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Elementary Mathematics Teachers' Perceptions of RTI2 Implementation for Special Education Students in Southwest Tennessee

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This is to certify that the doctoral study by

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Walden University
2024

Abstract

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by

Dennis L Kimbrough

MA, University of Nebraska Omaha, 1998

BS, Rust College, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Curriculum, Instruction, and Assessment

Walden University

June 23, 2024

Abstract

The problem addressed through this study was the inconsistent implementation of RTI2 in the mathematics classes for special education (SPED) upper elementary (i.e., Grades 3-5) students at a Southwestern, urban Tennessee school district (SUTSD). Students in SPED have low mathematics proficiency. Researchers have demonstrated that RTI2 is a process that can be used to address students' deficit areas; however, the implementation of the program in the local school district has not been established. This basic qualitative study aimed to explore teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in mathematics classrooms. The implementation science framework, which promotes the integration of research findings and evidence into practice and policy, was the lens for this study. The study's research questions explored teacher perceptions of the usefulness and challenges of implementing RTI2. The 10 participants were gathered through a purposeful sample of the SUTSD Grades 3-5 teachers with 1-year experience using RTI2. Data were analyzed thematically to capture commonalities in the data gained from participants' knowledge and experience. The results of implementing RTI2 indicated that it is useful to SPED students in mathematics classrooms because it enables teachers to connect learning to students' lives and help students with mastering skills. Teachers identified challenges associated with the need for content support, additional personnel support in the classroom, and support to address deficits in student engagement. The potential positive social change is that district leadership could use the findings to strengthen the implementation of RTI2 within the SUTSD and prepare SPED students for their future.

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Dedication

This dissertation is dedicated to my parents, Emmett and Janie, who taught me early on that education is the key to helping erase poverty. My father always stated, "Go to school and get an education." They also instilled in me the value of working hard; if you work hard, you can achieve and get the things you want in life. This dissertation is also dedicated to my loving daughters, Courtney & Alexandria; being an example for them has helped push me to get this degree finished. I pray that as your father, I have set an example for both of you to follow going forward. I would also like to thank God for giving me the strength to follow through and complete this degree when I wanted to give up many times, but he would not allow me to do so. I also want to thank Latisha for being there to support me and encourage me throughout this journey. Her love and strength helped to compel me to the next level.

Work hard, keep God first, and anything is possible!

Acknowledgments

I would like to first thank my parents for giving me life and the freedom to let me know that my future does not have to be defined by my surroundings or my past. I am the author of my book of life, and I dictate the outcome I wish to see.

Pursuing a doctorate degree initially was not something I desired for myself. However, later in my career, the thought became a reality; and I enrolled in the doctorate degree program. This was a decision that I made towards the completion of my career, and I felt I needed to get it done before retiring from the profession. So, I would like to thank all the professors who shared knowledge with me throughout this process and spent time with me late at night on Zoom to make sure I not only understood the "why" but also guided me in the right direction as well.

I would truly like to thank everyone who played a part in the completion of this degree as well, for none of this would have been possible without each of you supporting me through this journey.

"I can do all things through Christ which strengthened me." Philippians 4:13

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Chapter 1: Introduction to the Study

Students in the United States are falling behind their peers in other countries and therefore are disadvantaged when competing in the international job market (Craig & Marshall, 2019). The Response to Intervention (RTI) framework was adopted in school districts across the U.S. to provide students with an appropriate level of support to meet their academic needs. The implementation of RTI within upper elementary grades has been a challenge in the Southwestern urban Tennessee school district (SUTSD), which was the focus of this study. RTI2 is Tennessee's version of the RTI framework.

According to the Tennessee Department of Education (TNDOE; 2017), the RTI2 framework is a model that promotes recommended practices for an integrated system connecting general and special education using high-quality, scientifically research-based instruction and intervention. The RTI2 framework is a 3-tier model that provides an ongoing process of instruction and interventions that allow students to make progress at all levels, particularly those students who are struggling or advancing (Craig & Marshall, 2019, p. 16).

Schools use RTI as an educational strategy to provide students with effective and high-quality instructions. Specifically, the problem studied was the inconsistent implementation of RTI2 in the mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD. The implementation science framework was used to guide the study. The definition of implementation science is as follows: "the scientific study of methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice" (Improved Clinical Effectiveness through

Behavioral Research Group [ICEBeRG], 2006, para. 2). The purpose of this basic qualitative study was to explore SUTSD Grades 3-5 elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom.

Potential positive social change implications of the study include the knowledge gained from teachers' perceptions, which may be shared with district leadership and used to strengthen the implementation of RTI within the SUTSD. Additionally, the study's findings could inform leadership in school settings like the study school. The potential positive outcomes of improved RTI implementation include preparing SPED students to compete in an international job market. The ripple effect of improving the educational outcomes for students includes the benefit of a workforce that is better prepared for the future U.S. economy.

In Chapter 1, I introduce the study and a description of the research problem. The major sections are a discussion of the background, problem statement, purpose of the study, and research questions that guide this study. Additionally, Chapter 1 includes the conceptual framework grounding the research, the nature of the study, definitions, assumptions, scope and delimitations, limitations, and the significance of this study.

Background

RTI is a multitiered approach to the early identification and support of students with learning and behavior needs (Burnley, 2019). The RTI process begins with high-quality instruction and universal screening of all students in the general education classroom (Missall et al., 2021). Under the RTI framework, struggling learners are provided with interventions at increasing levels of intensity to accelerate their rate of learning (Coyne et al., 2018). The initial implementation of RTI in Tennessee occurred in 2013 (TNDOE, 2013). RTI has since grown into a systematic tool for applying interventions based on close monitoring of students' progress (Björn et al., 2016). When a student is struggling in RTI, they are moved to the next level, referred to as Tier 2. If the student is still struggling, then they are moved to Tier 3. RTI2 is Tennessee's version of the RTI framework for teaching and learning, through which teachers provide students high-quality, differentiated instruction providing intervention to students who struggle to address academic difficulties (TNDOE, 2022). This process is used to support students in meeting the needs of their skill deficits as they learn mathematical concepts.

RTI2 is a data-driven, multitiered approach to the early identification and support of all students, including those who demonstrate learning and behavioral challenges (Bhakta, 2018). RTI2 begins with high-quality, culturally responsive differentiated instruction, positive behavior systems, universal screening, and data analysis of all children's learning in the general education classroom (Barrio, 2019). High-quality instruction is defined as "education that takes place in the general classroom and 75 to 80% of the students achieve the expected learning outcomes" (Morse, 2019, p. 31). Students who are not within this range are identified as needing additional academic support. "RTI2 promotes the use of research-based, high-quality instruction and interventions and provides an integrated, seamless model that supports student progress at every level" (TNDOE, 2016 p. 16). Under the mechanism of RTI2, a team of educators come together in a problem-solving setting to identify the academic and behavioral needs of students when they are not proficient despite high-quality core instruction and positive behavior support (Schiller et al., 2020). Determining appropriate interventions for students is an important aspect of the RTI program.

RTI has grown into a systematic tool for applying interventions based on close monitoring of the progress of students (Young & Johnson, 2019). Young and Johnson (2019) found that by using information from assessments, teachers could determine appropriate interventions for a student. Students who do not develop mathematics skills at grade level are placed in Tier 2 or Tier 3 of the multitier intervention system of RTI2 (Bugg, 2020).

In the fall of 2014, the TNDOE mandated the implementation of RTI2 for all districts (Warner, 2018). However, challenges and barriers exist in the implementation of RTI by teachers at the school and classroom levels (Alahmari, 2019). Specifically, the findings of Alahmari (2019) revealed educators lacked resources, training, personnel, cultural collaboration, and experience to assist with the implementation and fidelity of RTI2. Employing an exploratory study, Zhang et al. (2019) examined 158 teachers' perceptions of implementing RTI at their schools. Focusing on teacher efficacy for inclusive practices and the feasibility of RTI implementation, they found many teachers had an insufficient understanding of the RTI model despite their open attitude. Teachers experienced barriers to their RTI implementation from the aspects of the environment, culture, and expertise. Additionally, teachers had insufficient expertise in formulating and implementing individualized instruction, which was a factor in teachers' low confidence in RTI implementation. To build confidence, teachers need training on how to implement the requirements from RTI.

The lack of training is a critical factor impeding the successful implementation of RTI (Vollmer et al., 2019). Having examined the experiences of 95 program directors across 33 states and the District of Columbia, Vollmer et al. (2019) indicated preservice teachers received little-to-no training related to the fidelity of implementation of RTI. They also found teachers from the states that required RTI in their educational programming were statistically more likely to have RTI training than those from the states without legislated RTI implementation. Utilizing a constructivist theoretical framework, Bugg (2020) suggested professional development where teachers became learners in the intervention process would change their perceptions. Thus, according to Alahmari (2019) and Sharma et al. (2017), professional development designed to support teachers as they learn how to implement RTI and RTI2 for SPED students is essential.

Researchers that have investigated RTI and RTI2 in the education of mathematics for SPED students also indicated significant gaps in research (Alahmari, 2019; Gillis, 2017; Vollmer et al., 2019). Gillis (2017) highlighted that it remained unclear how the RTI2 model was implemented in Tennessee elementary schools. Alahmari (2019) recommended additional research on professional development as well as exploring the perceptions and concerns of educators with implementing RTI. Vollmer et al. (2019) recommended future researchers explore the RTI training for teachers, as it was required to advance teachers' RTI knowledge and competencies to deliver the model effectively.

Moreover, existing evidence indicates that the school district administration made few attempts to monitor the implementation of RTI2 in the mathematics classes for SPED Grades 3-5 students, which was the focus of this study. There remains a lack of qualitative data on the implementation from relevant stakeholders (Schiller et al., 2020). In response to addressing the lack of data, the phenomenon from the perspectives of SUTSD upper elementary teachers was explored.

Problem Statement

The problem addressed through this study was the inconsistent implementation of RTI2 in the mathematics classes for SPED upper elementary students at a SUTSD. Students in SPED typically have low mathematics proficiency (Craig & Marshall, 2019; Every Student Succeed Act (ESSA), 2022, Irwin et al., 2021; Nelson & Powell, 2018). According to the evidence from the 2018-2019 mathematics achievement data for all students, only 34% of students in Tennessee were proficient in reading in 2018, and only 8% were proficient in mathematics (ESSA, 2022). Further, evidence showed students with mathematics difficulty continue to struggle with mathematics and have lower math performance in subsequent grades (Nelson & Powell, 2018).

In a technologically driven society, math students in the United States are also falling further and further behind their international counterparts (Craig & Marshall, 2019). The general problem is low school motivation (Lazarides et al., 2018; Parhiala et al., 2018), ineffective instruments used to capture student math achievement that interprets real-life applications (Craig & Marshall, 2019), and inconsistent implementation of RTI2 in mathematics classes (Hopson, 2021).

Purpose of the Study

The purpose of this basic qualitative study was to explore SUTSD upper elementary (i.e., Grades 3-5) teachers’ perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. This study addressed the problem of practice using teachers’ perceptions of the usefulness and challenges of RTI2. I analyzed the data by using the implementation science framework as a lens through which to examine the research questions in this study. Participants’ perceptions provided insight into the data collected to determine if interventions were beneficial to support student learning.

In this study I used methods that promoted the integration of research findings and evidence into practice and educational policy. Using a basic qualitative methodology, I collected and analyzed the perspectives of individuals. These data revealed the challenging factors associated with program implementation. I also employed thematic analysis to identify commonalities in the data gained from participants’ knowledge and experience.

Research Questions

This study aimed to answer two research questions to address the problem of practice. The first question sought to gather information on the perspectives teachers had on the usefulness and effectiveness of RTI2 implementation for SPED students. The second question aimed to report the challenges with program implementation across Grades 3-5 mathematical classes. Based on the identification of the problem of practice the following research questions guided this study:

RQ1: What are SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions of the usefulness of RTI2 for SPED students in mathematics classrooms?

RQ2: What challenges do SUTSD upper elementary (i.e., Grades 3-5) teachers report implementing RTI2?

Conceptual Framework

The conceptual framework within this study was the implementation science framework (Nilsen, 2020; Rapport et al., 2018). An implementation science framework is the study of methods that promote the integration of research findings and evidence into practice and educational policy (Nilsen, 2020; Rapport et al., 2018). Successful implementation consists of three drivers: competency, organizational, and leadership drivers. Competency drivers are mechanisms to develop, improve, and sustain one's ability to implement an innovation intended to benefit students. Organizational drivers are mechanisms to create and sustain hospitable organizational and system environments for effective educational services that enable implementation. Leadership drivers focus on providing the right leadership strategies for different types of leadership challenges. These leadership challenges often emerge as part of the change management process needed to make decisions, provide guidance, and support organization functioning (Nilsen, 2020; Rapport et al., 2018).

The implementation science framework provided a useful lens through which to examine the research questions in this qualitative study due to its focus on methods that promote the integration of research findings and evidence into practice and educational policy. The research questions within this study focused on teachers' perceptions of the implementation of RTI2 in the classroom, thus, addressing educational practice. Therefore, this study provided evidence that can be used to inform the practice of teaching while implementing RTI2 in the mathematics classrooms. The information garnered from this study can also inform educational policy and further research on the topic. By using thematic analysis of the data collected from interviewing teachers who had experience with the implementation of RTI2, evidence was provided from their knowledge. The implementation science framework is discussed further in Chapter 2.

Nature of the Study

Basic qualitative research was appropriate for this study because the research design is useful for understanding the nature of how or why a phenomenon occurs (Hamilton & Finley, 2019). When considering the context of the study, the central research was focused on teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. Thus, a qualitative methodology was appropriate, given this methodology is often rooted in subjective perspectives, perceptions, and experiences gathered from participants, rather than numerical quantities or frequencies. Further, a basic qualitative study provides a space where researchers can go beyond the boundaries of other qualitative designs and make advances by deviating from methodological prescriptions, remaking existing methodologies, and building approaches (Kahike, 2014). Data were collected from teachers by conducting semistructured interviews. The interviews lasted from 30 to 60 minutes. I applied thematic analysis, which resulted in themes to highlight the experiences of the teachers while implementing RTI2 for SPED students in the mathematics classroom.

Definitions

Definitions of key terms are included in this section to provide context for this study.

Career Ready: A student has the skills and knowledge to plan their careers and succeed in the workforce. Students are provided with education and learning opportunities to gain the skills and knowledge to succeed in the workforce (Gysbers, 2013).

Computer Technology: Technology is the use of machines such as computer hardware and instruments such as cell phones. Integrating technology into education means creating opportunities for students to use technology devices to solve problems or accomplish a task to improve the environment in which the education is taking place (Gilakjani, 2017; İŞman, 2012).

Fidelity or *Fidelity Instruction*: “Intervention fidelity is the extent to fidelity which the program, as designed, was actually implemented” (Hulleman et al., 2013, p. 68). “Fidelity as being composed of these four components: adherence, exposure, participant responsiveness, and quality” (Lemire et al., 2022, para. 40).

Scientifically Based Research or *Interventions*: Scientifically-based research involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs and includes research that achieves the following:

- employs systematic, empirical methods that draw on observation or experiment;
- involves rigorous data analyses that are adequate to test the stated hypotheses and justify the general conclusions drawn;
- relies on measurements or observational methods that provide reliable and valid data across evaluators and observers, across multiple measurements and observations, and across studies by the same or different investigators;
- is evaluated using experimental or quasi-experimental designs in which;
- individuals, entities, programs, or activities are assigned to different conditions and with appropriate controls to evaluate the effects of the condition of interest, with a preference for random-assignment experiments, or other designs to the extent that those designs contain within-condition or across-condition controls;
- ensures that experimental studies are presented in sufficient detail;
- clarity to allow for replication or, at a minimum, offer the opportunity to build systematically on their findings; and
- has been accepted by a peer-reviewed journal or approved by a panel of independent experts through a comparably rigorous, objective, and scientific review (TNDOE, 2013, pp. 113-114).

Leadership: “A process whereby an individual influences a group of individuals to achieve a common goal” (Northouse, 2021, p. 6). In addition, leaders need to have a clear goal that they communicate both verbally and nonverbally, be attuned to the people following them thus providing a social structure that is positive for their followers (Northouse, 2021).

Math Difficulty: Math difficulty can refer to two groups of students, including those diagnosed with a learning disability in mathematics or dyscalculia, and those who demonstrate below-grade-level mathematics performance without a disability diagnosis (Nelson & Powell, 2018).

Mathematical Proficiency: A student has the capacity to learn mathematics, including the expertise, knowledge, and competence, all while possessing the awareness of the value of the topic and knows how to apply it in life. It encompasses solving problems, adaptive reasoning, and mathematical operations (Al-Hanafi, 2019; Jawad, 2021; National Research Council, 2002).

Multitiered Tiered Systems of Support (MTSS): As of March 2017, some states no longer use RTI on their web sites. They have substituted MTSS; however, the state of Tennessee has used MTSS since 2019 (Burnley, 2019).

Response to Instruction and Intervention (RTI2): RTI2 is a data-driven, multitiered approach to the early identification and support of all students, including those who demonstrate learning and behavioral challenges (Bhakta, 2018).

Response to Intervention (RTI): RTI is a multitiered approach to the early identification and support of students with learning and behavior needs (Burnley, 2019).

Special Education: “The most intensive interventions and specially designed instruction to meet the unique needs of students identified with an educational disability.

This term may include related services such as speech/language or occupational therapy depending on student needs" (p. 114).

Assumptions

Assumptions are those aspects of the study that are accepted as true or plausible by researchers and the audience who will read the study (Wolgemuth et al., 2017). The qualitative paradigm assumes that there are multiple realities that are subjective, and that there is an interaction between the researcher and what is being researched (Culbertson, 1981). This assumption is necessary to the research in that interaction with participants is needed to interview them to explore SUTSD Grades 3-5 elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. I included the teachers' perspective because they each hold knowledge of the phenomenon due to the nature of their employment.

There are other assumptions specific to utilizing qualitative methodology. The values explored through qualitative studies need to be understood to promote social changes. The teachers interviewed had values that could promote social changes designed to aid students in improving their mathematical achievement. The researcher and the participant both shape the factors studied through the inductive process and these factors are context bound. Additionally, the participant's voice and perspective are important to highlight. Through the interviewing process, the interaction between the researcher and teacher was shaped by various factors as they both contribute to the school. These factors affect the context of the school and are contextually bound. The purpose of the qualitative methodology was to understand, critique, and identify potential challenges of the phenomenon (Culbertson, 1981). Therefore, understanding, critiquing, and identifying the usefulness and challenges of the phenomenon is necessary for the potential to be revealed.

It was also assumed that participants answered interview questions honestly and to the best of their ability. To encourage teachers to answer candidly, I reassured them that their responses were confidential, and their names would not be used. The theoretical assumption was that the implementation science framework is an appropriate conceptual framework for studying the research problem. The justification for this selection is the relevancy and applications in the context of education and studying RTI2 (Barwick et al., 2020; Watson et al., 2018).

Scope and Delimitations

In this study, I addressed the usefulness and challenges regarding the inconsistent implementation of RTI2 in the mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD. I selected this problem because a lack of consistency in implementing of RTI2 had been found to be an issue (Kovaleski et al., 2022). Yet, the implementation of RTI2 initiatives increase academic outcomes in addition to improving behavioral outcomes (Bohanon et al., 2020). There are fewer disruptive behavior problems, and a sense of safety is established as well as academic improvement when implemented (Borgan et al., 2020; Bradshaw et al., 2016). However, a nationwide study showed better guidance is necessary regarding implementation of improvement programs (Borgen et al., 2020; Briesch et al., 2019). This study helped in that endeavor.

Delimitations are restrictions within a researcher’s control (Theofanidis & Fountouki, 2019) that are consciously and purposefully to safeguard the integrity of the research (Theofanidis & Fountouki, 2019). This study was delimited to 10 upper elementary (i.e., Grades 3-5) teachers from a SUTSD in Tennessee. Grades K-2 and 6 were excluded from the study. The consequence of this delimitation was that transferability and generalizability are only intended within the same sample and geographic groups. In a basic qualitative research design, all data collected were qualitative in nature, relying on texts and narratives to generate the needed data for this study. The consequence of this scope and delimitation was that I did not report any statistical findings. All findings were based on the themes that were generated from the thematic analysis of data.

Limitations

The anticipated limitations were associated with the sampling and instrumentation selected for this study. The first anticipated limitation was associated with the sampling method and the target population of interest. Given that I selected to use a qualitative methodology, the sample included 10 upper elementary (i.e., Grades 3-5) teachers from an elementary school in a SUTSD. Thus, the generalization of this study was limited to this population and the geographical location of Southwest urban Tennessee, which may not be applicable to other regions or countries.

The second potential study limitation was associated with the qualitative methodology in general and specifically semistructured interviews, which I selected as the instrumentation for data collection. The basic qualitative research design includes collecting participants' perspectives through in-depth interviews. Thus, one anticipated limitation was that the study and data collection were limited by the individual integrity and sincerity of each study participant's responses to interview questions. As participants were asked to discuss perceptions, perspectives, and experiences associated with their occupation, participants may have felt the need to misrepresent their teaching abilities, RTI2 implementation success, or other relevant details. To mitigate this limitation, I reassured participants that their responses were confidential so that they were comfortable answering truthfully. Additionally, semistructured interviews are limited in that study participants' responses may depend on their understanding of the topic. Therefore, I used follow-up questions to inquire further into their answers.

Significance

This study may advance knowledge, enrich the literature, and contribute to the scholarship of RTI2 in SPED especially in mathematics education for SPED students. Researchers that have investigated the RTI2 model and the implementation of RTI2 in teaching SPED students' mathematics highlighted significant gaps in existing research. Gillis (2017) shared that it remained unclear how the RTI2 model was implemented in Tennessee elementary schools. Alahmari (2019) recommended additional research on professional development, as well as exploring the perceptions and concerns of educators with implementing RTI. Vollmer et al. (2019) recommended future researchers explore the RTI training for teachers, as it was required to advance teachers' RTI knowledge and competencies to deliver the model effectively. Moreover, evidence reveals few attempts have been made to explore the implementation of RTI2 in the mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD.

Research examining RTI related to student achievement outcomes is essential when addressing achievement gaps between student subgroups. According to Alahmari's (2019) study, RTI intervention is necessary to close achievement gaps; however, the author found consistent challenges in implementing RTI. Within the SUTSD, low performance among SPED students may be improved by understanding Grades 3-5 elementary teachers' perceptions of the challenges of implementing RTI2 with SPED students in the mathematics classroom.

