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# Grade 8 Mathematics Teachers' Perceptions of Students' Low Performance in a Northeast U.S. State

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This is to certify that the doctoral study by

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and that any and all revisions required by
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2026

Abstract

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MA, Walden University, 2019

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Dissertation Submitted in Partial Fulfillment

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## Abstract

The problem that was addressed through the study is that 82% of Grade 8 students score below proficiency on the end of year mathematics exam in a Northeast state. Grounded in Deci and Ryan's self-determination theory, Maslow's hierarchy of needs, and Gay's culturally responsive theory, the purpose of this qualitative study was to explore Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance and the resources needed to support student success. For this basic qualitative design, semistructured interviews with 10 Grade 8 mathematics teachers were conducted. Through thematic analysis, the following four themes emerged: teachers were aware of factors influencing students' mathematics performance and the effects of their instructional approaches; however, teachers' practices are shaped by capacity limitations at their school and district. Teachers requested expanding capacity and support systems and increasing student accountability by fostering supportive and motivating environments. The study has the potential to foster positive social change by increasing educational administrators' awareness of teachers' needs. This increased awareness may encourage the development and implementation of professional development opportunities needed to enhance teachers' instructional practices, while creating programs that include culturally responsive methods to promote equity and success for educators and students.

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# Dedication

This doctoral study is dedicated wholeheartedly to my beloved grandmother, brother, and, most significantly, God, to whom I attribute all my blessings. My support system has been a consistent source of inspiration. My family has consistently offered their emotional, moral, and spiritual support.

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I want to express my gratitude to everyone who has supported me through life's challenges and provided the motivation and understanding necessary for my success. A special thanks goes to my committee chair, Dr. Mary Hallums, for her steadfast support, encouragement, and wisdom throughout my doctoral journey. I also want to thank Dr. Kimberley Alkins, my second chair, for her support and reviews throughout the process. I also appreciate Dr. Mario Jackson's valuable feedback and encouragement during this period. Furthermore, I am grateful to Dr. Beate Baltes and the members of the doctoral office hours for their insights into the development phases of this journey. I would also like to thank my best friend, Mrs. Tamara Brown, for her invaluable technological assistance and support throughout this journey. Lastly, I would like to thank my parents and husband for their unwavering encouragement and support.

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# Chapter 1: Introduction to Study

Mathematics is crucial in students' ability to gain lasting job opportunities. This study addressed the problem that 82% of Grade 8 students scored below proficiency on the end-of-year mathematics exam in a Northeast state. The National Center for Education Statistics (NCES, n.d.-b) reported that the 2022 testing period saw the largest decline in performance on the mathematics National Assessment of Educational Progress (NAEP) among students in the United States since 1990. The NCES (n.d.-b) also found that not only was there a drastic decline, but no state showed improvement between 2019 and 2022. The NCES (n.d.-a) showed an 8-point decline in Grade 8 students' performance nationwide from 2022. Sattem et al. (2022) found that numerous state data showed increased underperformance in mathematics across all grade levels. Navigating the issues that influence students' learning became more pressing as the COVID-19 pandemic receded and the learning loss became more evident.

Despite the many reforms within the education system over the past decades, students continue to underperform. According to Sattem et al. (2022), 60% of students in Texas and 70% in Indiana failed to meet proficiency in the mathematics exam. The Northeast state's Department of Education reported in 2022 that only 18% of Grade 8 students met proficiency in the math portion of their exams. Teachers play a crucial role in understanding the issues that impact students' academic performance. In this study, I explored Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in mathematics in a Northeast state and the resources needed to teach these students. The impact of a social change that positively affects students' performance was centered around understanding teachers' experiences, improving

students' instructional experiences, incorporating meaningful matters, and increasing students' achievement.

This chapter provides the basis for this study. Sections include the background, problem statement, purpose of the study, research questions, conceptual framework, nature of the study, definitions, assumptions, scope and delimitations, limitations, significance, and a summary. Important details are provided in each section to explain the study. The background centers on supporting research literature that addresses the study and the existing gap in practice. The problem is supported by research and data, which facilitated the investigation of the issue. The research provided a bridge between the issue and the present interest. The research questions outline the information needed to gather compelling data, while the conceptual framework provides a foundation for the study. The nature of the study outlines the methodology, what was explored, and the rationale for employing a basic qualitative study. The definitions section incorporates the identification and explanation of critical terms through literature. Assumptions are detailed in identifying any information considered accurate without evidence. Next, the scope and delimitations detail the boundaries, while limitations provide insight into possible biases associated with the study. The limitations section is followed by an examination of the study's significance, including its potential for social change. The chapter concludes with a summary that provides an overview of Chapter 1.

## Background

Students' struggles in math were highlighted in the 2019 and 2022 NAEP reports. According to the NCES (n.d.-b), students saw an 8-point decline in mathematics. Sattem et al. (2022) and Bjorklund-Young and Plasman (2020) reported that the math gap had

expanded dramatically since the COVID-19 pandemic. The researchers also noted that concerns regarding students' math abilities began 30 years before 2022. Despite the many changes and reconstructions in different departments, students' mathematics performance remains a concern today (Bailey et al., 2021; Lyle et al., 2020).

Lyle et al. (2020) and Bailey et al. (2021) asserted that various factors contribute to students' academic performance. These factors include low motivation, socioeconomic status, and poor attendance. Crepeele (2022) also explained that the percentage of students who met proficiency standards and those who did not over the last decade reflected differences in the opportunities and resources available to families and students.

The U.S. Department of Education was tasked with providing educational opportunities to low-income districts and resources needed to close the academic gap through various grant-funded programs (NCES, 2017). The No Child Left Behind Act (NCLB) was later enacted to work in conjunction with the Elementary and Secondary Education Act (ESEA), despite its initial focus on accountability among teaching staff and on increasing awareness of student achievement. NCLB (2002) defined highly qualified teachers as those who possess the content knowledge and teacher licensure required for their teaching area. Despite initiatives that fostered the development and implementation of many programs and the introduction of the ESEA, students' NAEP mathematics scores declined in 2019, 2022, and 2024, as reported by the NCES (n.d.-a, n.d.-b, n.d.-c, n.d.-d). Ayscue et al. (2022) noted that despite various acts intended to improve student achievement, many schools struggled to retain staff because the demands of these acts created an overwhelming workload.

Uzzell et al. (2024) highlighted that a potential challenge students may face is the frequent turnover of teachers. Despite the focus on students' low performance, it is essential to understand what is happening within the circle of staff and students to effectively identify the challenges they may face. NCLB, ESEA, and grants did not improve students' achievement. One major lesson learned was that implementing these various acts brought more politics into the education system, resulting in less effort to support students (Uzzell et al., 2024).

Appiah et al. (2022) identified a link between students' performance and experiences. Olsen and Huang (2021) and Robinson (2022) emphasized the importance of the teacher–student relationship and self-efficacy. The relationships formed during instructional time offer opportunities for lasting learning in comfortable learning environments (Olsen & Huang, 2021). Although these factors remain relevant, the COVID-19 pandemic introduced additional challenges. The COVID-19 pandemic exacerbated the learning gap, underscoring the need for strategies to enhance mathematics performance because this gap hinders students' comprehension and application. Sattem et al. (2022) noted that at the beginning of the 2021–2022 school year, students lacked many key concepts necessary for further understanding and progress. These findings suggest that a lack of quantitative skills was increasingly problematic as quantitative literacy became vital in the United States (Namkung et al., 2019).

Implementing and promoting computational thinking was another initiative introduced throughout the states to achieve student success. Papert (1980) initiated the development of a computational practice that was later refined by Weintrop et al. (2016).

Papert and Weintrop believed that computational practices, which involve breaking down problems, solving them, and modeling, are critical to students' ability to develop and apply critical thinking. Using computational practices built on previous ideas and providing deeper insights has been refined several times over the last decade (Cui & Ng, 2021; Miller, 2019; Shumway et al., 2021).

Although students may have improved in some concepts, Lockwood and De Chenne (2021) highlighted the need for paper-and-pencil methods because nothing had been shown to supersede them. Lockwood and De Chenne also noted that although some practices are effective, learning specific mathematical concepts is more effective with a pencil. This argument arose as Lockwood and De Chenne discussed the repeated use of computers in the classroom and its impact on students' computational and critical-thinking skills. These issues highlighted some documented concerns researchers had noted over the years regarding students' learning.

The current study was necessary as educators revise the curriculum and resources to address students' ongoing underperformance in mathematics. Only 18% of eighth graders in this Northeast U.S. state achieved proficiency in 2023. Understanding Grade 8 mathematics teachers' perceptions of the challenges contributing to students' performance was essential. A deeper understanding of the factors influencing students' performance may enable educators and school leaders to develop effective instructional strategies that contribute to this achievement and to provide additional resources to enhance student success.

## Problem Statement

The problem that was addressed through the study is that 82% of Grade 8 students score below proficiency on the end of year mathematics exam in a Northeast state. Hill and Uribe-Florez (2020) explained that many reforms have enabled states to better support teachers in implementing standards-aligned instruction. Amid all these additions to schools' instructional practices, students continue to have low mathematics performance. Evidence of this problem was shown in the Northeast state's assessment.

According to a 2022 Northeast state report, approximately 82% of Grade 8 students failed to meet proficiency standards in the 2022–2023 school year, meaning only 18% met them. A similar decline was also reported in the 2019–2020 school year, with 83% of students failing to meet proficiency standards, and only 17% meeting them. Although no data were available for the 2020–2021 school year and the 2021–2022 school year, students' performance immediately before and after the COVID–19 pandemic demonstrated that more than 75% of test takers did not meet proficiency. In the United States, despite the introduction of new initiatives aimed at closing the academic gap in mathematics, the NCES (n.d.-a) reported an 8-point decline in the 2022 NAEP mathematics score. With the NCES reporting that the United States also experienced a decline in mathematics scores, the issue of eighth-grade mathematics performance is a significant concern for states and the nation.

Teaching students' comprehension is crucial. The National Council of Teachers of Mathematics (NCTM, 2000) noted that vague standards force teachers to interpret them, create activities, and assess understanding. Hill and Uribe-Florez (2020) and Sattem et al. (2022) demonstrated that educators face challenges in implementing these

skills and providing resources. Limited literature existed on teaching challenges and essential resources related to eighth-grade mathematics performance. Although studies existed on middle school math, the focus was on the entire Grade 6–8 scope, anxiety, motivation, and student perception (Herman et al., 2022; Li et al., 2020; Wei et al., 2020). The current study offered qualitative insights into a specific grade level (eighth) by using data from a Northeast state and the NAEP to demonstrate that low mathematics performance was not confined to a single state but was also evident nationwide. Additionally, Campbell et al. (2024) and Powell et al. (2021) noted that students' high school mathematics performance may be influenced by their middle school experiences.

## Purpose of the Study

The purpose of this basic qualitative study was to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state and the resources needed to support student success. Ober et al. (2022) cited data suggesting that students' attitudes toward high school mathematics stem from their experiences and perceptions of mathematics from the middle school level. Reid (2024) noted that effective mathematical performance requires varied instructional approaches to increase students' understanding and critical thinking skills. The findings from the current study may provide school leaders with an understanding of the challenges affecting teachers and their ability to deliver adequate instruction, as well as successful strategies and resources that may help improve students' performance in meeting proficiency standards. The findings may be used to create professional development opportunities that help teachers evaluate the effectiveness of the resources they use and identify new resources that may enhance student understanding. Additionally,

understanding teacher-perceived challenges can inform strategies to mitigate the risk of low performance in middle and high school.

## Research Questions

Two research questions guided this qualitative study, which explored the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state. The research questions I sought to answer addressed teachers' perceptions of factors that may have contributed to this performance and the resources that may be used to increase student success:

RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast state?

RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast state?

## Conceptual Framework

The conceptual framework that guided this study was Deci and Ryan's (1980) self-determination theory (SDT), Maslow's (1943) hierarchy of needs, and Gay's (2010) culturally responsive theory. Deci and Ryan's (1980) SDT addressed the need for growth and change, which drives behavior. People seek to grow and improve (Deci & Ryan, 1985). Furthermore, the theory addresses humans' need to master challenges.

### Deci and Ryan's SDT

SDT, developed by Deci and Ryan (1980), has undergone several revisions to reflect current changes in the theory. These changes include Deci (1971) and Deci and Ryan (1980, 1985, 1991). Deci and Ryan's theory is based on the premise that people are

self-driven and that self-driven factors channel behavior in either positive or negative directions (Deci & Ryan, 1980).

In 1985, Deci and Ryan expanded the theory by explaining that intrinsic and extrinsic motivation differ in their generality and that behaviors are shaped by these determinants. As Deci and Ryan (1975) stated, it is essential to recognize that both intrinsic and extrinsic motivation are not the sole factors influencing a student's behavior. However, other factors may be playing out in their daily lives. These viewpoints align with Maslow's (1943) and Gay's (2010) theories, which hold that students' needs and cultural beliefs may influence their motivation and success.

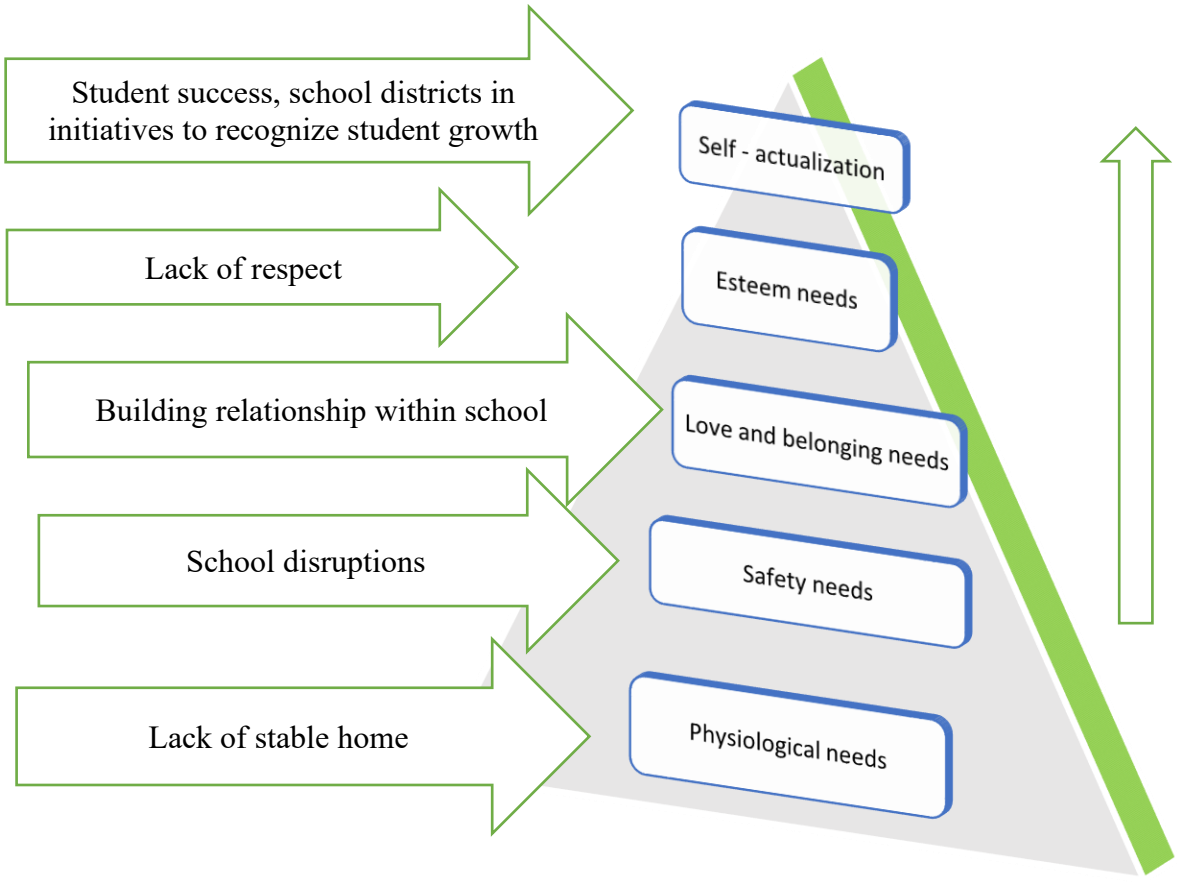
**Maslow's Hierarchy of Needs**

Maslow (1943) is known for the human motivation theory, which frames research on student performance. For Maslow (1943), human motivation is driven by a five-tier hierarchy of needs. For humans to achieve self-actualization and recognize that the skills needed for success are inherent in their needs, including physiology, safety, love and belonging, esteem, and self-actualization, they need to build upon these needs (Maslow, 1943, 1954).

