"Lively Instruction" allows students to engage directly with the content and the classroom community. Participant One explains, "They need to get up, walk around and socialize. Participant Three describes her classroom as a beehive:

> Our classroom is like focused beehive. You've got kids up and moving, near each other, helping each other, walking around, encouraging one another. It's beautiful

> chaos. The teacher and the inclusion teacher are there for support and to gauge understanding.

The active nature of Participant Three's classroom is consistent with the other participants who promote "games," "scavenger hunts," "collaboration," "movement," and "socialization" in their respective classrooms.

Rankings of Instructional Practices

Cooper (2011) identified 13 instructional practices as the points of entry to engagement. The researcher asked each participant to rank Coopers (2011) 13 instructional practices ordinally from one (greatest importance) to thirteen (least importance). This ranking can be seen in Appendix F. The instructional practices included in Appendix F are listed in alphabetical order and are not reflective of any points of entry prescribed by Cooper (2011). Frey (2018) explains that ordinal measurement is a method of assigning numerical values to assign a hierarchy. This allowed participants to determine which practice has the greatest value when considering their understanding of the phenomenon of classroom engagement. During the subsequent interview, number three each participant noted the challenging nature of prioritizing the practices. Participant Three explained:

> They were very difficult to rate. There is an argument for why all of them are important, and subsequently, there is an argument why some of them are least important. I kept switching the numbers around, but at the end of the day, my philosophy is if I can have the trust from a student, I can get them to do the work they don't want to do.

The researcher utilized descriptive statistics to summarize and highlight trends

found within the ordinal data from the instructional practices ranking. The researcher employed the median measure of central tendency as it is less affected by outliers in the data set. Tables 12 and 13 (p.71) represent the median statistics for both the Cooper's Classroom Engagement Framework (Table 12) and the Instructional Practices Rankings (Table 13).

Table 12

Median Statistics for the Points of Entry of the Classroom Engagement Framework

	School A Teachers	School B Teachers
"Connective Teaching"	4.0	3.5
"Lively Instruction"	11.5	11.5
"Academic Rigor"	6.0	7.0

**Practices were ranking ordinally, 1=most important and 13=least important*

Table 13

Median Rankings of Instructional Practices of the Classroom Engagement Framework

Instructional Practices	School A	School B
	Participants	Participants
"Connective Teaching"/EE		
Enable Self Expression	7.0	9.5
Relevance	4.0	8
Demonstrate Care	4.0	1
Understand Students	1.5	2
Affirm Student Success	6.0	3.5
"Lively Instruction"/BE		
Be Entertaining	12.5	13
Games and Activities	9	6
Assign Group Work	9	10.5
Assign Projects	12.5	12
"Academic Rigor"/CE		
Assign Challenging Work	5.5	8.5
Academic Press	5.5	3.5
Use Time Efficiently	8.5	7.5
Demonstrate Passion	6	6

**Practices were ranking ordinally, 1=most important and 13=least important*

The findings presented by the descriptive statistics support the findings of Cooper (2011, 2014) that "Connective Teaching" is the most important point of entry to

engagement. Participants at both School A and School B agree that "Connective Teaching" is the foundation of all practices that support their understandings of classroom engagement. The findings also demonstrate that participants at School A and B place "Academic Rigor" above "Lively Instruction," echoing the findings that participants believe "relationships and high expectations" are the foundations of student success in Math 1 classrooms.

Teaching Ninth graders

A significant finding of the study centers around the unique experiences of teaching Math 1 to primarily freshmen students. Although this study was conducted in two high schools serving separate and distinct populations of students, participants agreed that a top priority of Math 1 teachers is setting students up for future success in high school. Participants described the importance of the "transition from middle to high school," "teaching them to do school," "consistency," and recognizing the level of "maturity." Participant Three at School B explains why she is passionate about teaching Math 1:

> I love teaching Math 1 because you mainly teach freshmen, and their personalities are trying to find themselves in high school, so building that trust in my classroom in Math 1 is important so they know they can depend on me even when they leave my classroom. Being a teenager is hard, and it can be hard to navigate. My door is physically always open. I am excited to hear about them and how they are doing.

School A Participant Two describes teaching freshmen:

> They come to us very much still middle schoolers. And we have to take that into account, like with their work ethic, we have to help them build that. You have to

> understand that they are still young, but you must know how to carefully consider the line. Freshmen typically need more coaching than juniors and seniors.

These findings regarding the importance of creating relationships and "teaching them how to do school" support the research from Fennell (2008) that emphasizes the importance of Math 1, a course that provides post-secondary opportunities that could close the gap between various populations as it exposes students to higher-level math concepts and reasoning skills. Participant One explains the unique challenges that traditional Math 1 students pose:

> I think a Math 1 teacher is just dealing with a different caliber of student than sophomores, juniors, and seniors. You must have flexibility, patience, and accessibility. There's a lot of emotional and social needs for ninth graders, and I put a lot of weight in that.

Across the board, the participants agreed that consistency is key to successful engagement in Math 1 classrooms. Participant Four communicated the importance of consistency when she stated that "Freshmen need consistency. They do better when they know what to expect. When it is not random and crazy every single day, they know what they are supposed to do. It leaves less room for confusion on their part". Holding students to "clear high expectations" that are "communicated ahead of time" allows both teachers and students to share ownership of the classroom environment.