Whereas many researchers have quantified the effectiveness of RTI and RTI2 models, there remains a lack of qualitative data on the implementation from relevant stakeholders (Schiller et al., 2020). This study could advance knowledge by exploring the implementation of RTI2 in the mathematics classes for SPED elementary students at a SUTSD from the perspectives of elementary teachers using a basic qualitative research method. The findings of this study could benefit educational leaders, teachers, and policy decision makers by providing insights in the areas of RTI2, SPED, and mathematics education for SPED students.

The results of this study may influence positive social change in students and educational practices on several levels. Schools that implement RTI2 to benefit students struggling in mathematics may enable those students to participate in more effective interventions by harnessing relevant findings from this research. The TNDOE could also use this study's findings to inform new or revised laws and initiatives that govern the implementation of RTI2 within the state's elementary schools. Further, this research may produce promising qualitative insights about stakeholders' perspectives, perceptions, and experiences with RTI2 to complement existing quantitative research on the effectiveness of RTI2.

It is essential that all students are provided educational opportunities to be successful. Thus, gaps in student achievement among student subgroups need to be addressed. The 2018-2019 SUTSD mathematics achievement data (e.g., 2019-2020 data were not available due to the 2020 pandemic) showed that in upper elementary Grades 3-5, 79% of SPED students were not proficient in mathematics (TNDOE, 2019). These data complete a 5-year trend in low academic mathematics performance from this group of students. According to 2013-2014 SUTSD data, 69% of SPED students in Grades 3-5 at the SUTSD were below basic/basic on the state mathematics assessment in 2014 with underperformance rates of 64.2% (n = 1333), 72.2% (n = 1563), 61.5% (n = 1679) for Grades 3, 4, and 5, respectively (TNDOE, 2016). As there are so many SPED students in this SUTSD, understanding factors that affect programmatic or academic support for these students may improve outcomes for a significant number of students.

While numerous researchers have examined the positive effects of RTI2 implementation on SPED students' academic achievement (Gillis, 2017), there was an opportunity to focus on how the RTI2 model was implemented in this SUTSD. An RTI2 implementation guide was released and recently updated by the TNDOE (2016) to provide guidance, tools, and resources for schools and educators that implement RTI2. However, no independent research was found that could corroborate how useful or helpful the implementation guide or other district support was for the educators and other school staff members that implemented RTI2. Through this study, I explored teachers' perceptions of the usefulness and challenges of implementing RTI2. Thus, by understanding teachers' perceptions the study may provide insight into improving RTI2 implementation and ultimately student achievement of the SPED students within the SUTSD.

Summary

In Chapter 1, I introduced the study and research problem. In this chapter, I covered the sections and discussions of the background, the problem statement, the purpose of the study, and the research questions that guided this study. Within this chapter, I also outlined the conceptual framework that I used to ground this study, the nature of the study, definitions, assumptions, scope and delimitations, limitations, and the significance of this study.

The specific problem under study was the inconsistent implementation of RTI2 in the mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD. Correspondingly, the purpose of this basic qualitative study was to explore a SUTSD upper elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The conceptual framework for grounding this study was the implementation science framework (Nilsen & Bernhardsson, 2019; Rapport et al., 2018). Within this study, the research questions were focused on exploring SUTSD Grades 3-5 elementary teachers' perceptions of the usefulness of RTI2 for SPED students in mathematics classrooms and the challenges teachers reported when implementing RTI2. This study has the potential to advance knowledge, enrich the literature, and contribute to the scholarship of RTI2, SPED, and mathematics education for SPED students. This study also has practical implications by providing information to assist teachers' practice in the classroom by more consistently implementing RTI2 and in turn help students succeed in their educational endeavors in mathematics. In the area of promoting a positive social change, any improvement in the teaching and learning outcomes among the Grades 3-5 SPED students at the SUTSD could, in turn, increase the economic development of the local communities and promote a positive social change in Southwest urban Tennessee. In Chapter 2, I review literature relevant to the research.

Chapter 2: Literature Review

The specific problem in this study was the inconsistent implementation of RTI2 in the mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD. The purpose of this basic qualitative study was to explore SUTSD upper elementary teachers' (i.e., Grades 3-5) perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. Pellegrini et al.'s (2018) meta-analysis indicated that knowing mathematics is vital as technologies advance and advanced engineering and complex science are on the rise; so, those who have core mathematic skills may benefit. Students in the United States are falling behind European and Asian students in mathematics (Pellegrini et al., 2018). Along with learning basic mathematics in elementary schools, students learn if they are good at mathematics. According to Pellegrini et al., students either find mathematics to be fun or boring, and this impression, which is often formed during these early years, has long-term consequences.

Mathematics scores in the Unites States have fluctuated for elementary students. According to the National Assessment of Educational Progress (NAEP, 2018), fourth-grade students in the United States increased their mathematic scores on a steady basis from 1990 to 2000. However, scores were flat from 2003 to 2017, averaging 40% proficiency in 2017. Only 25% of those who qualified for free or reduced lunch scored proficient on the NAEP, while those who did not qualify for free or reduced lunch scored 57%. There is still a small gap in mathematics proficiency between female students (38%) and male students (42%). When examined by race, the highest proficiency was among Asian American students at 67%, followed by European American students at 51%, while African American students only scored at 19%, Hispanic students were at 26%, and Native American students at 24% (NAEP, 2018). In this literature review, I present studies published within the last 5 years focused on the implementation of RTI, RTI2, and RTI3. The topics I discuss in this chapter include the literature search strategy, conceptual framework, related literature review of key variables and concepts, and a summary.

Literature Search Strategy

I conducted a search for current, 2017-2022, peer-reviewed articles via the Walden University online library. The databases that I used to locate articles included Academic OneFile, Academic Search Complete, ERIC, JSTOR, Sage Journals, Google Scholar, and Research Gate. The following search terms were used to locate articles specific to this study: *mathematics; elementary school; math programs; professional development; elementary education; educational games; math learning; Grades 3-5; Multi-Tiered System of Support framework; best-evidence; competent readers; struggling readers; implementation science; learning disability; computer technology; mathematics; instructional design; meta-analysis; special education; low-performing students; Tier 2 of RTI; elementary school RTI2 Tennessee; the Multitiered Approach; barriers, challenges, and solutions for implementing RTI; Implementing RT1 for Improving Student Outcomes in Reading; Implementing RT2 for Improving Student Outcomes in Mathematics; Use of Assessments Within RTI; Leadership and Implementation Science; Computer Technology Mathematics Interventions; Professional Development and*

Teacher Educational Programs for Mathematics Teachers; and *K-12*. I also used variations of these terms to ensure exhaustive search results.

Conceptual Framework

The research was focused on exploring the SUTSD Grades 3-5 elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The conceptual framework for the study was implementation science, which includes implementation drivers and evidence-based methods. Implementation drivers are the components of infrastructure needed to develop, improve, and sustain the ability of teachers and staff to implement an innovation as intended as well as create an enabling context for the new ways of work. Drivers include core components to facilitate the support of changes on the class, building, and district levels all based on empirically supported research studies showing they are effective (National Implementation Research, 2021).

There are three drivers involved in the conceptual framework of implementation science: competency, organization, and leadership (National Implementation Research, 2021). Competency drivers help develop, improve, and maintain the ability to implement an innovation that is beneficial to students. Fidelity of implementation, coaching training, and selection are involved in developing competencies. Fidelity means measuring an instructional practice or innovation to determine the degree to which it was implemented as intended. Organization drivers help create and maintain enabling context in organizations and systems to provide effective educational services. Systems intervention, decisions that support data systems, and facilitative administration enable the successful implementation of these drivers within the organization. Organization drivers are also involved in the fidelity of implementation. Data support data systems is a data system that enables decision making that is both timely and reliable and needs to be implemented as an organization driver. Leadership drivers provide the appropriate leadership strategies for a variety of leadership challenges. These challenges arise as change management is instituted so decisions, guidance, and support may be provided to maintain the functioning of the organization while going through a change and transforming systems (National Implementation Research, 2021). Table 1 is a depiction of the benefits of integrated and compensatory drivers.

Table 1

Benefits by Driver Type

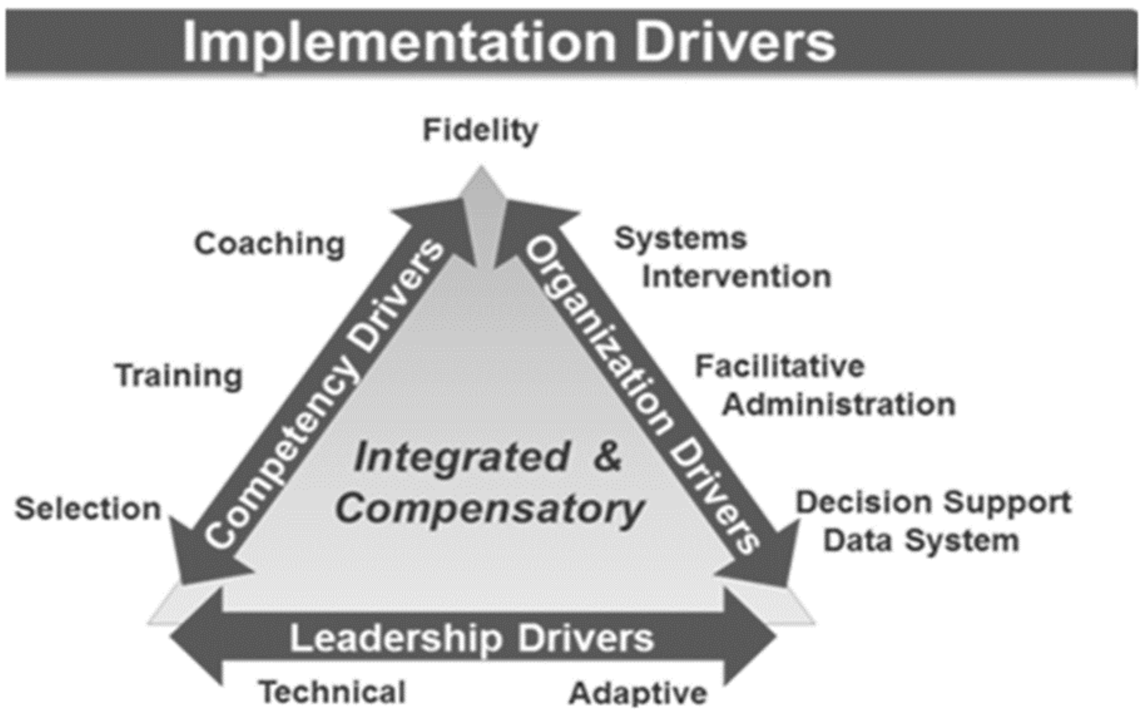
Integrated	Compensatory
Increased communication	Builds on strengths
Increased efficiency	Considers the source of expertise
Increased job satisfaction	Increases efficiency and effectiveness
Increased productivity	
Improved fidelity and outcomes	

Note. Adapted from Topic 4: Integrated and Compensatory, by National Implementation Research Network, 2021. https://nirn.fpg.unc.edu/module-2/implementation-drivers. Copyright 2008 by Fixsen and Blase.

All three implementation drivers have specific goals, philosophy, skills, and knowledge related to programs and practices, thereby creating integration (National Implementation Research, 2021). The drivers are also compensatory, meaning that abilities and skills that may not be obtained in one driver can be compensated by using a different driver (National Implementation Research, 2021). Figure 1 is an illustration of the implementation drivers showing the interrelation of the three drivers within the implementation science model and the major elements that should be present within each driver.

Figure 1

Implementation Science Model Drivers



Note. From Module 2: Implementation Drivers: Introduction, by National Implementation Research Network, 2021. https://nirn.fpg.unc.edu/module-2/implementation-drivers. Copyright 2008 by Fixsen and Blase.

Competency, organization, and leadership are the three drivers that play a role in the conceptual framework of implementation science (National Implementation Research, 2021). The ability to put into practice an innovation that benefits students can be developed, improved, and maintained with the use of competency drivers. Developing competencies involves coaching, training, and selection fidelity in implementation.

Foundation of Implementation Science

Eccles and Mittman (2006) defined implementation science as the "study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine care" (p. 1). As explained by Presseau et al. (2022), "implementation science means studying how to move research evidence into practice to change the care provided in the real world" (p. 24). Essentially, implementation science is a set of procedures that are followed to implement evidence-based practice (EBP) and was first developed to improve care in the health industry. Since then, the procedures have spread out into other disciplines such as education (Lyon et al., 2018; Moir, 2018). The procedures and therefore the framework of implementation science is interdisciplinary (Cook & Odom, 2013; Presseau et al., 2022). Implementation science procedures have been implemented in a wide range of fields such as medicine, psychology, nursing, public health, social work, social sciences, business, public policy, and engineering (Kilbourne et al., 2020).

While implementation science has been applied broadly, there are still no universal interventions specifically developed for SPED students to use in the general classroom (Gallagher et al., 2022). The definition for universal interventions is strategies that can be incorporated into teaching and learning of the classroom that are beneficial for all students including students with SPED needs (Edyburn, 2010). Even those strategies that have been involved in pilot studies in the classroom pay little if any attention to contextual factors that may or may not hinder implementation (Douglas & Burshnic, 2019; Roberts et al., 2020).

Application of Implementation Science in Research

There are many different conceptual frameworks that have been developed in the last 20 years that stem from implementation science, as originally posited (Albers et al., 2017; Eccles & Mittman, 2006; Nilsen & Bernhardsson, 2019). The use of frameworks helps limit conceptual confusion when applied to different studies, while also supporting the creation of consistent constructs and domains (Nilsen, 2020). Frameworks help to build evidence for understanding what, how, and when implementation strategies are successful in the context of education (Bauer & Kirchner, 2020; Clark & Dockweiler, 2020).

There are two frameworks that are frequently utilized that lead to implementation services and practices. The first is the Active Implementation Framework that was developed by the National Implementation Research Network (NIRN) and often referred to in the literature as the NIRN model and the second is Exploration, Preparation, Implementation, and Sustainment (EPIS; Albers et al., 2017; Eccles & Mittman, 2006). These two frameworks contain concepts in many of the other implementation science frameworks as explained by Odom et al. (2020).

Common across different implementation science models are the steps in the process that guide implementation, and the different factors within and outside of an organization that operate simultaneously during each step of the process. Odom et al. (2020) described the commonalities of different implementation science models and how certain components had to be in place. One such commonality is that of ensuring sustainable use of the program by implementation of the introduction to the program or practice in later phases (Odom et al., 2020). The evidence-based practices EPIS model focuses on four such phases: exploration, preparation, implementation, and sustainment (Moullin et al., 2019). The NIRN also has four phases: exploration, installation, initial implementation, and full implementation. To successfully implement, three drivers are necessary: competency, organizational, and leadership drivers. Further explanations are contained in the literature review section that follows.

Another common theme that affects implementation outcomes is fidelity, which is also referred to as integrity (Gage et al., 2020; Odom et al., 2020). Implementation fidelity refers to whether the implementation of an intervention adhered to the intervention model (Perepletchikova, 2011; Rojas-Andrade & Bahamondes, 2019). Gage et al. (2020) emphasized that "Fidelity is a multidimensional construct focused on providing evidence of adherence, quality, dosage, differentiation, and responsiveness following implementation" (p. 33). Otherwise, the likelihood of generating positive outcomes is hindered (Gage et al., 2020). Additional research has focused on the importance of fidelity of implementation (Rojas-Andrade & Bahamondes, 2019; Sanetti & Luh, 2019). Teachers need training in implementation fidelity (Edyburn, 2010; Gage et al., 2020). One free online resource is the IRIS Center, which is supported by the U.S. Department of Education's Office of Special Education Programs located at Vanderbilt University's Peabody College (Gage et al., 2020).

Studying implementation involves understanding the social contexts in which the actions are executed and examining the technical resources and organizational conditions that support the proper execution of an intervention (Rojas-Andrade & Bahamondes, 2019). It is necessary to determine how executed actions conform to a few contexts while maintaining fidelity or treatment integrity to the intervention model (Gage et al., 2020; Rojas-Andrade & Bahamondes, 2019). School mental health programs help students improve and strengthen their psychological skills and emotional well-being, as well as reinforce a positive learning environment. Studies have focused on implementation science and how to transfer the benefits outside the classroom (Bhattacharyya et al., 2009). However, the gap between research knowledge and practice remains large. The following six domains must be included as listed by Appraisal of Guidelines for Research and Evaluation (AGREE) Collaboration (2001). The scope and purpose are as follows:

- Stakeholder involvement
- Rigor of development (including quality of evidence)
- Informing recommendations
- Clarity and presentation
- Applicability
- Editorial independence

The primary steps involving fidelity have also recently been identified, thereby making implementation easier. If fidelity data are considered when making data-based decisions regarding a student's progress within the RTI framework, there are four possible options (Sanetti, 2019). First, if fidelity data are adequate and the student has made progress as expected, an intervention may be maintained or faded over time. Second, if fidelity data are adequate, and the student has not made progress as expected, it is possible that a different or more intensive intervention may be warranted. Third, if fidelity data are inadequate and the student has made progress as expected, it is possible the intervention is being implemented well enough or that improved fidelity could result in more rapid progress. Fourth, if fidelity data are inadequate and the student has not made progress as expected, implementation support is needed (Sanetti et al., 2019). To assist practitioners with successful implementation, a simplified implementation process is helpful. Curran (2020) developed a teaching tool that included a clear definition utilizing everyday language.

- The intervention/practice/innovation is THE THING.
- Effectiveness research looks at whether THE THING works.
- Implementation research looks at how best to help people/places DO A THING.
- Implementation strategies are the stuff we do to try to help people/places DO THE THING.
- Main implementation outcomes are HOW MUCH and HOW WELL they DO THE THING. (p. 2)

A literature review on implementation science identified obscure findings that most likely impede researchers and therefore should be addressed (Nilsen & Bernhardsson, 2019). Although 12 contextual dimensions were identified across the 67 studies reviewed, Nilsen and Bernhardsson (2019) found the most widely addressed dimensions were the following:

- organizational support
- financial resources
- social relations and support
- leadership (p. 1)

Nilsen and Bernhardsson (2019) found six studies that mentioned context although only four defined the concept. It is important to acknowledge that the inconsistency of contextual terms has an impact on implementation outcomes. An example of inconsistencies can be seen in the different words used instead of determinants such as obstacles, enablers, barriers, hinders, impediments, and facilitators. Differences in context mean that while some implementation outcomes are attained, failures of implementation limit generalizability. These failures block comparisons across studies and communication among researchers (Nilsen & Bernhardsson, 2019).

Implementation science is a universal strategy that should be integrated into designs and evaluations of all school programs, thereby ensuring not only sustainability but also effectiveness (Moir, 2018). It would be best to concentrate on long-term gains instead of short-term fixes. However, investments are also needed in funding and support. The potential to improve outcomes for students overall is inherent within implementation science (Moir, 2018). Educational psychologists could use the components of implementation science to design evidence-based interventions (EBI) to support positive change. Although there have also been studies that reveal the barriers and challenges in the implementation process, there appears to be a lack of attention to SPED students, which I address in the next section.

Implementation science was used in the study to explore SUTSD upper elementary teachers' (i.e., Grades 3-5) perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. As a foundation, implementation science was used to form the research questions. Both research questions focus on implementation of RTI2, so implementation science was also be used as a lens during analysis to understand if concepts of implementation science were utilized within the SUTSD upper elementary math classes. The problem is inconsistent implementation of RTI2 in the mathematics classes. To understand what teachers' perceptions and challenges were required asking questions during the interview that revealed the challenges they experienced during the implementation process. Then that information can be used to improve the process of implementing RTI2 in the mathematics classes for SPED students to promote positive change. While developing the interview questions, I constantly kept in mind implementation science so that the information garnered from the interview would answer the research questions.

Literature Review Related to Key Concepts and Variable

This review of the literature includes prior research related to the implementation of RTI, referred to as RTI2 in Tennessee. Both terms are used interchangeably throughout this literature review. There has been inconsistent implementation of RTI2 in mathematics classes for students in SPED upper elementary (i.e., Grades 3-5; Hudson & McKenzie, 2016). Students needing SPED services are identified through the process of implementing the first level of RTI, which includes assessments (Hudson & McKenzie, 2016).

MTSS is also used to help students progress through their academic studies. To clarify, MTSS is aimed at leveraging different approaches to help individual students in a variety of academic and behavioral situations (Blackburn & Witzel, 2018). MTSS includes RTI programs, but MTSS encompasses much more than RTI. With MTSS multiple tiers of support are designed with different levels of intensity so if a student needs more time and intensive instruction intervention, they are provided with them. RTI is designed to improve achievement of the students with low performance with interventions based on empirical research. MTSS has a much broader focus aimed at enhancing the entire education system for all students. The purpose of RTI is interventions that are aimed to curb a student's low performance. Both MTSS and RTI are research-based interventions that fit the needs of the students, specifically the areas in which they need help to improve their performance (Blackburn & Witzel, 2018). Furthermore, both can be implemented from early childhood education until high school graduation. The focus for teachers is on content and behavior, decision-making that is based on assessments and data which often require professional development, research is integrated into the programs, and they also require collaboration with others such as parents, other teachers, and school counselors (Blackburn & Witzel, 2018).

RTI is encompassed within the MTSS system as one level. RTI and MTSS have a wide impact on educational outcomes including enhancing equity in educational and disciplinary practices by providing educators the opportunity to reflect on their own biases and thereby disrupt institutional racism in addition to focusing on core instruction as the first prevention of a student's difficulties (Betters-Bubon et al., 2022; Dohrmann et al., 2022; Fallon et al., 2021). There are still several challenges concerning the implementation of RTI2 and the entire MTSS program while meeting the needs of a wide variety of cultural and individual student needs (Aikenhead, 2017; Long et al., 2016). Understanding different perspectives of this problem may clarify some of the reasons for the lack of implementation of RTI2.

The remainder of this literature review is divided into several sections that include descriptions of the multitiered approach of RTI and RTI2 along with barriers, challenges, and solutions. Implementation of RTI to improve reading outcomes of students is discussed followed by the outcomes for mathematics as the former is a new area of research. The importance of leadership and implementation science is then related to the topic of the study. Because technology in the classroom is often used with interventions concerning mathematics it is presented in its own section followed by the topic of professional development training and education for teachers in connection with mathematics. The chapter ends with a summary and conclusions.