Maslow (1943) argued that physiological factors, safety, love and belonging, esteem, and self-actualization influence human motivation. Maslow (1968) further explained that human success is built on internal and external factors that provide the motivation and interest needed to overcome daily challenges. These internal and external factors were used in the current study to shape and modify the possible challenges that teachers may face, providing context and a clearer view of the reasons for students' low performance (see Figure 1).

**Figure 1**

*Conceptual Framework: Maslow's Hierarchy of Needs*




Note. Adapted from Maslow (1943).

**Gay's Culturally Responsive Theory**

Gay (2018) also provided insight into content that appeals to students' interests. Content relevant to students' lives and experiences captures their interest and encourages active participation, leading to better academic performance and sustained enthusiasm for learning (Gay, 2018). The SDT and culturally responsive theories offer an opportunity to understand why students may not perform at proficiency, based on the idea that

motivation and experience play a significant role in the level of interest and effort they invest in the task.

Gay's (2018) viewpoint includes: theory, research, and evidence-based instructional approaches that have successfully decreased performance gaps. It is essential to recognize that culturally responsive teaching is particularly important in Northeastern states, where a high percentage of students are diverse. This growing diversity calls for teaching practices that meet students' needs. Gay's theory, as well as Ryan and Deci's (2000a, 2000b) theory, shape the idea that teaching students to increase their achievement requires knowledge of where students are coming from and their experiences. Gathering this understanding helps to create successful instructional practices that target a specific group of students.

Gay's theory enhanced understanding of how low scores on standardized tests indicate underlying issues. Gay (2018) noted that while students' poor test performance reflects a lack of conceptual knowledge, it does not clarify the reasons behind their struggles. This insight underscores the importance of recognizing that low Grade 8 students' mathematics achievement signals deeper problems rather than being the root cause. Discussions with teachers about these scores can facilitate a dialogue exploring why students are experiencing difficulties and how they can be helped.

Human behavior can be seen as directly correlated with their experiences and motivations. Rojas et al. (2023) explained that Maslow's theory of needs provides a scientific lens for understanding how human behavior is directed and influenced by motivations, or what drives their interests. The theory provided insight into possible reasons students may perform below average. It supported the challenges provided by

teachers regarding views on eighth-grade students' mathematics performance in a Northeastern state. I used the conceptual framework to develop the interview questions. The framework also helped define the study's significance and was used to analyze interview transcripts and literature reviews for common concepts and themes. Gay's (2010) culturally responsive theory, Ryan and Deci's SDT (1985), and Maslow's (1943) hierarchy of needs provide a conceptual framework emphasizing the concepts of motivation of needs, aligning and focusing the study.

## Nature of the Study

This study used a basic qualitative research design to gather data on the perceptions of Grade 8 mathematics teachers on the low performance of mathematics students in a Northeastern state. Semistructured interviews are the primary data collection method used to explore Grade 8 mathematics teachers' perceptions of their experiences with students' performance. Tisdell et al. (2025) explained that qualitative inquiry incorporates interviews to identify substantive themes and patterns in the issue under investigation. Furthermore, a basic qualitative design enables the discovery and exploration of Grade 8 mathematics teachers' perceptions firsthand, including follow-up explanations and the use of real-life experiences (see Chenail et al., 2011; Kahlke, 2014). Using a basic qualitative approach was ideal when the purpose of the study was to understand the unique perspective of each participant's lived experiences (Kahlke, 2014; Percey et al., 2015). This basic qualitative study design provided an opportunity to gather and analyze data on an issue across the classroom, school district, and state to find a solution and further promote positive social change. A basic qualitative approach was therefore ideal for this study.

Low eighth-grade student performance in a Northeast U.S state can negatively affect students' ability to perform at other grade levels. The low performance created the need to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance. Maslow's (1943) hierarchy of needs addresses human motivation and offers explanations for factors that may affect students' low performance (disruptive learning environments, lack of food and shelter, lack of interest in learning). In addition to Maslow's hierarchy of needs, I can use Ryan and Deci's (2019) SDT to explain how self-motivation may shape students' perceptions of factors influencing their performance in a Northeastern state. Self-motivation is a general framework for understanding why people do what they do and what motivates them, rather than what undermines their behavior (Ryan & Deci, 2019).

Ravitch and Carl (2021) advocated the use of purposeful sampling in research. Purposeful sampling enables the selection of participants based on criteria that yield the most reliable data for the study. Purposeful sampling will, therefore, be used to identify 10-15 participants who teach eighth-grade mathematics in four middle schools within an urban school district in a Northeastern state. Each participant must have taught eighth-grade mathematics for at least 3 years. Semistructured interviews provided an opportunity for follow-up questions and in-depth analysis of participants' responses. The data were analyzed using thematic analysis to identify patterns, themes, and concepts related to teachers' challenges, successes, and resources.

## Definitions

*Academic performance*: Students' performance within a subject or grade level (Brew et al., 2021).

*Achievement gap*: Occurs when a subgroup of students' scores significantly lower on a standardized test than their counterparts (NCLB, 2002).

*Culturally responsive*: Knowing where students are from, what practices they value, and how they can be incorporated (Gay, 2018).

*Instructional strategies*: Methods utilized to develop students' understanding and make connections with content (Dülger et al., 2025).

*Professional learning community*: A process in which teachers and administrators continuously seek and share learning and act on their learning (Stoll et al., 2018).

*Proficiency*: Refers to measurements on standardized tests, such as proficiency levels, scales, and cut-off scores (Gross et al., 2015)

*Self-efficacy*: Belief in one's capability of achieving success in an activity, which ultimately determines the outcome of the activity (Bandura, 1977; Cervone & Pervin, 2022). Perceived self-efficacy is a person's belief in their capacity, which affects their behavior, choices, and motivation toward activities (Bandura, 1977; Cervone & Pervin, 2022).

*Social determination theory*: Refers to the ability of humans to develop a more natural, innate version of themselves (Ryan & Deci, 2000a, 2000b).

## Assumptions

Several assumptions guide this study. The first assumption is based on 3 years of experience; participants would be able to share their perceptions of factors influencing students' low performance in Grade 8 mathematics. The second assumption is that participants' responses will accurately represent their beliefs regarding their challenges, successes, and the resources they require. The third assumption is that participants will

sign informed consent forms, indicating their willingness to participate and remain anonymous. Assumptions are essential to developing a premise that is crucial to the methodology and outcome of the basic qualitative study.

## Scope and Delimitations

The scope of this basic qualitative study focused on Grade 8 mathematics teachers' perceptions of students' low performance in a Northeastern state. The first delimitation was the use of purposeful sampling. Through purposeful sampling, I selected 10 Grade 8 mathematics teachers who had been teaching Grade 8 mathematics for three or more years across a Northeastern state. The limit on the years of experience ensured that teachers had sufficient expertise to provide valuable insights into the research questions. The second delimitation of the study was the use of interviews rather than focus groups. This delimitation ensured that teachers' time was considered and allowed individual perceptions to be shared anonymously, making an interview the best-suited approach. Furthermore, I developed this data collection tool to ensure that a teacher's perception was captured individually rather than in a group setting, to identify themes and patterns.

This basic qualitative study was limited to middle schools in a Northeastern state. Ten Grade 8 mathematics teachers with at least 3 years of experience were recruited and participated in the interview. The interview was used to explore Grade 8 mathematics teachers' perceptions of students' low performance and the possible factors contributing to it. The interview questions were used to gather information to analyze why students' performance is low and to identify resources to improve it. Based on state data identifying low performance among Grade 8 and 9 students in mathematics

understanding, factors influencing students' performance can create pathways for solutions geared towards Grade 8 and beyond. This qualitative study could be applied in districts with similar low performance in mathematics at the Grade 8 level. The study also presents an opportunity to explore the impact of the suggested strategies on students' performance.

## Limitations

The study focused exclusively on mathematics teachers for Grade 8 students. Due to this focus, the results cannot be generalized to other subjects or grade levels. Additionally, participants may face challenges, including busy schedules and time constraints. To address these issues, flexibility was provided in scheduling and the interview process, allowing participants to choose convenient times that encourage honesty and accuracy. Furthermore, Creswell and Poth (2016) noted that qualitative studies may be susceptible to researcher bias. To mitigate this, I took on the role of the researcher and kept a reflective log to maintain an impartial perspective.

## Significance

The findings can help Grade 8 teachers in teaching mathematics and other subjects throughout the state. Additionally, administrators and stakeholders can identify new materials to include in the teachers' resource list for potential support. The research has the potential to provide school administrators with an in-depth understanding of the resources that teachers believe would enhance learning and achievement. Providing teacher feedback enables stakeholders to understand the challenges teachers face and the resources they consider beneficial in supporting student achievement.

The research can support NAEP data showing that students' low proficiency rates are an issue at both the local and national levels (NCES, n.d.-b). However, little is known about Grade 8 mathematics teachers' perceptions of the factors that affect students' performance. This research may also bring about positive changes for students who have struggled with mathematics across all grade levels for years. Providing an overview of the challenges and successes of teaching students can enable school leaders to critically review and implement resources that may help students better understand and connect with more difficult topics.

Students' low performance in mathematics is a national, state, and local problem. By understanding the challenges that affect student proficiency, teachers and administrators can address the factors contributing to students' low performance, enhance teacher effectiveness, and improve student outcomes and achievement. The teachers' experiences in these middle schools can be used to encourage other districts to gather information from mathematics teachers and to create instructional strategies and materials best suited to meet the needs of their populations. Furthermore, school officials within these districts may use the information provided to facilitate professional development, address the issues shared, and provide knowledge and experience on the identified resources. This basic qualitative study could be replicated in other states that experience low mathematics proficiency. Mathematics is a crucial skill that helps students improve their learning. Sharma and Sharma (2023) explained that mathematics develops critical thinking and enables humans to select jobs that require higher-order thinking. Exploring effective strategies to enhance students' performance significantly impacts their success and lifelong learning, ultimately contributing to social change.

## Summary

The purpose of this basic qualitative study was to explore the perceptions of Grade 8 mathematics teachers regarding the low performance of students in a Northeast state and the resources needed to support student success. Despite the creation of the NCLB Act and the use of ESSA to increase accountability, a decline in students' performance on state assessments remains. The decline reported by the Northeast state shows that 83–84% of students failed to meet proficiency standards. These data show that 16–17% of students meet proficiency standards. There is a gap in practice regarding Grade 8 mathematics teachers' perceptions of the factors contributing to low performance in a Northeast state. The study's basic qualitative design used semistructured interviews to explore and understand the perceptions of Grade 8 mathematics teachers regarding low student performance in a Northeast state. Findings from the study can contribute to positive social change by shedding light on teachers' experiences with factors contributing to students' low performance. Furthermore, resources and strategies to improve student performance were identified so that policymakers can incorporate them and provide professional development for staff.

Chapter 1 presented the problem statement, purpose statement, research questions, methodology, significance, and overview of the findings. Chapter 2 will provide a comprehensive overview of the literature and theories that inform the possible factors teachers may discuss during their interviews. Chapter 2 will present peer-reviewed articles to explain low mathematics performance over the last five years, the challenges cited, and the possible strategies.

# Chapter 2: Literature Review

For decades, researchers have highlighted growing concerns that many students across the United States and around the world have been underperforming in mathematics, with some students reaching grade levels more advanced than others. This study explored Grade 8 mathematics teachers' perceptions of the low performance of students in a Northeast state. This basic qualitative study addressed the issue of underperformance in mathematics among Grade 8 students in a Northeast state, a trend observed across the United States. The research examined the annual underperformance of Grade 8 students in a northeast U.S state. Various studies have identified factors influencing students' low performance, such as teacher-related practices, motivation, parental involvement, and past experiences (Belbase & Roblee, 2024; You et al., 2021). Students' low performance in mathematics at the eighth-grade level has a lasting impact on their ability to make lasting connections to the mathematical skills presented in high school, ultimately influencing their achievement.

The gap in practice pertains to the hurdles, achievements, and resources necessary for educating students in a Northeast state. There is a scarcity of literature detailing teachers' views on the challenges they face while teaching middle school students, specifically at the eighth-grade level. Additionally, a literature review revealed inconsistent results regarding the ongoing decline in students' scores. Consequently, further investigation was essential to understand the experiences of mathematics teachers in the Northeast state's eighth-grade classrooms, which could clarify the reasons behind students' underperformance. Gaining insights into these experiences may yield resources and initiatives that can be launched in this Northeast state to mitigate student

underachievement. This study emerged from a lack of existing literature and identified gaps concerning the low performance of eighth-grade students in mathematics. The deficiency in support highlighted the need to explore teachers' experiences to identify strategies to enhance students' mathematics performance.

Chapter 2 opens by outlining the issue and objectives, emphasizing the importance of understanding the achievements and challenges faced by mathematics teachers teaching Grade 8 students in a Northeast state. It then examines the underachievement of Grade 8 students in mathematics in a Northeast state and across the United States. The chapter reviews existing literature on the perceptions of Grade 8 mathematics teachers regarding the challenges and successes in teaching mathematics in a Northeast state.

Additionally, the conceptual framework underpinning the study is aligned with Deci and Ryan's SDT, Maslow's hierarchy of needs, and Gay's culturally responsive theory. SDT focuses on understanding how individuals' needs drive their interests. Established in 1980, SDT rests on the fundamental principles of psychological needs: competence, autonomy, and relatedness. Maslow's hierarchy of needs addresses essential components of human life that must be fulfilled before higher goals can be pursued. Lastly, Gay's theory is built on the need to consider and plan based on students' cultural experiences to ensure a bridge between their lived experiences and their path to success. In this chapter, the literature was examined that sheds light on why students underperform in Grade 8 nationwide. It addresses the factors contributing to low mathematics performance and outlines strategies to enhance student outcomes.

## Literature Search Strategy

I used the Walden University Library, the Educational Resources Information Center (ERIC), Dissertations & Theses @ Walden University, the ProQuest Education Database, Taylor and Francis Online, the U.S. Department of Education, and the National Center for Education Statistics to identify the literature for the study. Google Scholar was also used to assist with citation chaining. Some search terms included *math achievement*, *math performance*, *academic achievement, instructional practices*, *learning styles, middle school education, academic gap*, *grade 8 mathematics student achievement*, *and high school students' performance in the United States*. Walden University was used to find articles published in the last 5 years, consider peer-reviewed literature, and determine whether relevant references in dissertations and articles were reviewed and utilized.

## Conceptual Framework

Low performance in mathematics reduces students' access to high-performing jobs after high school completion. In this qualitative study, I aimed to explore and understand Grade 8 mathematics teachers' perceptions of the low performance of students in a Northeast state. Research indicates that teachers encounter various challenges, including demotivated students, students experiencing math anxiety, and those with achievement gaps, which are linked to math anxiety, previous experiences, and a lack of interest. The factors contributing to low performance in mathematics relate to Ryan and Deci's (2000a) SDT, Maslow's (1943) theory of human motivation, and Gay's (2018) culturally responsive theory.

**Deci and Ryan's Self-Determination Theory**

SDT examines the elements that enhance intrinsic motivation, self–efficacy, feelings of achievement, and overall success in learning. Across various educational levels and contexts, SDT has been applied to explore how students perceive and experience high school (Guay, 2022). Furthermore, SDT encourages students to appreciate and value their education by increasing their self–efficacy. Ryan and Deci (2000a) explained that SDT can help promote positive educational experiences.

Ryan and Deci (2000b) applied SDT to enhance motivation, performance, and personal growth. Their implementation of SDT fulfilled essential psychological needs, such as competence, relatedness, and self-efficacy, all of which are crucial for students' effective mathematics performance. Deci and Ryan (1991) also explored how external factors influenced student perceptions, self-determination, and motivation, impacting their development. The researchers emphasized that factors such as achievement, comprehension, academic engagement, persistence, and self-regulation—both intrinsic and extrinsic—play a crucial role in student success.

Self–efficacy is a crucial aspect of understanding students' aspirations, levels of motivation, and career choices (Bandura, 1993, 2001). Social cognitive theory examines how individuals learn, the behaviors that arise from this learning, and the social contexts in which these behaviors occur (Dozier-Brown, 2019). Understanding how a student learns is vital to developing lessons and assessing instruction's effectiveness. Expectations and reinforcements stem from past experiences and influence behavior related to similar tasks in the future. A significant feature of social cognitive theory is its impact on internal and external social reinforcement (Bandura et al., 1963). To explore

why students may not be performing well, it is essential to consider the experiences of both teachers and students, as these interactions are fundamental to the behaviors displayed.