Students as Active Participants

In contrast to Mitchell's (2020) finding that suggested teachers, regardless of the school's student population socioeconomic demographic, agreed it is the responsibility of students to engage in the educational processes, this study found that participants

primarily believe that it is the teacher's responsibility to engage students in the classroom. Participant Two shared that "There is an entry point for everyone. It is sometimes a struggle to get them talking or get them even wondering. So, I have to find the entry point." This sentiment was shared by all participants. Participants described "anticipating misconceptions in the material" and "building examples and non-examples" to support mastery of the content for all students. Participant Three shared:

> The most challenging student is the one that tells themselves they can't do it. It's a battle that I am fighting. It is not that they can't learn the material because everyone can learn it, it's that they're putting up all of these walls, I mean, it is almost like you can see them tuning you out when you are trying to explain a problem, and it is not that they are being rude, it is just that they believe that everything you're saying is too difficult for me to get. So, I have to prove to them that they can do it and break down that wall at the same time. This is much easier to accomplish in small groups because I can provide the reassurance, physical proximity, and support they need to feel successful.

Participants agreed that successful Math 1 teachers must find a way to break down the material and teach the content in multiple ways to solve a problem. Participant Four explained:

> Students need to be given options so they can determine what they understand and what is best for them. It is really important for Math 1 teachers to break things down, show visuals, write out steps just to ensure your students are successful.

Student choice can promote the critical thinking skills necessary for success in and outside of the Math 1 classroom. Participants agreed that students learn the most from

"making mistakes" and identifying "where I went wrong."

Trust

Participants at both School A and School B agreed that building trust within the Math I classroom is fundamental to their understanding of the phenomena of classroom engagement. In support of the findings of van Uden et al. (2013), "For students in primary education, negative teacher-student relationships have a greater effect on engagement than positive relationships, whereas the opposite is true for secondary education" (p.45). Participants described developing a classroom environment built on trust between students and the teacher starting day one by "letting students get to know me," "making sure that they feel successful," and "asking students what they look for in a teacher." Participant Two shared a personal experience with her students to demonstrate the importance of understanding and relating to her students:

> It's just building that trust with the students first and letting them know I care. I think a lot of them come into math class already with this preconceived notion that I hate this class. I try to break down those barriers initially. I talk to them about how in college, I went to Costa Rica, and I spent some time there, and I had to live with a family who didn't speak my language. And I didn't know their language. And my first day there, I just started crying because I was trying to communicate with them, and I didn't know how to answer their questions. And so, all I knew to do was cry. I tell them that for some of them, when they get to Math class, that's how they feel. They feel like they don't know how to answer. They don't know, they're saying numbers and letters, and all of this is going on in the same equation. And they are like, what is happening? It seems like a different

> language. And so, I just try to build that confidence. It doesn't matter where you're starting, we're going to work together, and we're going to grow from where you're at now.

Participants unanimously explained that connecting with the students helps drive the student intrinsically once they "feel success," they are often internally motivated. Participant One characterized her students as "hard to reach and tough to teach" but explained, "Once the relationship is formed, there is an accountability piece. They want to please you, and they want to do the work. You are going to get more product out of someone who trusts you." Participant Three explained that "A successful student starts with because my teacher cares about how I do. Every day is not fun, but every day they know I care." This emphasis on relationships and the importance of recognizing the unique needs of individual student underlies Cooper's (2011) "Connective Teaching" as the most significant entry point of engagement.

Feedback

Findings from the study support the research that feedback may foster engagement in the classroom by promoting personal connections to the content (Jones et al., 2008). The researcher found that all participants believed that immediate feedback was critical to their understanding of the phenomena of classroom engagement and identifying problem areas. Participants explained that immediate feedback provides students a "signal" and an opportunity to identify and learn from their mistakes. These findings support the research of Tlhoaele et al. (2014) and Sullivan & Downey (2015), which suggests that students take ownership of learning when feedback and self-assessment play a role in learning. Participant Two from School A and Participants Three

and Four from School B explained that they use digital platforms like Desmos, Canvas, and Kahoot to provide instantaneous feedback to students about their performance as well as utilize the knowledge to guide their instruction. Participant Three shared that she uses digital lesson checks to get feedback in "real time" and "organize small groups" based on content mastery. The "green group" was the high-level scoring group where the teaching was enough and students were ready to continue with independent practice. The middle range group would get some Depth of Knowledge 2-3 level questions that require students to apply skills and content while using strategic thinking. The teacher support group would get a little more teacher-directed practice.

Participants at School B emphasized the use of "solution stations" to provide students with immediate feedback. Students could check the last step of the process to determine whether they mastered the content. Participant Four explained that "The whole point of learning is that if you mess up, why did you mess up? That is where your greatest learning is going to come from, and I really try to drill that into them." Participant one from School A echoes the sentiment in her message to her Math I classroom:

> What happens if you get it wrong? Nothing. What happens if you get it right? Still Nothing. So, I need you to know where your mistakes are so that I can help you, and I commend students when they say I got this wrong and I don't know where I made the mistake.

Participants agreed that feedback is simultaneously important for the teachers and students. It can provide students with necessary information about successful mastery as well as a guide to teachers in appropriate planning of content to increase student

engagement and mastery.