The Multitiered Approach

RTI is part of a multitiered approach for the early identification and support of students with learning and behavior needs. The RTI2 process begins with high-quality instruction and universal screening of all children in the general education classroom. The National Center for Learning Disabilities (2016a) is focused on assisting learners to be prepared in succeeding in work and life. Struggling learners are provided with interventions at increasing levels of intensity to accelerate their rate of learning. The National Center on RTI (2016) posited that students identified as needing Tier 3 instruction will attend longer instructional sessions with increased frequency (i.e., at least daily) and participate in a smaller group setting. In short, teachers will monitor progress weekly to determine if students are improving in specific skills. If progress-monitoring data reveal the student projections falling short of specific learning goals, the teacher will engage in a problem-solving process. It is at this point the teacher may elect to modify specific components of the intervention to examine which methods are increasing student learning as measured by RTI2 progress monitoring.

Through RTI all students are provided materials and instruction to facilitate their learning. RTI has grown into a systematic tool for applying interventions based on close monitoring of students' progress (Björn et al., 2016). By using information from assessments, teachers can determine appropriate interventions for a student. There are clear definitions and guidelines for implementation and RTI has become an everyday practice in many schools throughout the nation. The intensity, how long the interventions last, and what that support looks like are all included, and defined in RTI, which has become helpful for educators. The role of SPED teachers is not clear as it relates to RTI implementation as inclusion has also been put into practice whereby SPED students are fully integrated into general classrooms instead of only attending separate classes. Interpretations of RTI differ, resulting in no one superior interpretation. For example, while co-teaching implemented within a RTI model may help education professionals collaborate to support SPED students within the classroom, more research is needed to determine if Tier 2 and Tier 3 student support can be fully met in regular general education classrooms (Björn et al., 2016).

Screening students is an important factor of RTI. Within the RTI model, Tier 1 is for all students and all students are screened several times every year so at-risk students can be identified (Clark & Dockweiler, 2020; Fuchs & Fuchs, 2017). The progress of all students is monitored and if they do not progress on the first level (i.e., Tier 1), other support is needed, and they move to Tier 2. Tier 2 consists of small groups where the students are given research-based instruction. The intensity of the interventions provided are stepped up along with the length of time spent in Tier 2. If the student is still having problems the student moves to Tier 3, which is nearly always individual instruction based on a research-based intervention (Clark & Dockweiler, 2020; Fuchs & Fuchs, 2017).

Comparing two different education systems that use RTI may help with comprehension. Björn et al.'s (2016) study compared RTI in the United States with the implementation in Finland and found that most SPED students in Finland are educated in general classrooms, which is not the case in the United States (Björn et al., 2016). Individual guidance was used much more in Finland than in the United States. In Finland SPED teachers are in general education classrooms, which the opposite is the case in the United States. Additionally, in Finland a diagnosis is not mandatory for a student to receive SPED as decisions are made in the schools with the teachers, parents, and SPED teachers. While comparisons between the two countries in implementing RTI may be limited due to the differences in the education systems (Björn et al., 2016), understanding the different approaches used may help in establishing effective implementation of RTI. Given that a diagnosis is not required to receive SPED services in Finland, it brings into question if requiring a diagnosis is necessary.

In summary, RTI is a multitiered approach to early identification and support of students with learning and behavior needs. Teachers monitor progress weekly to determine if students are improving in specific skills. If progress monitoring data reveal the student projections falling short of specific learning goals, the teacher will engage in a problem-solving process. RTI has grown into a systematic tool for applying interventions based on close monitoring of that student's progress (Clark & Dockweiler, 2020; Fuchs & Fuchs, 2017). There appears to be clear definitions and guidelines for implementation of RTI. To clarify, Tier 1 is for all students and all students are screened several times every year so at-risk students can be identified (Clark & Dockweiler, 2020; Fuchs & Fuchs, 2017). In Tier 2 the intensity of the intervention is increased along with the length of time spent. Students are moved to Tier 3, where they receive more individualized intensive interventions if they do not respond to Tier 2 interventions (Clark & Dockweiler, 2020; Fuchs & Fuchs, 2017). Finally, it is helpful to note the different approaches to implementation of a multitiered system for SPED students, which provided another perspective and added questions (Björn et al., 2016).

Barriers, Challenges, and Solutions for Implementing RTI

A lack of consistency in implementing the RTI2 model has been identified as a barrier to the model's success in schools (Lambert et al., 2018). The findings showed that during EBI implementation, teachers frequently receive limited training and support, in addition to educational leaders rarely identifying and addressing implementation concerns. Teachers indicated a lack of time in large classrooms, stress, inability to remember to use it, and burnout were barriers to RTI implementation (Lambert et al., 2018). While the data included in Lambert et al.'s (2018) study are almost 15 years old, similar results were found by Lawson et al. (2022). Current research has identified other barriers to the implementation of RTI within K-12 classrooms.

Although it has been over 10 years since RTI, commonly referred to as MTSS, first began to be implemented within school districts, teachers still struggle with implementation (Grapin & Sulkowski, 2022). Grapin and Sulkowski (2022) explained the MTSS models and summarized the effectiveness of them. Teachers identified high teacher turnover and teacher confusion regarding MTSS implementation as potential barriers to successful implementation. The staff changes added to the confusion as new school administration, MTSS coordinators, psychologists, and new superintendents were hired to fill vacant positions. A lack of appropriate materials and resources also impeded successful implementation. There was also a lack of collaboration among teachers and limited training for general education teachers (Grapin & Sulkowski, 2022). The current study utilized a small sample; therefore, the generalizability of the findings was limited. The researchers did provide teachers' perspectives and challenges involved in implementing RTI. Details of their challenges and confusion are lacking. However, Morse (2019) and TNDOE (2013) reported successful implementation of RTI within some schools and beneficial outcomes from interventions in the early grades.

Coyne et al. (2018) found positive reading outcomes for schools implementing RTI in early elementary grades. Coyne et al. conducted a major study to assess the reading intervention within an MTSS or RTI reading initiative. Students from first, second, and third grade that had reading difficulties participated in the study. There were

318 students from four different elementary schools that spanned four school districts. Using a regression discontinuity pretest/posttest design the findings showed that there were improvements in phonemic awareness and word coding. However, there were no improvements in reading comprehension or reading fluency. Even so, the conclusion was that when supplemental reading interventions were used in the MTSS frameworks there is a significant positive impact in reading outcomes (Coyne et al., 2018). Discontinuity models can easily result in a Type II error and there could have been other variables that impacted the scores (Mafukidze et al., 2023). There are many other variables that may have an impact on the test scores of students such as a negative school environment and whether the implementation of RTI was adequate.

Building blocks form a strong foundation for RTI implementation. Morse (2019) identified the building blocks to successful implementation of RTI. The first was to establish a clear vision and gain the full commitment of all stakeholders including teachers, instructional specialists, school staff, and district office staff. Additional foundational elements included having school leaders committed to providing sufficient staffing, budget, and resources to support the effort, set annual action goals, and develop a mission (Pierce & Jackson, 2017). Teacher development took priority, and several workshops were instituted every year to learn the essential components of RTI and how to implement them successfully. Thus, a strong foundation was established with goals to meet for everyone involved in the implementation of RTI. According to Nilvius and Svensson (2022), the RTI framework is most effective when used as it was designed so adherence to the model was important. However, this is only one way of ensuring successful implementation of RTI. The state of Tennessee has been successful in implementing MTSS.

The TNDOE developed an extensive report discussing the implementation of RTI to improve student outcomes. TNDOE (2016) defined the "ready student" as having "strong academic and technical content knowledge and skills, is ready for postsecondary and career, and has developed the social and emotional skills necessary to be a productive member of our state's economy" (p. 7). According to Pellegrini et al. (2018), successful implementation of RTI helped students in mathematics and was also linked to positive student achievement outcomes in mathematics. A meta-analysis of 87 articles conducted by Pellegrini et al. revealed that approaches to mathematics education have the strongest chances of succeeding if they included personalization to meet the needs of the student. For students who have failed numerous times in math, a combination of motivation, behavior, and social-emotional skill building should be included in mathematic improvement interventions (Pellegrini et al., 2018).

To summarize, a lack of consistency in implementing EBIs of the RTI2 model was a barrier, as well as, the lack of fidelity, limited training for teachers, a lack of support for teachers, and a lack of education leaders who address implementation concerns (Lawson et al., 2022). A lack of resources and confusion from the high turnover of staff and teachers have contributed to barriers (Grapin & Sulkowski, 2022). Training for teachers about how to implement MTSS and the lack of collaboration between teachers also contributed to barriers (Morse, 2019). Many schools have not yet overcome these barriers while other schools have been more successful. Some school districts have successfully implemented MTSS. Having a clear vision, a full commitment of all stakeholders, sufficient staffing, a large enough budget, and available resources have been identified as building blocks to successful implementation (Morse, 2019).

The student ready model, which concentrated on students obtaining social and emotional skills, along with technical knowledge and skills with the aim of helping students to be productive members of society contributing to the economy, was found to be successful (TNDOE, 2016). The strongest factor contributing to successful achievement of math was personalization of education to meet the students' needs (Pellegrini et al., 2018). Other factors were a combination of social-emotional, behavior, and motivation skill development (Pellegrini et al., 2018). The next section will concentrate on how to use RTI to improve reading skills.

Implementing RTI for Improving Student Outcomes in Reading

There have been numerous research studies focused on implementing RTI to improve student reading outcomes. The Institute of Education Sciences invested $100 million for the purpose of evaluating reading comprehension interventions and assessments to find solutions that worked to improve students' reading outcomes. Over 130 scholars took part in the effort from numerous institutions. Edmunds's et al. (2019) study was a quantitative RCT quasi-experimental design. Some of the students enrolled in social studies general education classes had limited English, attention difficulties, or dyslexia and received free or reduced-price lunches and/or SPED services. Most students were Latino and there were no European American students involved in the study. The findings revealed that teachers had limited support with implementation of Tier 2 and not enough instruction time, which coincided with findings of Edmonds et al. (2019). The results were minimal due to the small effects reported within the study.

While many studies focused on the implementation of RTI have examined reading outcomes, additional research on how to improve reading comprehension is needed, especially for students on Tier 1 and Tier 2 in Grades 4 through 12 (Stevens et al., 2020). Stevens et al.'s (2020) study investigated the effects of a set of comprehension and vocabulary EBPs to improve reading comprehension called Strategies for Reading Information and Vocabulary Effectively (STRIVE) implemented in social studies classes. There were three groups of students. One group consisted of students that were instructed during Tier I and Tier 2, the second group was made up of only Tier 2 students, and the third received instruction as usual. The intervention contained elements of limited time and perhaps these students needed longer duration, more frequent meetings, and with smaller groups of students. Stevens et al. explained their process in detail so this study could be replicated. Fidelity data were not collected so there is no way of determining if the interventions were implemented adequately. The sample was small, so research using a larger sample is needed and using a random control trial design would be optimal.

Testing the effectiveness of interventions is important to determine if they are improving students' performance. The intervention used in Stevens et al.'s (2020) study was the STRIVE. A professional development workshop was taught as part of the study. Stevens et al. used a quasi-experimental study to investigate the impact of a set of comprehension and vocabulary practices within 13 schools. A total of 36 teachers volunteered to participate in their study. Pre- and posttest comparisons showed a set of vocabulary and comprehension practices to help students in Tier 1 and Tier 2 throughout all classes, which resulted in small improvements, especially in reading (Stevens et al., 2020). More research is needed with larger samples as there are promising results. Stevens et al. concluded there was also a lack of personnel involved in Tier 2 interventions, so identifying interventions that can be used in the school frameworks is important (Stevens et al., 2020). Future research focused on whole-class instruction striving to identify added benefits of aligned instruction is also needed (Stevens et al., 2020). Stevens et al. (2020) found that cohesion between the two tiers was lacking.

In summary, Stevens et al. (2020) and Smyth et al. (2022) identified solutions linked to the implementation of the MTSS or RTI models that resulted in student reading improvements. Even so, many students still need to improve particularly in reading comprehension (Stevens et al., 2020). Students needing SPED services due to learning difficulties were identified using RTI and the assessments therein (Smyth et al., 2022). Each level of the MTSS program provides scientifically based interventions and instruction for students not meeting general education expectations that have positive outcomes so was deemed effective (Kovaleski et al., 2022). The assessment tools of the Northwestern Evaluation Association (NWEA) Measures of Academic Progress (MAP) for Regular Education Instruction (REI) not only helped educators identify students needing more support but also provided a list of skills the student has successfully mastered (NWEA, 2018).

Implementing RTI2 for Improving Student Outcomes in Mathematics

Evaluating RTI2 implementation focused on math outcomes has also been examined within current research (Kovaleski et al., 2022; Reisener et al., 2016). According to Reisener et al. (2016), empirical supported interventions for students having difficulty with mathematics. Using brief experimental analyses (BEAs) and brief multielement design along with extended analysis the authors found variability in the outcomes across the participants who were from elementary and middle schools. During the BEA students responded positively to at least one intervention and their performance improved during the extended analyses. The sample was small, so validity is limited, though other studies had similar results. However, there are only a few studies on this topic. Expert consultations were used to administer the intervention, so the context was different from the usual classroom. BEA of math interventions is appropriate for math skills that are complex such as solving algebraic equations, so generalization is unknown. Despite that, the use of BEA in math was successful in identifying individualized interventions related to RTI (Reisener et al., 2016).

Evaluating RTI2 implementation focused on math outcomes has also been examined within current research (Kovaleski et al., 2022). Kovaleski et al. (2022) conducted a study focused on identifying empirical supported interventions for students having difficulty with mathematics. Using BEAs and brief multielement design along with extended analysis the authors found variability in the outcomes across the participants who were from elementary and middle schools. During the BEA students responded positively to at least one intervention and their performance improved during the extended analyses (Kovaleski et al., 2022).

Many students are not performing at grade level in mathematics, and this is even a larger problem among SPED students. In 2018, 7.9% of the student population in Tennessee were identified as SPED; among them, over 60% were identified as having low mathematics proficiency (Irwin et al., 2021). ESSA (2022) also found that in a SUTSD, 79% of SPED students in upper elementary (i.e., Grades 3-5) were not proficient in mathematics, according to the 2018-2019 mathematics achievement data. In 2020, fourth-grade mathematics scores in Tennessee were 3 points lower than in 2019 (Aldrich, 2022; NAEP, n.d.). In 2022, the scores dropped 5 points. The entire nation of students' scores plummeted during these years most likely due to the COVID-19 pandemic when schools had to hold classes online to keep students, teachers, and personnel from getting infected by the virus after the initial total shutdown (Aldrich, 2022).

Multiple factors may be associated with the low mathematics performance by SPED students (Craig & Marshall, 2019; Parhiala et al., 2018). Special education students often perform poorly in mathematics (Craig & Marshall, 2019; Irwin et al., 2021; Nelson & Powell, 2018). Some students might be diagnosed with a learning disability in mathematics or dyscalculia while other students might demonstrate below-grade-level mathematics performance without a disability diagnosis (Nelson & Powell, 2018).

Nelson and Powell's (2018) study focused on whether identification of mathematics difficulty was predictive of mathematics achievement in later grades and whether a diagnosis of math difficulty was stable across grade levels through conducting a literature review of 35 articles. Nelson and Powell found students with mathematics difficulty demonstrated growth on mathematics measures. However, this growth still led to lower performance than that of students without math difficulty. Additionally, identification of mathematics difficulty was strongly related to mathematics performance in subsequent grades (Nelson & Powell, 2018). Various factors have contributed to SPED students performing low in mathematics. Within the 35 studies there were over 15 different ways of determining if students had math difficulty. The researchers took into consideration how the authors of the included articles determined students were at risk of math difficulty.

Nelson and Powell (2018) found numerous ways of defining math difficulty and therefore comparisons across studies were a challenge. A consensus on how to define math difficulty is needed. It should be noted that the studies included in Nelson and Powell's study were published between 1985 to 2016; thus, the research spanned 3 decades. Qualitative studies were not included, and they could only be published in English. Both researchers coded the data separately, which strengthened the findings. Even though RTI2 was not mentioned in the study the applicability to the research is still valid in that this study provided a long-term view of students who have math difficulties and methods of identifying those students.

Parhiala et al. (2018) found factors related to low mathematics performance among SPED students include school motivation and emotional well-being. Parhiala et al. examined the profiles of school motivation and emotional well-being and their links to academic skills in math among a sample of 1,629 participants. The uniqueness of Parhiala et al. study was that participants were required to have been in Jyväskylä's Longitudinal Study of Dyslexia and were Finnish speaking only. Students completed a survey and several instruments such as the School Burnout Inventory and the Self-Esteem Scale. The sample was large (1,629), thus strengthening this study. The study took into consideration several different ways of determining if students had problems in math including standardized tests scores.

The findings showed that low school motivation usually led to poor math performance (Parhiala et al., 2018). Based on this association between poor mathematics skills and low motivation, Parhiala et al. suggested when planning support for students, those with problems in mathematics were especially at risk for low motivation. However, the problem is complex and there are many factors leading to low scores in addition to problems related to the instruments used to assess student mathematics skills. It should be noted that generalization of this study's results is limited due to differences in school systems globally and that participants were limited to students in Finland. Moore and Cuevas (2022) found that students' motivation increased when they set goals in a program called Cognitively Guided Instruction (CGI). When students get feedback on their goals, they also make improvements as it tells them they are capable (Putwain et al., 2018). RTI is an example of a program that was found to help struggling readers substantially (Neitzel et al., 2022).

The problem of low mathematics scores among students is multifaceted. Craig and Marshall (2019) suggested low mathematics scores were partly attributed to ineffective instruments used to capture students' mathematics achievement that interpret real-life applications. However, this is not the only issue affecting mathematics scores. Focusing on mathematics universal screener scores, tier level identifiers, and level of risk indicators, Hopson (2021) found the factors that influenced the rates of effectiveness of interventions included interventionist utilization of data, student entry tier levels, and time spent in interventions. Additional research found that low math achievement was associated with both students' negative attitude and ineffective curriculum (Chand et al., 2021). These contradictory findings are problematic in that there is no consensus as to the variables that contribute to low math scores. One of the solutions for helping students raise mathematics scores is RTI.

Kane and Rosenquist (2018) focused on RTI practices within elementary education that were successful; however, the use of RTI in connection with improving math is a new research area. The purpose of this case study was the exploration of the implementation of RTI to improve mathematics outcomes for K-5 students. The participants within the study were primarily African American or Hispanic and all of them qualified for free lunches, thus were low income. Students were taught with the Do the Math program and closely monitored. Curriculum-Based Measurements (CBM) was found to help establish that a student was struggling due to lack of progress, but it did not aid in determining where to start RTI instruction for teachers. Results also showed a steady increase though there was variability in the results over the study period. While the results were positive, given the small sample size, future studies could expand the timeline to assess the entire school year and with multiple grade levels (Kane &

Rosenquist, 2018). I kept the fidelity logs during this study; thus, I had knowledge of the implementation process and if that process coincided with the intended process for implementation. I monitored the progress with weekly multiple-choice questions and the scores turned into percentages followed by mean calculations. An examination of the trend line showed increasing success rates. I restricted the program to a small group of fourth-grade students and was focused on addition and subtraction. The Universal Screener given near the end of the school year showed increases and enabled teachers to monitor students' progress.

Existing research also includes studies focused on interventions within Tier 2 of the RTI model. According to Fuchs et al. (2008), Tier 2 has seven instruction principles as a multitier prevention system:

- instructional explicitness
- instructional design to minimize the learning challenge
- strong conceptual basis
- drill and practice
- cumulative review
- motivators to help students regulate their attention and behavior to work hard
- ongoing progress monitoring (para. 58)

In Tier 2, the first principle, instructional explicitness, refers to the student being taught by the teacher who shares information students need to learn explicitly. The aim of the second principle, instructional design that eases the learning challenge, is to eliminate misunderstanding by explicit use of explanations, careful use of sequencing, and regular use of integrated teaching, thereby closing the achievement gap as soon as possible (Kane & Rosenquist, 2018). This is particularly vital to teaching mathematics as it has procedural demands requiring ingoing changes in the curriculum. The third principle, effective intervention, requires a strong conceptual basis for procedures to be taught and this is especially relative to SPED as drill and practice that are successful (Kane & Rosenquist, 2018). Neglect of the third principle is common, leading to learning gaps and confusion so it needs to be emphasized in SPED. Drill and practice are the next principle and involves sorting problems into the different types of problems and mixing them in the lessons taught every day (Kane & Rosenquist, 2018).

The fifth principle, cumulative review, relies on the foundation skills already taught to the student and is essentially using conceptual teaching to mix problem types, practice sorting, and conduct a review (Kane & Rosenquist, 2018). The final principle is helping students with motivation to enable them to work hard and manage their behaviors and focus their attention. It must be emphasized that students in Tier 2 have already experienced failure, so they often want to avoid emotional stress of mathematics, they have a fear of failure, and do not want to try. Supporting students in this level is vitally important for their success in mathematics (Fuchs et al., 2008).

Use of Assessments Within RTI

Assessments are valuable tools for measuring current academic achievement and can play a pivotal role in the selection of effective interventions (Reinhardt, 2018). Identifying which students need help has been assessed with the use of a new assessment tool that covers not only reading but other subjects as well. NWEA and MAP assessment enables educators to place a student in an RTI band in addition to providing a list of skills the student has mastered (NWEA, 2018). For teachers, the assessments show what skills students should be working on, and the data can also help create applicable curriculums (NWEA, 2018). Teachers can review the progress of a student throughout the school year. This study demonstrated that using NWEA MAP assessments in conjunction with RTI2 programs can help struggling students improve. To clarify further, MAP Growth can measure K-12 students in reading, language usage, science, and mathematics.

MAP Growth is valid, reliable, and fair as reported by NWEA instituted studies. The scores reflected overall subject area scores in addition to scores for strengths and weaknesses of a student. Scores were then transferred to RTI (Reinhardt, 2018). As concluded to Reinhardt (2018), RTI2 program leaders make informed decisions on which students need assistance, and what the assistance should be, and make educational placement based on results from NWEA MAP assessments. The NWEA MAP gives an accurate assessment of mathematics so if teachers in this qualitative study have used it, they may be able to provide their expert opinions on how it worked for their students.