Collecting insights from experienced teachers enables the researcher to identify common and divergent trends across year groups and datasets. Grasping various factors influencing students' performance through teachers' viewpoints sheds light on their daily struggles and the support required for teaching mathematics to Grade 8 learners. Social cognitive theory focuses on how students acquire knowledge and how effectively they retain information. This theory also serves as a framework for examining the social environment and its influence on student behavior (Bandura, 1986; Ryan & Deci, 2000a, 2000b). Research has aimed to explore both what students learn and the methods they employ in their learning. Altering teaching methodologies or promoting reflective thinking among educators creates a strong, active connection (Ganley et al., 2019). Smith et al. (2020) state that establishing procedures and development opportunities will enhance teachers' skills and viewpoints.

**Maslow's Hierarchy of Needs**

Maslow developed the theory of human motivation in 1943, which states that humans are motivated when the five hierarchical needs are met: physiological, safety, love and belonging, esteem, and self-actualization. Maslow also built on the premise that the previous level had to be fulfilled before another level could be unlocked. Although Maslow initially proposed that lower needs must be satisfied before higher ones can be met, modern research suggests that people may simultaneously meet multiple levels (McLeod, 2025). Additionally, Maslow explained that different societies may prioritize

needs differently. The concept of prioritizing aligns with Gay's culturally responsive approach. Understanding the needs of humans is crucial only when their cultural background is considered, and the importance is duly highlighted.

### *Physiological*

Physiological needs may not be met if parents struggle to provide the basic needs of food and shelter within the students' household. Dar and Sakthivel (2022) explained that physiological needs include air, water, food, shelter, sleep, clothing, and reproduction. Students' physiological needs must be met to ensure safety. Student behavior sometimes contributes to poor learning environments. Acquah et al. (2021) explained that people possess something machines do not, such as spirit and inspiration. The spirit and inspiration, however, are built on knowing that the basic survival steps are being met. Only then can secondary goals be considered.

The ability to remain focused and believe in the value of education starts with knowing that one will have meals, whether breakfast, lunch, or dinner. Dar and Sakthivel (2022) explained that it is more challenging for adults than for children to focus on tasks when hungry. Maslow's (1943, 1954) theory also addressed other avenues of chemical inclusions that support the body's operation and the factors that contribute to maintaining physical fitness. Wilder (2023) explained that a parent's socioeconomic background is key to students' academic achievement. A parent with a low income will ultimately struggle to provide food and housing security, and students often need to remain focused or recognize the importance of learning. Building on these issues surrounding Maslow's hierarchy of needs suggests that until students' basic needs for food, shelter, and sleep are

met, the need to participate in or be interested in learning mathematical skills or any educational concept will be inhibited.

### *Safety*

Safety is the second level of needs, following the meeting of basic needs. When students fight or have consistent issues within the classroom, other students may not view the environment as safe or conducive to learning. Sometimes, persistent student conflict can arise, creating discomfort and an unsafe environment for students and teachers. Vasudevan and Butcher (2025) explained that external factors can influence student achievement. One such factor is the need to feel secure and protected.

A person's inability to feel secure may create distractions and cause them to focus on just this level before unlocking a new one (Maslow, 1943). In the classroom or school, students become concerned when they are involved in consistent fights or threats that hamper continuous learning. Gee et al. (2023) explained that many inequities existed before the COVID–19 pandemic. However, job losses and systemic barriers have led parents to change schools. Additionally, Gee et al. explained that data show that, aside from the cost of living, parents have cited school safety as a concern that encourages students to transfer to other areas or discourages them from attending school. This instability creates discomfort and prevents them from focusing on learning until their environment is safe and welcoming.

### *Love and Belonging*

Love and belonging fall under the second and third tiers of the hierarchy of basic needs: safety and physiological support, respectively. When students feel safe and have access to food and shelter, they can better understand the importance of love and

belonging and put in the effort needed to experience them. Maslow (1943, 1954) emphasized the importance of attaining love and belonging before progressing to the next level of the hierarchy.

Teachers play a key role in helping students develop a sense of love and belonging. Noltemeyer et al. (2021) explained that although Maslow's hierarchy states that lower-level growth needs must be met before higher ones, it is important to recognize that school-age children have different needs that require attention before the need for learning can be justified. The researchers found that fulfilling essential needs contributed to students' overall needs, including a need for love and belonging. Kuttner (2023) also explained that belonging is critical for students' success and well-being. To foster love and belonging, school should be viewed as systemic, political, place-based, agentic, and a right (Kuttner, 2023).) Utilizing these aspects enables school officials to prioritize the importance of belonging and a sense of love.

Despite Maslow's (1954) reiteration that love and belonging are critical to human success, people still struggle to feel connected and loved. Riley (2022) highlights that fostering a sense of belonging at school for all students remains challenging. The Organization for Economic Co-operation and Development has found that school attendance has decreased worldwide. The Organization for Economic Co-operation and Development (2017, 2019) found that one in every three students does not feel like they belong. This lack of belonging results in students not feeling motivated, which in turn leads to their inability to unlock the higher tiers needed to support student achievement.

### *Esteem*

Esteem is the fourth level in Maslow's Hierarchy of Needs. Maslow (1943, 1954) believed self-esteem is only attained following the achievement of love and belonging**,** physiological needs, and safety. Albarracin et al. (2024) defined self-esteem as the evaluation of one's worth or value. The researchers also believed that esteem plays a significant role in well-being and mental health. Maslow (1943, 1954) distinguished esteem needs into strength, achievement, adequacy, and confidence, while the second phase represents respect from others, recognition, appreciation, or importance. Fostering esteem within the school and classroom involves numerous initiatives that aim to motivate students and encourage attendance and effort.

Students can develop self-esteem when they experience acceptance and value. Rojas et al. (2023) explained that income is relevant in satisfying basic needs but not for safety, love and belonging, esteem, or self-actualization. The researchers also found that love and belonging contribute the most to people's well-being. Providing opportunities to develop esteem helps students feel as though their needs are being considered in planning and that they are being provided with the ideal opportunities needed for success.

### *Self-Actualization*

Self-actualization is the final stage in Maslow's hierarchy of needs. It involves students understanding their goals and strengths and using them to deepen their understanding of the lesson's skills. Maslow (1943) explained that self-actualization can be achieved by realizing one's full potential, with some believing that one can be more than one is, ultimately leading to tremendous external success. McLeod (2025) explained that self-actualization raises the question of how it can be achieved.

Providing students with opportunities to reach their full potential is crucial to increasing their chances of success. These opportunities require increased resources, surrounded by students' interests and culture, to sustain their motivation. Maslow (1968) referred to the need for growth throughout a person's life. Maslow believed that no human is static; there are always growth opportunities. Providing students with ample opportunities to identify and develop their strengths and growth opens the door to learning mathematics and recognizing how it benefits them beyond high school. Through exposure to various opportunities, students can connect the subject content and the lessons surrounding it to their daily lives.

**Gay's Culturally Responsive Teaching**

Gay's (2010) culturally responsive teaching began with the increased presence of students from diverse cultural backgrounds worldwide in the United States. This increased diversity requires that educational systems provide inclusive and effective instruction for all learners. Gay suggested recognizing the importance of improving culturally responsive practices. Gay's approach is intended to provide academic and socio-emotional support needed to improve students 'well-being, including personal strengths, cultural knowledge, lived experiences, and home communication.

As years went by, Gay's theory provided more insights into how it can be used to achieve a successful outcome in the classroom. Gay (2023) explained that teachers can add meaning and value to classroom materials and practices to improve and increase students' engagement and achievement. Franco et al. (2024) explained that culturally responsive teaching embraces the perspective that students' cultural differences are strengths that educators can use to increase students' learning.

Exploring and understanding students' low performance will involve examining various aspects of their lives and experiences. Gay (2018) proposed that culturally responsive teaching is the behavioral expression of knowledge, beliefs, and values that recognize the importance of racial and cultural diversity in the learning process. Utilizing the idea that, when planning lessons, policymakers should include students' social context, students, curriculum, and instruction, provides a lens that enables deeper facilitation of more culturally responsive teaching practices. Building on where students are from and what they are familiar with ties with the need to provide a sense of love and belonging in Maslow's hierarchy. All these factors and considerations help to provide students with the resources needed for their achievement.

## Literature Review Related to Key Concepts and Variables

The study examined Grade 8 mathematics teachers' perceptions of the low performance of students in a Northeast state. The literature review focuses on current research on students' mathematics gaps and their impact on achievement, educational barriers, math anxiety, and the use of technology in the classroom. These topics provide insight into the challenges students may face and into some resources that have proven effective in improving student performance.

### Achievement Gap in Mathematics and Its Intervention Strategies

Performing below grade level has been recognized by many individuals across educational levels and contexts. According to Steiner (2023), the issue of underperformance affects individuals from diverse backgrounds. Mathematics' importance can be debated based on students', families', and individuals' beliefs and outlook. Wagner and Fair (2022) explained that mathematics is crucial for developing

students' critical thinking and for enabling personalized strategies to enhance student performance. Problem-solving skills empower students to analyze the world and prepare them for high-level jobs by enhancing their critical thinking capabilities (NCTM, 2000). The researcher argued that reading provides a deeper understanding of problems that require dissection and interpretation. Understanding the achievement gap between students and the intervention applied is crucial for recognizing the practices used and the issues that arose before, during, and after them.

The achievement gap has been more pronounced in specific grades, genders, ethnicities, mathematics disciplines, and locations than in others. Shukla et al. (2022) explained that the achievement gap reinforces a deficit mindset that persists across the U.S. educational system. Polikof et al. (2023) demonstrated that although the achievement gap has increased substantially since the pandemic, students' mathematical performance predated the school lockdown. The researchers further explained that the pandemic created additional barriers that disproportionately affect students who may lack the basic amenities needed to receive instruction from home.

Over the decades, mathematics interventions have evolved as school leaders adopt new methods to enhance students' comprehension and foster their growth. The intervention framework was implemented in schools nationwide to better identify student needs and boost learning. The three-tier intervention model has proven particularly effective across the various programs adopted. Research by DeFouw et al. (2021) and Junjulas et al. (2024) provides insights into strategies to improve high school students' math skills. The researchers employed surveys to evaluate the impact of intervention programs and uncover potential obstacles to their implementation. Findings from Junjulas

et al. revealed that the use of proactive problem-solving techniques and constructive feedback significantly improved students' understanding and performance.

Blakey et al. (2024) noted that numerous efforts have been undertaken over the past 30 years to improve middle school students' math performance in the United States. However, as they cited, students still struggle compared to their peers. The National Conference of State Legislatures (2019) has collaborated with the Every Student Succeeds Act (ESSA), restructured following the NCLB Act, to ensure American students have equal opportunities and to bridge the opportunity gap. Garfield and Kearney emphasized that a school's capacity to enhance student readiness has a significant impact on student performance.

Researchers have noted a persistent trend of low mathematics performance among students for over a decade. Matheny et al. (2023) found that many students below grade seven struggle with fundamental mathematical skills. This trend, observed from 1900 to the early 2000s, prompted the introduction of the NCLB Act, which was subsequently updated to the ESSA. Student performance evaluations were based on NAEP assessment results. According to a state document, the Northeast state uses these performance reports to assess schools by county, city, age, and race. A 2022 Northeastern state report indicates that these data are crucial for identifying areas where students encounter challenges, understanding the pandemic's impact on their performance, and determining the additional support required. The report includes testing results from Grades 4, 8, 9, and 11 in mathematics.

## Barriers to Learning Mathematics

Students' learning is often impeded by several barriers that restrict their ability to reach their full potential. Betts et al. (2024) stressed that strong performance in high school mathematics is a key predictor of success in college. In support of this, Fuller et al. (2021) emphasized the importance of enhancing mathematics and science education to foster vital STEM skills and opportunities for students. Nonetheless, Betts et al. observed that many middle and high school students still underperform academically. Factors that influence academic achievement include social and environmental barriers. Mangarin and Caballes (2024) state that cognitive barriers, mathematics anxiety, ineffective teaching methods, sociocultural factors, and limited resources affect students' learning. In this section, I will discuss cognitive barriers, parent involvement, and prior knowledge.

### *Cognitive Barriers*

Chew and Cerbin (2021) explained that teachers must consider various cognitive challenges when preparing instruction and teaching students. The authors cited several factors that may impact students' learning, including student mental mindset, student fear, insufficient prior learning, and misconceptions. According to Chew and Cerbin, these factors can be critical in preventing students from successfully understanding and applying the mathematics needed for success. The researchers explored various instructional practices to further alleviate these issues and help students regain the skills needed for learning. Myers et al. (2021) expounded on these cognitive challenges by implicitly addressing students with learning disabilities. Through no fault of their own, Myers et al. explained that students with disabilities often experience setbacks that create volumes of misconceptions and insufficient prior learning. Lambert and Schuck (2021)

supported the issues faced by special education students by also lamenting the problem of students who may have disabilities but are undiagnosed. According to Lambert and Schuck, this undiagnosed case creates deeper barriers, including ineffective teachers and incomplete prior learning, as Chew and Cerbin also support. These deficiencies contribute to mathematics anxiety and low self-efficacy, which may further reduce students' ability to excel.

### *Parental Involvement*

Parent involvement encompasses parents' investment of resources in their children's education, focusing on parent-child interactions in the academic sphere, which is divided into the home and school spheres (Grolnick & Slowiaczek, 1994). Parent involvement of any kind is critical in helping students succeed. Wilder (2023) has highlighted that teachers, administrators, and other stakeholders have long recognized the importance of parent involvement in promoting and maintaining student success. Wilder's study found that, regardless of parental involvement, students' performance improved.

The changes indicated by Wilder (2023) suggested that, despite the definition of parent involvement, students are motivated and influenced by their parents' role in their academic success. Furthermore, Yang et al. (2023) found that parental involvement is critical for students' social support and academic achievement. Sengonul (2022) explained that key parental involvement included reading to children, providing encouragement, maintaining high expectations, establishing open communication between school and home, and discussing school-related issues with children. The study also notes that while parent involvement takes different forms depending on a parent's

socioeconomic background, some form of involvement helps mitigate the disadvantages that lower-income families may face.

### *Prior Experiences*

Middle school education builds on the foundational knowledge and skills acquired in elementary school and develops the more complex connections required in high school. According to Kartal and Tillett (2021), middle school is a vital developmental phase where educators play a key role in introducing essential concepts and skills. As Kartal and Tillett noted, these skills lay the foundation for advanced study in high school and thereafter. Furthermore, the authors reiterated that a strong foundation in middle school prepares students for future academic pursuits while providing avenues for fundamental world skills. Other researchers, such as Uzun and Şen (2023), have highlighted the importance of solid mathematical development and the disadvantages of failing to develop it. According to Uzin and Şen, poor mathematical skills in schools can hinder a student's future opportunities and success.

Students' learning experiences have influenced their views and willingness to learn math. Zoll et al. (2023) addressed the Montessori method and its impact on students' learning. This educational approach provides students with a tactile and visual experience that fosters a deeper understanding and connection. Encouraging students to learn mathematical concepts and providing self-directed activities opens the door for students to make sense of abstract concepts, thereby eliminating any fear or confusion that may arise from teacher-heavy practices (Zoll et al., 2023).

How content is presented can pose a significant challenge. García-Holgado et al. (2020) noted that integrating mathematics with other subjects and fostering deeper

connections substantially highlights its importance and enhances understanding. Fritz et al. (2019) observed that, despite numerous reforms in mathematics education, students still perceive it as complex. This perspective is further confirmed by performance reports from NCES and a 2022 Northeastern state document, which indicate a persistent decline in mathematics proficiency among students in the Northeast state and the broader United States.

**Effective Instructional Practices in Mathematics**

Mathematics revolves around the educators and the methods employed to develop necessary skills (Vale & Barbosa, 2023). There are many effective instructional practices in mathematics. This section includes research related to active learning, problem-solving, differentiated instruction (DI), and hands-on strategies.

Vale and Barbosa (2023) suggested incorporating active learning to engage students and address diverse needs through varied approaches; similarly, the NCTM (2014) has emphasized active learning to enhance students' understanding of mathematics. This concept of active learning is grounded in Vygotsky's (1996) socio-constructivist learning theory, which emphasizes teachers' use of reading, writing, discussion, and reflection to support problem-solving in small groups.

Engaging students with complex tasks is fundamental to active learning. Vale and Barbosa (2021) argued that such tasks enhance students' abilities and foster positive attitudes. According to Copple and Bredekamp (2009), exposure to mathematical skills is essential for students' understanding and comprehension. Copple and Bredekamp (2009) also suggest linking curiosity and relevant skills to real-life situations, which nurtures students' social and cultural capabilities. While Zoll et al. (2023) advocated for

incorporating Montessori methods into the classroom, Polya (2014) reiterated the need for problem-solving strategies, emphasizing cultural relevance and mathematical thinking. Polya's "How to Solve It" allowed educators to dissect students' problems into four phases. These steps included understanding the problem, devising a plan, and revising the solution. Polya believed these phases help students build connections while developing critical thinking skills.