Obstacles Posed by Remote Learning

The Covid-19 pandemic and the resulting restrictions posed new challenges for the participants as they embarked on multiple variations of mandatory remote learning during the duration of the study. The obstacles as outlined in Tables 9 (p.60) and 11 (p.62) illustrate the participants' understanding of the challenges posed by remote learning. Participants agreed that some results of the solutions enacted to overcome these obstacles would remain in their teaching repertoire post-pandemic. Challenges faced by the participants included "students not logging on or not engaging in the class," and refusal to "turn on cameras." Participants were also tasked with creating a classroom community when transitions from all remote to hybrid teaching (half of the students in the classroom and half online) constantly changed, sometimes from month to month. Participant Two explained that group work in the remote setting was particularly challenging. She emphasized the importance of defined roles within groups and breakout rooms to ensure students stayed on task. She explained that the freshmen would sit awkwardly when they were supposed to be talking about the Math I content. Defined roles like "reporter," "recorder," and "designated first talker" helped to ensure students were on task as she jumped between breakout rooms.

Participants also agreed on the importance of consistency during remote learning. Participant One described the challenges she faced:

> Within the world of Covid, they need grace. It has been a struggle, but I've learned to meet them where they are, which can be difficult because you know where they should be, and you know where they need to go. They were supposed

> to have learned this concept, but they didn't, so we need to build in more time for that. So, it is meeting them where they actually are and teaching them.

Participants shared that digital platforms like Desmos and DyKnow allowed them to monitor student work remotely in real-time. These platforms made it easier to provide feedback when students were not in the presence of their teacher. Participant Four explained, "I code Desmos activities that told students good job, etc. as they were working. I could also see where their mistakes were and guide them through correcting their process errors."

The study participants also reported positive outcomes on student engagement in the remote setting. According to Participant One at School A:

> One of the biggest positives to come from this is the incorporation of technology. I think it has prepared students for the type of learning they are going to be doing in the future. Our students are very college oriented, and they are all going to be involved in some type of online class. Many of our students start taking college courses junior year of high school. On the flip side of that, are ninth graders ready for that responsibility? No! It has been a giant learning curve for them.

Participant Four also saw positive impacts on student engagement and learning in the remote setting. Participant Four from School B shared:

> One positive outcome of virtual learning is the need for me to ask students to explain the thinking and justify their answer through written expression. I ask students to explain their thinking, like why did you choose this choice and why was this your thinking. This helps me understand the thought process.

While the transitions in and out of remote learning presented multiple challenges to

participants, focusing on fostering trust and relationships in the virtual setting helped the transition between learning plans more manageable.

Summary and Reflection of the Findings

This study supports that Cooper's (2011) Classroom Engagement Framework provides a structure to begin a meaningful dialogue about teachers' perceptions of the phenomena of classroom engagement and the practices that foster engagement in Math 1 classrooms. Building trusting relationships based on a mutual understanding of the unique needs of freshmen, the role that teachers play in generating helpful feedback that promotes student engagement supports the idea that emotional engagement "Connective Teaching" precedes facilitation of "Academic Rigor" and "Lively Instructions" as points of entry to engagement (Cooper, 2011) within Math 1 classrooms.

Chapter 4 includes the findings of the phenomenological case studies of two socioeconomically diverse secondary schools' Math 1 classrooms that explored teacher understanding of student classroom engagement. The qualitive codes, dominant themes, and participant descriptions of dominant themes were reported from the 16 semi-structured interviews. Descriptive statistics were employed to illustrate the data collected from the participant rankings of Cooper's (2011) 13 instructional practices. These rankings were also used as a member check to ensure quality of the findings presented.

Participants' lived experiences and their understanding of the phenomena of classroom engagement was presented. The results suggested that teaching freshmen in Math 1 may have influenced the similar findings between the two distinct populations served at School A and School B.

The researcher utilized The Classroom Engagement Framework (Cooper, 2011) to frame the study question and the initial data analysis. Findings suggest that Cooper's (2011) Classroom Engagement Framework holds true in the traditional classroom setting as a point of entry to engagement and frames engagement in the remote classroom setting. This study demonstrates similar participant understandings of the complexity of the phenomena of classroom engagement in Math 1 classrooms.

Chapter 5 will present the implications of the understandings gained from the study, recommendations, and directions for future research.

CHAPTER 5: THE THREAD OF "CONNECTIVE TEACHING"

Introduction

The topic of engagement has become increasingly popular in education and psychological research due to its emphasis on explaining student behaviors (van Uden et al., 2013). Legislation has increasingly focused on using engagement in schools to combat absenteeism, drop-out rates, and low achievement (Natriello, 1984; van Uden et al., 2013; Cooper, 2014). Multiple definitions and variables within the research have emerged in attempts to tie down a single definition of classroom engagement (Azevado, 2015). Yet, a widely agreed-upon definition and measurement of engagement still does not exist.

As new measures of educational accountability continue to be implemented at various levels, including local, state, and federal mandates, teachers are charged with increasing student achievement while deciphering new legislation. According to the North Carolina Educator Effectiveness System Rubric, Standard IV articulates teachers facilitate learning for their students. Strand "b" explains, "Teachers plan instruction appropriate for their students... Teachers engage students in the learning process" (North Carolina Teacher Evaluation System Rubric, 2008). While policymakers, administrators, and educational leaders emphasize engaging students in the learning process as an essential role of teachers, they do not clearly define how one is to achieve this goal.