Assessment techniques and implementation of RTI differ from state to state. While there are various methods of implementing RTI and RTI2, one common factor is the use of assessments to identify students in need of additional supports. Many state departments of education and educational leaders use RTI as an elaborate gateway to SPED services. The use of RTI as a gateway to receiving SPED services can complicate the process of identifying learning difficulties before recommending students for SPED services (Smyth et al., 2022). Students are identified or referred for SPED services through RTI, which may be used to inform the implementation and effectiveness of RTI. According to Smyth et al. (2022), there is still controversy regarding whether the evaluations of RTI are measuring the effectiveness of the programs. Special education and RTI2 described within this study differ only slightly from RTI.

There are specific evidence-based screening mechanisms used within RTI to identify disabilities also referred to as Science of Reading Screening (SORS; Barnes & Peltier, 2022). The purpose of screening is to identify students who perform below the benchmark goals in reading and may have a disability that impacts their reading ability. The objective is to identify these students before they fail (Torgesen, 1998). With the MTSS system implementation many states now have specific screening laws about dyslexia (Gearin et al., 2021). The National Center on Improving Literacy (2019) mandated that students are to be screened multiple times throughout the year but the mechanism for screening is up to each state's screening regulations, the nature of adoption of their curriculum, and policies about MTSS. Therefore, there is a wide range of variability on these policies (Gearin et al., 2021). It is vital that there is alignment between state policies and science or there will be increases in identification procedure mistakes, lower early intervention practices, and lower students' reading achievement (Barnes & Peltier, 2022). A variety of screening mechanisms is utilized at different times to detect diverse issues indicating the need for intervention.

The IDEA act did not mandate any specific screening tools. In Tennessee screening tools teachers use in RTI involve assessments to measure reading ability, needs for academic success, oral reading fluency, word identification, silent reading fluency, vocabulary acquisition, and comprehension. In addition, the TNDOE, (2013, 2016, 2018) explained assessments for monitoring progress and benchmark attainment focused on literacy abilities and skills particularly when the student moves from one tier to another.

Even with these screening tools available and utilized, many teachers do not feel confident about making important decisions based on the screening results (Al Otaiba et al., 2019). Teachers are asked to make decisions on an intervention for a student based on a set threshold or cutoff. Reading scores are on a continuum so students may score just below or just above the cutoff score; thus, determining if the students scoring near the cutoff need an intervention can be a challenge. Therefore, additional indicators should be used to identify students at risk for difficulties (Catts & Petscher, 2021; Compton, 2021). Other screening mechanisms frequently used include Aimsweb and Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Durwin & Moore, 2021). However, there is a plethora of laws and policies that regulate when and what screening tests should be used by schools that have led to confusion and misunderstandings (Barnes & Peltier, 2022). For example, the leaders that teach in Tennessee must become familiar with multiple laws to ensure compliance with numerous laws and any future legislation.

Screening policies tend to be effective for the collection of data but that does not always translate into correct identification of those who need interventions. For example, Odegard et al. (2020) conducted an examination of data about reading for 8,000 students in second grade. The findings showed that when compared to White students, students of color were less likely to be identified for dyslexia. The findings also showed that most of those same students (8,000) had some sort of reading deficit. The researchers called evidence-based screening tools that improve effective instruction. Additionally, both teachers and administrators need professional training on these topics (Odegard et al., 2020).

In summary, implementing RTI results in improvement of student outcomes in mathematics. The program improved student outcomes in math for K-5 minority and low income students (Kane & Rosenquist, 2018). There are six instructional principal areas to implement Tier 2 of RTl (Fuchs et al., 2008). Different skills are learned by each instructional principal, but drill and practice are commonly neglected, yet specifically relative to SPED (Kane & Rosenquist, 2018).

Leadership and Implementation Science

According to the research, leaders shape school climate. Prasetyo (2021) found that leadership involvement is a key aspect of the change process that will in turn lead to student behavior change. The National Implementation Research Network (2021) used the illustration created by Fixsen and Blasé to depict three implementation drivers, which include competency drivers, organizational drivers, and leadership drivers.

Leadership drivers consist of providing the appropriate leadership strategies for the challenges leaders face. The challenges are frequently connected to changes made within the organization. The drivers are based on research that provides evidence from implementation science scholars often referred to as evidence-based practices when utilized in the activity of practice. Therefore, leadership is an important aspect of successful implementation, fidelity guidance, making decisions, and supporting the functions of the organization (National Implementation Research, 2021).

In implementation science, comprehensive innovations that build a foundation to an infrastructure are needed for interventions to be successful (Cook et al., 2019). Leadership must create a context to introduce changes such as principals showing their understanding and support of new programs (Lyon et al., 2018). A positive school climate is a complex issue that has positive impacts on decreasing problem behaviors and promoting both teacher and student wellbeing. Additionally, student academic outcomes even though it is a complex construct to capture empirically data is effective (Grazia & Molinari, 2021; Polichar et al., 2021; Wang et al., 2018; Winnaar et al., 2018).

In summary, leadership is an important aspect of introducing changes in schools. Leadership needs to build a good foundation for changes by showing support for the inventions (Cook et al., 2019; Locke et al., 2019; Lyon et al., 2018). A positive school climate decreases problem behaviors, promotes both teacher and student wellbeing, and increases student academic outcomes (Grazia & Molinari, 2021; Polichar et al., 2021; Wang et al., 2018; Winnaar et al., 2018). School leaders highlight that RPI implementation is an intervention involving students, staff, teachers, principals, parents, and the community (Barnes & Peltier, 2022).

Computer Technology Mathematics Interventions

Interventions concentrating on mathematics using technology appear to be a popular topic in the literature especially when addressing the needs of low-performing students. Technology is often integrated into classrooms where mathematics is taught, and the learning that takes place has been documented for mathematics students (Tucker, 2018). Some technology allows students to collect and record data or make conjectures

(Cullen et al., 2020). Several studies and meta-analyses have evaluated different aspects of computer technology (CT) linked with mathematics. In this section I will present research on the issue of access to computers and then the use of CT in mathematics instruction.

Just like CT, implementation science is connected to SPED. Vroom and Massey (2022) defined implementation science as the study of factors that have an impact promoting and supporting students based on research about evidence-based practice. The New Jersey Department of Education (2017-2018) explained the link between implementation science, technology, and SPED. Using technology-accessible school materials supports the inclusion of students with disabilities in general education classrooms. Evidence-based practice is a concrete example of implementation of science that educators utilize in practice. The educators presented the formula as a way of understanding the connections New Jersey Department of Education, 2017-2018 School Year. Effective innovations in the form of EBP times effective implementation times contexts that are enabling equals significant outcomes. The increased use of technology means that teachers identify the needs of students through assessments, which is accomplished either in the classroom or with an individual student, which increases accessibility to materials that are grade-level appropriate for the student. Programs can be designed that encompass the three drivers of implementation science and when these are used and integrated in practice, high-fidelity will be ensured and sustainable programs can be implemented. Training for staff needs to be provided so they know when, how, and with whom to put into practice the skills they learn in addition to selecting staff that have skills, knowledge, and abilities. Coaching can help utilization of skills in practice.

Fidelity assessments can determine if the innovations and evidence-based programs are being implemented as intended New Jersey Department of Education, 2017-2018 School Year. Technology, when used to improve accessibility, can support students through RTI2 and specifically it can be used to support SPED students in mathematics classrooms.

Mathematics is connected to RTI in that RTI involves mathematics instruction in general education, often referred to as core instruction (Smyth et al., 2022). The needs of an estimated 80% to 90% of students are met by core instruction. Utilizing scientifically based strategies the teacher adjusts instruction so that all students' needs are met for obtaining positive outcomes (Smyth et al., 2022).

Technology has been used to teach STEM to elementary students including kindergarteners (Ching et al., 2019). A curriculum that integrated robotics to teach STEM was found to provide a positive learning experience that improved attitudes towards math and students developed perseverance, teamwork skills, and content learning and connection. Students also leveraged robotics to solve problems (Ching et al., 2019). Even children from preschool and pre-primary grades have learned coding and computational thinking by using apps on smart phones (Papadakis, 2022). Coding and skills in problem solving, collaboration, and critical thinking were linked, thereby developing higher order thinking skills (Miller et al., 2017). Coding is a 21st-century skill for cultivating interest in computing while students as young as 4 to 7 years old develop cognitive, physical, social, and emotional skills using game-based apps (Yu & Roque, 2018). Coding is usually learned in continuing and postgraduate education (Minchillo et al., 2018). Four-year-old children have successfully learned how to program their own robots (Bers, 2018). Technology in the form of videos provide visuals of curriculum content that increases elementary contextual math test scores (Rahmawati et al., 2019).

Even 30 years after the World Wide Web first appeared, there is still a digital divide between lower and higher income households (Vogels, 2021). The findings showed that the situation has changed little since 2019. Twenty-four percent of households with income levels of $30,000 a year do not own a smartphone, 43% do not have broadband services, and 41% do not have a computer at home (Perrin & Atske, 2021). Individuals with household incomes over $100,000 a year have multiple ways to access the Internet such as computer, tablet, smartphone, and broadband services at 63% while only 23% of lower income families have multiple ways to access the Internet (Perrin & Atske, 2021). A small percentage (13%) of low-income households do not have any of these devices and a tiny portion (1%) with incomes of $100,000 have a lack of access. However, ownership of smartphones on the lower end incomes is on the rise as there has been a 12% increase since 2013. School children also show a "homework gap" with lower income households not having broadband at home at 35%. Since the COVID-19 pandemic 59% of households with lower incomes do not have Internet, or no computer, and students need a smartphone at home to complete their assignments (Vogels, 2021). Ownership of digital devices do not differ much from Americans who have a disability and those who do not (Perrin & Atske, 2021).

Teachers have over 80,000 educational apps available from which to choose (Lynch, 2018). The use of games in the classroom has become a topic of interest in recent literature. Mathematic teachers and researchers are exploring innovative instructional approaches to motivate students and improve math achievement for K-12 students (Liu et al., 2022). This is an important topic as possessing mathematics proficiency increases chances for being hired in the global marketplace (Suter & Camilli, 2019). Examples of apps for elementary math classes are Quick Math Pack that helps with learning times tables and telling time (Lynch, 2018). ABC Mouse has won numerous awards and teaches all the basic core subjects for preschool, kindergarteners, and first and second grades. Jungle Time helps students to tell time using digital, face clocks, and Roman numeral clocks (Lynch, 2018). Math Playground, an online resource, teaches young students math using games (Lynch, 2018).

Even with numerous advantages, most students in the United States still struggle to compete with students in other countries in mathematics. Due to mathematic proficiency of students in the United States ranking low, both college graduate and high school graduates will most likely have difficulty competing for jobs (Suter & Camilli, 2019). In 2018, sales in computer games came to a record $43 billion. There is at least one person who is considered a gamer in three fourths of families throughout the nation. All disciplines are seeing game-based learning as an emerging paradigm for teaching at all grade levels. Students learn many things using games such as mathematics problem solving using a game called E-Rebuild (Ke et al., 2018). Such creates a demand for teachers to undergo training in these and other types of technology.

Computer games are one aspect of the use of technology in the classroom, so Callaghan et al. (2018) designed their study to better understand how teachers integrate games in mathematics classrooms and the relationship to student achievement. Callaghan et al. sampled 869 teachers who had professional development related to the use of games in math interventions in their mixed-methods study. The standardized math scores were utilized from students from second through sixth grades (10,715) from 52 southern California schools. The game used was ST Math developed for elementary-aged students. The game is designed to help students solve puzzles or eliminate obstacles impairing the progress of the ST Math penguin, Jiji.

The results revealed that there was a variety of ways elementary teachers integrated games into the instruction (Callaghan et al., 2018). Aligning class material and game content can help students understand math. Furthermore, reordering game objectives and professional development videos had a significant positive relationship with student math achievement scores.

The learning disabilities of students require teachers to consider how different types of technology in the classroom will not only be accessible but will be useful to their personal needs. For students with specific learning disabilities (SLDs), teachers need to give them individualized personalized support to move beyond their difficulties in mathematics (Wen et al., 2021). E-learning is a web-based system that utilizes digital technologies and other educational materials to deliver to students with a supportive enhanced learner-centered, personalized, interactive, and pleasant learning environment (Rodrigues et al., 2019). This study was a systematic review of 19 articles that were analyzed using Braun and Clarke's (2006) thematic technique. The findings showed that the mathematics e-learning tools were not designed for SLDs as several issues surfaced (Wen et al., 2021). The interfaces that were text-intensive made them hard to use. Student performance feedback was lacking, and students were unable to adjust to the levels of difficulty. Students also had problems in maintenance and setup.

Wen et al. (2021) suggested developers make games more inclusive, so they are effective. The chief reason teachers used technology was to let them practice on their own so other students could be helped. E-learning tools could be a viable option to learn mathematics (Wen et al., 2021). Pedagogical strategies were also taken into consideration in the studies reviewed related to home-based learning that showed parental involvement was essential (Huber et al. 2018; Laho 2019). Additional studies included showed that clear communication between parents and teachers was adopted (Laho, 2019). While technology will most likely not play a part in the qualitative study unless mentioned by participants, it is included due to the predominate use of technology as a mathematical intervention.

How often students use technology and how teachers learn about technology have also been researched. Kormos and Wisdom (2021) examined the usage frequency of technology in the classroom and outside the classroom in this qualitative study focused on rural schools. Online surveys were used to collect data from 860 K-12 teachers. Quadratics were utilized. The results showed that teachers obtain technological knowledge in different ways, including by trial-and-error experience. Barriers to implementing usage of technology was especially apparent with many students not having Internet access at home and the lack of financial support for technology use in the classroom. Teachers did not use technology management systems such as Google Classroom but also saw technology to be effective. A lack of finances to buy technology throughout the district was found to be an obstacle. However, teachers had become familiar with different types of technologies, including their benefits and how to use them in the classroom along with their curriculum (Jones & Dexter, 2018). It appears that there are still several barriers to using technology that students and teachers face (Kormos & Wisdom, 2021). The number of participants was sufficient in this study. Even though the surveys were not from commonly used instruments, valuable information was generated with a population that is rarely included.

Questionnaires have been developed to measure teachers' attitudes about the use of games to teach mathematics. Liu et al. (2022) explored attitudes and beliefs of 117 preservice teachers on their intentions to use games to teach mathematics. This study was conducted in one university in the Midwest of the United States. The majors of the preservice teachers varied and 38 were SPED majors. The researchers developed the Attitudes Towards Computer Games in Mathematics Teaching Questionnaire to collect data. Descriptive and inferential statistical analyses were applied to the data. Multilevel linear regression analysis was applied. Gaming experience was found to be positively associated to attitudes about computer games, while intention to integrate computer games and self-efficacy was negatively linked to gender stereotypes. This was an increase in experienced gamers compared to in-service teachers and all participants were millennials (Entertainment Software Association, 2019). Therefore, preservice teachers need training in adapting and using games in education (Liu, 2022). The barriers expressed about game use in the classroom were mostly about finances and how to integrate them. Mohamed (2018) found that preservice teachers with the most positive attitudes were SPED majors.

There is no one-size-fits-all when it comes to selecting the most appropriate technology learning tools (Liu, 2022; Mohamed, 2018). Participants indicated that the use of computer games in the classroom can either help or discourage the learning of the students. Cultural backgrounds may influence gaming appeal or not. Preservice teachers need to be in possession of the skills, experience, and knowledge to integrate games into the classrooms of K-12 students (Liu, 2022; Mohamed, 2018).

Developers have succeeded in developing a game that can service all age-level groups. Baldo is an intelligent system built on the gaming-based learning approach that not only provides training but also assesses numerical abilities for all age groups (Ponticorvo et al., 2022). Baldo is a module dedicated to motivational and affective dimensions about cognition and tutoring aimed at mathematics that chooses activities to match the potential level of the players. Basic numerical skills have been promoted by using digital technological tools (Benavides-Varela et al., 2020). As specified by Ponticorvo et al. (2022) students made improvements of numerical cognition in game-based learning as players must address rules, goals, problem solving, and interaction. Games tend to not only impact positive learning but positive feelings about mathematics (Alahmari, 2019; Kamaluddin & Widjajanti, 2019). These findings coincided with results achieved with materials that used traditional games focused on multiplying and dividing abilities (Isnardiantini et al., 2019).

Learning games need to be scientifically evaluated and ethical values attached to each game specific to the player owning their own generated data (Bertram, 2020). Bertram (2020) was insistent that players should have to give consent for others to use their data or in the case of children a parent or guardian would need to provide consent. Random Controlled Trials (RCTs) should be applied to learning games along with the use of standardized scales from the Program for International Assessment (PISA) and Trends in International Mathematics and Science Study (Bertram, 2020).

To summarize, interventions concentrating on mathematics using technology appear to be a popular topic in the literature especially when addressing the needs of low-performing students. Technology is often integrated into classrooms where math is taught, and learning improvements have been documented (Alahmari, 2019; Kamaluddin & Widjajanti, 2019; Ran et al., 2021; Tucker, 2018). The chief reason teachers used technology was to let students practice on their own so other students could be helped. All disciplines are seeing game-based learning as an emerging paradigm for teaching at all grade levels. Students learn many things using games such as mathematics problem solving (Ke et al., 2019). The use of digital technological tools has promoted basic numerical skills (Benavides-Varela et al., 2020). The barriers expressed about use of games in the classroom were mostly about finances and how to integrate them into class curricula. Assessing the psychological learning aspects of games is needed and should be passed on to parents and educators. Players should have to give consent for others to use their data or in the case of children a parent or guardian (Bertram, 2020). Professional development is needed for mathematics teachers to successfully implement technology into the curricular. Teacher education programs also need to provide the knowledge and skills for using technology by way of implementation science.

Professional Development and Teacher Educational Programs for Mathematics Teachers

Teacher education programs prepare preservice teachers for the teaching profession (Hamukwaya & Haser, 2021). Hamukwaya and Haser (2021) recommended professional development to provide support for mathematics teachers and pass on information learned from teacher to student. To be competent, teachers need to have the knowledge and skills to utilize implementation science for the benefit of their students in the RTI framework. Professional development can take the form of short-term courses, mentoring, conferences, workshops, seminars, reflective and exploratory studies, individual research or reading, and online courses or peer group discussions (Rosli & Aliwee, 2021). Elementary mathematics specialists are the participants in several studies discussed in this section and they often provide professional development for other teachers. They are essentially leaders of their schools and frequently interact with principals (Campbell & Malkus, 2014; Hjalmarson et al., 2020; Swars et al., 2018).

Mathematics specialists are often referred to as mathematics teacher leaders or mathematics coaches and may also be a teacher of students or professional development facilitators (Hjalmarson et al., 2020). Hjalmarson et al. (2020) defined mathematics specialists as leaders of teachers that help in providing professional development that are also on-site to assist teachers with their knowledge and expertise. This qualitative study synthesized research about the role of mathematics specialists and how it has been studied to enhance the understanding of the position. Knowing about mathematics specialists is useful in that teachers may have had experiences with them or want assistance from such an expert (Hjalmarson et al., 2020). The discussion about mathematics specialists has generated studies on the training of the specialist.

Knowledge of how mathematics specialists are educated helps in the understanding of the wide range of duties for which they are responsible and the complexity of their roles. Elementary mathematics specialists' mentor or support other teachers, thus creating an effect on the entire school (Henrikson & Lumpe, 2021). Swars et al. (2018) conducted a longitudinal mixed-method study to identify the benefits of a K-5 Mathematics Endorsement Program that prepares mathematics specialists who have vital roles in education systems. Several quick shifts in pedagogy were noted related to content; however, the teachers still had difficulty opening opportunities for students to make generalizations themselves (Swars et al., 2018). Teaching efficacy beliefs also increased. Henrikson and Lumpe (2021) found similar results especially on the need for support from elementary mathematics specialists. Teachers who teach general education are not educated with the knowledge or skills that a mathematics specialist possesses (Swar et al., 2018). However, by 2024, only 11 states offered certifications, endorsements, or licensure for mathematics specialists.

Teachers are usually educated as generalists in the United States despite the acceptance of teacher preparation as an important factor that has an impact on learning and achievement. There is a lack of focused preparation for elementary mathematics teaching because elementary teachers are trained as generalists in teacher education programs (Swar et al., 2018). Thus, many teachers do not know how to teach mathematics with precision and coherence (Wu, 2019). Mathematics specialists also help improve student achievement (Swar et al., 2018). Harbour et al. (2021) conducted a literature review, which resulted in recommendations for further research, using both qualitative and quantitative methods as research involving mathematics specialists and student achievement is an emerging issue. By using secondary data Olson (2020) extended the research on this topic to the entire country instead of only a small sample with data from 37,400 students enrolled in fourth grade from 1,500 elementary schools. Researchers have found a significant relationship between mathematics specialists and student achievement outcomes (Harbour & Saclarides, 2020; Olson, 2020). Other factors such as professional development also improve student achievement.

Teacher professional development improves student achievement. Rosli and Aliwee (2021) agreed with Harbour and Saclarides (2020) that mathematical teacher professional development has enhanced student learning. However, not all professional development programs have been helpful for teachers teaching mathematics. According to Aseeri (2019), professional development should meet the needs of teachers attending the professional learning. Professional development for mathematics teachers affects knowledge, students’ outcomes, and teaching practices, therefore other stakeholders should attend to factors of the teachers’ learning outcomes when designing professional development opportunities (Rosli & Aliwee, 2021).

Preservice teachers have also been participants in studies focused on teaching mathematics. Students should have strong knowledge of mathematics obtained from earlier grades, so they do not struggle to catch up (Hamukwaya & Haser, 2021). Consistent with prior research (Jawad et al., 2021), Hamukwaya & Haser, (2021) found that workload and density of the curriculum left little time to help students with mathematics learning difficulties.

In summary, teacher education programs prepare preservice teachers for the teaching profession (Hamukwaya & Haser, 2021), whereas professional development ought to be a continuous effort providing support for mathematics teachers and from teacher to student (Hamukwaya & Haser, 2021). Most elementary mathematics teachers are trained as generalists and not as mathematics specialists, thus giving rise to the vital roles of elementary mathematics specialists (Swars et al., 2018). School staff members who collectively judge themselves capable of promoting academic success imbue their schools with a positive atmosphere. It is within this context that the role of elementary mathematics specialists' mentor other teachers and provide support to others, thus having an impact on the entire school. Mentoring by mathematics specialists in line with competency drivers of implementation science ensures teachers' competencies are developed, improved, and sustained by the support provided so students benefit.