DI is a teaching method designed to meet the diverse learning needs of students and accommodate different learning styles. DI is a foundational pedagogical approach for teachers to address these needs (Smale-Jacobse et al., 2019). Effective deployment of DI involves continuous training, assessment, and monitoring (Van Geel et al., 2019). Various strategies offer students mixed opportunities and necessitate a blend of approaches and segmentation. Pozas et al. (2021) argued that combining student groups with student teaching improves comprehension. Herner-Patnode and Lee (2021) also explained that the learning environment is crucial in implementing and utilizing DI.

Dienes was a key innovator in math education, advocating the use of manipulatives and hands-on materials. Dienes and Perner (1999) noted that such tools foster conceptual understanding and encourage mathematical reasoning through self-directed questions and exploration. Dienes' theory, highlighted in Dienes and Perner's (1999) work, underscores the significance of physical representation and visualization in mastering math. For Dienes, these tangible representations enable students to comprehend abstract concepts at their own pace.

Hayden (2024) noted that teachers use a variety of instructional strategies to engage students and deepen their understanding of mathematical concepts. These

methods encompass both hands-on and abstract ideas that facilitate comprehension. Ok et al. (2020) stressed that DI techniques effectively address diverse learning needs. Some educators adopt a flipped classroom approach, while others emphasize discussions and group projects (Baig & Yadegaridehkordi, 2023). Moreover, leveraging technology through educational apps or online simulations can enrich students' learning experiences by offering personalized instruction and promoting project-based learning opportunities (Koskinen & Pitkäniemi, 2022).

**Math Anxiety**

As defined by Cuder et al. (2024), math anxiety is an emotional trait related to mathematics. Math anxiety can stem from various experiences, including humiliation and embarrassment, making math difficult for students. Kelly et al. (2020) found that a teacher's teaching style can influence students' anxiety. Another issue stated by students was parental pressure and self-imposed pressure regarding proficiency performance (Cheung et al., 2025)

Pizzie and Kraemer (2023) noted that students with math anxiety face overwhelming negativity that hinders their ability to complete assignments. This anxiety also leads to an avoidance of schoolwork and potential math courses. Li et al. (2022) acknowledged the issues students may face and suggested that educators consider factors that may lead to anxiety, creating classroom practices to alleviate discomfort. Therefore, overcoming this fear is crucial for enabling individuals to develop the necessary skills for success. Younger students frequently struggle with math anxiety due to weak math concepts and low self-efficacy in mathematics (Vanbinst et al., 2020; Zhou et al., 2024). Cheung et al. (2023) found that many middle school students struggle due to a lack of

prior knowledge and skills necessary for advanced critical thinking. Additionally, they recommended implementing remediation strategies to bridge this gap and enhance students' abilities and understanding.

Math anxiety affects students' performance and attitude towards math. Bautista (2023) reviewed 14 articles that highlighted math anxiety and its effect on study. In the survey, Bautista highlighted that students are affected by many factors that reduce their ability to attempt or comprehend mathematics. Despite focusing on a different country, Bautista's study highlighted concerns like those of Wang et al. (2021) regarding factors that influence students' learning. Anxiety can be used to evaluate students' performance on math assessments (Westfall et al., 2021). Many students have felt blank on tests (Commodari & La Rosa, 2021). This sense of being blank prevents students from performing effectively on assessments.

**Professional Development**

Professional development enables teachers to collaborate and develop effective strategies to enhance instruction. García-Álvarez et al. (2023) explained that professional development is vital for enhancing knowledge, skills, self-actualization, and effectiveness. In this section, I will explain the importance of professional development and its role in reforming teachers' instructional practices.

Ventista and Brown (2023) highlighted that teachers are increasingly expected to operate as high-level knowledge workers. They asserted that continuous professional development is crucial for achieving this role. Lifelong learning is essential to ensure that employees' knowledge remains relevant and that students are aware of contemporary

global challenges (Aigbe et al., 2024). García-Álvarez et al. (2023) also noted that professionals with extensive experience often receive limited resources.

Professional development encompasses activities and processes designed to enhance a teacher's instructional practices and beliefs, ultimately promoting student learning (Salas-Rodríguez & Lara, 2023). Salas-Rodríguez and Lara (2023) and Melhuish et al. (2022) highlighted that such development includes enhancing teacher performance and competency. Ongoing development and mastery of teaching skills lead to better teacher performance and equip educators to impart essential skills to students.

Rüede et al. (2023) emphasized that strengthening teacher capacity relies on ongoing professional development that offers opportunities. Gupta and Lee (2022) found that teaching experience and the depth of training have a significant impact on student achievement, which is encompassed under teacher qualifications. While improvement may be a long-term goal, it is vital to keep teachers' skills and capabilities aligned with the requirements of the 21st century. Candela and Boston (2022) argued that teachers' selection of cognitively challenging tasks is essential for effective instructional practices. Melhuish et al. (2022) concur with this viewpoint, explaining that these challenging tasks require critical thinking and encourage mathematical discussions. Melhuish et al. (2022) believed that highly cognitive tasks help students with justification.

The effectiveness of professional development depends on the facilitator's ability to connect teachers' and administrators' beliefs and practices. Fadlelmula (2022) explained that professional development that effectively helps teachers increase their self-efficacy provides the more rigorous planning needed to develop students' thinking. Bălan (2021) defined the structures of Professional development as the form in which it is

delivered, the duration of the professional development, and the type of collaborative participation. Kilag and Sasan (2023) explained that effective professional development helps to ensure instructional practices that primarily benefit student achievement. Sims et al. (2025) further explained that professional development helps teachers refine their instructional techniques, which, in turn, drive pupil achievement and teacher confidence.

Wright et al. (2023) explained that a key method to enhance teachers' efficacy is a commitment to collaboration, fostering both engagement and resilience among educators. Additionally, it is essential to note that teacher job satisfaction is closely tied to collaboration and support within the educational community (Johansson et al., 2020). Rüede et al. (2023) have long called for teachers' continuous engagement in high-quality or intensive professional learning opportunities. They believed these engagements enhance instructional practices, which in turn improve students' learning.

**Technology in the Classroom**

The NCTM (2020) emphasized the integration of technology into mathematics education to enhance teaching and learning. According to Hill and Uribe-Florez (2020), essential digital technologies include laptops, desktops, printers, scanners, and calculators. They further noted that in a mathematics classroom, digital tools facilitate the creation of graphs, formulas, and interactive videos. The advantages of technology encompass helping students develop analytical skills and become lifelong learners (Criollo-C et al., 2021). Additionally, NCTM (2020) endorsed the inclusion of Microsoft Office and Google Suites, as these tools offer ways to adapt and streamline instruction for all learners.

Shi et al. (2023) found that the use of whiteboards significantly improves students' cognitive abilities, thereby enhancing their academic achievement. Boonmoh et al. (2021) further support the notion that the 21st century is a digital era. Researchers believe that technology plays a crucial role in facilitating and creating knowledge in the digital era. Moreover, Boonmoh et al. found that technology increases teacher knowledge, student support, and motivation. Given that many 21st-century students own cell phones, Dontre's (2021) study sheds light on how mobile applications positively affect students' performance in math classrooms.

The use of laptops, desktops, and projectors significantly enhances comprehension. Chan et al. (2023) noted that game-enriched tools provided students with the skills needed to tackle word problems and master challenging or abstract math concepts. Incorporating technology boosts both engagement and understanding. Criollo-C et al. (2021) argued that different technologies in the classroom equip students with essential skills for lifelong learning and critical thinking. Additionally, NCTM (2020) highlighted the added advantages of technology in facilitating student communication through inferences and processes.

Teachers use tasks and student participation to enhance lifelong learning skills. Hamilton (2022) found that classroom technology utilizes instructional and demonstration modes. These modes support differentiated instruction (DI) by incorporating both whole-class instruction and individualized practices. Technology requires people to be digitally competent. According to Tárraga-Mínguez et al. (2021), this means knowing how to make decisions using different devices and software. With

21st-century careers centered on technology, students must develop key skills while becoming familiar with modern, engaging learning tools.

Lessons enhanced by technology significantly boost both students' understanding and the effectiveness of instruction (NCTM, 2020). Interactive resources cater to diverse learning styles, facilitating a deeper understanding of concepts. Parveen and Ramzan (2024) noted that technology has become a critical part of our lives and a central component of the United Nations' Sustainable Development Goals. Enhancing teacher training improves educators' ability to create personalized lessons. Basilotta-Gómez-Pablos et al. (2022) underscored the importance of programs that upgrade teachers' and students' digital skills in the classroom. Additionally, Miguel-Revilla et al. (2020) noted that the efficient use of technology heightens student engagement. Finally, Awofala and Olaniyi (2023) emphasized that technology simplifies mathematics, promotes creativity, and provides opportunities for formal feedback. Reviewing and learning how to incorporate technology is essential for enhancing the student's learning environment (Attard & Holmes, 2022).

## Summary and Conclusions

Student achievement in mathematics has been a long-standing debate across the United States. Research continues to evolve, explaining why many students are underperforming in mathematics and the consistent decrease. A review of the literature highlighted that students' underperformance has been linked to math anxiety, lack of parental involvement, and prior experience. Garfield and Kearney explained that a school's ability to improve students' academic outlook is an important aspect of its existence and purpose. Wagner and Fair (2022) further explained that mathematics is a

critical skill needed for students' success. These researchers explained not only why students' academic performance is important but also the role the school community plays.

The literature highlighted several factors that contributed to students' achievement. Factors included prior experiences, math anxiety, lack of parent involvement, and academic gaps. Key terms were learning loss, teacher discomfort with content, parent views on education, and student achievement. Teachers have a front-row seat to students' performance and areas for improvement. Understanding these teachers' views helps create the context necessary to develop effective programs and redesign instructional practices that increase student performance. Teacher leaders can provide professional development to enhance teachers' quality and competence. Although the literature offers thorough research on student achievement and the reasons why students underperform, there is a lack of literature on teachers' perceptions of students' performance. The study will contribute to existing literature and address a gap in current practice.

This basic qualitative study is built on teachers' experiences within a Northeast U.S. state. Teachers will share their perceptions through semistructured interviews. The interview intends to explore Grade 8 teachers' perceptions of students' low performance. Maslow's (1943), Gay's (2010) culturally responsive theory, and Deci and Ryan's (1943) SDT are the conceptual frameworks used to guide this study and to understand how the elements of the research influence students' performance. Understanding teachers' experiences helps school learners create the support needed to reduce low performance in mathematics.

Chapter 3 provides details about the study's research method. This chapter outlines the research design and rationale, the role of the researcher, participant selection, instrumentation, data collection, data analysis plan, trustworthiness, and ethical procedures. Trustworthiness explains how validity and reliability are established. The ethical procedures outline the safety measures and protocols used to maintain confidentiality and protect all parties involved in the study.

# Chapter 3: Research Method

The purpose of this basic qualitative study was to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state and the resources needed to support student success. Although Kuhfeld and Lewis (2025) reported that a consistently low percentage of students have met proficiency across the United States, NCES (n.d.-b) noted that many states perform below others. Delaware and Maryland were two Northeast states with high student levels that did not meet proficiency standards. Teachers' challenges included limited resources, lack of parental support, lack of student interest, and materials used, as well as their connection to students' academic gaps (Van de Walle et al., 2019).

This chapter focuses on the research method for the current basic qualitative study. In this chapter, I restate the research question and define the phenomenon under study. Information on the qualitative research design is provided, along with a detailed justification for its selection. I also discuss the study design and methodology, setting, participants, and method of data transcription. Lastly, I outline the ethical considerations, the plan for data collection, and the measures I took to ensure the study's trustworthiness, which included credibility, transferability, dependability, and conformability. The ethical procedures section outlines procedures for maintaining participant safety and for adhering to institutional review board (IRB) guidelines. This chapter concludes with a summary of the main ideas and a transition to Chapter 4.

## Research Design and Rationale

A basic qualitative design was used to answer the research questions:

RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast state?

RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the mathematics success of students in a Northeast state?

Researchers often adopt a qualitative approach to gain insight into naturalistic settings and to understand people's perspectives and beliefs (Creswell & Creswell, 2017). For the current study, I explored the perception of Grade 8 mathematics teachers regarding students' low performance in a Northeast state. Recent research identified several challenges that teachers face, including the material used (Karah, 2022), limited resources, and inadequate time for planning (Chew & Cerbin, 2021; Kasa et al., 2024). Other factors include parent involvement and student motivation (Van de Walle et al., 2019).

The current basic qualitative study focused on teachers' experiences teaching mathematics to Grade 8 students in a Northeast state. This approach fostered alignment with a simple, semistructured approach to exploring and understanding the low performance of Grade 8 mathematics students. Ellis and Hart (2023) explained that in addition to flexibility, qualitative research enables the creation of personal meaning. Kahlke (2014) explained that using a basic qualitative design offers the benefit of understanding a person's experiences through their perspective, thereby enhancing the meaning derived from those experiences. Interviewing multiple teachers provided an opportunity to gain insight into each person's unique experience in the current study.

The basic qualitative research design provided alignment by examining how students have been successful and why some have not performed as well. According to

Sarfo et al. (2021), using semistructured interviews to explore the why and how helps to understand the grade levels and issues. Ravitch and Carl (2021) explained that qualitative research requires contextualized research processes to interpret humans' views and approaches. Given the nature of the study and the need to understand each teacher's experience, a basic qualitative study was more appropriate than ethnography, phenomenology, or grounded theory.

Qualitative research relies on the experiences and routines of individuals within the context of the problem (Taherdoost, 2022). In contrast, quantitative research relies on numerical methods, using percentages and numbers. This study focuses on teachers' perceptions of an ongoing problem, so understanding their educational routine and experience would be most appropriate. Taherdoost (2022) explained that a case study provides an in-depth study of people, processes, or events. Furthermore, a case study requires the application of different data collection methods. In this study, I will use only interviews, focused on individual teachers' perspectives. In contrast, ethnography employs prolonged observation to gain an in-depth description of a cultural group. A basic qualitative study provided only one opportunity for data collection, focusing on people's experiences.

Themes were used to code and organize data collected from teachers. According to Stahl and King (2020), thematic analysis enhances trustworthiness by facilitating coding and flexibility, thereby increasing knowledge and understanding of the study. Furthermore, dependability, credibility, and the ability to transfer information and recommendations are key components for building trustworthiness (Ravitch & Carl,

2021). Research on teachers' perceptions of 8th-grade mathematics students' low performance can provide teachers in the field with an in-depth understanding.

## Role of the Researcher

Ravitch and Carl (2021) explained that qualitative interviews are relational, involving a relationship between the interviewer and respondents that fosters trust and reciprocity. Qualitative research also offers in-depth interviews, which can be modified multiple times throughout the interview process. Burkholder et al. (2020) explained that the researcher serves as a primary data collection instrument, participating in participant interviews and data analysis. I was the researcher in this study. To this extent, I aimed to explore Grade 8 mathematics teachers' perceptions of student low performance through a thematic analysis of their views. As the researcher, I used purposeful sampling to identify potential participants, develop an interview protocol, collect and analyze data, and report the findings. I also protected research integrity, managed bias, and maintained confidentiality.

Providing an overview of the process and explaining their expectations are vital in creating a comfortable atmosphere (Creswell & Poth, 2016). Explaining the process is critical to building trust, increasing comfort, and enhancing reliability. Ravitch and Carl (2021) explained that because experiences influence qualitative research, the qualitative researcher needs to be aware of their values and beliefs that could bias their research. To reduce bias, I employed purposive sampling to ensure that participants teach mathematics to Grade 8 students and have been teaching for at least 3 years. As I work at a high school in a Northeast state, I am not familiar with potential participants from the state's middle schools. Not having a prior relationship with the participants helps them avoid feeling

compelled to participate or answer questions, thereby reducing bias. I also assured the participants that I would keep all information confidential during the study. I assigned an alphanumeric code in place of the participant's name (e.g., Participant 1, Participant 2). Additionally, I adhered to Walden University's policies and requirements.

## Methodology

A basic qualitative study was used as the methodology and research design for this study. The methodology of a research study encompasses the setting and sample population, as well as how participants were selected. Creswell and Báez (2020) explained that the method addresses the study's research questions and the data collection and reporting materials. I conducted the study in an urban school district in a Northeast state using purposeful sampling to select 10 Grade 8 mathematics teachers.