At the onset of this study, the researcher was guided by her role as a classroom teacher and lead teacher. As a practitioner in her own classroom, the investigator was fueled by the increasing pressure to ensure all students were engaged in the classroom setting, regardless of whether the course was mandated as a requirement for student

graduation or as an elective. In her role as a lead teacher, the researcher was motivated to facilitate a dialogue with a purpose (Burgess, 1984) between stakeholders to help establish a framework to discuss the expectations surrounding classroom engagement using a common dialogue. Northhouse (2013) explains, "Leaders direct their energies toward individuals who are trying to achieve something together" (p.6). Establishing common ground is essential to the success of all educational leaders as it allows stakeholders to begin to foster change. The researcher hopes this study's findings will help cultivate conversations that lead to a mutual understanding of the phenomena of classroom engagement.

Using a phenomenological multiple case study framed in the constructivist paradigm, this study investigated the lived experiences of secondary Math 1 teachers to explore their understandings of classroom engagement through their own words and practices. This research aimed to describe the essence of the phenomenon of classroom engagement found in Math 1 classrooms across a single district that represents diverse populations of students.

The findings presented in Chapter 4 emphasized participants' understanding of the importance of Cooper's (2011) Classroom Engagement Framework's "Connective Teaching" as the foundational point of entry to engaging students within the Math 1 classroom setting. "Connective Teaching" (Cooper, 2011) is characterized as emotional engagement (Fredericks et al., 2004) and is the thread that ties Cooper's (2011) additional entry points to the framework of engagement "Academic Rigor" and "Lively Instruction." The findings also support "Connective Teaching" (Cooper, 2011) as essential to participants' understanding of the phenomena of classroom engagement

practices in the constraints of the Math 1 classroom. Future research regarding teacher perceptions of the phenomena of classroom engagement in electives versus compulsory courses, as well as an exploration into additional math courses and other content areas, have the researcher wondering if "Connective Teaching" (Cooper, 2011) is the foundation for engagement across all disciplines.

The researcher also recognizes the potential influences of some classroom delivery changes brought on by the Covid-19 global pandemic. Classroom instructional practices may have been impacted due to the movement across modes of instruction utilized to deliver the critical content, such as remote instruction, hybrid, and face-to-face instruction.

Chapter 5 will explore the implications of the findings, recommendations, and suggestions for future research regarding teachers' perceptions of the phenomena of classroom engagement.

Implications of the Findings

The study's most significant finding concerns the participants' understanding of the unique challenges and responsibility of teaching ninth grade students to "do high school." The researcher's initial focus of finding a common dialogue to discuss the phenomena of classroom engagement in secondary Math 1 classrooms overlooked the distinct characteristics of traditional Math 1 students. The majority of traditional Math 1 students are ninth graders who are transitioning from middle to high school for the first time. All participants reiterated throughout each of the four semi-structured interviews the important role that Math 1 teachers play in building skills for success, not only with regard to the Math 1 content but also the skills necessary for success in high school.

Chapter 5 is titled "The Thread of 'Connective Teaching.'" Consistent with the findings of Cooper (2011, 2014) and Mitchell (2020), the iterative semi-structured interviews with Math 1 teachers about their lived experiences as well as rankings of Cooper's (2011) 13 instructional practices, revealed the significance of "Connective Teaching" to the participants' understanding of practices that foster engagement in secondary Math 1 classrooms. Cooper's (2011) operational definition of "Connective Teaching" emphasizes the importance of understanding students, demonstrating care, affirming student success, honoring student self-expression, and making content relevant to the learners. In effect, Cooper's (2011) "Connective Teaching" supports van Uden et al.'s (2013) research about the significance of positive student-teacher relationships in the secondary environment as a predictor of student engagement and success. The findings suggest that teachers need to develop ways to balance content while also effectively nurturing relationships in the secondary classroom to promote engagement. While teachers are charged with creating an effective balance between relationships and rigor, administrators are responsible for preparing and supporting teachers in their endeavors to accomplish this task in the hopes of increasing student engagement in the classroom setting.

Future Professional Development

"By helping teachers succeed in the classroom, we could put more students on the path to success" (TNTP, 2015, p. 1). The result of the *Mirage Report*, a two-year longitudinal study, concluded that school districts are making huge investments in developing teachers; even with this effort, most teachers are not improving from year to year, and school districts, it would seem, are not adequality helping teachers understand

how to improve (TNTP, 2015, p.2). With the reauthorization of the Elementary and Secondary Schools Act (ESEA) in December of 2015, President Obama's newly named Every Student Succeeds Act (ESSA) directed educators to continue to develop best practices for mastery for all students. According to the legislation, "The term 'professional development' means activities that … are sustained, intensive, collaborative, job-embedded, data-driven, and classroom-focused" (ESSA, 2015). In other words, professional development should be a continuous process, not an unconnected series of workshops. *The Mirage* reported that school districts spend an average of nearly $18,000 per teacher per year, specifically on professional development —the equivalent of six to nine percent of their annual operating budgets (TNTP, 2015). With this investment in teacher development, many would expect to see tangible returns on student learning outcomes. Despite this considerable investment, Douglas Reeves explains that in the present culture of accountability in public schools for teachers and students, one arena where this is least evident is within professional development seminars. Reeves suggested that the current status of professional development involves a great gap between what teachers expect from professional learning opportunities and what they actually receive in professional development (Reeves, 2010, p. 24).