Summary and Conclusions

The specific problem explored in this study was the inconsistent implementation of RTI2 in mathematics classes for SPED upper elementary (i.e., Grades 3-5) students at a SUTSD. Students in the United State are falling behind European and Asian students in mathematics (Pellegrini et al., 2018). Students learn in elementary school if they are good at mathematics along with learning basic mathematics. Test scores were flat from 2003 to 2017, averaging 40% proficiency in 2017 after the implementation of Tiers 1, 2, and 3.

A lack of consistency in implementing the RTI2 model has been identified as a barrier to the model's success in schools. The findings showed that during EBI implementation, teachers frequently receive limited training and support, in addition to educational leaders rarely identifying and addressing implementation concerns. Furthermore, teacher education programs prepare preservice teachers for the teaching profession. Hamukwaya and Haser (2021) recommended professional development to provide support for mathematics teachers and passing on information learned from teacher to student.

Fidelity is an important factor in intervention programs (Rojas-Andrade & Bahamondes, 2019; Sanetti & Luh, 2019). If an intervention has fidelity, I implemented it as it was intended so if fidelity data are satisfactory, and the student has made progress the intervention can be eliminated gradually. A lack of fidelity and confusion about RTI implementation, high teacher turnover, and a lack of appropriate materials and resources to meet students’ needs also impeded successful implementation (Kovaleski et al., 2022). To summarize, a lack of consistency in implementing EBIs of the RTI2 model was a barrier, as well as, the lack of fidelity, limited training for teachers, a lack of support for teachers, and a lack of education leaders who address implementation concerns.

Leaders shape school climate and leader involvement is important for a successful change process (Acosta et al., 2019; Bosworth et al., 2018). Leaders need to create a foundation and show support for new programs (Lyon et al., 2018). Even though a positive school climate is difficult to capture empirically there are positive impacts in a variety of areas including student achievement (Grazia & Molinari, 2021; Polichar et al., 2021; Wang et al., 2018; Winnaar et al., 2018).

Computer technology has been used successfully to teach mathematics (Cullen et al., 2020; Tucker, 2018). Most students learn the core mathematics by teachers using evidence-based strategies and adjusting instruction, so all students' needs are met (Smyth et al., 2022). STEM subjects taught to elementary students including kindergarteners using technology has improved students learning experience and in turn improved attitudes towards mathematics (Ching et al., 2019). Coding was taught to elementary students, which also helped them learn mathematics, even very young students (Papadakis et al., 2022). By learning coding, students develop critical thinking, cognitive, physical, social, and emotional skills using game-based apps (Miller, 2019; Yu & Roque, 2019). Four-year-old children learned how to program their own robots and contextual math scores improved with the use of technology (Rahmawati et al., 2019). Teachers have a wide variety of technology educational games to choose from that can motivate and improve mathematics achievement scores (Liu, 2022; Lynch et al., 2018). Game-based learning has been integrated into all disciplines and teaches students to solve problems and increase test scores in addition to being popular and well received by students (Lynch et al., 2018; Suter & Camilli, 2019).

Research has been conducted on how teachers integrate technology successfully, but teachers need professional development to increase their knowledge on the topic.

Callaghan et al. (2018) conducted a study about the learning of students with disabilities that enhanced their achievements with individualized personal support in mathematics and technology. Yet there are still problems that need to be solved to make it easy for students to use these learning resources (Wen et al., 2021). Improvement in low-performing students in mathematics with the use of computer technology can be successful; however, there are still challenges about the usefulness of technology in RTI (Ran et al., 2021). Preservice and classroom teachers need to know how to integrate games into elementary classroom and educational games have been developed for all levels of education. Additionally, students have positive feelings about mathematics when using educational games (Alsawaier, 2018; Liu 2022; Ponticorvo et al., 2022).

Teachers need to understand and become familiar with the usefulness of technology (Bowman et al., 2020; Xie et al., 2021). Leaders need to support both general education teachers and mathematics specialists concerning technology and provide professional development (Hjalmarson et al., 2020; Swars et al., 2018). Mathematics specialists can have a positive impact on the entire school and a wide-ranging study showed they improved student achievement (Henrikson & Lumpe, 2021). Professional development also increases student achievement (Harbour & Saclarides, 2020; Rosli & Aliwee, 2021).

According to Kane and Rosenquist (2018), RTI practices for elementary education were successful. However, there are barriers to implementation or lack of implementation such as a lack of knowledge about how to implement RTI and the lack of training thereof on the secondary level of education (DiMarco & Guastello, 2021; Raben et al., 2020). These studies did not include students in elementary schools. Additional research needs to be conducted specifically about the perceptions of educators and the implementation of RTI (Alahmari, 2019). This study intended to fill the gap in research created by not including perceptions of educators and the implementation of RTI. In Chapter 3, I presented the methodology the study utilized as well as other aspects of how the study was conducted including the analysis process.

Chapter 3: Research Method

The purpose of this basic qualitative study was to explore SUTSD upper elementary teachers’ perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom in Tennessee. In this section, I explained the methodology used for this study. Additionally, I explained the instruments for data collection and the content validity of the interview questions. I addressed detailed procedures for recruitment, participation, and data collection. Finally, I explained the process for analyzing the data.

Research Design and Rationale

The phenomenon under investigation in this study was upper elementary teachers’ perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The study participant pool was limited to elementary school educators teaching Grades 3-5.

Research Questions

This study aimed to answer two research questions to address the problem of practice. The first question sought to gather information on the perspectives teachers had on the usefulness and effectiveness of RTI2 implementation for SPED students. The second question aimed to report the challenges with program implementation across Grades 3-5 mathematical classes. Based on the identification of the problem of practice, the following research questions guided this study:

RQ1: What are SUTSD upper elementary (i.e., Grades 3-5) teachers’ perceptions of the usefulness of RTI2 for SPED students in mathematics classrooms?

RQ2: What challenges do SUTSD upper elementary (i.e., Grades 3-5) teachers report implementing RTI2?

Research Tradition

I used a basic qualitative design for this investigation. A qualitative approach is ideal when a researcher is interested in individuals' experiences and insights (Hammarberg et al., 2016). A qualitative methodology was appropriate for this research because the perspectives of individuals are the primary data being collected, rather than relationships between variables. Hammarberg et al. (2016) stated that qualitative investigation is appropriate when preexisting variables cannot be identified. Researchers who conduct qualitative studies often ask how and why questions because they commonly explore a phenomenon that cannot be easily identified or explained (Hammarberg et al., 2016). Qualitative methods provide detailed information regarding the phenomenon in its natural context. Hammarberg et al. (2016) noted that the basic qualitative research design is ideally suited when examining normative behaviors, beliefs, attitudes, and concepts.

Justification for Research Tradition

Other approaches were less appropriate in determining the implementation impact on student learning. In phenomenology for example, the researcher seeks to understand participants’ experiences of a particular phenomenon through an examination of their lived experiences (Delve et al., 2022c). In this study, I was not interested in how teachers described their lived experiences, but rather how they described their perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. An ethnographical approach was not appropriate in this study as ethnographers engage a community and explore the themes that emerge. Ethnographers do not seek to explain a particular phenomenon but are steered by what arises naturally from their observations (Delve et al., 2022c). Grounded theory was also not appropriate for the study as grounded theory explores process, action, and interaction to develop a theory that is based on observations, rather than on experiences told by the participants (Delve et al., 2022c). A case study was not appropriate as multiple data types are required. In the current study, additional data types are not available or would not significantly contribute to the understanding of the research questions (Delve et al., 2022c).

Role of the Researcher

Within this qualitative study, I conducted in-depth interviews using a semistructured interview guide. In this study, I was an observer and implemented the data collection using the interview guide. This involved asking questions using the semistructured interview guide, asking follow-up questions as appropriate, informing participants of their rights, and gaining their informed consent. I was also responsible for analyzing the data collected in this study and reporting the results.

Managing Relationships and Roles

Positionality is recognizing that researchers and participants both have multiple roles that they bring to the research process (Fenge et al., 2019). According to Rowley (2014), novice researchers can face ethical dilemmas when conducting qualitative research. Therefore, a continuous critical self-reflection about the people involved in the study is suggested (Corlett & Mavin, 2018). When the researcher has dual roles, critical self-reflection may mitigate impacts on participants, the researcher, and the research (Fenge et al., 2019). Knowing the boundaries between participant and research is important to consider (Fenge et al., 2019). For example, there may be a power or inequity imbalance the researcher needs to consider (Fenge et al., 2019). The purpose of critical self-reflections is to increase insight about how multiple identities can have an impact on the research, and another is the impact the research can have on participants (Fenge et al., 2019; Rowley et al., 2014). Interaction with participants can be influenced by the researcher's subjectivity and positionality (Dean, 2017).

I currently serve as a principal in the school district that was used in this study, and I also served as the researcher. Within my role as researcher, I conducted research with participants outside of my supervisory role and in other schools in the district. I engaged in critical self-reflection to minimize any subjectivity due to my role as principal in the study school district.

Supportive supervision is vital for novice researchers who often feel unprepared and/or insecure in their role as researcher (Simpson & Wilson-Smith, 2017). The ability of the researcher to be aware of their weaknesses, strengths, and trigger points was identified (Fenge et al., 2019). It is also important for the novice researcher to feel comfortable sharing experiences that are challenging during the research process. Peer mentors can also provide valuable support to the researcher (Dickson et al., 2021). In addition to my committee, I also sought the support of a dissertation coach to guide me through learning the research process.

Researcher Bias & Ethical Issues

My professional role as an employee at a SUTSD had some implications that may have influenced the qualitative study. This means that I was acquainted with some of the possible participants who responded to volunteer to participate in the study. To address potential bias due to my relationships, I did not select participants with whom I had a personal relationship, or that I supervised. Furthermore, I kept a research journal throughout the data collection process that documented my thoughts and experiences. This helped document decision making within the study and reduced the possibility of bias (Kunkler et al., 2017).

Methodology

Within this section, I outline the population and sampling technique followed by why the participants were chosen for the interviews. Furthermore, I provide details about access to the study site and participants, followed by information about the instrument for collecting data. To show sufficiency, the link between the interview questions and the research questions is detailed. Next, I present how and why a pilot study was conducted. The processes for recruitment of participants, criteria for participation, and data collected are depicted within this section. I provide an explanation of the data analysis procedure, the trustworthiness of the study, ethics of the study, and a summary of the chapter.

Participant Selection

The population included 42,082 general and 5,686 SPED teachers in Tennessee in elementary grades (TNDOE, 2021). I selected participants for this research from an upper elementary school within a SUTSD, specifically Grades 3-5 teachers who had used RTI2 for SPED students in mathematics classrooms. Each teacher had a minimum of one year teaching experience.

Sampling Strategy

I used the purposeful sampling method to select potential participants from the population. Purposeful sampling is a nonprobability sampling technique that allows the researcher to select participants based on a predetermined set of criteria (Kunkler et al., 2017. This strategy was appropriate because purposeful sampling strategy enabled me to select participants who were likely to be knowledgeable examples of the phenomenon that was the focus of this study (Kunkler et al., 2017). By choosing participants in this manner, a researcher is more likely to collect data from individuals who have experienced the phenomena being investigated (Kunkler et al., 2017).

Participation Selection Criteria and Verification

From this population, teachers with the following qualities were eligible to participate in this study: (a) they were currently employed at a SUTSD, (b) they had used RTI2 for SPED students in mathematics classrooms, (c) they had at least a year of teaching experience, and (d) they taught upper elementary (i.e., Grades 3-5). To ensure that all participants met these criteria, I asked all respondents to complete a short prequalification survey utilizing SurveyMonkey, an online survey platform. The survey covered the inclusion criteria for participation in addition to participants' gender, race/ethnicity, and age.

Justification of Desired Participants

I invited teachers to participate by emailing them an invitation to participate. The study sample consisted of 10 Grade 3-5 teachers who met the inclusion criteria for the study. However, data collection continued until data saturation was reached. Data saturation refers to the point at which no new or novel information is being collected from participants (Rubin & Rubin, 2012). By reaching data saturation, the researcher can assure that the sample participants do not misrepresent the population, and that the data are not skewed by unique experiences that are not generally experienced by others in the population. Saturation within this study was reached with the 10 participants, which is consistent with research guidelines suggesting a minimum of 10 participants are needed to reach saturation in qualitative research (Creswell and Creswell, 2017). Creswell and Creswell (2017) indicated that a sample size of 10 to 12 participants is often employed to gain an in-depth understanding of the topic. In this study, I was able to interview 10 participants to participate to provide sufficient data to reach saturation.

Procedures for Gaining Access to Participants

I contacted participants after Walden University approved my study through the institutional review board (IRB) process (IRB approval no. 05-15-23-0528767). Subsequently, the school district gave permission to conduct the study along with permission to use the email addresses of upper elementary teachers to contact them regarding participating in the study. I contacted the teachers by email with an invitation flyer that included the purpose of the study, the criteria for participating, and the time they would be expected to spend volunteering to be interviewed. As I received responses, I asked the teachers to complete a survey on SurveyMonkey to ensure they met the criteria that included how long they had been teaching in their current place of employment, what grades they taught, and if they implemented RTI2, which included some demographic information. Next, I sent them a letter of consent via email that included a summary of the study, purpose of the study, a statement of confidentiality, assurances that their participation was unaffiliated with their employment, an estimate of how much of their time the study would take, and an identification number to represent their responses since their name would not be used. After I received the consent letter back, I scheduled a time for the interview.

Instrumentation

In this study, I served as the researcher-observer and used a semistructured interview guide as my data collection instrument. The semistructured interviews that informed this study were guided by protocol with open-ended questions.

Establishing Validity

Prior to beginning data collection, I asked an expert panel to review the interview protocol that was used in this study. The expert panel consisted of three experts in qualitative research and data collection. These individuals were my professors and advisory team at Walden University. I asked the expert panel to review the interview protocol and make recommendations to improve it to ensure the interview protocol was likely to collect information to inform the research questions. The interview protocol reviewed by the expert panel was used during the data collection phase (see Appendix A). These interview questions were submitted to IRB for study approval.

Instrument Pilot Study

A pilot study was used to test the interview questions for clarity in the wording, understandability to participants, and comprehensiveness to solicit enough information relating to the research questions as suggested by Malmqvist et al. (2019). Several researchers clarified why using a pilot study when conducting qualitative research is advantageous. One was to identify issues that may arise during the interviewing process such as whether the interview questions need to be adjusted so that rich in-depth data are obtained (Gudmundsdottir & Brock-Utne, 2010). Furthermore, spending time with the interview questions during the piloting process helps the researcher to be well-prepared to be humble and reflexive (Poggenpoel & Myburgh, 2003). The time spent during the pilot study also enhances the trustworthiness of the research and mitigates bias by providing some interviewing experience (Poggenpoel & Myburgh, 2003).

I received approval from the IRB and a pilot study was conducted to ensure the interview questions were understandable and clear to participants. Two participants were in the pilot study; and their data were not included in the final study. Both the pilot and final study followed the same outlined procedures. After transcribing the data, substituting a number for their name, and deleting any information that was related to their identity, I consulted with my dissertation chair for feedback on the pilot study. I made changes to enhance the interview questions or procedures based on the suggestions of the chair. Only then did I proceed in conducting the full study.

Procedures for Recruitment, Participation, and Data Collection

This section includes an explanation of how I recruited 10 participants in this study and the process of providing informed consent, which was vital to conducting research that was ethical and not harmful to them. Participants needed information about the study in which they were volunteering. This process provided them with the necessary background information on how the interview process was conducted. In this section I also include how recruited participants entered the study.

Recruitment Process

To elicit the sample participants, I emailed each teacher information about the study, including the purpose and how they could contact me if they were interested in participating in the study in a recruitment flyer. After receipt of responses, I screened each interested teacher for eligibility to ensure they qualified to participate based on the criteria I had established as written in this document and their answers on the demographic survey.

Participation Process

I followed the same procedure for contacting them with the request for them to complete the survey and after they had done that, I sent them the consent form by email and waited for them to send it back to me. Of the 36 emails sent only 10 participants responded. I then arranged interviews with all 10 eligible teachers at a time that was convenient for the participants by emailing them three possible time slots and asked them to choose one. I noted the time for myself after I got their response. Prior to the interview

I sent them a reminder email with the link to Microsoft TEAMS, an online platform, that they only had to click on to join the interview.

Informed Consent

If they qualified, I sent them a consent form. I decided who participated in the study based on purposeful sample procedures such as who may have had the knowledge, ability, and experience to answer the interview questions. I included an overview of the location, frequency, duration, and recording of all data collection events for this study as well as the process for the 10 participants to exit the study and provide any follow-up events, as needed.

Interview Data Collection

In this subsection I provide an overview of the actual interview data collection events. I included the location, frequency, and duration of the data collection events, as well as the method for recording it. This process worked fluidly in this study with the 10 consenting participants.

All data for this study were gathered in semistructured interviews with the participants. Interviews were hosted on Microsoft TEAMS, an online meeting platform, and were audio recorded using the technology in this software. I informed the participants at the beginning of their interviews that they were allowed to withdraw from the study at any time or skip any questions they did not wish to answer. I also assured them that their data would be kept confidential. Then I asked them if they had any questions before we began the interview.

I repeated this process 10 times, once for each participant. I completed my first interview on June 6, 2023, and my last one on July 5, 2023. The shortest interview was 30 mins and the longest was 60 mins. The average interview length was 45mins.

Recording and Tracking Interview Data

Each interview was recorded using Microsoft TEAMS's recording feature. Prior to beginning the recording, I received participant consent to record the interview. All participants granted consent. I thanked them for their time, and I asked the interview questions in the same order for each participant unless they had answered a question within another answer. Then, that question was skipped, or I used a follow-up question. I followed the directions on Microsoft TEAMS to video, record, and transcribe the interviews.

I chose Microsoft TEAMS because it was easy to use, it has been used numerous times for such tasks, and sensitive information was secured. I strived to transcribe them as accurately as possible while noting any biases, thoughts, conclusions, or questions in my journal as they arose.

After each interview was completed, I asked the participant to review the transcript. This process of giving the transcript back to the participant allowed them to ask questions or give feedback concerning the accuracy. After they sent it back to me, I then made any changes requested by the participants to ensure that the transcript accurately reflected their thoughts and opinions.

Participant Exit and Follow-Up Procedures

Each of the 10 participants received a thank-you email from me when they had completed the interview and transcript review. I also asked them if they would like to receive a copy of the dissertation or a summary of it. There were no follow-up interviews or treatments.

Data Analysis Plan

To analyze the interview data, I gathered in this study, I followed the outlined analysis plan. In this section, I explain the coding process of the thematic data analysis. I used the six steps of thematic analysis developed by Braun and Clarke (2006). This was an appropriate analysis because the aim was to condense the answers of the participants into themes that answered the research questions. Since the research questions were considered when creating the interview questions, it was anticipated that they were answered. The objective of this research was to solicit descriptions of the knowledge the participants had gained from their experiences with the phenomenon.

During the entire research process, I kept a combined journal and audit trail. The journal consisted of notes concerning my biases, reasoning, emotions, decisions, and questions that arose during the research process as suggested by Berger (2015). An important aspect of keeping a journal is that it gives the researcher a chance to reflect on the differences and commonalities of the participants involved in the study (Berger, 2015). An audit trail was also part of the research journal. Carcary (2020), as cited in Bowen, 2009), stated that an audit trail "can serve as a means of holding up to scrutiny the methodological and theoretical decisions made throughout the research process" (p.

305). Therefore, as part of the journaling process, I wrote down decisions I made and why they were made.

Coding Processes

I used inductive coding because I did not want to influence any outcomes with preconceived codes or code books. The aim was to allow the themes to develop through the process of coding, not to impose predetermined codes onto the data. Braun and Clarke (2020) explained that inductive coding is organic and uses no coding framework. In addition, the themes are the outcome of the data coding process (Braun & Clarke, 2020).

The coding process has multiple phases that the researcher must employ to analyze the qualitative data. Phase 1 is focused on the coding process and requires the researcher to read and reread the data in full to gain familiarity (Braun & Clarke, 2014); thus, I read and reread all the interview transcripts to develop my familiarity with the data. From this process, I ensured that I was familiar with the data and begin to generate initial thoughts regarding the data.

Phase 2 requires the researcher to identify patterns of meaning in the data as initial codes (Clarke & Braun, 2014). Within this phase, I coded all sections of the data that were relevant to the research questions into smaller chucks of meaning. These codes informed my initial thoughts gleaned from Phase 1.

In Phase 3, the researcher groups similar initial codes into themes (Clarke & Braun, 2014); thus, I reviewed each of the initial codes, considered how they related to one another, and combined them into larger themes. These themes captured significant concepts within the data and research questions.

In Phase 4 the researcher reviews and refines the themes (Clarke & Braun, 2014). Within this phase, I reviewed the developed themes and the chunks of text within each theme and refined the themes, combining themes when appropriate, splitting themes when they grew divergent, and removing themes that were not supported by the data.

In Phase 5, the researcher names and defines the themes to indicate their relevance as answers to the research questions (Clarke & Braun, 2014). At this phase, I attempted to capture the essence of each theme, consider what the theme really meant, what subthemes existed within themes, and how those sub-themes interacted with the main theme. Clark and Braun's (2014) final phase of coding requires the researcher to create a presentation of results. When at least 10 participants' interview data were analyzed using the process identified by Braun and Clarke (2020), and when analysis of data from the last two consecutive participants yielded no new themes or insights, I judged that data saturation was achieved and data collection and analysis were complete.

Type of Analysis

I analyzed data using Braun and Clarke's (2020) thematic analysis process. Thematic analysis was inductive and consisted of identifying and labeling patterns that emerged from the data during repeated review and comparison. The steps of the thematic analysis procedure were as follows: (a) reading and rereading the data in full to gain familiarity, (b) identifying patterns of meaning in the data as initial codes, (c) grouping similar initial codes into themes, (d) reviewing and refining the themes, (e) naming and defining the themes to indicate their relevance as answers to the research questions, and (f) creating a presentation of results.

Thematic coding is a process whereby the descriptions given by the participants in interviews are grouped into themes of commonalities. The aim of this research was to explore SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. Clarifying the knowledge held by these participants and putting into understanding form thematic coding was appropriate. Gathering descriptions of the phenomenon is the goal of qualitative research outcomes. However, by using thematic coding I was able to generate understandable data that answered the research questions. Braun and Clarke (2020) stated that thematic analysis is a process of organizing data to identify insight into patterns of meaning. It is the meaningful descriptions given by the participants that I sought to make sense of in the commonalities. By grouping the data, I was able to grasp the meaning of the entire group, or at least most of the participants, thus obtaining the essence of the meaning of their experiences.