### Participant Selection

The qualitative study focused on Grade 8 mathematics teachers in a Northeast state. Using purposeful sampling, individuals who are exceptionally responsive to a specific issue, thereby providing a deeper understanding of the problem under investigation (Creswell, 2013). The purposeful sampling method also provides an opportunity to gather teachers' perceptions from a small sample size (Ravitch & Carl, 2021). I selected 10 participants. This method ensured that participants were mathematics teachers at the current grade levels for at least 3 years. To verify, once an email was sent introducing the study and seeking participants, teachers who volunteered encountered a pop-up question asking for the year they started teaching in the district. Given their experience requirements, teachers could share their perceptions of the factors influencing students' poor performance.

Nassaji (2020) explained that qualitative inquiry lacks definitive criteria for determining an appropriate sample size. I requested permission from the leaders of the Northeast State Education Association to send interview invitations to all middle school mathematics teachers in the urban district middle schools (see Appendix A). Based on their responses to availability and my determination to meet the study criteria, I selected 10 teachers. I conducted interviews to explore their perceptions of students' low performance in mathematics. To support this selection, Ravitch and Carl (2021) noted that a smaller sample size not only yields richer data but also offers greater depth.

**Instrumentation**

I used semistructured interviews to address the research questions in the basic qualitative study. An interview protocol and simple semistructured interview questions were used to answer the research questions for this basic study. According to Burkholder et al. (2020), an interview protocol provides consistency in the interview process. The use of structured interviews allowed carefully chosen questions to be asked, which could be followed up and further explored to gain a deeper understanding of the issue under study. Additionally, using semistructured questions will allow the inclusion of follow-up questions that provide a more in-depth understanding of reactions and body language.

I created an interview protocol consisting of questions aligned with teachers' experiences (see Appendix B). I developed the protocol's questions using Maslow's (1943, 1954) hierarchy of needs and Gay's (2018) culturally responsive theory. Maslow raised the question of understanding teachers' classroom experiences. At the same time, applying Gay's culturally responsive theory provided insight into the scope of resources that would be crucial, based on the experiences and issues that arose. These findings were

supported by the literature of Sattem et al. (2022), which acknowledges students' struggles during this period and teachers' concerns regarding meeting students' needs. As Maslow (1943) noted, without acknowledging and addressing students' needs, the goal of learning becomes difficult. The interview protocol includes an introduction, a closing statement, and 11 interview questions. Table 1 shows how each interview question aligns with the research questions and conceptual framework.

**Table 1**

*Alignment of Semistructured Interview Guide Items With the Research Questions and Framework*

| Item | | Framework | | | Research question | |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| | | 1 | 2 | 3 | | |
| 1 | Background | | | | X | |
| 2 | Background | | | | X | |
| 3 | Background | | | | X | |
| 4 | Challenges | X | X | X | X | |
| 5 | Challenges | X | X | X | X | |
| 6 | Success | | | | | X |
| 7 | Support | | X | | | X |
| 8 | Success | | | | | X |
| 9 | Support | | X | | | X |
| 10 | Challenges | | | | X | |
| 11 | Support | | X | | | X |
| 12 | Debrief | | | | | |

*Note*. Under Framework 1= SDT, 2 = Hierarchy of Needs, 3 = Culturally responsive teaching.

The self-designed interview protocol provides flexibility and consistency in the interview process (Burkholder et al., 2020). Using a self-designed interview protocol enables in-depth discussion of topics while observing participants' attitudes and opinions. I documented these observations in the notes section of the interview protocol (see

Appendix B). I also used the notes section to write down follow-up questions. These responses enabled additional questions to be asked of different participants.

Qualitative research design aligns the purpose, problem, and research question by providing a medium to explore the low performance of mathematics students. This design also allows the question to be asked about how and what else can be provided to increase student achievement. Burkholder et al. (2020) expanded on the flexibility of probing questions, noting that they provide deeper insight into interviewees' perceptions and help explain how and why students struggle.

Creswell and Poth (2016) emphasized the importance of the primary instructor's role throughout the data analysis process to mitigate bias. Using open-ended questions provides information that guides the research. Throughout the interview, teachers were asked to share their experiences and any other details that might shed light on the issues affecting students' achievement. Data collected in field notes were bracketed and capitalized to ensure that any analysis of self-bias was not intentional (see Saldaña, 2021). It was also crucial to highlight that notes were to be added to the interview protocol to indicate any changes in behavior when questions were asked, along with the rationale for those changes.

**Procedures for Recruitment**

Participants were selected based on their current grade-level teaching and years of experience teaching mathematics. Teachers were recruited through the Northeast State Education Association, which has divisions based on school districts and counties. I emailed all middle school mathematics teachers. The email will include information about the study and its purpose, along with the consent form in Appendix A. The consent

form included a section for participants to sign, acknowledging their consent to participate and providing information about the study's purpose. Participants who responded were sent a pop-up question about the year they started teaching Grade 8. Based on this response, I scheduled an interview at a convenient time for the participant. An email was sent explaining that a gift card would be provided at the end of the interview, their identity would be kept confidential, and alphanumeric codes would be used in place of their names. Participants were also reminded during recruitment and before the interview that they would be recorded, the purpose of the recording, and that the recordings would be destroyed within 5 years of the study's completion.

**Procedure for Participation**

The procedures for recruiting participants, data collection, and analysis in qualitative research form the backbone of ensuring that the findings are connected to the study's understanding (Ravitch & Carl, 2021). Once participants selected the time, a follow-up message was sent to confirm the time and explain that the gift card would be available at the end of the process. The follow-up message informed participants that reminders would be sent 72 hours and 24 hours before the scheduled time to ensure the selected time is accurate. The email also expounded on the time and the interview questions. Zoom meetings were held at a time convenient to the participants, ensuring sufficient time to engage for 35–40 minutes. The interview began with a review of the consent and an explanation of how confidentiality would be maintained.

**Procedures for Data Collection**

I employed a semistructured interview to collect data to address the study's research question. Semistructured interviews facilitate the collection of in-depth

information and evidence from interviewees, aligning with the study's focus (Naz et al., 2022). Furthermore, semistructured interviews offer researchers flexibility through direct questioning, thereby guiding the research. The advantages listed provide amendments where needed to facilitate follow-up and additional questions, aiming to gain a deeper understanding of the phenomenon.

Participants were acknowledged for their voluntary participation, followed by a brief introduction explaining why they chose to become teachers. I explained the study's purpose, the length of the interview, and the ethical process. The participants were assigned alphanumeric codes in place of their names to maintain confidentiality. Semistructured interviews were conducted in 1-hour increments via Zoom, with a buffer for late starts and any necessary additions or adjustments to questions.

I sent the interview links to each participant at the agreed time. Participants were reminded that they would be audio recorded to ensure accurate transcription of the information. I also asked participants not to be distracted while I was taking notes, as the notes ensured their experience was accurately reported. During the interview, I used an interview protocol (Appendix B) that included interview questions and a section for notetaking and organization. These notes provided information on second-cycle coding. Participants were informed that they would receive a copy of their interview transcript after the interview. Lastly, participants were told that data would be retained for 5 years, in accordance with Walden University's IRB regulations. My contact information was provided for follow-up questions.

**Data Analysis Plan**

This study was conducted to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state. Two research questions guided this study. Data was collected using semistructured interviews. Research questions served as a guide that prepared the researcher to learn and reflect throughout the qualitative study design (Ravitch & Carl, 2021). The interview protocol consists of 11 questions. Interview Questions 1–5 and 10 align with RQ1, and Interview Questions 6–9 and 11 align with RQ2.

Data were collected using Zoom recording, journaling, and follow-up questions. I organized and prepared the participants' data for the first and second cycling coding. Bogdan and Biklen (1997) described data analysis in qualitative research as the process of arranging the interview transcripts and observation notes**.** I used Bogdan and Biklen's data analysis method. I transcribed the data to prepare for coding and to share with the participants. I used the professional version of Zoom to conduct the interviews, which features a transcription option for the audio files. Following the transcription, I listened to the audio alongside the transcript to verify errors and punctuation.

Member checking helps to increase the validity and accuracy of data. The corrected transcript was shared with the participants for review and verification. The primary function of member checking is to provide credibility and validity to the data (McKim, 2023). Following the participants' review, a brief form was sent for them to verify and confirm whether any charges would be made.

According to Saldaña (2016), brackets, italicized text, and bold text can be used to distinguish patterns and themes. To this end, common words, phrases, and capitalizations

will be used to identify themes and distinguish patterns (Saldaña, 2016). I used Microsoft Word to assist in the coding process. Interview transcript data, preliminary codes and notes, and final code will be the three columns used to code words and phrases (Saldaña, 2016). Categorized data were examined using coded words and phrases to identify common themes in the teacher's perceptions of low performance in a Northeastern state.

### *First-Cycle Coding*

The first coding cycle began after data were gathered from the semistructured interviews. In the first coding cycle, I manually identified key expressions in the text using bold and capital letters. I took qualitative notes throughout the interview to increase understanding and interpretation. These notes were documented in the second column provided next to the interview questions (see Appendix B). Saldaña (2016) explained that coding words and phrases involves creating three columns: one for the interview transcript data, another for preliminary codes and notes, and a third for final codes. The coded words and phrases were divided into Column 1, "interview transcript data", Column 2, "preliminary codes and notes," and Column 3, "final code. The next step was to interpret the information provided. I identified and analyzed common themes from teachers' perceptions of students' low performance.

### *Second-Cycle Coding*

The second coding cycle involved compiling participant data into a table that aligned with the research question. Themes and codes were created to provide smaller fragments, which developed into categories (Saldaña, 2016). The next step was to look for a pattern. I used data that repeated twice as a pattern. Patterns facilitated the understanding and interpretation of data from various perspectives, enabling the

identification of similar phrases, words, and meanings. Lastly, patterns were used to identify categories in second-cycle coding.

### *Theme Development*

I categorized codes and themes in this stage of the study. The categories were analyzed to identify similarities that may not have been developed into themes. Mishra and Dey (2022) highlighted that in the theme development stage, the researcher seeks to identify the emerging themes and themes from the literature. It is essential to note that Saldaña (2016) emphasized that themes can be expressed through nouns and verbs. Mishra and Dey stated that the themes provide conceptual and theoretical insights into the study. These themes were identified in response to the research questions.

## Trustworthiness

Trustworthiness refers to the reader's confidence in the data presentation (Stahl & King, 2020). Credibility and trustworthiness are essential for providing rich, reliable descriptions. Validity, as explained by Ravitch and Carl (2021), speaks to the quality and rigor of the study. Burkholder et al. (2020) explained that validity is a measure of the trustworthiness of a research study. Furthermore, the researchers demonstrated that trustworthiness is the degree to which a researcher can have confidence in the survey and the method. I assessed the study's trustworthiness through member checks. Burkholder et al. (2020) further explained that member checks allow the opportunity to identify and note the potential effects of the researcher's presence on participants' responses and behavior. Additionally, I used credibility, transferability, dependability, and confirmability to ensure validity. Burkholder et al. (2020) explained that, in addition to

credibility, transferability, dependability, and confirmability, these factors also contribute to increasing trustworthiness.

## Credibility

Credibility refers to the extent to which the research aligns with reality (Stahl & King, 2020). Credibility can be achieved through continuous engagement, observation, member checking, and reflexivity (Burkholder et al., 2020). Member checking encompasses validating the accuracy of recorded data (Lincoln & Guba, 1985). Member checking in this study allowed participants to review and validate recorded data. This additional step ensured that information interpretation is accurate and accurately reflects the teachers' view. Additional member checking also helps eliminate research bias and accurately represents the respondent's perspective (Erdmann & Potthoff, 2023).

## Transferability

Transferability refers to the ability to reuse findings and recommendations in other settings with similar characteristics. Lincoln and Guba (1985) and Burkholder et al. (2020) emphasized that qualitative data cannot be applied across different issues without a thorough and rich description of the data and findings. I provided these descriptions to help other researchers understand the similarities between their studies and the information that can be used to build on their research. Stahl and King (2020) further explained that transferability will be applied when the reasons for the adaptation are justified. Additionally, the findings from this study provide context for the issues eighth-grade mathematics teachers encounter when teaching students and identify resources that may help improve student performance.

## Dependability

Dependability in qualitative research refers to the consistency and stability of the research findings over time and under similar conditions (Lincoln & Guba, 1985). This aspect of trustworthiness is created from consistent, thoroughly completed research. Lim (2025) referred to audit inquiry and triangulation as components of this qualitative research. These strategies help ensure that the challenges and successes discussed by mathematics teachers are organized to add depth and coherence. A rationale was created for the study that aligned. This alignment was implemented by having two teachers, not associated with the study, review the interview protocol, thereby ensuring validity.

## Confirmability

Confirmability concerns whether the findings, interpretation, and conclusions are rooted in the data and not unduly influenced by the researchers' bias or interests (Lim, 2025). Ensuring the findings are based on a participant's experiences and perspectives is essential. Confirmability can be completed through member checking, reflexivity, peer debriefing, audit trail, and triangulation (Lim, 2025). Understanding that these strategies can accurately represent the findings without personal biases is essential. Following member checking, an audit trail was used to document the study's conduct and data analysis through detailed notes.

## Ethical Procedures

Qualitative researchers should proactively ensure the ethical components of their study are certified (Sperling, 2022). After I received approval from the Walden University IRB (Approval No. 08-22-25-0841648), each participant received an email containing an in-depth disclosure of the study's nature and purpose, the interview

timeframe, the audio recording, and an explanation of participants' requirements and rights. At the start of the interview, participants were also informed that I would keep their information confidential. The final version listed the participants as Participant 1, Participant 2, and Participant 3 to protect their identities. Member checking was conducted to allow respondents to review their transcripts. Participants were also informed that all data collected during the study would be kept secure for 5 years, in accordance with Walden University's policy. Walden's IRB provided ethical research guidelines throughout the study, from the initial to the final stages.

## Summary

Chapter 3 outlined the purpose of this basic qualitative study: to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state and the resources needed to support student success. This chapter included the research design, the researcher's role, and the study's methodology. The methodology section outlined the participants, the setting, the data collection procedures, and the analysis methods. The data analysis plan detailed the data to be collected, the analytical process, the interpretation, and the study's trustworthiness and validity. Lastly, the chapter included obtaining and verifying permission to secure participants' identities and collect data. Chapter 4 follows IRB approval, with the findings presented in layers.

# Chapter 4: Results

The purpose of this basic qualitative study was to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state and the resources needed to support student success. Locally and nationally, numerous reforms have been implemented to improve students' academic performance. Various factors, including student attendance, family involvement, and socioeconomic disadvantage, have been identified as key contributors to students' performance (Bailey et al., 2021; Lyle et al., 2020). To guide this basic qualitative study, the following research questions were addressed:

RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast state?

RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast state?

This chapter presents and discusses the results of this basic qualitative study, aligning them with the research questions. The chapter presents the setting and provides demographic information about the participants. The data collected in this study included the number of participants, the study duration, and the method of data collection. The data analysis section comprises the codes, categories, and themes that emerged from the data. The adjustment and implementation of research strategies for dependability, credibility, transferability, and confirmability are discussed in the chapter's section on evidence of trustworthiness. Chapter 4 concludes with a summary of the research questions and a transition to Chapter 5.

## Setting

This basic qualitative study was conducted via Zoom with mathematics teachers across a Northeast state. The Northeast state was relevant because students were facing challenges in meeting Grade 8 mathematics proficiency standards. All interviews were conducted outside of working hours, and the participants were from varied districts across the Northeast state. No changes in personnel, budget cuts, or trauma affected the study.

Ten Grade 8 mathematics teachers from a Northeast state participated in this study. All participants were Grade 8 mathematics teachers with at least 1 year of experience teaching eighth-grade mathematics. Teachers' experiences ranged from 4 to 22 years. The date and time of the interview were set by the participants, who were provided with a range of options. The flexibility allowed minimal distraction while maximizing the time for open-ended questions, which may have included follow-ups. To protect participants' identities, I assigned each participant a unique identification code, ranging from Participant 1 to Participant 10. A total of 10 participants were interviewed (see Table 2).

**Table 2**

*Participants' Demographics*

| Participant | Total teaching experience (years) | Teaching experience in Grade 8 (years) |
|---|---|---|
| Participant 1 | 6 | 2 |
| Participant 2 | 25 | 2 |
| Participant 3 | 8 | 7 |
| Participant 4 | 12 | 9 |
| Participant 5 | 9 | 8 |
| Participant 6 | 6 | 3 |
| Participant 7 | 13 | 6 |
| Participant 8 | 13 | 13 |
| Participant 9 | 5 | 2 |
| Participant 10 | 10 | 5 |

## Data Collection

Basic qualitative data were gathered from 10 Grade 8 mathematics teachers using semistructured interviews. According to Ravitch and Carl (2021), interviews are a valuable qualitative method for gathering in-depth information and insights from participants through their experiences and perceptions. Following the IRB approval, emails were sent to all Grade 8 mathematics teachers in a Northeast State Union. However, due to high teacher turnover, most of the teachers did not meet the study's requirements. Due to the limited responses, I posted a recruitment flyer in private Facebook groups for math teachers in the Northeast state. Once participants reached out, a form was sent to verify their location, the subject they taught, and the number of years teaching Grade 8. To ensure the accuracy of the information, I checked the Northeast state license site to verify that the teachers were practicing or had practiced within the state. Once verified, a scheduling form was provided to participants. Once the time was provided, a meeting link was sent.