Thomas Guskey offers a solution to closing the professional development gap described by Reeves. According to Guskey, two crucial factors must be considered when creating authentic, successful professional development: (1) What motivates teachers to engage in professional development and (2) the process by which change in teachers typically occurs (Guskey, 1986). These key questions, along with Guskey's five critical stages of professional development: participant' reactions, participants' learning,

organizational support and change, participants' use of new knowledge, and student learning outcomes (Guskey, 2014), can be utilized in planning professional development to support teachers in increasing student engagement. Ironically, educational leaders must "engage" teachers to ultimately "engage" students.

Cooper's (2011) Classroom Engagement Framework of "Connective Teaching," "Academic Rigor," and "Lively Instruction" could be used to ensure common vocabulary to identify areas of need regarding teachers' understanding of practices that promote student engagement is critical to the discussion. This common dialogue may allow stakeholders to plan professional development that supports teachers to gain new understandings about engagement in secondary classrooms. This common vocabulary can help facilitate a dialogue within school buildings to support engagement practices that may translate to increased student learning outcomes and students who are more engaged emotionally, behaviorally, and cognitively (Fredericks et al., 2004). Once teachers and administrators identify areas of need within school buildings, appropriate professional development can be planned. In conjunction with teachers, administrators should plan, present, attend, and engage in professional development to foster a sense of community and trust where teachers feel that they can take risks in the classrooms. After teachers implement the professional development, administrators should utilize the common vocabulary presented in Cooper's (2011) Classroom Engagement Framework to give feedback on the engagement practices witnessed during formal and informal observations. Data from observations using the common vocabulary should be utilized to determine the next steps for schools when planning future professional development. The researcher hopes that this process could translate into trusting relationships between

stakeholders, just as the trusting relationships described in this study may promote increased student engagement.

Directions for Future Research

The current qualitative study utilized phenomenological multiple case studies to explore how secondary Math 1 high school teachers understand student engagement in classroom settings by examining the lived experiences of the participants. Future research could begin with a continued exploration of how secondary Math 1 teachers at the middle school level understand student engagement in classrooms. Further studies could utilize Cooper's 2011 Classroom Engagement Framework to determine whether "Connective Teaching" is the initial point of entry for Math 1 across the secondary settings. Potential future research could also focus on various stakeholders' understandings of the phenomena of classroom engagement in the context of other subject area classrooms. In addition to examining teachers' understandings, students could be included in the qualitative analysis to determine their understandings through their own words and lived experiences describing their perceptions of engagement. This study could reveal the distinctions of understandings of multiple stakeholders within the classroom setting. Ultimately, future studies could investigate perceptions of "engagement" on multiple levels between the school, district, and community.

In addition to a continued exploration of Math 1 teachers' understandings, future research could focus on the nuances of the understanding of the phenomena between high school mathematics courses, Math 3, or AP statistics for example. A comparative study between Math 1 and Math 3 teachers' understandings of the phenomena of classroom

engagement in the state of North Carolina may highlight unique distinctions in the classrooms where students are assessed by the North Carolina Department of Instruction's End of Course tests, whereas a study focusing on AP Statistics courses may give insight into the distinct honors student population.

Future qualitative research could focus on exploring the phenomena of classroom engagement across the core content areas at the secondary level, including English, Science, and Social Studies. Researchers could also potentially frame a study that looked at the differences in teachers' understandings of the phenomena of classroom engagement based on compulsory versus elective courses. This study could support a deeper understanding of Cooper's (2011) findings, which indicate that students were more engaged on average in electives, particularly in the arts, athletics, career, life skills, and shop/agricultural courses.

Although the goal of this qualitative phenomenological multiple case study was for the researcher to obtain rich descriptions of the classroom engagement practices, future research could include descriptive quantitative research designs. Researchers could utilize Cooper's (2011) Instructional Practices to determine if different disciplines, different levels of teacher experience, or different educational settings, for example, had different points of entry to the Classroom Engagement Framework. Other quantitative studies could include correlational descriptive research investigating the relationships between "Connective Teaching," "Lively Instruction," and "Academic Rigor" within the context of different content areas.

Conclusion

Early research regarding engagement centered on engaging students to

prevent absenteeism and other concerning behaviors that often resulted in increased dropout rates (Natriello, 1984; Rumberger, 1983; Mosher, 1985; Sizer, 2004; Shore, 1996; Shore, 1997). Recent studies involving student engagement in the classroom revealed a disparity between who is responsible for engaging students in the learning process (Mitchell, 2020). Cooper's (2011) Classroom Engagement Framework provided the researcher with a context to explore secondary Math 1 teachers' understandings of the phenomena of classroom engagement. It also unexpectedly uncovered Math 1 teachers' broader goal of engaging their freshmen students in high school.

This research was a follow-up to Mitchell's (2020) study that explored secondary educators' (teachers and administrators) understanding of student engagement. The current study's findings support the conclusion of Cooper (2011) and Mitchell (2020) that the importance of "Connective Teaching" (Cooper, 2011) as an entry point to the Cooper's Classroom Engagement Framework (2011). The current findings of the study differed from Mitchell's (2020) initial study, which found that teachers primarily viewed students as responsible for engaging in the classroom setting. Participants in the current study viewed engaging students in the classroom primarily as a teacher responsibility. The researcher hopes that the current findings continue to support the facilitation of a common vocabulary and practices that promote engagement in the classroom, which may support increased student learning and higher evaluations for teachers.