Software

I used NVivo 14 computer-assisted qualitative data analysis software to analyze the data. The transcripts from the interviews were imported as source files and analyzed in the software, as recommended by Merriam and Tisdell (2016). NVivo does not automate the data analysis process, but it can be used to keep a record of the researcher's decisions during the data analysis, thereby increasing the trustworthiness of the data analysis (Merriam & Tisdell, 2016). I used NVivo to help sort and code the interview transcripts and as a reliability check of the data. All transcripts were uploaded into NVivo and 168 initial nodes were generated. *Nodes* are a collection of references about a specific theme, case, or relationship. Within the NVivo software I, as the researcher, identified patterns within segments of text and grouped text segments into nodes followed by a secondary grouping into codes. Assigning the segments of text(i.e. nodes), to the emergent codes involved clustering and labeling them. In NVivo, this process was repeated by assigning that had similar meanings to the same NVivo node, and giving the node a brief, descriptive label that summarized the relevant meaning of the data assigned to it. I also used Microsoft TEAMS to video, record, and transcribe responses from participants before using NVivo.

Discrepant Cases

To be considered a theme, the group of participants, or at least most participants, must have described similar experiences, thus given that experience similar meanings. So even though there may be conflicting descriptions of the same experience, that only means that those two participants gave different meanings to it. Neither is wrong because meaning is subjective. However, if only one participant's description is so different that none of the codes allow for common groupings, that one would be eliminated during the grouping processes. I looked for patterns throughout the thematic coding process. A pattern is only formed with a group of codes, not a single code from a single person. Therefore, that single code is not applicable to any pattern or theme of commonality.

Trustworthiness

This section includes a discussion of the trustworthiness of the study. Within this section, I included information about the credibility, transferability, dependability, and confirmability of the study. Additionally, this section covered how I assuaged any concerns related to the trustworthiness of the study. Trustworthiness can be established through various techniques such as prolonged contact with the participants, member checks, saturation, and reflexivity (Burkholder et all., 2020). During the interviews I had contact with each participant one-on-one in addition to further contact through emails. Transcript reviews were conducted with each participant by giving the transcript of their interview back to them to check for accuracy as suggested by Lincoln and Guba (1986). The interviewing process continued until saturation was met. Saturation is reached when the participants keep repeating the same answers so no new data can be collected (Petty et al., 2012). Wallendorf and Belk (1989) described a reflexive journal as "reflexive documents kept by the researcher in order to reflect on, tentatively interpret, and plan data collection" (para. 77). I also kept a journal that included my reflective thoughts during the entire research process.

Credibility

Credibility is the extent to which the study and the results can be trusted (Petty et al., 2012). It is up to those assessing the study to determine the credibility, which is like validity in qualitative studies (Petty et al., 2012). Credibility can be thought of as truth value according to Petty et al. (2012). If the findings are believable to the participants, then it can also be considered creditable (Sandelowski, 1986). Asking if the findings ring true to others not involved in the study is another way of understanding credibility (Sandelowski, 1986).

The credibility of the research was supported by interviewing at least 10 participants and by reaching data saturation. Data saturation refers to the point at which no new or novel information is being collected from participants (Rubin & Rubin, 2012). By reaching data saturation, I could assure that the sample participants did not misrepresent the population, and that the data are not skewed by unique experiences that are not generally experienced by others in the population. While each participant's experiences are unique to them, reaching data saturation ensures that the experiences described by participants are at least relatable to others within the population. Reaching data saturation also helps ensure generalizability of the data. Transcript reviews were conducted with the participants, thereby adding to the credibility of the study so the accuracy of the transcripts of the interviews could be established.

Transferability

For my study to be trustworthy, I also needed to ensure that the study is transferable. Transferability is the extent to which the findings can be applied in a similar situation (Lincoln & Guba, 1986). Thick, rich descriptive data are collected to ensure transferability (Lincoln & Guba, 1986). Just as the credibility of the study was supported by interviewing at least 10 participants and by reaching data saturation, so was the transferability of the study (Ratajcyk et al., 2016). As a qualitative study, it is unlikely that the results of this investigation were generalizable to the population beyond the individuals participating in this study. However, by recruiting sufficient sample size and reaching data saturation it is more likely that the findings of the study may be transferable to similar populations (Ratajcyk et al., 2016). I endeavored to collect thick, rich descriptions from the participants by listening carefully and using follow-up questions to clarify and deepen their answers.

Dependability

Dependability is the extent to which trackable variance, as Guba (1981) put it, when a reader knows about the procedures the researcher went through to obtain the findings it helps establish the dependability of the study (p. 81). A way of establishing dependability is keeping an audit trail so others can follow the changes brought to the researcher by the research process itself, such as insights that change (Guba, 1981). I kept an audit trail as part of the journaling process by writing down decisions, reasonings, insights, and biases that surfaced during the research process. This process provided increased dependability of the study.

The dependability of the research was assured by transcribing participant interviews verbatim and by asking each participant to review their transcripts upon completion. This ensured that the data were not accidentally misrepresented by the participant or me, the researcher. Since the participants were able to clarify their remarks after the fact, I was sure the participants believed the statements accurately represented their experiences. To further ensure the dependability of the data, I assured that coding drift did not occur by reviewing the data several times throughout the coding process as my understanding of the data deepened. *Coding drift* refers to the phenomenon where a code might mean something different at the beginning of coding than it did at the end of coding (Ratajcyk et al., 2016). By adjusting the codes as necessary at the end of the coding process and at periodic intervals throughout the process, the researcher ensures the codes remain consistent throughout coding and that another researcher can replicate the coding process; this in turn establishes dependability (Braun et al., 2014).

Confirmability

Confirmability is the degree to which the findings reflect the aim of the enquiry (Lincoln & Guba, 1986). Confirmability can be established by the researcher keeping a detailed, explanatory audit trial that includes how the interpretations were made and the reasoning process behind the conclusions (Guba, 1981). I ensured confirmability by closely following the protocols documented in this chapter. By doing so, other researchers will be able to closely replicate my work to confirm or refute the findings presented in the current study (Rubin & Rubin, 2012). By closely documenting and justifying the procedures I used in the study, other researchers can examine and critique my processes (Rubin & Rubin, 2012). This increases the overall validity of the findings in the current study as readers know that the findings are replicable should another study be completed using the same population (Rubin & Rubin, 2012).

Ethical Procedures

I ensured this study remained ethically completed by maintaining integrity of the research and the confidentiality of the participants throughout the course of this research. Before collecting data, I sought site authorization from the target school district and the school where data was collected and received IRB approval. I also followed the values in the *Belmont Report* as described in the next sections.

Treatment/Protection of Human Participants

I followed the principles established by the *Belmont Report* (1978). This included maintaining respect for participants, beneficence, and justice. I treated each participant with dignity and respect (U.S. Department of Health and Human Services, 2021). This was accomplished by treating each participant with courtesy and answering their questions honestly. I also followed through on all promises made to participants, such as keeping their data confidential and representing their experiences accurately (U.S. Department of Health and Human Services, 2021). I ensured beneficence by treating all participants equally. Participants were asked the same protocol questions, and their data and confidentiality were handled in the same way (see U.S. Department of Health & Human Services, 2021). Lastly, I ensured justice was accomplished by sharing the results of the research with each participant and the academic community (see U.S. Department of Health & Human Services, 2021). I also changed the names of all participants to numbers and deleted any identifying information to protect the privacy and to maintain confidentiality of their information.

Treatment of Data

All data collected were confidential and no concerns were noted with the collection process. Data on the computer were kept secure with the use of a password as were any copies on a thumb drive. The data acquired will be destroyed after 5 years. Thus, after 5 years, the data on the thumb drive and the computer will be wiped clean, in adherence to IRB standards. I, as the researcher, will have access to the data for 5 years and it will not be disseminated on any platforms publicly.

Other Ethical Issues

In conducting the study, first, I ensured I did not include any participants with whom I had a personal, professional, or supervisory relationship. I accomplished this by reviewing the initial survey they completed about the criteria and demographic information. If I recognized the name with which I had one of these types of relationships, I deleted it from possible participants. Further, I kept a journal about my reflective thoughts, ideas, biases, insights, and reasoning processes to ensure the quality of the study.

Summary

The purpose of this basic qualitative study was to explore SUTSD upper elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The phenomenon under investigation in this study was upper elementary teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. A basic qualitative design was leveraged for this investigation. As the researcher, I served as the primary data collection instrument in this study. I was also responsible for analyzing the data collected in this study and reporting the results. This research took place in Tennessee.

The general population in this study was upper elementary teachers who had used RTI2 for SPED students in mathematics classrooms. The specific population in this study was SUTSD upper elementary teachers who had used RTI2 for SPED students in mathematics classrooms. Ten participants were selected using purposeful sampling. Data were analyzed using Braun and Clarke's (2020) thematic analysis process. The credibility and transferability of the study was supported by interviewing 10 participants and by reaching data saturation. The dependability of the research was assured by transcribing participant interviews verbatim and by asking each participant to review their transcripts upon completion. I ensured confirmability by closely following the protocols documented in this chapter. I kept all data confidential and followed the principles of the *Belmont Report* (National Commission for the Protection of Human Subjects of Biomedical, & Behavioral Research, 1978).

Chapter 4: Results

The purpose of this basic qualitative study was to explore SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The RQs that guided this study were as follows:

RQ1: What are SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions of the usefulness of RTI2 for SPED students in mathematics classrooms?

RQ2: What challenges do SUTSD upper elementary (i.e., Grades 3-5) teachers report implementing RTI2?

This chapter includes sections describing the study's setting, participants' demographic characteristics, data collection procedures, data analysis using Clarke and Braun's (2014) six-phase data analysis and NVivo, evidence of trustworthiness, results, and summary.

Setting

Personal/Organizational Conditions

The participants taught Grades 3-5 SPED mathematics at elementary schools in the SUTSD. They were also teachers that used RTI2 to support student learning and had at least 1 year of teaching experience. There were no personal or organizational conditions that influenced participants or their experiences at the time of the study that affected the study results.

Participant Demographics and Characteristics

The participants included in this study were homogeneous in terms of race or ethnicity. The study included nine females and one male participant. The participants were all African American and most had more than 10 years of experience as classroom teachers. Table 2 shows the participant demographics by gender, age, and years of teaching experience.

Table 2

Participants Demographics, n = 10

P#	Gender	Age *m* = 41.7	Years teaching experience *m* = 16.1
P1	F	49	8
P2	F	47	17
P3	F	38	16
P4	F	29	7
P5	F	60	28
P6	F	48	2
P7	F	43	20
P8	M	53	22
P9	F	39	18
P10	F	47	23

Data Collection

All data for this study were gathered in semistructured interviews with the 10 participants. Each of the 10 participants were interviewed once online via Microsoft TEAMS and were audio recorded using the integrated audio-recording feature. All 10 interviews were conducted between June 6, 2023, and July 5, 2023. Interviews lasted between 30 to 60 minutes with an average length of 45 minutes.

The participants selected a time based on three choices given, and both the time and date were noted. A Microsoft TEAMS link was then emailed to the participants. At the appointed time, I met with each participant on TEAMS. The interview was recorded and as each participant responded to 13 interview questions. The data collection ranged from 30 to 60 minutes per participant. There were no unusual variations nor circumstances in the data collection process. Data were transcribed by the Microsoft TEAMS software after the interview was completed.

Data Analysis

The data analysis was conducted according to Braun and Clarke's (2014) six-phase data analysis. In this section, I provide an overview of Phases 1-5, as well as a detailed account of how I inductively analyzed the raw data using the coding plan. Phase 6, which addresses how to share the data analysis, is addressed in the Results section of this study.

Phase 1: Familiarization with Data

Phase 1 is focused on the familiarization process and requires the researcher to read and reread the data in full to gain familiarity (Clarke & Braun, 2014); thus, I read and reread all the interview transcripts to develop my familiarity with the data. From this process, I ensured that I was familiar with the data and began to generate initial thoughts regarding the data.

Phase 2: Generation of Codes

Phase 2 involved identifying patterns of meaning in the data as initial codes (Clarke & Braun, 2014). This phase was conducted in two steps. In the first step, I broke all responses that were relevant to the research questions into smaller segments of text. The smaller segments of text each consisted of a phrase or group of consecutive phrases from a participant's response that expressed a single idea relevant to addressing a research question. Each segment of text was assigned to an NVivo node. An example of a segment of text was the following language, which was drawn from a response from P10: "The assessments are helpful because they can pinpoint and give you a starting point to where you need to start to bring them [students] up to where they need to be." This segment of text was identified as relevant to RQ1, because it indicated a teacher perception of the usefulness of assessments, which are part of RTI2. Overall, a total of 168 relevant segments of text were identified and assigned to NVivo nodes.

In the second step of Phase 2 of the data analysis (i.e., coding the data), the segments of text were assigned to codes. Assigning the segments of text to the emergent codes involved clustering and labeling them. In NVivo, this process was repeated by assigning segments of text that had similar meanings to the same NVivo node, and giving the node a brief, descriptive label that summarized the relevant meaning of the data assigned to it. Each labeled NVivo node represented one code. As an example of the coding process, the segment of text quoted from P10 was assigned to a code that was labeled "assessments helpful." When other segments of text from P10's transcript or from other participants' transcripts had similar meanings, they were assigned to the same code. For example, P3 stated, "I found it [an RTI2 assessment] helpful when it comes to whatever they have determined what the student's deficit area is." Given that this segment of text had a similar meaning to the previously quoted statement by P10, it was assigned to the same NVivo code, which represented the code, assessments helpful.

Overall, the 168 relevant nodes were assigned to 21 codes. Table 3 indicates the emergent codes, along with sample segments of text representing each code.

Table 3

Emergent Codes with Examples

	Emergent code	Participant	Example
1	Additional support needed for content	P4	They're progressing to learn how to multiply, but once you put it in a different context or a word problem, it becomes too difficult for them.
2	Assessments helpful	P3	I don't think there are any assessments that could be better.
3	Building relationships with parents	P2	It is very hard to get parents involved. So, you have to lead by example.
4	Connecting learning to everyday lives	P6	I hope to accomplish that students understand the importance of mathematics and numbers and how it would be applied and used in their everyday life.
5	Differentiated interventions are effective	P8	I have a student that had a score of maybe 300 on a diagnostic test, and after having instruction with them three times a week for 45 minutes, they had tremendous growth.
6	Have needed tools to help struggling students	P6	I think I have all the information and tools, or I have access to it if I need to get it.
7	Have resources needed	P7	I think we have a lot of resources. I don't think resources are the problem at all. We have so many different things we can use.
8	Lacking personnel support	P4	I guess the biggest challenge would be just the personnel support because it was just me, and I didn't have a teacher assistant. So just trying to reach all of the needs and meet all of the needs of the needs and meet all of the needs of my students and making sure that we're still in compliance.
9	Making work engaging	P1	Just making it a more engaging subject. A lot of times people dread to come to math class.
10	Mastering skills	P1	One thing I hope to accomplish every year is for them to master some skills.
11	More computers would improve learning	P2	Technology always improves learning because that's the world we're living in right now. I think the hands-on just laptops in general with interactive manipulatives that children can manipulate on a screen.
12	No time for math	P10	Our biggest challenge so far this year you know we have our TI block and so this past school year, we weren't able to do math RTI because reading trumps math.
13	PD is helpful	P5	All of my professional developments that I have attended, I have learned something. There has been a takeaway. There has been something that I have gained that I can bring back to the classroom that will enhance my teaching and help my students learn.
14	PD is not helpful	P1	I have participated in some professional development around RTI squared and I did not find that helpful for my students.

Table 3 cont.

Emergent Codes with Examples

	Emergent Code	Participant	Example
15	Progress monitoring with data	P5	Using the IRATY data and also that mastery connect, those are those district assessments that help us to pinpoint and to identify the deficit areas of the student, along with teacher observation and knowing my students.
16	Providing differentiated support to struggling students	P2	So there's a lot of research that comes in it, but starting with a pretest, grouping them according to what I'm seeing, researching to plan for, and then knowing what is it they need to be successful and what is it that they need to extend them.
17	RTI2 is a stumbling block to meeting requirements	P7	I feel like it's more of a stumbling block because it's not necessarily being implemented the way it's supposed to, it's so much paperwork, so much testing.
18	RTI2 is helpful	P9	It gives me that opportunity to be more one-on-one with the students and that smaller group setting and actually see their misconceptions and what they're actually lacking or missing.
19	Technology is useful	P4	I felt like it was very helpful because a lot of times if, as a teacher, we don't have those tangible manipulatives, we could let the students go to a website and use manipulatives there.
20	No challenges	P8	I hadn't had or encountered any challenges, as of yet.
21	Student observation	P1	Observation, I just have to observe them. I have to see what kind of learner they are. Maybe they have to touch something. Maybe they fidget all the time, and they need to do something with their hands, or that comes from my experience as a kindergarten teacher. Or maybe they, you know, need to see me model more. Or they need, you know, just different. That's just me observing them and looking at their password, reviewing their student work.

Table 4 indicates the emergent codes and the number of data excerpts assigned to each of them. It also shows the number of participants who responded to each emergent code listed in Table 4.

Table 4

Summary of Emergent Codes by Number of Participants & Number of Excerpts

	Emergent Code	*n* Participants	*n* Excerpts
1	Assessments helpful	10	20
2	Building relationships with parents	10	13
3	Connecting learning to everyday lives	10	13
4	Differentiated interventions are effective	10	10
5	Additional support needed for content	9	20
6	Have resources needed	9	10
7	Have needed tools to help struggling students	8	8
8	PD is helpful	8	9
9	Providing differentiated support to struggling students	8	15
10	Progress monitoring with data	6	6
11	RTI2 is helpful	6	6
12	Making work engaging	5	7
13	Lacking personnel support	4	8
14	RTI2 is a stumbling block to meeting requirements	4	4
15	Student observation	4	4
16	Technology is useful	4	4
17	Mastering skills	3	3
18	More computers would improve learning	3	3
19	PD is not helpful	2	2
20	No challenges	1	2
21	No time for math	1	1

Phase 3: Combining Codes to Themes

In Phase 3, I grouped similar emergent codes into themes (Clarke & Braun, 2014); thus, I reviewed each of the emergent codes, considered how they related to one another and combined them into larger themes. These themes captured significant concepts within the data and were organized by research question. Overall, the 21 initial codes were grouped into four preliminary themes:

- Theme 1: Teachers believed that RTI2 can be useful for helping teachers and parents to support students.
- Theme 2: Teachers understood that RTI2 can be useful for identifying and helping struggling students.
- Theme 3: Teachers believed content support, personnel, and student engagement were barriers to RTI2.
- Theme 4: Teachers believed that RTI2 may itself be a stumbling block for teachers who are unfamiliar with it.

These themes capture significant concepts within the data. The next phase was reviewing the themes.

Phase 4: Reviewing Themes

In Phase 4, the researcher reviews and refines the themes (Clarke & Braun, 2014). Within this phase, I reviewed the preliminary themes and the chunks of text within each theme and refined the themes, combining themes when appropriate, splitting themes when they grew divergent, and removing themes that were not supported by the data. In conducting the process of review, Preliminary Themes 1 and 2 were combined because they were found to be insufficiently distinct to support their separate presentation. The names of Preliminary Themes 3 and 4 were combined because they both dealt with barriers. Phase 5 section reviewed the resulting themes.

Phase 5: Significance of Themes

In Phase 5, the researcher names and defines the themes to indicate their relevance as answers to the research questions (Clarke & Braun, 2014). In this phase, I attempted to capture the essence of each theme, considering what the theme really meant. As I analyzed the findings from the data and regrouped the initial four themes to two significant themes that addressed the research questions:

- Theme 1: Teachers believed that RTI2 can be useful for identifying and supporting struggling students.
- Theme 2: Teachers Believed That Content Support, Personnel, RTI2 Requirements, More Computers, No Time for Math, PD Not Helpful, and Lack of Student Engagement Were Barriers to RTI2.

There was a total of two themes that emerged from the interview questions during the data analysis. Table 5 shows the alignment between those emergent codes and revised themes.

Table 5

Alignment of Emergent Codes and Themes

Theme		Emergent Code	*n* Participants	*n* Excerpts
Theme 1: Teachers believed that RTI2 can be useful for identifying and supporting struggling students.	1	Assessments helpful	10	20
	2	Building relationships with parents	10	13
	3	Connecting learning to everyday lives	10	13
	4	Differentiated interventions are effective	10	10
	5	Have resources needed	9	10
	6	Have needed tools to help struggling students	8	8
	7	PD is helpful	8	9
	8	Providing differentiated support to struggling students	8	15
	9	Progress monitoring with data	6	6
	10	RTI2 is helpful	6	6
	11	Technology is useful	4	4
	12	Student observation	4	4
	13	Mastering skills	3	3
Theme 2: Teachers believed that content support, personnel, and lack of student engagement were barriers to RTI2	1	Additional support needed for content	9	20
	2	Making work engaging	5	7
	3	Lacking personnel support	4	8
	4	RTI2 is a stumbling block to meeting requirements	4	4
	5	More computers would improve learning	3	3
	6	PD is not helpful	2	2

Theme 1: Teachers Believed that RTI2 Can Be Useful for Identifying and Supporting Struggling Students

Based on the data analysis, RTI2 provided teachers with the tools to identify struggling students through monitoring progress with data and observing students. When struggling students were identified, effective, and differentiated support was provided to meet students' individual needs, the participants indicated. The participants expressed the perception that they had the tools they needed to help struggling students. Table 6 indicates the emergent codes that I grouped to form Theme 1.

Table 6

Codes with Number of Participants and Excerpts That Informed Theme 1

	Emergent Code Informing Theme	*n* Participants	Excerpts
1	Assessments are helpful	10	20
2	Building relationships with parents	10	13
3	Connecting learning to everyday lives	10	13
4	Differentiated interventions are effective	10	10
5	Have resources needed	9	10
6	PD is helpful	8	9
7	Have needed tools to help struggling students	8	8
8	Providing differentiated support to struggling students	8	15
9	Progress monitoring with data	6	6
10	RTI2 is helpful	6	6
11	Technology is useful	4	4
12	Student observation	4	4
13	Mastering skills	3	3
	Theme 1 Totals	10	117

The following narrative shows the participants' responses in alignment with the emergent codes for informing the theme.