All interviews were scheduled within 1 week, with a 1 hour interval between each. The interviews were conducted via a video conferencing platform within a 14-day period, from September 18 to October 1, 2025, with each interview averaging 25 minutes. The length of the interviews varied based on participants' responses to open-ended, semistructured interview questions. Throughout each interview, probing questions or clarifications were added as needed.

Following the interview, I held a debrief session with each participant. These debrief sessions included the next steps in the study. Participants were also encouraged to make notes on a Google Form of any changes that would be provided with the transcription. Transcripts were labeled with the participant's assigned number and the term researcher to differentiate and ensure clarity and understanding for readers. To maintain confidentiality and privacy, participants were identified by a label, designated as Participant X. The label was updated according to their position within the study. For the second review, editing was based on listening to the audio and reviewing the initial transcript. The data collected will be stored for 5 years beyond the study's conclusion.

## Data Analysis

Qualitative data analysis is rigorous, systematic, and iterative (Ravitch & Carl, 2021). The research data analysis followed the guidelines of Bogdan and Biklen (1997). After collecting the interview data, I created codes and categories and then extracted themes. Initially, I used Zoom transcription to convert the audio file into text. Once transferred into Microsoft Word, I reviewed the transcripts verbatim for accuracy. I removed repetitive words such as "you know" and "um." Following a review by my committee, the transcripts were revisited to ensure more accurate transcription, which

was then reviewed and revised for each recording. From there, I reviewed my interview notes to identify any additional information that stood out to me in each conversation. Once the coding statements were completed, I grouped the codes into categories and then condensed them into themes. After discussing the codes with my friend, who is a committee chair, and with guidance from my dissertation committee, I condensed the codes into fewer categories, resulting in four themes for the research questions.

**Discrepant Cases**

Addressing discrepancy cases requires thorough documentation. Burkholder et al. (2020) highlighted that a researcher must document and analyze the strength of the identified discrepant data. Furthermore, Burkholder explains that in cases where the discrepant data is weak, there should be a utilization of a stronger derived theme and pattern. However, where there is strong discrepancy in the data, further investigation must be utilized and the validity examined. Any identified discrepant data identified throughout the study will be evaluated utilizing the viewpoints above.

**First-Cycle Coding**

The first step in the first-cycle coding process was reviewing the transcripts following the teachers' interviews. I read each transcript twice and examined words and phrases to create the categories. Descriptive codes followed a single-word, short-phrase format based on participants' responses. I highlighted specific words from the mathematics teachers' transcripts, which allowed for meanings and concepts to emerge. The participants' phrases and words were then reviewed to identify their significance. From this identification of significance, 15 codes were created. From RQ1, eight codes emerged, for example, *a lack of support designed for students during learning, and a lack*

*of multilingual support in diverse classrooms*. From RQ2, seven codes emerged. Table 3 provides the codes with examples of excerpts aligned with the research questions. The words and phrases included the following*: students have wide academic gaps*, *lack of mathematics-trained teachers*, *longer time between lessons to accommodate students' needs*, and *one-on-one tutoring.*

**Table 3**

*First-Cycle Codes With Participant Excerpts Aligned With Research Questions*

| Research question | First-cycle code | Participant | Interview excerpt |
|---|---|---|---|
| RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast U.S state? | Lack of support designed for students during learning | Participant 8 | "So, for example, if I have a class, I have a diverse class of learners, ranging from some kids who are at the pre-K level, some kids who are at the seventh-grade level. I have other kids that are in the middle, fourth grade, fifth grade, but they should be learning eighth-grade material, which is really hard for me as a teacher without any support." |
| | Lack of multilingual support in a diverse classroom | Participant 2 | "Well, I see that we need to sometimes, especially in classes where we have a high percentage of students who don't speak English. We need greater support." |
| | Lack of mathematics-trained teachers | Participant 2 | "Their teacher is not a trained math teacher. I've seen that this is what's causing the problem at middle school eighth grade, and they even get to high school, there are so many gaps that are wider every year because of this drought for good teachers. |
| | Parents typically demonstrate little to no interest in their students' success. | Participant 3 | "Then I also try to involve parents in sharing topics on how they can support their children at home." |
| | Students have wide academic gaps. | Participant 5 | "Trying to fill in the wide gap in students' abilities in the classroom. It has often been students who grasp concepts |

| Research question | First-cycle code | Participant | Interview excerpt |
|---|---|---|---|
| | | | quickly, while others are still struggling with the basics from earlier grades. So, this makes it difficult to balance my lessons." |
| | Lesson pacing fails to accommodate students' diverse abilities | Participant 8 | "So, we have to go back and reteach, fill those gaps, and it's just how the curriculum is set up. And because of that, a lot of kids are not able to reach proficiency because of the amount of things." |
| | Students struggle to overcome language barriers. | Participant 4 | "Others struggle with language barrier." |
| | Lack of interest and math anxiety | Participant 7 | "I would say, again, math anxiety because they are a little bit nervous trying to experience much in a higher level, or a higher level, and sometimes it can be negatively part of their confidence and also performances and mathematics." |
| RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast U.S state? | Meeting students where they are through a spiraling approach. | Participant 2 | "So, let's say I taught integers way back, maybe in the first semester, and in the third in the second semester. Each lesson is not even just so much in second, so each day you keep bringing back a little bit of the previous concept, so students don't forget it. You try to tie it back into whatever you're doing. So, it's kind of like keeping the content fresh in there." |
| | More adaptive programs to meet students' needs. | Participant 3 | "I'm talking about resources that can make a huge difference. Visual aids like charts, geometric tools, kind of manipulative [to] help students grasp abstract |

| Research question | First-cycle code | Participant | Interview excerpt |
|---|---|---|---|
| | | | concepts. Technology to also play a big role in the area of educational apps, math games, and some kind of online tutorials that can help learning more interactive and fun." |
| | Longer time between lessons to accommodate students' needs. | Participant 9 | "Create more time." |
| | One-on-one Tutoring. | Participant 4 | "I try as much as possible to provide extra learning sessions, tutoring, and also, I provide simple steps instead of going to the complex." |
| | More practices to improve consistency. | Participant 10 | "I give them a lot of assignments that I believe they can do regularly, every time, every day. Once they get back to the house, they try to practice it repeatedly until they're consistent. |
| | Encouraging students to believe in themselves. | Participant 8 | "I continuously tell them the goal doesn't have to always be an A for everybody, whatever their best is, I just tell them to give me their best, their best might be a B, or it might just be a C. However, it's still good enough to pass. I try to have those one-on-one conversations with them to let them know how they can achieve their goals". |
| | More professional development to help develop teacher skills | Participant 6 | "Workshop for teachers, more resource materials to understand |

| Research question | First-cycle code | Participant | Interview excerpt |
|---|---|---|---|
| | | | the basic ones before going into [another]. |

**Second-Cycle Coding**

NVivo was used to color-code and identify words that were repeated more than twice. Data that repeated twice became patterns—the identification of patterns created categories. The 15 codes were condensed into 10 categories. Categories from RQ1 included *lack of prior knowledge, curriculum shortfall, prior math experience, motivation, shortage of trained mathematics staff, and need for instructional support during the lesson.* Words and phrases that formed the categories for RQ2 included *invest in qualified teachers for diverse settings, leveraging technology, and improving climate and culture.*

**Table 4**

*Second-Cycle Categories With Participant Excerpt Aligned With Research Questions*

| Research question | Category | Participant | Interview excerpt |
|---|---|---|---|
| RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast U.S state? | Lack of prior knowledge | Participant 9 | "Many of them come to eighth grade with the wrong perception altogether. Mathematics is something that has steps, and I think most of them have missed the steps." |
| | Curriculum shortfall | Participant 6 | "Curriculums in order for us to be able to teach the basic ones, maybe start from addition and subtraction, and the rest of them, so that with time, they could be able to understand the basic ones |

| Research question | Category | Participant | Interview excerpt |
|---|---|---|---|
| | | | before going into maybe any quadratic or any other mathematics that are for them." |
| | Prior math experience | Participant 1 | "Because, if there are no proper foundational experiences, there is no proper foundational upbringing, then, there tend to be misunderstandings when they get to grade 8 and all of that." |
| | Motivation | Participant 5 | "Students do believe mathematics is difficult or hard or not for them as well, which affects their motivation." |
| | Shortage of trained mathematics teachers | Participant 2 | "I found that a lot of times middle school, a lot of middle school students don't actually have a math teacher. And what do I mean by that? Their teacher is not a trained math teacher." |
| | The need for support during instructions. | Participant 7 | "Most of my students with disabilities need extra support." |
| RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a | Effective professional development | Participant 1 | "As for me, the teachers, we could actually adjust a training, maybe if we could go for a training, and we have been taught about 10 things in the training. I feel like if there is constant training, maybe in a year or two. This should be about more workshops for us, the teachers, so that we can be able to get more ideas and |

| Research question | Category | Participant | Interview excerpt |
|---|---|---|---|
| Northeast U.S state? | | | more knowledge, to support the students in class." |
| | Invest in qualified teachers for diverse settings | Participant 2 | "The same way there are special education teachers, teachers should be provided with bilingual support for high percentage of Spanish speakers." |
| | Improving climate and culture | Participant 8 | "I've seen where I allow them to be accountable. I have a data tracker where, every time we administer a state assessment or a class assessment, they record their scores. They have various colors attached to them. So, they know what area they need to work on when we review for our state exams. So, it boils down to the teaching style, the expectation, the goal that we're going towards." |
| | Leveraging technology | Participant 7 | "I bring technology in because we are in [an era] in which technology is great. And I use online resources to guide them." |

**Themes**

Saldaña (2021) explained that codes and categories are synthesized into comprehensive themes by integrating words or phrases that establish a connection between categories. Four themes were created from the codes and categories. Saldaña defined themes as abstract and subtle expressions that represent a situation. Themes were compared with the conceptual framework and the literature to identify commonalities.

- Themes 1: Academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of instructional approaches.
- Theme 2: Students' performance and teacher practices are shaped by the capacity limitations of their school and district, aligning with RQ1.
- Theme 3: Expanding teacher capacity and support systems to improve student outcomes.
- Theme 4: Increasing student accountability by fostering supportive and motivating environments, aligning with RQ2 (see Table 5).

**Table 5**

*Categories Aligned With Research Questions and Themes*

| Research question | Category | Theme |
|---|---|---|
| RQ1: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast U.S state? | Lack of prior knowledge<br>Curriculum shortfall<br>Prior math experience<br>Motivation<br>Shortage of trained mathematics teachers<br>Lack of support during instructions. | Theme 1: Academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of instructional approaches.<br>Theme 2: Students' mathematics performance and teachers' practices are shaped by the capacity limitations of their school and district. |
| RQ2: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast U.S state? | Effective professional development<br>Develop more support within the classroom<br>Invest in qualified teachers for diverse settings | Theme 3: Expanding teacher capacity and support systems to improve student outcomes. |

| | | |
|---|---|---|
| | Leveraging technology | |
| | Improving climate and culture | Theme 4: Increasing student accountability by fostering supportive and motivating environments. |

### Discrepant Cases

Deviation from interview transcripts provides the researcher with rich data to compare and analyze data and a deeper understanding. Patton (2015) explained that discrepant data provide an opportunity for researchers to broaden patterns and knowledge emerging from data analysis. Throughout the data analysis process, no discrepancies were identified.

## Results

This basic qualitative study explored the perceptions of Grade 8 mathematics teachers regarding students' low performance in mathematics. Data collected from 11 interview questions answered the two research questions. The first RQ1 was addressed by participants' responses to Interview Questions 1–5 and 10 during the interview. The second RQ was addressed through participants' responses to Interview Questions 6, 7, 8, 9, and 11. In the following sections, the categories related to each theme were discussed, organized by research questions, and supported the themes with participants' responses.

### RQ1: Perceptions of Factors Contributing to Low Performance

The first research question was: What are Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast U.S state? I sought to understand teachers' thoughts on the underlying academic, social, and systemic factors influencing students' performance. Through my analysis, two themes were identified.

#### *Theme 1: Academic Factors Influencing Grade 8 Students' Mathematics Performance*

Four categories were organized under Theme 1: Academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of

instructional approaches. These categories are lack of prior knowledge, curriculum shortfall, prior math experience, and motivation. These categories were selected as I believe they defined and explained how teachers perceived students' performance and teachers' approaches to addressing these challenges. Additionally, many teachers have reported improvements in students' results after providing support to address students' challenges.

**Lack of Prior Knowledge**. Participants started the interview by discussing the educational challenges encountered when teaching Grade 8 students. While five teachers faced more academic challenges than others, they all shared similar reasons for students' low performance. Teachers reported that students' struggles with mathematics stem from their inability to connect previously taught concepts. These inabilities range from inconsistent practice to a lack of consistently trained teachers to a lack of interest. Participant 1 stated,

> I feel like, foundational beginning is actually one of the problems children in Grade 8 are actually facing. Because if there are no proper foundational experience, there [is] no proper, foundational upbringing, then there tend to be misunderstandings when they get to Grade 8 and all of that.

Participant 2 made a similar statement by stating that "students' challenges depended on their demographics, but more students do not have the basic or prerequisite skills that they need to do the work at the Grade 8 level." Participant 3 shared that "one of the biggest challenges I face teaching grade mathematics is the wide gap in students' abilities." The participant indicated that some students in the same classroom grasp concepts quickly, while others struggle with the basics they should have mastered in the

earlier grades. Participant 9 stated that “students have difficulty understanding what I’m teaching, and I discovered that in Grade 8, there’s a little bit of difference in understanding and comprehension compared to other grades.” All teacher participants reported that foundational challenges have hindered their ability to achieve proficiency.

**Curriculum Shortfall**. Four participants also shared that students’ low performance stems from the way the curriculum is developed. Five teachers reported that students were left behind because the pacing did not match their current abilities, widening the gaps.

Participant 3 shared,

> In the same classroom, I often have some students who grasp concepts quickly while others are still struggling with the basics from earlier grades. So, this makes it difficult for me to balance my lessons so that no one feels like they are left behind or bored. It is challenging to balance lessons so that no one feels left behind or bored.

Participant 6 shared, “I faced a lack of understanding. I faced children not being able to assimilate what they have been taught in class. Participants 4 and 7 shared that students have difficulty connecting the concepts to their daily lives and real-life experiences. Participant 8 identified misalignment in the curriculum across the grades and the need for modifications, stating,

> When we do our vertical alignment, we realize that, like in seventh grade, some of the things that they are learning, there is a gap; they don’t learn it in eighth grade, and there is no connection. They’re not learning that topic again until they return to high school, and vice versa. Some of the issues that they do in eighth grade

> when they move on to ninth grade, they don't do some of that stuff again until they do, until they're like in their sophomore year in high school. I think a part of it is simply a matter of vertical alignment and how the standards are structured.

Teachers felt that, despite data demonstrating students' lack of prior knowledge, no modifications or adjustments were made within the curriculum.

**Prior Math Experience**. All teachers agreed that positive student experiences provide the interest needed for learning. Participant 2 stated,

> Well, what I have learned is that one of the biggest things in helping students to be successful is to help them believe in themselves, because I found that a lot of students think that they are dumb, they think they can't do math.

Other participants pointed to students' prior experience as the reason for a block to learning mathematics. These blocks prevent any level of understanding or learning. Three participants held different viewpoints on student efficacy. Participant 8 stated,

> In seventh grade, the kids will tell me sometimes what they were doing; they do stuff like probability, statistics, things that they can relate to, statistics. Those are very relatable. When you start working with math, especially in eighth grade, you often encounter slopes. I mean, those are applicable, but those are new words to them.

Participant 6 believed students' inability to make connections creates barriers that influence learning and understanding. All participants believed that students have either had bad experiences in mathematics due to poor grades or find the concepts too abstract for them to gain a deeper understanding.