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APPENDIX A: INFORMED CONSENT DOCUMENT

Department of Educational Leadership
9201 University City Boulevard, Charlotte, NC 28223-0001

Consent to Participate in a Research Study

Title of the Project: Exploring Secondary Classroom Engagement in Mathematics

Principal Investigator: Jessica Mitchell Cline, Doctoral Candidate, UNCC

Faculty Advisor: Dr. Rebecca Shore, UNCC

You are invited to participate in a research study. Participation in this research study is voluntary. The information provided is to help you decide whether or not to participate. If you have any questions, please ask.

Important Information You Need to Know

- The purpose of this study is to investigate how secondary, Math I teachers understand student engagement in the classroom setting through exploring the lived experiences of the educational professionals.

- I am asking secondary Math I educators with at least three years of teaching experience to complete three interviews and two classroom observations regarding their understanding of the phenomena of classroom engagement.

- Please read this form and ask any questions you may have before you decide whether to participate in this research study.

Why are we doing this study?
The purpose of this study is to better understand how Math I teachers understand the phenomena of classroom engagement.

Why are you being asked to be in this research study.
You are being asked to be in this study because you are a secondary Math I teacher, with at least three years of experience.

What will happen if I take part in this study?
If you choose to participate, you will complete three interviews with the researchers during the first interview you will be asked your classroom structure and pedagogical choices. The second interview will focus on classroom engagement and third interview will be a follow up to the first two discussions. Researchers will also complete two classroom observations, one between interview two and three and one after interview three.

What benefits might I experience?
You may not benefit directly from this study but it is possible that you will receive informed reflective time to better understand how to engage your students through discipline specific practices.

What risks might I experience?
You may experience some mild or emotional discomfort as you will be asked reflective questions on your teaching practice which could be personal and sensitive. Should you experience mild emotional discomfort, you have the option to not answer. In addition, the telephone for mental health services of the North Carolina State Health Plan is (800)367-6413 and will be shared with anyone who experiences mild, emotional discomfort. These experiences should be rare, less than 1%.

How will my information be protected?
I will keep participant identification information including names, contact information, and consent forms in hard copy will be locked in a file cabinet and on a password protected UNCC google cloud account that is not linked to any device. The research data will be kept separate from the participant identification data. The research data and audio files will be kept on a password protected UNCC authorized google cloud account named with participation pseudonym information. Audio files will be deleted after interviews are transcribed.

How will my information be used after the study is over?
After this study is complete, data will be deleted and not used or shared for future research studies.

What other choices do I have if I don't take part in this study?
Not Applicable- This is a voluntary study.

What are my rights if I take part in this study?
It is up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer.

Who can answer my questions about this study and my rights as a participant?
For questions about this research, you may contact Jessica Mitchell Cline, JSMitch1@uncc.edu, 704-467-3388, Dr. Rebecca Shore, Dissertation Chair.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Office of Research Compliance at 704-687-1871 or uncc-irb@uncc.edu.

Consent to Participate

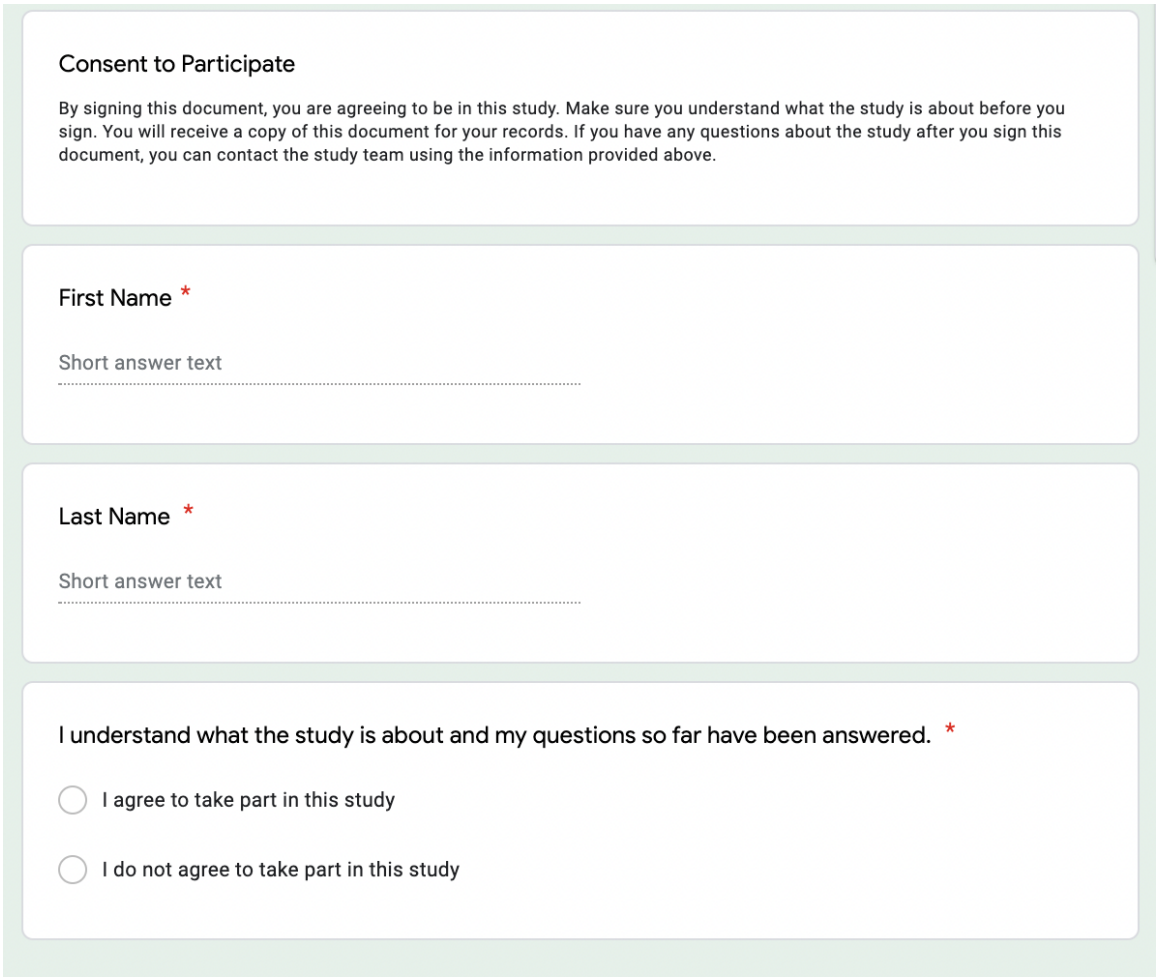
By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about, and my questions so far have been answered. I agree to take part in this study.