Assessments Are Helpful. All 10 participants perceived the formative and summative assessments associated with RTI2 as helpful in determining student deficit areas so that remedial instruction could be provided. This was helpful because it saved the teachers instructional time by allowing teachers to disaggregate assessment data into specific areas to support struggling students.

Building Relationships With Parents. All 10 participants perceived building relationships with parents as challenging but necessary, and they attempted to accomplish it through frequent communication. The 10 participants stated that having parents involved in their child's academic learning provided an extra support level at home.

Connecting Learning to Everyday Lives. All 10 participants attempted to connect math curriculum to concepts and situations in their students' normal, everyday lives to make abstract ideas more concrete and easier to learn. Teachers supported struggling students by connecting the math concepts to their lives to provide relevance. Some of the codes include the following: I hope to accomplish that students understand the importance of mathematics and numbers and how it would be applied and used in their everyday life.

Differentiated Interventions Are Effective. All 10 participants perceived interventions that were differentiated to target individual students' or groups of students' specific needs as more effective than one-size-fits-all instruction.

Have Resources Needed. Nine participants indicated that they had the instructional resources they needed to accomplish their students' learning goals within the RTI2 process. The codes are I think we have a lot of resources, I don't think resources are the problem at all, and we have so many different things we can use.

PD is Helpful. Eight participants indicated that the PD they attended dedicated to RTI2 was effective in giving them strategies and instructional techniques that they could implement in their classrooms to improve their students' learning.

Have Needed Tools to Help Struggling Students. Eight participants indicated that they had the testing and instructional resources that they needed specifically to address the learning needs of students who were struggling to master foundational concepts.

Providing Differentiated Support to Struggling Students. Eight participants indicated that they engaged, through RTI2, in providing effective differentiated support to struggling students.

Progress Monitoring With Data. Six participants indicated that they utilized data collected through assessments to monitor the progress of their students.

RTI2 is Helpful. Six participants provided discrepant data indicating that RTI2 was predominantly helpful to them in meeting their struggling students' needs.

Technology Is Useful. Four participants expressed the perception that technology such as tablets and laptops were useful learning resources for their students.

Student Observation. Four participants indicated that one of the ways they assessed whether their students needed extra support was by observing them in the classroom and judging by their body language whether they appeared to be struggling.

Mastering Skills. Three participants indicated that one of the instructional goals that RTI2 was particularly effective in supporting was helping their students to master skills and to address academic deficits identified through the RTI2 process.

Summary. Based upon the data analysis, teachers stated that RTI2 provided them with the tools to administer helpful assessments, to build relationships with parents, to connect learning to everyday lives, to differentiate interventions and support, to have the resources needed to support student along with PD, to identify struggling students, to monitor progress with data, to master academic skill deficits, to assist learning through technology, to observing students, and to help teachers with RTI2 instructions. When struggling students were identified, effective differentiated support was provided to meet students' individual needs, the participants indicated. The participants expressed the perception that they had the tools they needed to help struggling students. Thirteen emergent codes were used to support Theme 1.

Theme 2: Teachers Believed That Content Support, Personnel, RTI2 Requirements, More Computers, No Time for Math, PD Not Helpful, and Lack of Student Engagement Were Barriers to RTI2

The participants indicated the main challenges to implementing RTI2. Challenges identified by teachers included needing additional content support, making work engaging, lacking personnel support, reducing stumbling blocks to implementation, increasing the number of computers to improve learning, improving PD offered, and increasing time for math. Table 7 indicates the codes grouped to form Theme 2.

Table 7

Codes with Number of Participants and Excerpts That Informed Theme 2

Emergent Code Informing Theme	*n* Participants	Excerpts
Additional support needed for content	9	20
Making work engaging	5	7
Lacking personnel support	4	8
RTI2 is a stumbling block to meeting requirements	4	4
More computers would improve learning	3	3
PD is not helpful	2	2
Theme 2 Totals	23	41

Additional Support Needed for Content. Nine participants indicated that a challenge in RTI2 implementation was that students needed additional support for mastering content associated with lower grade levels than their current grade level.

Making Work Engaging. Five participants indicated that an implementation challenge was making the subject of math engaging for students.

Lacking Personnel Support. Four participants indicated that they did not have sufficient personnel support, in the form of teaching aides, to provide all their students with the individual and small-group attention that proper RTI2 implementation required.

RTI2 Is a Stumbling Block to Meeting Requirements. Four participants indicated that RTI2 was predominantly a stumbling block, or a barrier, in meeting their struggling students' needs.

More Computers Would Improve Learning. Three participants indicated that if their students had access to more computers, then learning would be improved.

PD Is Not Helpful. Two out of 10 participants indicated that PD for RTI2 was not helpful. Teachers still struggled with implementation of RTI2 in the classroom and supporting students' academic outcomes.

Summary. Nine participants indicated that a challenge in RTI2 included needing additional support for content, engaging strategies towards the work, lacking personnel support, creating a stumbling block to meeting RTI2 requirements, needing more computers to help with the learning, lacking helpful PD, and needing more time for math all played a part in making RTI2 implementation difficult. Seven emergent codes were used to support Theme 2.

Discrepant Cases

When most participants assigned a given meaning to an experience, and a minority of participants assigned a discrepant or divergent meaning to that same experience, the meaning assigned by most participants was identified as the finding in the study, and the meaning assigned by the minority of participants was defined as discrepant data (Creswell & Creswell, 2017). There were only two discrepant findings within the data. While nine participants reported challenges, one participant provided discrepant data reporting no challenges. Another discrepant finding shared by a participant was a lack of time for math. One participant indicated that reading typically took up all the time needed for RTI2 math implementation.

Results

The two themes that emerged from these data informed the RQs in this study. Table 8 details the alignment of the RQs to the themes that were generated from the data analysis.

Table 8

Alignment of RQ Content to Theme

	Themes	RQs: Teacher perceptions about … 1 RTI2 usefulness for teaching mathematics to SPED students	2 Challenges to implementing RTI2
1	Teachers believed that RTI2 can be useful for identifying & supporting struggling students.	X	
2	Teachers believed that content support, personnel, and lack of student engagement were barriers to RTI2.		X

Understanding the development of the themes from the data source and how they inform the research questions (RQs) was key to addressing the purpose and problem in this study.

Research Question 1

The first research question, RQ1 looked at SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions of the usefulness of RTI2 for SPED students in math classrooms. Based upon the analysis, RQ1 was aligned and addressed with Theme 1. The interview data informed RQ1 since only participants' discourse could provide perspectives and perceptions of teachers' attitudes and beliefs. This discourse helped determine the usefulness of the RTI2 program when identifying and supporting struggling students. Participants identified elements within the RTI2 process that were useful. Including assessments, resources, and professional development.

Theme 1: Teachers Believed that RTI2 Can Be Useful for Identifying and Supporting Struggling Students

All the participants contributed to this theme. The findings indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and help students with mastering skills. The participants shared that assessments associated with RTI2 were also helpful in promoting student learning. The participants reported that teachers had the resources they needed to enhance student learning. Participants shared that teachers were further assisted in enhancing student learning through PD, and through building relationships with students' parents.

Assessments Helpful. All the participants described the assessments associated with RTI2 as helpful. The teachers believed that the assessments embedded in the program that are used for RTI2 gave them a breakdown of what students' areas of deficit were. They used this information to determine the next steps to improve student learning of mathematical practices. P7 indicated that the assessments were helpful for tracking growth and revealing learning gaps: "I think that looking at the data and seeing growth from each semester is really helpful in seeing what's working, what's not working." P6 indicated that she used assessments to understand, "How they answer, what strategies are they using to answer? So, I use all of that from the assessments to see how they're learning, what steps I need to take to get them where they need to be." P4 reported being satisfied with the assessments because she could use them to target work to address learning gaps:

> If I see that a student is struggling in numbers and operations, I can go in and either assign lessons, or I can look to see what individual or small-group instruction lessons that I can pull to help those students. So, I'm honestly satisfied.

Six participants reported that they had the resources they needed to assist students. P2 said, “I use so many resources, there's not one in particular that I can think of that I don't have access to.” P3 agreed, saying, “We got basically, you know, the things that we need.” P5 stated, “Can't think of the resource I don't have right now.” P7 also indicated that resources were abundant in her school: “I think we have a lot of resources. I don't think resources are the problem at all. We have so many different things we can use.” P10 described the assessments as providing a nuanced, detailed snapshot of students’ skill levels: “The assessments, they are helpful because they're going to give you a look at where the deficit is. So, I can go into i-Ready and see exactly, okay, you scored first-grade here, your kindergarten-level here, you're below kindergarten here.”

Building Relationships With Parents. All 10 participants reported that they assisted their students as part of RTI2 requirements by building relationships with their students’ parents. They felt that building meaningful relationships with parents enhanced students’ learning mathematical concepts while using RTI2. Communication with parents was frequent and informative and, in some instances, parents were given information in advance to prepare their child ahead of time. By having these meaningful relationships, they were able to provide parents with strategies to use at home with their child. Thus, for the participants, parents were a key component of supporting student learning in RTI2. P2 provided a detailed and representative response about parental involvement. She said that parents needed to be involved through “Constant communication. It is very hard to get parents involved. So, you must lead by example, so it's not so much what I say I'm doing but showing you what I'm doing.” P2 added that many parents did not know how to support their students’ learning at home, and that teachers therefore needed to build relationships with parents: “The parents really can't and really do not know how to support their children. So, I think giving them simplistic things to use at home, but before you can get parents engaged, you must build that relationship.” P2 indicated that building relationships with parents was based on convincing parents of three points: (a) that the teacher was truly concerned with the child’s best interests, (b) that the teacher was not judging them or the child, and (c) that the teacher was not expecting the parents to be solely responsible for the child’s learning:

> Once you build that relationship with parents, they are understanding that you truly want to help their child, that you know you're not judging their child based on what they can or cannot do, that makes them open up more to say, OK, what is it that I can be doing at home, rather than expecting me to do it all?

P3 emphasized the open communication aspect of relationship-building with parents: “Just having that communication and letting the parents know of my concerns, as far as where their child is struggling, and then a lot of times just trying to provide the parents with resources.” P4 used regular newsletters to keep parents informed: “I always send newsletters home to show the parents, one, what the students are learning, and

[two], show them how they can support their child." P6 gave parents advance notice of classroom learning so that parents could provide advance support: "I keep the parents informed on what we are learning ahead of time, so they need to start with their student ahead of time." P8 reported giving parents his personal phone number to keep in frequent contact with them about their children's progress: "I've always developed great relationships with parents, and even by giving them my personal number, to where they need any type of help, they can reach out to me for their child's growth academically, emotionally, or socially." P9 reported staying in frequent communication with parents as well: "Constant parent communication, constantly getting the parents involved via email, telephone calls, we sent home graded papers, keeping them well aware and informed of what's going on." Building parental relationships is an important aspect to using RTI2 as well.

Connecting Learning to Everyday Lives. Teachers also believed that real-world connections when using RTI2 to reinforce mathematical concepts was important to students' success in learning. All 10 participants indicated that RTI2 was useful in connecting mathematics course content to students' everyday lives to promote learning by making the curriculum more concrete. They felt that by bridging the connection with real-world places students might visit or things they do would give them a better understanding of mathematical practices in real-life applications. Participant 2 (P2), for example, said, "Math is so easy to do with that real-world connection. So, I try to think about children in general and what their interests are, what captures their attention, and then relate it to them." P2 added as a specific example, "A lot of students usually go to an answer that has something to do with shopping at a store and how we utilize math. We're shopping in stores, so yes, it's always good to make that real-world connection." P3 agreed, saying that she always tried to demonstrate real-world applications of mathematical concepts during instruction in mathematics classrooms. . P3 shared:

> I try to bring in something that I think that they are familiar with and try to put it in there, and even when we're reading the word problem, I would ask them, so do we go to the fair? And like, yeah, we do go to the fair. OK, I want you to put that. Put yourself in their personal scenario.

Participants shared how they connect real world examples to their instructions. P4 described teaching real-world applications of math as teaching not only the "how" of math, but the "why": "Not only am I teaching them the procedural things, but I'm teaching them the why, the conceptual understanding of math, and showing them that you use math every day, and it's practical, it's something that you're going to need." P5 agreed, describing lessons that made real-world applications of the curriculum explicit as "authentic": "An authentic lesson for them is making the connection between real life and math, and I think that helps them to better understand that more so than anything." Another way in which teachers reported making real world connections was shared by P8: "As far as percentages, balancing checkbooks, and even with the geometry aspect, as far as architectural drawings and things of that nature."

Differentiated Interventions Are Effective. Ten participants indicated that differentiated interventions are effective because it provided students with tools to help them understand instruction. Teachers used strategies to help students learn difficult concepts and provided them with anchor charts when needed to support learning. During math class manipulatives were used to make the connection more concrete for learners and authentic. P1 said:

> She received a new student, and the student had a hard time with reading and math. However, she was stronger in math, I gave her some keywords and how to break the problem down. And you know, like when you see smaller or lesser or greater and putting those words on the board or an anchor chart where she could see those words all the time. That really helped her.

Another way differentiation supported student learning was indicated by P10 who said:

> That one student struggled with skip counting by three, so I had the student to draw it out. And then we used cubes and started skip counting by threes. By the end he was able to do his skip counting by threes.

P2 also shared differentiation strategies they used to support a student with addition and subtraction. It can be a hard concept to understand regrouping but using strategies aligned to the learning outcome students were able to learn the concept of regrouping. P2 stated, "she had a student struggling with addition and subtraction with regrouping. Several strategies were used to support this student during intervention. It was important to make sure she had her intervention time and by doing so she made significant improvement." P3 also indicated that one student struggled with adding and subtracting. "I had to bring back manipulatives and strategies that worked for me. So, I worked with the student repeatedly on how to add and subtract to get her to understand." P9 shared "by students being able to use hands-on with manipulatives during intervention time worked well in small groups. It allowed me to use more manipulatives than in a larger group. The student was successful by physically touching the manipulatives."

Students struggled with fluency in math as well but by being able to work with them in small groups they were able to learn due to the lesson being more authentic to their specific need. P4 stated:

> That one student skill deficit area was math automaticity. So, her struggle was fluency and the foundational pieces of math. I worked with her in a small group during intervention. And by the end of the school year, she did not test of intervention services, but she did progress to the next skill area.

P5 stated, "that anytime you can make the learning authentic for the student they will learn. Authentic anything if they can make the authentic connection, they understand it and they will remember it."

P6 recalled a student that received intervention support during intervention and by the end of the school year she no longer needed RTI2 support. By working with this student in a smaller setting the learning was tailored to her specific deficit area.
P6 stated:

> I think that her being exposed to small group settings and being able to ask questions and me being able to explain it in more detail helped her to get a better understanding of how different strategies that she can use were more comfortable to her.

RTI2 has many resources available for teachers to use to support students in their area of deficit. Teachers don't have to look in many places to find what they need because it is all embedded in the RTI2 Program.

P7 stated:

> A student had a gap in measurement and data from second grade. So I used materials from the RTI2 program to support the student area of deficit and to focus on the specific skills that she needed for me to help her with. From there it was just about time for the year to end and she tested out of RTI2.

The RTI2 program requires teachers to follow guidelines to ensure student success in learning. Students must spend a certain amount of time on the program and a certain amount of time with the teacher. This gives the student the needed practice and opportunity to close gaps in their learning. P8 stated, "I have a student that had a score of maybe 300 on a diagnostic test and after having instruction with them three times a week for 45 minutes, they had tremendous growth."

Having Resources Needed. Nine participants stated that they had the resources they needed to implement RTI2. These resources ensured students' skill deficits are met during the intervention implementation. They also offer a variety of teaching strategies to increase student performance. Having these resources readily available ensures the teacher can implement intervention accordingly. P1 indicated, "the school had a plethora of resources available as a tool to support learning." P10 shared that it was hard to think of something needed that they didn't already have." P2 stated, "I use so many resources that there is not one resource in particular that I can think of that I don't have access to." P3 indicated, "she has all she needs to support students."

The availability and access to these resources significantly increases a student's chance to show growth. It allows the teacher to meet the needs of students in a variety of ways. Although additional resources offer multiple ways to engage during intervention, teachers often utilize the resource they believe will increase a student's chance to be successful. P6 simply stated, she would like to use canvas more as a resource. She has access to it but have not used it very much." P7shared, "we have a lot of resources, I don't think resources are the problem at all. We have so many different things we can use, especially now we have a new curriculum with intervention materials provided."

Having resources readily available also means a teacher must be proficient in implementing and using them as well as monitoring student progress. This progress is an indicator of student success with the current intervention as well as the resource used for intervention implementation. P8 just simply said, "I have all the tools that I need for my students to become successful." P9 shared the same information, "I feel that we do have most of what we need referring to manipulatives and technology base. I think it is enough materials there in the classroom to support the students."

PD Is Helpful. Eight participants reported that the PD they received in RTI2 helped them to help their students. The PD training session gave the teachers more insight into the use of the program and how to navigate it to find resources. All participants gained different perspectives on how to use the program and therefore the PD benefitted from their instructional knowledge, which in turn supported students learning math while using the RTI2 program. P2 indicated that she had seen growth in her students because of her PD: “I have participated in professional development, and yes, it was very helpful, especially when you want to implement [RTI2] better, and once you see your children are growing, I will say that going to the PDs helps a lot.” P5 indicated that all the RTI2 PDs she attended contributed to her students’ learning: “All of my professional developments that I have attended, I have learned something. There has been a takeaway that I have gained that I could bring back to the classroom that enhanced my teaching and helped my students learn.” P3 said of a PD in which she had participated, “That did help me because I had to be able to navigate through the program.” P9 said that after RTI2 PD, “Overall, I was able to take something away, like learning about different websites that the students can use, like math playground, math theater. I did learn that information, so yes, that was helpful to bring back to the class.”

Have Needed Tools to Help Struggling Students. Nine participants indicated that they had the tools they needed to assist struggling students. The toolbox within the RTI2 program helped teachers support small group instructions by providing step-by-step instructional lessons to target specific areas of deficit. Teachers stated that the assessments and tools gave them enough information to use to help students. One thing the RTI2 program was not lacking was resources to support student learning. P4 referred to the Ready Teacher Toolbox as a sufficient set of tools: “I have everything for small-group instruction if they’re below-level, on-level, or above-level, or even if I must go back and reteach. I have a toolbox in Ready Teacher Toolbox that I can pull from that’s very helpful.” P5 described the assessments and tools as sufficient: “I have enough information about my student to help them. I do. There may be something else better out there, but right now, what we're using, it gives me enough information to know where my students are."

P6 stated, "I think I have all the information and tools I need." P7 agreed, saying, "I think we as a district have tons of resources. I don't really think that's the problem." P9 provided further corroboration, saying, "It's very good to help me out with knowing exactly where this student is falling short, so I will say I believe it is enough now, really using that i-Ready assessment to see what areas that the student needs assistance in." Thus, the participants found RTI2 useful for identifying and helping struggling students, and they believed that RTI2 was sufficient for this purpose.

Providing Differentiated Support to Struggling Students. When struggling students were identified, differentiated support was provided to meet their individual needs, seven participants said. The participants indicated that the differentiated supports available within RTI2 were effective for helping struggling students. The RTI2 program provided different resources depending on the student's area of deficit. These differentiated resources can be used to address students' particular skills that need strengthening. P1 provided the example of how reading support was used to help a student who was struggling in math because of a learning gap in reading:

> I have a young girl that came to us very troubled from a charter school. She really is a very weak reader, and so being that she was strong in math, when we got to reading problems, then she started to close off again. So, I had to give her some strategies for her to be able to use those keywords and how to break the problem

> down. And give her like, OK, when you see smaller or lesser or greater, and put those words on the board, or on anchor charts, where she could see those words all the time. And so, that really helped her. And she began to get our confidence back.

P4 discussed using a small-group intervention to help a student make progress in foundational math skills:

> I had a specific SPED student, and this student was in third grade. She was on a kindergarten level, and for intervention, her deficit skill area was math, automaticity, and of course their focus is on the fluency and the foundational pieces of math. So, we took that student, and we worked with her in small groups during intervention, and small group during instruction. And then her SPED teacher would pull her out. And the SPED assistant would sit in with her when she was with me doing math, and by the end of the year, she didn't test out of intervention services. But she did progress to the next skill area, which was math computation. So, she went from just that foundational piece to problem-solving. So, I saw an increase in that area.

P6 described a successful small-group intervention for a student who was struggling in math, in which being able to devote more time to explaining strategies to the student helped the student understand those strategies more thoroughly:

> She started out the year as a Tier 3 mathematics student, but after we did small group intervention, she was removed from intervention by the end of the year, and she was so excited about it, because I think that her being exposed to it in a small-

> group setting and being able to ask questions and me being able to explain it in more detail helped her to get a better understanding of different strategies that she can use that was more comfortable to her.

P10 described a successful intervention to help a student make progress with multiplication tables:

> I had a baby who really struggled with multiplication in the beginning, and so our strategy we started with was just trying to get that baby to skip count. That was hard in the beginning because they just couldn't do it. They couldn't skip count by threes . . . [But] by the end, he was able to do his multiplication facts by skip-counting. And we never got to the sevens or eights, but he was able to get up to the fives by skip-counting.

Progress Monitoring With Data. Six participants indicated that they identified struggling students through progress monitoring with data. The data allowed the teachers to know what areas the students were struggling in with learning mathematical concepts. The reports and scores enabled teachers to know exactly where students needed support in learning. Progress monitoring with data is beneficial for student learning using RTI2. P4 said, "I go by the Screener this year . . . The data team met monthly and decided what skill area would be the deficit area for the students." P5 reported that she used data in addition to her own observations of her students to identify when a student was struggling: "Using the i-Ready data and also that MasteryConnect, those are those district assessments that help us to identify the deficit areas of the students, along with teacher observation and knowing my students." P7 also said, "I use the i-Ready reports too, and if it's aimsweb, then I use that." P8 said that to monitor students, "I go by the data of their test scores." P9 stated, "Going back to the data, I use the i-Ready diagnostic test, the i-Ready scores, to see where they are and where I can build them up."

RTI2 is Helpful. Six participants indicated that RTI2 was helpful in supporting students and providing what they needed to be successful. Offering differentiated support for students at their level ensures the best opportunity for them to experience growth. For those students that have been identified as needing additional support, response to intervention is the pathway toward building the content knowledge in their skill deficit areas. P10 stated, "I felt RTI2 was very beneficial in my years past where I was able to have what I needed to do RTI2." P3 felt RTI2 was very helpful because, "It allowed us to meet students where they are."