All teachers believed that many students struggle with math anxiety. This issue, they believed, prevents students from performing at their best. Teacher 1 stated, "I also feel like there are a lack of confidence and math anxiety, because I've actually observed a lot of them, and I feel like they have math anxiety." All participants believed that helping students to believe in themselves and not overthink is an important step. Participant 3 echoed this sentiment, stating that some already believe that mathematics is too complicated or not for them. Participant 7 stated,

> I would say a lot when it comes to mathematics with a student. Firstly, I would say a significant challenge is the absence, which is a matter of anxiety. Most of my students feel some stress about mathematics, are nervous, and are trying to overcome their fear. Like my test, and I've had some challenges, like different learning skills, yeah, for sure.

All the teacher participants stated that students' anxiety not only impedes their daily assignments but also impedes their ability to perform effectively on tests. Participants further noted that these impediments are the reason students may exhibit low proficiency.

**Motivation**. Another reason participants believed students have low performance is a lack of interest. Participant 7 shared that

> Most of them in my classes are, I would say, 20% of them are students with disabilities, and they are the math anxiety, like they face these challenges, like they feel much as a very weird something, and sometimes negatively, but their confidence and also performances in mathematics.

Other participants shared slightly different viewpoints. Participant 3 stated, "Another challenge is the negative attitude many students bring into the classroom. Some already

believe mathematics is too hard or not for them, which affects their motivation." Thus, participants suggested that a strong correlation exists between students' attitudes, performance, and experiences, which collectively influence their success. Participant 8 discussed,

> I arrived in 2019, as COVID played a different role. The kids are a little bit. Regarding their social and emotional learning, they are so much in tune with the technology that when you do hands-on stuff with them, it's like they don't want to do it. They don't want to participate. When you apply it to technology, sometimes even though they know what to do, they still don't want to participate. It appears that the value of education is somewhat diminishing following the COVID-19 pandemic. Prior to COVID, kids were more in tune with learning, the value of education, and where they're going after high school, in the future, but right now, it's a little bit diverse.

Participants believed that students' performance and attitude are highly dependent on their experience. This rapport and relationship have created students who are more inclined to try to participate. Participant 2 revealed,

> Helping students to be successful is to help them to believe in themselves, because I found that a lot of students think that they are dumb, they think they can't do math, so I think I'm very good at motivating students.

For participants 2 and 3, helping students to understand that they are capable created the willingness to participate in class activities geared towards increasing understanding. Participants have cited many examples where relationship building and motivation have fostered trust and believe that students need to attempt challenging tasks.

### *Theme 2: School and District Capacity Limitations*

Students' performance and teacher practices are shaped by the capacity limitations of their school and district, which was Theme 2. Under this theme, two categories were identified. These categories include a shortage of trained mathematics teachers and misuse of instructional coaches. These categories further help to elucidate how teachers perceived students' performance and their approaches. Participants have also shared positive improvements after applying strategies to alleviate these challenges.

**Shortage of Trained Mathematics Teachers**. Four participants cited a shortage of trained mathematics teachers as a reason for students' low performance.

Participant 2 stated,

> I found that many middle school students often don't have a math teacher. And what do I mean by that? Their teacher is not a trained math teacher. I've seen that this is what's causing the problem at middle school eighth grade and also as they even get to high school there's so the gaps are wider and wider every year because of this drought for good teachers students are not being taught by people who truly understand math and if you have a teacher who does not understand the concept how can they get it across the students who really need help understand so I think that's one of the reasons.

Participant 6 shared,

> I would say one of the reasons why they performed poorly in classes is because they were not taught properly. They didn't really get that love for it. I feel like there's a way a teacher can actually make a child love a particular subject, and all

> of that wasn't really done. So that's one of [them]. So, [there is] no proper background of the subject.

Participant 1 said, "The lack of teachers creates pressure for other teachers to meet all students." Participant 8 not only needed trained support but also general support, as they had a classroom full of students with diverse mathematical learning needs and lacked the support to address them. Participant 8 stated,

> So, for example, if I have a diverse class of learners, ranging from some kids who are at the pre-K level to some kids who are at the seventh-grade level. I have other kids that are in the middle, fourth grade, fifth grade, but they should be learning eighth-grade material, which is really hard for me as a teacher without any support.

Participants who encountered various barriers during lesson delivery stated that these barriers have eroded their confidence in delivering high-quality instruction to students. Despite numerous interventions and recruitment efforts, further improvements are needed to enhance students' learning and address staff needs.

**Need for Support During Instruction.** Three participants acknowledged that limited support for teachers was a factor in students' low performance. Participant 8 began by highlighting the lack of direct support for teachers who navigate students' diverse needs. Participant 1 stated, "Class size can make it tougher when trying to understand." Participant 7 emphasized the need for mathematics coaches to provide one-on-one support or create targeted interventions to meet students' needs. Three participants believed instructional coaches should be able to provide support to classes with highly diverse needs.

## RQ2: Perceptions of Resources Needed

RQ2 sought: What are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast state? This question opened the opportunity for educators to discuss the role of professional development and the resources they believed would be key to improving students' proficiency. Two themes emerged from the responses to this interview question.

### *Theme 3: Expanding Teacher Capacity and Support*

The third theme that emerged was expanding teacher capacity and support systems to improve student outcomes. Under the previous themes, the teachers identified that students who had negative mathematical experiences in prior grades, lacked a math teacher, had inconsistent or untrained teachers, and/or attended schools with limited resources tend to develop math anxiety and a lack of interest in learning. To this end, they believed that effective professional development, greater support within the classroom, investing in qualified teachers across diverse settings, and leveraging technology could help students succeed in mathematics.

**Effective Professional Development**. Four participants believed that building capacity with coaches and other instructional administrators would filter through to improve students' learning. District and school-level administrators provide professional development and instructional coaches to support teachers' growth and development, tailored to students' needs. Participant 9 stated,

> My school district has done a huge job there in order to review every section of [the] curriculum. They try to review it and call for teachers, interview teachers to

> make sure to know if the previous curriculum is working properly, and if it's not, they try to all [work] together, fix it, re-amend it, revisit it.

Participant 8 further stated,

> We have like a math instructional coach and then we'll have specific sessions that are geared to curriculum some are geared to teaching practices and others are geared to whatever the teacher would have been requested so those would have been sent out via survey and then whatever the teachers want they make themselves available at the at the district level sometimes the math coach will also well most times the math coach will all and instructional coaches will sit in on our weekly professional development meeting professional meetings grade level meetings.

Participant 10 echoed similar views. Participant 10 stated,

> They have tried as much as they can by organizing seminars for math teachers. But it is not something that was really; it was just teaching math teachers how to approach teaching. I wish it would incorporate students and the curriculum.

All participants emphasized the importance of professional development that incorporates teachers' feedback and addresses school needs, thereby ensuring that students' needs are met through effective teaching practices.

School administrators also use data from state and unit tests to revise lessons or concepts that are revisited in the next math course or on the state exam. Participant 2 shared,

> The main point of data is for us to analyze it and to use it to help improve students' performance, and what that does for us, too; it helps us to realize better

> results on the end-of-grade exam. For some, when we constantly see the data, and we're looking at, like, okay, how can I get these students who only got two out of 10 on this assessment?

Participants believed that professional development helps to shape teachers into making effective instructional strategies for students.

**Develop More Support Within the Classroom**. As mentioned under Theme 2, some teachers believed that the limited support received by teachers was a factor in students' low performance. However, the participants also acknowledged that the district provides mentoring and coaching at the local level to ensure that students and teachers receive some support. Participant 4 shared that her district provides "workshops and training sessions, coaching, mentoring, and also provides online resources to our students." Despite this support, some participants reported that additional help is still needed to address students' and teachers' classroom needs. Participant 6 shared, "More workshops are needed." Participant 1 shared a similar sentiment on the need for developing more classroom support for teachers:

> I would say I would actually need, more professional coaches, because, as for me, the teachers, we could actually [benefit from] training. Maybe if we could go for a training, and we have been taught about 10 things in the training. I feel like there [is] constant training, maybe in a year or two. This should be about more workshops for we, the teachers, so that we can be able to get more ideas and more knowledge, in order to support the students in class. And I feel like if materials were provided, materials like mathematical materials that could also help students understand mathematics better in class would also be very encouraging.

Throughout the interviews, participants mentioned the need for additional resources. These resources ranged from more physical support to technological materials. While the district must provide more support, these resources should be effectively used at the school level.

**Invest in Qualified Teachers for Diverse Settings.** Diversity and students with multiple needs are critical to planning and lesson delivery. Participant 2 shared,

> Within the classroom that is built in with students with an Individualized Educational Plan (IEP), core subject teachers (math, English, and science) are provided with a trained special education teacher to help give as much small-group or one-on-one support to students. These efforts help students receive as much support as possible during the lesson. With this same concept, teachers need a language specialist to assist students who speak little to no English.

For Participant 2,

> So, I would put the worksheet in Google Translate and so on. And let some use a dictionary also, because I found that the Hispanic students who struggle with math, it's not because they're not good at math, they just have a language barrier.

Participant 2 went on to suggest,

> I would say provide a co-teacher, but not just a co-teacher who is a special educator, but a co-teacher who is a Spanish [speaking]. Especially if there is a high percentage of Spanish speakers in the class

For Participant 8, the use of teachers with non-mathematical degrees and the creation of another path to meet certification requirements raises broader issues as the shortage of support teachers expands. Throughout the interviews, participants lamented the need for

teachers who at least have a degree in mathematics of some sort to ensure that students are receiving the best possible content and skills-building.

**Leveraging Technology.** Technology is a crucial aspect in developing students who are 21st-century ready for the workplace and college. Participant 7 shared,

> I will bring technology in because we are in an area where technology is excellent to go away. I use online resources to guide them. And mostly, I use these for my students with disabilities so that I can get to understand them quite well, and areas in which they are not performing effectively. I do technology integration, like trying to use a projector to educate them more.

Participant 5 expressed the importance of technology in supporting mathematics performance, stating

> I would say if we were [given the] opportunity to have more advanced technology to help students also play around, the kind of technologies will play a significant role in educational apps, math games, and online tutoring, so I would say a sort of visual art that links geometry and tools to help.

Participant 5 echoed a slightly different but similar perspective, explaining that technology provides students with an opportunity to learn in small groups while facilitating tasks in diverse forms.

Participants 6, 9, and 10 used tutoring and networking to support students. For example, Participant 6 explained that technology facilitates continuous support in and out of school through video conferencing and the recording of complex lessons. While participants deployed technology in various forms, all believed that technology supports

continuous learning, providing students with support both in and out of the classroom, using materials that students are often interested in.

***Theme 4: Increasing Student Accountability***

Students from diverse backgrounds are shaped by and raised in different cultures that have influenced who they are and what they believe. The category improving climate and culture falls under Theme 4: Increasing student accountability by fostering supportive and motivating environments. This theme was chosen because it further helps to explain a resource that participants believed would increase students' success. All participants have provided varied examples of how changing classroom expectations have increased students' engagement and performance. With the growing diversity in most districts, Participants 2 and 4 believed that students from different cultures have different viewpoints on education.

The participants believed in creating an environment of success, belief, and valuing education. Participant 1 shared "being patient, because I feel that if you want to be a good teacher, then it should be a kind of teacher who has patience. And, I have this ability to understand." Participant 6 also shared, "I create some motivational talks for them. I tell them that they can do it, I tell them that they should be consistent. Also, I told them that they can do better than before. Some participants believed that the accountability aspects help students understand that they are being held to a higher standard and will be able to achieve if they believe in themselves.

Teachers also indicated that they help students develop a sense of self-confidence. Time can sometimes pose a challenge not only for teachers within the classroom but also for parents and students at large. Participants 2, 5, and 7 mentioned the lack of parental

support and time, which students often cite as a reason for needing home practice. Participant 8 emphasized the importance of schools fostering a climate and culture that values education and promotes greater parental involvement. Although parents do not always attend meetings, a conscious effort is made to contact them and conduct follow-ups when behavioral issues hinder student success. Increasing student climate at school and home helps foster a consistent practice where students believe and know that various stakeholders expect the best.

## Evidence of Trustworthiness

Credibility, transferability, dependability, and confirmability were used to establish trustworthiness. Ravitch and Carl (2021) declared that a study's rigor encompasses trustworthiness or credibility. Furthermore, Burkholder et al. (2020) defined trustworthiness as a researcher's ability to believe that the data provided, as well as the resources, meet the standards necessary for confidence.

### Credibility

Credibility refers to the extent to which the research aligns with reality (Stahl & King, 2020). Semistructured interviews facilitated my ability to gain insights into Grade 8 mathematics teachers' perceptions of students' low performance. Member checking and peer review were used to develop and promote credibility. Participants were informed that their involvement in the study was voluntary and that they could withdraw at any time. This information was provided in writing during the recruitment and selection process, as well as again before the data collection.

Participants were informed of the procedures before and after the interview, specifically about the need to review the audio. Member check facilitated credibility. The

perceptions of the 10 participants were recorded, the audio transcribed, and the data coded. After reviewing the audio and transcription, I sent participants a copy of the transcript via email, along with instructions on how to make any necessary changes or raise any concerns. I reviewed the Google form to ensure that a follow-up was needed and conducted, and to confirm that the transcript accurately reflected their thoughts.

Reflexivity, according to Ravitch and Carl (2021), speaks to the risk of bias. To minimize such an occurrence, I reviewed best practices provided by Walden's Research Center and made notes throughout each interview. Following each interview, I reflected on the responses provided and, if needed, made notes on how I could facilitate a deeper understanding of the participants' perceptions.

**Transferability**

Drisko (2024) defined transferability as the abstraction of information used to apply knowledge gathered from specific persons who were not directly studied. I selected 10 participants from various middle schools within a Northeast U.S state. According to Burkholder et al. (2020), the researcher is responsible for determining the applicability of findings from another situation to their current study.

Due to the expansion of participants across a Northeast U.S. state and the similarities in their perceptions of students' low performance, the study's results may apply to other Northeast U.S. states with similar performance issues. School officials can use this study to improve students' Grade 8 mathematical performance. Additionally, based on feedback from teachers indicating that students carry these deficits from previous grades, the study's findings could inform the development of protocols and guidelines to help districts improve their curriculum practices and meet the needs of

learners. This study presents an opportunity for future research on ways to support teachers and students by utilizing the best practices identified by Grade 8 mathematics teachers in a Northeastern state.

### Dependability

Using the rationale for the study, two teachers unrelated to the interview were consulted to review the interview protocol and ensure validity, as well as to peer-review the data. During the interviews, information was also summarized as needed to ensure that I captured an accurate representation of the participants' views. During the data analysis, interview questions were grouped according to the research questions and the data collection process outlined in Chapter 3 of the study.

### Confirmability

Burkholder et al. (2020) defined confirmability as the process of confirming the data, primarily because people cannot separate themselves from reality. The documentation, including the collection and review of data related to the study, was another form of confirmability. Lastly, I made every attempt to present the data as reflecting teachers' perceptions of students' performance, rather than my own experience in the field.

## Summary

Students' low performance in mathematics is a challenge for many states. This qualitative study aimed to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a northeastern state. Chapter 4 included the research findings and data analysis process. Semistructured interviews were conducted to gather data from 10 mathematics teachers who are or have taught Grade 8 mathematics,

who participated in the study and shared their perceptions of the challenges and resources needed to improve students' performance. The data were examined to identify codes, categories, and themes that emerged throughout the interviews. Four themes emerged from the data and are outlined in Table 5.

Throughout the interview, middle school mathematics teachers discussed the challenges students exhibit within the classroom. The teachers identified gaps in prior knowledge skills, lack of interest, and pacing as factors contributing to students' low performance. The middle school teachers then identified resources like the use of apps to assist in closing gaps, the use of interventions to provide support to students who are significantly underperforming, more professional developments geared to curriculum development, as well as a practice geared towards shifting culture and climate, as ways that students' performance can be tackled and improved. While some proposed different solutions, such as the inclusion of bilingual teachers and special education teachers, others believed that math coaches should have meaningful roles to provide deeper support for students and teachers.

Chapter 5 will begin with an introduction that restates the purpose and nature of the study. I will start by summarizing and interpreting the findings, presenting the study's limitations, and making recommendations for future research. Additionally, I will provide insights into positive social change and a conclusion to the study.

# Chapter 5: Discussions, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance in a Northeast state and the resources needed to support student success. Ten middle school mathematics teachers who had or were currently teaching Grade 8 mathematics participated in the study. This research focused on two questions to understand teachers' views on the challenges they encounter when teaching Grade 8 students. The interview questions facilitated reflections not only on what had led students to underperform but also on how teachers had helped them succeed, as well as what initiatives had been and were still critical to addressing these challenges. As a result of the data analysis, four major themes emerged:

- Academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of instructional approaches.
- Students' performance and teacher practices are shaped by the capacity limitations of their school and district.
- Expanding teacher capacity and support systems to improve student outcomes.
- Increasing accountability through positive climate and cultural responsiveness.