_____
Name (PRINT)

_____
Signature Date

_____
Name & Signature of person obtaining consent Date



Consent to Participate

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

First Name *

Short answer text

Last Name *

Short answer text

I understand what the study is about and my questions so far have been answered. *

I agree to take part in this study

I do not agree to take part in this study

APPENDIX B: PARTICIPANT INTERVIEW PROTOCOL 1

INTERVIEW #1

Thank you for agreeing to speak with me. I appreciate you taking the time to read and sign the Informed Consent document. Please make sure that you do not mention the names of any students when describing classroom situations and interactions. The following is an overview of the study:

Topic: Classroom Engagement

Population: Math I Teachers

Purpose Statement: The purpose of this study is to investigate how secondary Math I teachers understand student engagement in the classroom setting, through the lived experiences of the educational professionals.

Research Question: The researcher will utilize a phenomenological case study to develop a rich description that answers the question: How does teacher understanding of classroom engagement vary across secondary Math I classrooms?

1. Do you have any questions for me before we begin?

DEMOGRAPHIC SURVEY ITEMS

The purpose of this survey is to gather information to ensure participants meet the eligibility criteria required for this project. I am intentionally seeking Math I teachers with at least three years of teaching experience.

2. Do you meet this requirement?
3. Name:

PERSONAL TEACHING BACKGROUND

4. What is your educational background?

Probe: How long have you been a teacher?

Probe: How long have you worked at _____?

Probe: Have you always worked at your current teaching location?

Probe: Tell me about your preparation to become a teacher.

5. What degrees do you hold?

6. Did you take a traditional path to teaching?

SCHOOL CULTURE AND ENGAGEMENT

7. How would you describe the culture of your school?

8. Is engaging students in the classroom a topic of conversation within your school building?

Probe: Has engagement been a topic of discussion consistently throughout your time at_____ or a more recent development?

CLASSROOM STRUCTURE (Academic Rigor)

9. How do you prepare your Math I students for the expectations of your course?

Probe: Why?

10. What are some of the ways you prepare your students to learn daily?

11. What are your philosophies regarding the management of student behaviors in your Math I classroom?

Probe: Do you have a classroom behavior management plan?

Probe: If so, how would you describe your plan?

TEACHING PEDAGOGY (Lively Instruction)

12. Tell me about your teaching philosophy.

Probe: How do students learn in Math I?

Probe: How do you plan for instruction?

Probe: What are your top priorities when planning lessons for you Math I classroom?

13. In your Math I classroom, what do you consider to be the most effective practices to help students understand the content?

Probe: Tell me about a typical Math I lesson?

PERCEPTIONS OF STUDENTS (Connective Teaching)

14. Tell me about the students in your Math I classroom.

Probe: Can you think of any students who present challenges with regard to learning in your Math I classroom?

Probe: What frequent challenges do you encounter as you try to keep the students focused and on task?

Probe: How do you work with these particular students?

Probe: How is this similar or different to how you work with students who are focused and on task?

APPENDIX C: PARTICIPANT INTERVIEW PROTOCOL 2

Interview 2

Thank you for agreeing to speak with me again. Just a reminder to make sure that you do not mention the names of any students when describing classroom situations and interactions.

1. Did the previous summary of Interview #1 reflect your memory of our conversation?

   Probe: Do you have anything you would like to add?

2. Do you have any questions for me before we begin?

Classroom Engagement Practices (Connective Teaching, Academic Rigor, Lively Instruction)

3. Tell me about a typical Math I lesson?
4. Are you concerned with student engagement in your Math I classroom?

Probe: Why?

5. What are your current perceptions of the phenomenon of student engagement in Math I classrooms?
6. How would you describe students who are engaged in the learning process ?

   Probe: Can you think of a specific student in your classroom that is routinely engaged?

7. What do you consider best practices to engage students in learning Math I?
8. Can you describe an example of student engagement in your classroom?
9. Is student engagement something you prioritize in your daily practice?

Probe: Why?

Probe: How?

10. Is student engagement something you plan for in your daily lessons?

    Probe: Specifically, how do you engage students in the classroom?

    Probe: Can you identify activities you have used to engage students in your classroom?