The key findings suggest that although students' prior knowledge and experiences influence their performance, changing the culture and climate within the classroom can foster improved performance.

## Interpretation of the Findings

Grade 8 mathematics teachers recognized that the challenges associated with students' low performance stemmed from their inability to grasp current grade-level concepts. In this section, I discuss the findings in relation to the conceptual framework and prior research reviewed in Chapter 2. The frameworks used to explain the findings of this qualitative study were Maslow's (1943) hierarchy of needs, Ryan and Deci's (2000a) SDT, and Gay's (2018) culturally responsive theory.

### RQ1: Perceptions of Factors Contributing to Low Performance

The first research question addressed Grade 8 mathematics teachers' perceptions of the factors contributing to students' low performance in a Northeast state. The two themes that emerged from this research question were (a) academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of instructional approaches (Theme 1), and (b) students' performance and teacher practices are shaped by the capacity limitations of their school and district (Theme 2). These themes are interpreted in the context of the literature review and framework.

#### *Theme 1: Academic Factors Influencing Grade 8 Students' Mathematics Performance*

The data demonstrated teachers' perceptions that students' low performance is due to their lack of prior knowledge or basic skills. Teachers cited that these abilities are linked to a lack of understanding of prior requisite skills for various reasons. Some reasons included, but were not limited to, a lack of interest, a shortage of trained mathematics teachers, and a shortage of teachers for diverse students. Cognitive barriers, mathematics anxiety, ineffective teaching methods, sociocultural factors, and limited resources were all factors that contributed to students' learning (Chew & Cerbin, 2021;

Lambert & Schuck, 2021; Myers et al., 2021). Hussar et al. (2020) found that many students below Grade 7 struggle with fundamental mathematical skills.

This lack of basic skills can result in a profound lack of understanding, leading to significant conceptual and procedural misconceptions. Teachers recognized the need for more software and resources to help close gaps. Criollo-C et al. (2021) argued that different technologies in the classroom equip students with essential skills for lifelong learning and critical thinking. Participants 2, 3, 6, and 8 all emphasized the need for resources to close achievement gaps and create a more inclusive classroom with a more balanced ability mix. Myers et al. (2021) expounded on these cognitive challenges by implicitly addressing students with learning disabilities. Through no fault of their own, Myers et al. explained that students with disabilities often experience setbacks that create volumes of misconceptions and insufficient prior learning.

According to Maslow's (1943) hierarchy of needs, human motivation is driven by a series of needs that must be met to progress to a higher level. Students may not be interested in learning mathematics because they lack foundational skills in mathematics. The lack of these skills, combined with pressure from home, creates a barrier that results in little to no effort in schoolwork. They may also struggle to understand due to a lack of materials needed to meet students' diverse needs. Another reason students may underperform is the lack of adequately trained staff to impart content effectively. Providing students with teachers who can develop and implement effective teaching strategies, build a tailored curriculum, and create customized instructional approaches yields positive results, as cited by Participants 1–10 in the research interview process.

Ryan and Deci's (2000a) theory of SDT offers students a path to develop the skills and attributes needed to believe they can use these skills to tackle complex concepts. Leveraging technology through educational apps or online simulations can enrich students' learning experiences by offering personalized instruction and promoting project-based learning opportunities (Koskinen & Pitkäniemi, 2022). Creating these avenues for students to believe in their capabilities fosters the connection to Maslow's (1943) hierarchy of needs. Maslow (1943) believed that students would progress to higher steps if they first achieved the lower steps. Helping students master basic skills will enable them to understand advanced skills as they progress through grades and concepts.

### *Theme 2: School and District Capacity Limitations*

Teachers believed that more support from other instructional staff was needed to address classroom needs. Participants reported that coaching and other forms of support were not provided, which may have contributed to the students' low performance. Participant 3 expressed that an instructional coach would be crucial in providing effective professional development to help teachers build the skills needed to identify students' gaps and support them where they are. García-Álvarez et al. (2023) explained that professional development is vital for enhancing knowledge, skills, self-actualization, and effectiveness. Teachers recognized the need for extensive professional development to enhance the skills of coaches and teachers in mentoring and supporting students with diverse abilities.

Lack of teachers who are trained in mathematics or who have strong mathematical skills. Teacher efficacy has created opportunities to recruit effective teachers proficient in

mathematics and other languages required by the population. In an interview, a teacher emphasized the importance of recruiting and assigning Spanish-speaking teachers to schools with high concentrations of Spanish-speaking students. Teachers believed that recruiting teachers with a strong mathematical background would help students have positive math experiences and reduce anxiety. The need for teachers who are fluent in other languages is rooted in Gay's (2010) culturally responsive theory. For Gay, understanding the student population, creating lessons, and providing resources are crucial steps to ensure that students and teachers have the tools for effective instructional practices.

**RQ2: Perceptions of Resources Needed**

The second research question addressed what are Grade 8 mathematics teachers' perceptions of the resources needed to support the success of mathematics students in a Northeast U.S. state? Two themes that emerged from this research question are: expanding teacher capacity and support systems to improve student outcomes (Theme 3) and increasing student accountability by fostering supportive and motivating environments (Theme 4). These themes are aligned with the literature review and framework.

***Theme 3: Expanding Teacher Capacity and Support***

Teachers viewed building capacity as providing professional development for all teachers and instructional staff. Teachers believed professional development helps create opportunities for collaborative learning. Sivalingam and Mansori (2020) emphasized the significance of lifelong learning to ensure that employees' knowledge stays relevant and that students are aware of contemporary global challenges. Participants emphasized the

need for more professional development to equip teachers and coaches with the necessary skills to support students effectively. García-Álvarez et al. (2023) also noted that professionals with extensive experience often receive limited resources.

Participants also shared that professional development should focus on increasing teachers' content efficacy rather than on training that is not directly related to a school or classroom's needs. Professional development encompasses activities and processes designed to enhance a teacher's instructional practices and beliefs, ultimately promoting student learning (Salas-Rodríguez & Lara, 2023). One of the teachers' issues was not feeling as supported as they would in a classroom setting.

Helping teachers develop the skills needed to increase efficacy will help unlock other needs, as described by Maslow (1943). Additionally, teachers can develop the self-determination needed to overcome the challenges students face in the classroom. Lastly, Participant 2 reiterated the importance of offering courses or programs to train and equip teachers with other languages popular within a school or district. These programs and courses could address the need for cultural responsiveness and promote a culturally responsive strategy within the classroom.

Teachers expressed that the district is tasked with providing high-quality instructors who are culturally aware of the ethnic needs of students. Beyond technological integration, teachers with language proficiency are needed. Additionally, interventionists and coaches are expected to provide support to teachers and students. Franco et al. (2024) explained that culturally responsive teaching holds that students' cultural differences are strengths educators can leverage to enhance students' learning. Utilizing teachers who speak the language of most of the population helps bridge the gap

in fostering a sense of belonging and love. Teachers shared that students are motivated to learn when they are provided with support that resembles them or speaks their language.

***Theme 4: Increasing Student Accountability***

Teachers perceived relationships as connections created to foster a supportive environment. Teachers have employed relationship-building strategies to encourage and motivate students in their pursuit of greater academic success. Ryan and Deci (2000) believed motivation can be intrinsic and extrinsic, and that these factors work together to shape who we are. Students may lack motivation due to their personal experiences with mathematics and the learning environment. These barriers and influences could be considered one reason students' performance continues to decline, and they are evident throughout the Northeast. Additionally, students still require educators to employ motivational strategies to help them overcome challenges in acquiring complex skills. One participant highlighted various strategies to help a student who did not care about or show interest in learning. By supporting the student, the teachers recognized that the student had demonstrated mastery of the skills being evaluated.

An improvement in students' academic performance creates a more invested student in subsequent classes. Other participants have spoken to math anxiety, and the fear students have when they enter the classroom. Bautista (2023) highlighted that students are affected by many factors that reduce their ability to attempt or comprehend mathematics. To help with this, teachers have developed small support groups designed to meet students where they are and use that as a guide to help them reach their desired destination. In applying the small group mechanism, participants have cited students' success not only in Grade 8 but beyond.

Relationships have also stemmed in the form of parental involvement. Teachers believed parental involvement helps children to feel supported. Participants believed that parents help to create an environment at home where students are held to high standards while fostering accountability. Wilder (2023) highlighted that teachers, administrators, and other stakeholders have long recognized the importance of parent involvement in promoting and maintaining student success. Maslow's (1943) love and belonging needs suggest that students are motivated to attend classes and try when they feel a sense of belonging and are fostered in an environment that supports this feeling. Unlocking the motivation step helps create the belief that achieving greater challenges is possible.

Lastly, Gay's (2010) culturally responsive theory addresses administrators' and school officials' ability to foster and provide an environment that meets the needs of all students. This framework was supported by Participants 2 and 8, who explained that educational challenges vary by ethnic background. As participants explained, providing effective teachers who speak the language is essential for the support these groups need, particularly those with high Spanish-speaking populations. Participant 9 also noted that many students struggle to understand concepts due to differences in vocabulary and terminology. Ensuring that lessons align with students' cultural backgrounds makes them more relatable and facilitates a deeper understanding.

## Limitations of the Study

There were two limitations to this basic qualitative research study. The limitations were the risk of bias and limited representation. Although the study involved 10 mathematics teachers, it was limited in its representation in a Northeast state. Bias is possible in any research, and it is particularly likely in a qualitative study when the

researcher is present. While I worked at a high school in the Northeast state, I did not conduct any interviews with teachers at my school or at the schools I interacted with. To further reduce bias, I employed critical steps to ensure trustworthiness. These steps included providing teachers not directly involved in the research with a copy of the interview questions to offer an additional pair of eyes for effective questioning and a deeper understanding. Member checking was also used to ensure that participants could review and provide insights where needed. Lastly, notes from each interview were used to provide additional questioning and follow-up not only for those participants but also for future participants. Every effort was made to draw conclusions solely from the information presented, rather than from my own perception.

## Recommendations

Based on the strengths and limitations of this study, three recommendations are made. My first recommendation is to conduct further research on teachers' perceptions of students' mathematics performance at the Grade 8 and 9 levels, as well as the effects of interventions on student performance. Sattem et al. (2022) found that many instances of underperformance in mathematics span multiple grade levels and age groups. Conducting a more comprehensive study with two connected grades helps determine whether the same gap and performance identified in grade 8 persist into grade 9. If there are changes, teachers can also identify new practices to help students in lower-level grades.

Another recommendation is to explore high-dose tutoring, as many participants have suggested, to help close the academic gap and improve student success. Many participants have cited not only the academic gap students have faced, but also that tutoring has helped some students to improve academically. Further study would help

determine whether tutoring should be applied at a particular stage to help more students improve. Additionally, gathering teachers' perceptions of this strategy helps create a comprehensive overview of how it is used and of students' performance before and after its application. Lastly, I recommend that teachers receive professional development that addresses culturally responsive teaching and learning, as well as more robust strategies to support students with diverse abilities.

## Implications

This study offers insight into middle school teachers' perceptions of the challenges and resources necessary to improve the mathematics performance of Grade 8 students. The findings help highlight the practices implemented to reduce learning loss. The findings reinforce the need for improvements in content delivery and professional development, equipping teachers with the tools to prepare for and support high-quality learning environments.

### Implications for Educators

Students' performance in mathematics can be improved by enhancing teachers' capacity and efficacy, as well as by building relationships and resources. Educators should be able not only to recognize and create strategies to address learning loss but also to provide the environment needed to support the learning loss identified in students. Teachers should also be equipped with the strategies necessary to identify class disparities and be provided with the resources needed to deliver high-quality education to all students. From these gaps, teachers should be equipped with the skills necessary to create and implement programs that facilitate the recovery of knowledge, enabling students to progress to the next academic level.

## Implications for School District

This improvement is achieved when students receive high-quality instruction from teachers who have been appropriately trained and supported. Workshops and collaborative learning communities can be viewed as meaningful programs designed to invest in professional development. Additionally, district officials should revamp curricula that create a spiral approach geared toward helping students close the gap while learning content-level skills. Districts should also create programs to help identify and target students performing below grade level.

The findings may influence the future of Grade 8 mathematics students by providing opportunities for students to improve their understanding and achievement in mathematics. Students' negative relationship with mathematics stems from past experiences and encounters that contribute to a level of demotivation and low performance. By revamping the curricula, providing resources for families to support students at home, and creating effective professional development, Grade 8 students will be able to improve their performance and attitude towards mathematics.

## Conclusion

Various researchers have identified factors influencing students' low performance, including teacher-related practices, motivation, parent involvement, and past experiences (Belbase & Roblee, 2024; You et al., 2021). This study explored Grade 8 mathematics teachers' perceptions of students' low performance in a Northeast U.S state. Maslow's (1943) hierarchy of needs, Ryan and Deci's (2000a) self-determination theory, and Gay's (2010) culturally responsive theory provided a conceptual framework

for this study, allowing researchers to better understand how the identified components contribute to students' performance.

The findings among teachers were academic factors influencing the mathematics performance of Grade 8 students, as well as the implementation of instructional approaches (Theme 1); students' performance and teacher practices are shaped by the capacity limitations of their school and district (Theme 2); expanding teacher capacity and support systems to improve student outcomes (Theme 3); and increasing student accountability by fostering supportive and motivating environments (Theme 4). Thus, the analysis revealed that students' performance in the Northeast state could be enhanced using a holistic approach that promotes and fosters relationships, addresses cognitive barriers, improves teacher efficacy, builds capacity, and enhances students' experiences. These improvements could be made through increased staffing and professional development. Professional development should provide practical strategies to improve student achievement.

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# Appendix A: Research Protocol and Questions

Date:
Time:
Interviewee Code #:
Location of Interview:

| Parts of the Interview | Interview Questions | Notes |
|---|---|---|
| Introduction | As a reminder, this interview will be recorded by me and revisited by me in preparation for the completion of the study.<br>Today's date is [DATE], and it is [TIME, including time zone].<br>I appreciate your willingness to volunteer for my doctoral research study.<br><br>Thank you for completing the form to verify your eligibility and for scheduling a time.<br><br>Let's go ahead and move into the interview questions. | • |

| | | |
|---|---|---|
| | The purpose of this basic qualitative study is to explore the perceptions of Grade 8 mathematics teachers regarding students' low mathematics performance in the Northeast U.S. state and the resources needed to support student success. The interview is expected to last approximately 30 minutes. I will begin the interview by asking about your experience in teaching mathematics.<br>• Then, I will ask you questions about your views on students' low performance. Please feel free to express your feelings, as there are no correct or incorrect | |

| | | |
|---|---|---|
| | responses. Following the interview, I will examine your answers for data analysis purposes. To maintain confidentiality throughout this process, I will neither identify you in my documents nor will anyone else be able to identify you in connection with your answers. At any time during this interview, you may opt to end this interview.<br>• Do you have any questions for me before beginning the interview?<br>Are you ready to begin the interview? | |
| Interview Question 1 | How long have you been a mathematics teacher? | |

| | | |
|---|---|---|
| Interview Question 2 | How long have you been a Grade 8 mathematics teacher? | |
| Interview Questions 3 | What educational challenges have you faced when teaching mathematics to eighth-grade students? | |
| Interview Question 4 | Explain how you address the challenges of teaching eighth-grade mathematics students. | |
| Interview Questions 5 | Why do you think eighth-grade students have challenges performing at proficiency in mathematics? | |
| Interview Question 6 | Have you had any success teaching eighth-grade mathematics students? | |

| | | |
|---|---|---|
| | If yes, what successes have you had teaching eighth-grade students? | |
| Interview Question 7 | How does the district provide professional development in evaluating and planning practical lessons for teaching eighth-grade mathematics students? | |
| Interview Questions 8 | As an experienced teacher, what have you learned about helping students succeed in mathematics? | |
| Interview Questions 9 | How do you support students who have been unsuccessful at mathematics?<br><br>Give examples? | |

| | | |
|---|---|---|
| Interview Question 10 | To what degree do you believe students' mathematical experience influences their attitude and performance in mathematics? | |
| Interview Question 11 | What resources would you need to better support students in becoming proficient?<br><br>Why have you chosen these resources? | |
| Question 12: Debrief | Thank you so much for participating in the interview. Your time is greatly appreciated, and your comments have a profound benefit to this study. This interview aims to explore the perceptions of Grade 8 mathematics teachers regarding students' low performance. | |

| | | |
|---|---|---|
| | Do you have any questions or anything that you would like to add?<br><br>Within the next five days, I will provide you with a copy of the interview transcript for your review. If you have any changes you would like to make, a form will also be provided where you can capture your thoughts and ideas.<br><br>Again, thank you | |