11. What are the characteristics of a good Math I teacher?

12. How would you describe the ideal relationship between a secondary math I teacher and student?

13. How would your Math I students describe you?

14. How would the other teachers in your department describe you?

    Probe: How would other teachers in the building describe you?

15. How would your administrative team describe you?

APPENDIX D: PARTICIPANT INTERVIEW PROTOCOL 3

Interview 3

Thank you for agreeing to speak with me again. Just a reminder to make sure that you do not mention the names of any students when describing classroom situations and interactions.

1. Did the preceding summary of our previous conversation reflect your memories of our discussion?

   Probe: Do you have anything you would like to add?

2. Do you have any questions for me before we begin?

Student Engagement (Connective Teaching, Academic Rigor, Lively Instruction)

Individual Ranking of Student Engagement Instructional Practices (completed via google form prior to the interview)- Appendix E

3. Why did you rank the practices in the manner that you did?

   Probe: How did teaching under plan C and B influence your rankings

4. How do you currently plan for your Math I classes?

   Probe: How has remote learning (blended, synchronous, asynchronous, or hybrid) instruction affected your planning?

5. Would your rankings or instructional planning practices differ for upper level math classes?

   Probe: Why or Why not?

6. What do you consider best practices to engage students in learning Math I in the virtual environment?

   Probe: Do they differ from your list of best practices in the traditional

classroom setting?

7. Can you describe an example of student engagement in your virtual or hybrid Math I classroom?

APPENDIX E: RANKING OF INSTRUCTIONAL PRACTICES

Instructional Practices

The following instructional practices were identified from the literature regarding student engagement. Please rank the practices listed below in order of most important consideration when plan for instruction to least important. 1- Most essential practice for engaging students in Math 1 to 13- Least essential practice for engaging students in Math 1. Please only use each ranking once.

Switch account

* Required

Email *

Your email

Affirm Student Success *

Choose

Assign Challenging Work *

Choose

Assign Group Work *

Choose

Assign Projects *

Choose

Be "Entertaining" *

Choose

Connect Class to Real Life *

Choose

Demonstrate Care *

Choose

Demonstrate Passion *

Choose

Enable Self-Expression *

Choose

Push students to work hard *

Choose

Use Games and Fun Activities *

Choose

Understand Students *

Choose

Use Time Efficiently *

Choose

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

Submit

Clear form

APPENDIX F- PARTICIPANT INTERVIEW PROTOCOL 4

Interview 4

Thank you for agreeing to speak with me again. Just a reminder to make sure that you do not mention the names of any students when describing classroom situations and interactions.

1. Did the previous summary of Interviews 1,2, and 3 reflect your memory of our conversation?

   Probe: Do you have anything you would like to add?

2. Do you have any questions for me before we begin?

Student Engagement Virtual Learning (Connective Teaching, Academic Rigor, Lively Instruction)

3. Now that we are in our final interview, do you have any final thoughts about your perceptions of classroom engagement?
4. How do you build credibility with your students virtually?

   Probe: How is that different from the traditional classroom setting?
5. How did you plan for engagement in the virtual setting?

   Probe: How did planning for engagement differ from your traditional planning?
6. What does participation in the virtual setting look like in your classroom?

   Probe: How do you encourage participation in your virtual classroom?

   Probe: How does this differ in the traditional setting?
7. What does active learning look like in your virtual or hybrid classroom?

   Probe: How does this compare to active learning in your traditional

classroom?

8. Do you have any final thoughts about the research process or engaging in conversations with a purpose regarding engagement?

APPENDIX G: QUALITATIVE CODES

Descriptive Codes

D- best practices to engage students
D- challenges
D- classroom management
D- communication between stakeholders
D- community
D- confidence
D- expectations
D- mindset
D- pedagogy
D- perceptions of engagement
D- perceptions of student's role
D- perceptions of teacher's role
D- reluctant learners
D- remote learning
D-responsibility of students
D- responsibility of teacher
D- students as advocates
D- student-teacher relations
D- transition from middle to high school

Interpretive Codes- Regarding the Students

IS- barriers to success
IS- camaraderie
IS- content discussions
IS-growth v. fixed mindset
IS-lack of confidence
IS- maturity
IS- perception of teacher as fair
IS-preconceived notions
IS-privileges as motivation
IS-postsecondary goals
IS- self-advocacy
IS-social & emotional needs 9th graders
IS- talk and work collaboratively

Interpretive Codes- Regarding the Teachers

IT-accountability
IT-affirm student success
IT-amount of Math I content
IT- anticipation of misconceptions
IT-availability and access
IT-bridge b/w middle and high school
IT-build confidence
IT-challenges of remote learning
IT-challenges of time
IT-communication with students
IT-communication to parents
IT- competition for students' attention
IT- credibility
IT-demonstrate care
IT-demonstrate passion
IT-differentiate instruction
IT-encouragement
IT-examples v. nonexamples
IT-facilitate learning
IT-humor
IT-immediate feedback
IT-immediate v. long term success
IT- instructional planning
IT-modeling
IT-monitoring progress
IT-promote trust
IT-provide structure and boundaries
IT-relevance of content
IT-routine
IT-small grouping
IT-teacher as coach

Pattern Codes
P- “Academic Rigor”
P-active participation
P- “Connective Teaching”
P-feedback
P- “Lively Instruction”
P-obstacles posed by remote learning
P-roles of stakeholders
P-teaching ninth graders
P-trust