Through the RTI2 process, teachers can drill down to the area students struggle with the most. Offering opportunities to strengthen student skills through intervention leads to improved outcomes and progress in their grade level content. P5 indicated, "the math part helps me to pinpoint the particular skills that the student needs in order to move on to the next level." P6 discussed being able to support students where they are is helpful. "I think it is more helpful because I can work with students in small groups and being able to address specific student needs has made it helpful. I wouldn't consider it a stumbling block."

Monitoring student progress through intervention is necessary to prove that students are making gains. Use of their student level data monitored over time allows the teacher to make intervention decisions to further support student learning. P8 stated, "it has been very helpful because the students I service actually like it and they like to see their growth with their scores and the domain they were deficit in." P9 shared, " it gives me more one-on-one with the students in small group setting and I actually see their misconceptions and what they're actually lacking or missing, in order to get to the next level."

Technology is Useful. Four participants indicated that technology was helpful in supporting students' learning. As teachers approach intervention, they can offer students access to not only face to face instruction, but computer-based interventions as well. These computer-based programs are designed to adapt to students' individual needs as well as allow for teacher tailored assignments. P3 shared that they had all the tools and resources needed. "I like being able to give the students what they need and using a different platform to be able to tie into their learning." P4 shared that during COVID teachers had to use technology to teach with and use virtual manipulatives. "The use of virtual manipulatives was new to me, but I felt it was very helpful because if we don't make the item tangible for the student they can now use it online via computer."

Interactive technology increases engagement and excitement for children who receive intervention. The use of this technology and access to virtual manipulatives makes the learning fun, easily accessible, and provides immediate feedback on each lesson. P7 stated, "I think that technology does help them where they're at and that's the best way to reach them. Something engaging to help them focus instead of sitting through a lesson." P8 shared we have all the technology we need at this time for my classroom, for each individual student. They have their own laptop device, and they have several websites that they can go to independently to improve their instructional time."

Student Observation. Four participants indicated that they primarily used their own observations of their students to identify when a student was struggling. They discussed watching and observing students' body language as a way of knowing when the students are struggling. One participant indicated that when students found it to be difficult, she noticed that the students would start to fidget. This indicated that the student needed support with the learning. By paying close attention to a student's body language, you can learn when a child is expressing frustration and needs help with the learning. P1 said she used observation to discover which learning styles best fit her struggling students: "Observation. I just have to observe them. I have to see what kind of learner they are. Maybe they have to touch something. Maybe they fidget all the time, and they need to do something with their hands." P2 reported using a trial-and-error approach based on experiment and observation: "Once we start to work and I see how they work, well, then I know what fits their needs. But it's more trial and error." P6 watched students' responses during class: "I'm pretty good at body-language reading. So how do they respond in class? How they're responding to group discussions or whatever." P9 reported observing body language in students to notice when they were struggling in class: "I look at the students' body language first to notice this struggle and once I see that, that's when I start that conversation with them."

Mastering Skills. Three participants indicated that RTI2 was useful in helping teachers and parents to assist students in mastering skills. Teachers expressed the need to provide additional support which is a crucial component of intervention. With this support, students' chances of mastering their skill deficit and progressing through the RTI2 process increases. P1 indicated, "One thing I hope to accomplish every year is for my students to master some skills. When I see the light bulb come on it makes me very excited. Because then you see them doing math with ease." P3 "I think I just want to make sure everyone is on grade level or kind of performing close to grade level as possible when mastering skills." P5 indicated, "My goal is to close that gap and those students exit RTI2 intervention."

Summary. The findings from the interviews confirmed that teachers believed that RTI2 can be useful for helping support students. All 10 participants indicated that by using RTI2 in conjunction with real-world application, differentiating intervention, building relationships with parents, and the use of assessments promoted learning by making the curriculum more concrete. The teachers felt that the assessments embedded in the RTI2 program gave them a synopsis of what students' areas of deficit were.

Participants shared useful elements within the RTI2 process. Eight participants recognized that the PD they received in using RTI2 helped them to help their students. The PD sessions provided teachers with more insight on how to use the program and how to navigate it to find resources to support learning. All 10 participants assisted their students by building relationships with their parents to support learning at home. They felt that having those meaningful relationships with parents enhanced students' learning. Six participants indicated that identifying struggling students through progress monitoring with data was easier using the RTI2 program. The data provided the teachers with specific areas the students were struggling with in learning mathematical concepts.

Participants identified additional ways in which RTI2 was useful in supporting struggling students. Four participants used their own observations of students to identify when a student was struggling. They discussed observing students' body language as a way of knowing they are struggling. When struggling students were identified, differentiated support was used to meet their needs, seven participants said. The participants indicated that the support within RTI2 was effective in helping struggling students. Nine participants indicated that they had the tools/resources needed to assist students. Further, the findings from the interview data showed that within the RTI2 program resources helped teachers support small group instructions, which provided step-by-step instructional lessons to target students' specific areas of deficiency. Four participants felt the use of technology allowed them to reach students that would normally be bored with traditional teaching. Also, technology was very beneficial with the use of manipulatives to help students. Three participants felt that RTI2 helped teachers and parents in supporting students in mastering skills. By using all of these common threads described by the participants and their experience with RTI2 implementation, students showed success in Mathematics.

Research Question 2

The second research question, RQ2 looked at challenges that SUTSD upper elementary (i.e., Grades 3-5) teachers reported while implementing RTI2 instruction. Based on the data analysis, Theme 2 informed this question, as follows: Teachers shared challenges related to content support, personnel, RTI2 requirements, computers, time for math, PD, and student engagement.

Theme 2: Teachers Believed That Content Support, Personnel, RTI2 Requirements, More Computers, No Time for Math, PD Not Helpful, and Lack of Student Engagement Were Barriers to RTI2

All participants contributed to this theme. The participants indicated three main challenges to implementing RTI2. Participants shared challenges related to lack of content support, the need for additional personnel support in the classroom, and lack of student engagement.

Additional Support Needed for Content. Nine participants indicated that their students needed additional support with course content. Students are missing skills that are necessary to support the learning of a new skill when introduced. This makes it hard for the teacher when these types of gaps exist. Students mastering skills from previous grades presents itself when students struggle with learning. Planning with colleagues is another important aspect of being able to reach all students as well. P2 believed that SPED and content teachers needed more planning and collaboration time to ensure that students received consistent, reinforcing instruction on content knowledge and skills:

> I think inside the classrooms, just teachers being able to collaborate and plan more with the teacher of content, because a lot of times, we have the standard, we know that we're teaching the standard. We know we're using this performance-based objective, but if the teacher and the SPED teacher are not collaborating, a lot of

> times I feel like there is wasted time when you come in for inclusion, or when you do pullouts, because you might be working on the same skill, but a different way.

P4 felt that students needed support with applying foundational math skills:

> I would say bridging the gap between those foundational skills and problem-solving skills. We have a lot of students that may know how to add and they're progressing to learn how to multiply, but once you put it in a word problem, it becomes too difficult for them.

P5 described the learning gaps between SPED and general education students as a challenge in inclusion settings: "There is a learning gap, especially when they are in the Gen Ed classroom. I think that is a challenge." P7 believed that students needed support with literacy to succeed in math: "Definitely the literacy component of the math word problems, on just understanding even where to start." P10 said of deficits in content mastery among her students, "They try their hardest, but there is a basic component a lot of times that's missing. And this is evident that mastery for this skill set is not there." P8 agreed, stating, "The challenges that are really occurring for the students that I have are just them not being proficient in their basic skills. They don't have those basic skills."

Making Work Engaging. Five participants indicated that a challenge was making math instruction engaging for students. Students seemed very unenthused when it came to math, and it was very hard for them to stay focused on what was being taught. By the time students made it to the next grade the skill deficit was evident due to students' lack of engagement. P1 said that a challenge she faced was, "Just making it a more engaging subject. A lot of times people dread to come to math class." P6 agreed, saying, “I think the biggest challenge for most of my students would be keeping their attention. That's always my challenge . . . Keeping them focused on doing what they're supposed to be doing.” P9 reported a related engagement challenge with, “Keeping the students’ focus on where we are, the other students who are not in participating with me in small group, keeping them [focused] on another assignment.” Thus, the main challenges that participants faced in relation to RTI2 implementation were the need for more content support, the need for personnel support in the classroom, and the need to increase student engagement.

Lacking Personnel Support. Four participants referred to the challenge of needing additional personnel support in the classroom. They felt that if they had an assistant to help support the learning it would be beneficial and free up time for the teacher. Teachers discussed having students on different instructional levels and making it harder for them to teach. Participants felt strongly that having more personnel would have a greater impact on student learning. P7 provided a representative response in saying, “We definitely did not have the manpower to be able to reach every kid where they were.” P7 explained why RTI2 was “manpower”-intensive when implemented properly:

> More people helping with the RTI process is the hard part right now. There are four major categories: numbers and operations, algebra and algebraic thinking, measurement, data and geometry. And so, you've got all four of those, plus, I teach fifth grade, so I've got kids on kindergarten-, first-, second-, third-, fourth-grade level. So, I've got all these different levels and different areas that they're

> either stronger in or weaker in. So, just really more help to implement wherever the children are, because the times that I've been really successful with RTI are times that I was able to have a very small group where every child was in the same area.

P4 described her lack of personnel support as her biggest challenge: “I guess the biggest challenge would be just the personnel support because it was just me, and I didn't have a teacher assistant.” P5 also described being understaffed as her greatest challenge: “My biggest challenge is should I say staffing, having enough hands-on bodies, let’s focus on, instead of a million things, I can now give this adequate attention, not pulled in so many different directions.”

RTI2 is a Stumbling Block to Meeting Requirements. Four participants indicated that RTI2 was a stumbling block due to implementation and requirements. Two of the participants shared what it was like for them as new teachers. Learning the program and instruction made it difficult to understand as well as not having support with implementation. P1 said that RTI2 was a stumbling block because she did not get to spend enough individual or small-group time with her students: “It's been more of a stumbling block this year because I don't get to spend that time with them, but I'm trying to get them ready to take this test on RTI day, and it's just not been effective.”

To implement RTI2 with fidelity, teachers must have a clear understanding of the purpose, implementation process, and progress monitoring. Without these components to support the program teachers are not fully prepared to deliver the intervention. P2 said that RTI2 was a stumbling block before she understood how to implement it: “At first, not knowing how to implement it, was a stumbling block, just trying to figure out, how do I get this done? How does this work? How can I meet the needs of my children using this?" P4 also said that when she was a new teacher, RTI2 was a stumbling block because she did not have enough support for implementation: "I think in the beginning, because I was a new teacher, it was a stumbling block because you had to plan for instruction. And then every day you had your period of intervention, and it just wasn't enough support."

Being knowledgeable about the program allows the teacher to be more effective, however, the lack of knowledge can hinder you from using the program effectively. Without the necessary skills and knowledge base implementation of the program does not benefit the students academically. P7 indicated that RTI2 was helpful to teachers who were familiar with it but a stumbling block to teachers who were not familiar with it: "When it can be implemented correctly with people that understand how to use the data, I think it can be helpful, but . . . not being familiar . . . I would say there's more stumbling blocks."

More Computers would Improve Learning. Three participants shared that more computers would be helpful in improving learning. Not only would more computers be helpful, having access to working computers with updated programs would benefit student progress. P1 stated, "I think if we could have access to more computers that worked it would be better for students. A lot of the devices are broken, and students do not have access to technology that works." P2 indicated that having technology would be beneficial because it is everywhere in the world. Children can manipulate items on a screen to assist with learning new skills." P6 stated, "Technology could improve the mathematics, but students will have to have access to it to be able to use it."

PD Is Not Helpful. Two participants provided data indicating that RTI2 PD did not help them to help their students. They felt the PD was mainly for compliance and did not provide any specific knowledge on how to use the RTI2 program when teaching mathematics. They mentioned that during the PD they were told that students had to have a certain number of minutes and were not shown any examples of what it looked like or how they should use it. P1 stated, "I have participated in some professional development around RTI squared and I did not find that helpful for my students." P4 specified that the RTI2 PD was not helpful because it was predominantly about compliance, and she needed information about instructional strategies:

> I did not find [RTI2 PD] helpful for me and my students because during the PD sessions the presenters talked more about compliance. They talked about Tier 2 needing this number of minutes, Tier 3 need X number of minutes, but I would love to have instructional strategies, and I've never seen an example of what it should look like, so I would love to have that as well.

No Time for Math. One participant shared that it was difficult to support students needing help with math during the school year. Offering an allotted time within the daily schedule is extremely important to ensure teachers have time to implement the intervention. P10 stated, "This year reading trumped math, if students needed support in math and reading, they received support in reading only.

Summary. The findings from the interviews stated that lacking additional support was needed for content, having enough personnel to support learning, meeting RTI2 requirements was a stumbling block, having enough operational computers to help improve learning, attending PD was not helpful, having no time for math, and making work engaging were factors in implementing RTI2. Some teachers found it difficult in trying to keep students' attention throughout the lesson and having more personnel support would help the teacher work with students in small groups. Small groups enable the teacher to be more effective in reaching the students academically. Teachers felt like PD was not helpful because they were not able to take what was learned and apply it to the classroom. Implementing the guidelines for RTI2 was difficult to keep up with, which in turn made it more difficult to effective. Lastly, having no time or not enough time to fully teach math was a hinderance in helping students to learn.

Evidence of Trustworthiness

Trustworthiness in research refers to the level of confidence in the methods, data, and interpretation used in the study (Elo et al., 2014). The researcher should establish the study's procedures and protocols so that the readers can understand the flow of the study. In this study, trustworthiness was ensured through credibility, transferability, dependability, and confirmability.

Credibility

Credibility is the extent to which the study and the results can be trusted (Petty et al., 2012). Credibility can be thought of as truth value, according to Petty et al. (2012). If the findings are believable to the participants, then it can also be considered creditable

(Sandelowski, 1986). The credibility of this study was supported by interviewing 10 participants and by reaching data saturation. Data saturation refers to the point at which no new or novel information was being collected from participants (Rubin & Rubin, 2012). By reaching data saturation, I ensured that the sample participants did not misrepresent the population, and that the data were not skewed by unique experiences that were not generally experienced by others in the population. While each participant's experiences were unique to them, reaching data saturation ensured that the experiences described by participants were at least relatable to others within the population. Transcript reviews were also conducted with the participants, thereby adding to the credibility of the study. Transcript reviews were conducted with each participant by giving the transcript of their interview back to them to check for accuracy, as suggested by Lincoln and Guba (1986).

Transferability

Transferability is the extent to which the findings can be applied in a similar situation (Lincoln & Guba, 1986). Thick, richly descriptive data are collected to ensure transferability (Lincoln & Guba, 1986). Just as the credibility of the study was supported by interviewing 10 participants and by reaching data saturation, so was the transferability of the study (Ratajcyk et al., 2016). As a qualitative study, it is unlikely that the results of this investigation will be generalizable to the population beyond the individuals participating in this study. However, by recruiting a sufficient sample size and reaching data saturation, it is more likely that the findings of the study may be transferable to similar populations (Ratajcyk et al., 2016). I endeavored to collect thick, rich descriptions from the participants by listening carefully and using follow-up questions to clarify and deepen their answers.

Dependability

Dependability is the extent to which the findings in a study are replicable in the same research context later (Lincoln & Guba, 1985). When a reader knows about the procedures the researcher went through to obtain the findings it helps establish the dependability of the study (Guba, 1981). A way of establishing dependability is keeping an audit trail so others can follow the changes brought to the researcher by the research process itself, such as insights that change (Guba, 1981). I kept an audit trail as part of the journaling process by writing down my decisions, reasonings, insights, and biases that surfaced during the research process and why they were made to increase the dependability of the study.

The dependability of the research was also enhanced by transcribing participant interviews verbatim and by asking each participant to review their transcripts upon completion. This ensured that the data were not misrepresented by the participant or me, the researcher. Since the participants were able to clarify their remarks after the fact, I was sure the participants believed the statements accurately represented their experiences. To further ensure the dependability of the data, I ensured that coding drift did not occur by reviewing the data several times throughout the coding process as my understanding of the data deepened. Coding drift refers to the phenomenon where a code might mean something different at the beginning of coding than it did at the end of coding (Ratajcyk et al., 2016). By adjusting the codes as necessary at the end of the coding process and at periodic intervals throughout the process, the researcher ensures the codes remain consistent throughout coding and that another researcher can replicate the coding process. This enhances dependability (Braun et al., 2014).

Confirmability

Confirmability is the degree to which the findings reflect the aim of the inquiry (Lincoln & Guba, 1986). Confirmability can be established by the researcher keeping a detailed, explanatory audit trial that includes how the interpretations were made and the reasoning process behind the conclusions (Guba, 1981). I ensured confirmability by closely following the protocols documented in Chapter 3. By doing so, other researchers will be able to closely replicate my work to confirm or refute the findings presented in this study (Rubin & Rubin, 2012). By closely documenting and justifying the procedures I used in the study, other researchers will be able to examine and critique my processes (Rubin & Rubin, 2012). This increases the overall validity of the findings in the study as readers will know that the findings are replicable should another study be completed using the same population (Rubin & Rubin, 2012).

Summary

Two research questions were used to guide this study. RQ1 was this: What are SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions of the usefulness of RTI2 for SPED students in mathematics classrooms? One theme was used to address this research question. RQ1 theme was: RTI2 can be useful for helping teachers and parents to support students. All the participants contributed to this theme. The findings indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and help students with mastering skills. The assessments associated with RTI2 were also helpful in promoting student learning, the participants reported, and teachers had the resources they needed to enhance student learning. Teachers were further assisted in enhancing student learning through PD, the participants said, and through building relationships with students' parents.

Also, the findings indicated that RTI2 provided teachers with the tools to identify struggling students through monitoring progress with data and observing students. When struggling students were identified, effective differentiated support was provided to meet students' individual needs, the participants indicated. The participants expressed the perception that they had the tools they needed to help struggling students.

RQ2 discussed challenges that SUTSD upper elementary (i.e., Grades 3-5) teachers report implementing RTI2. One theme used to address this question. RQ2 theme was this: implementation challenges are associated with shortfalls in content support, personnel, RTI2 requirements, not having enough working computers, no time for math, PD not helpful, and student engagement. All participants contributed to this theme. The participants indicated seven main challenges to implementing RTI2. The first challenge was the need for content support. The second challenge was the need for additional personnel support in the classroom. The third challenge was the need to address deficits in student engagement. The four challenge was that RTI2 could be a stumbling block for meeting requirements for teachers who were unfamiliar with it and had not received proper support for implementation. The fifth challenge was not enough working computers for students. The sixth challenge was PD teachers received was helpful. The seventh challenge was not having enough time for math instruction.

This theme indicated that RTI2 is a challenge for implementation, but it also indicated that RTI2 itself was a challenging system to master. Chapter 5 includes discussion, conclusions, and recommendations based on these findings.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore SUTSD upper elementary (i.e., Grades 3-5) teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The problem addressed in this research was the inconsistent implementation of RTI2 in mathematics classes for SPED upper elementary students at a SUTSD. Basic qualitative research was appropriate for this study because the research design is useful for understanding how or why a phenomenon occurs (Hamilton & Finley, 2019). Grades 3-5 teachers implementing RTI2 were invited to participate in the study. Interviews were used to obtain participants' perceptions of the usefulness and challenges of implementing RTI2 for SPED students in mathematics classrooms.

The findings indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and help students with mastering skills. The assessments associated with RTI2 were also helpful in promoting student learning, and being certain that teachers had the resources they needed to enhance student learning. The participants said that teachers were further assisted in enhancing student learning through PD and building relationships with students' parents. Further, the findings indicated that RTI2 provided teachers with the tools to identify struggling students through monitoring progress with data and observing students. Participants indicated that when struggling students were identified, effective differentiated support was provided to meet students' individual needs.

While participants perceived they had the tools they needed to help struggling students, they identified the main challenges to implementing RTI2 were content support, additional personnel support in the classroom, and the need to address deficits in student engagement. Participants also stated not having enough computers to support students' area of deficit was an issue due to computers not working or not having enough. They attended PD, but the learning was not meaningful in being able to apply what was learned. There was also no time for math due to reading being the primary focus area for students. Results revealed that RTI2 may itself be a stumbling block for teachers who are unfamiliar with it. Four participants indicated that RTI2 could be a stumbling block for meeting requirements for unfamiliar teachers who had not received proper support for implementation. Although lack of support was a challenge for RTI2 implementation, RTI2 itself was challenging to master. Chapter 5 includes interpretation of the findings, limitations of the study, implications, recommendations based on these findings, and conclusion.

Interpretation of the Findings

The first research question investigated if RTI2 can be useful for helping teachers and parents to support students, as well as if RTI2 can be useful for identifying and helping struggling students. The results indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives, while also helping students master skills. RTI has a wide impact on educational outcomes, including focusing on core instruction as the first prevention of a student's difficulties (Betters-Bubon et al., 2022; Dohrmann et al., 2022; Fallon et al., 2021).

Confirming, Disconfirming, & Extending the Literature

Although there is research supporting how RTI2 has improved students' reading (Coyne et al., 2018), there is limited research on how RTI2 has supported math implementation. Based on the educators' perceptions of the usefulness of implementing RTI2 in this study, the findings do not support existing research showing inconsistent support using RTI2. Hudson and McKenzie's (2016) study revealed that there has been inconsistent implementation of RTI2 in mathematics classes for students in special education upper elementary. In contrast, this study's findings determined that the educators' perceptions were that RTI2 is being implemented with fidelity.

The results of this study are consistent with past research showing the academic benefits of implementing RTI2. Coyne et al., (2018) found that while there were no improvements in reading comprehension or reading fluency, implementing RTI2 improved phonemic awareness and word coding among students. Many students were not performing at grade level in mathematics, an even larger problem among SPED students (Irwin et al., 2021). The current study's findings indicate that RTI2 was useful to SPED students in mathematics classrooms.

Previous research reveals that multiple factors may be associated with low mathematics performance by SPED students, including learning disabilities among students, when implementing RTI2 is ineffective (Craig & Marshall, 2019; Parhiala et al., 2018). However, other studies concur with the current findings by establishing that SPED students often perform poorly in mathematics, but the adoption of RTI2 is useful to SPED students by connecting learning to students (Craig & Marshall, 2019; Irwin et al., 2021). The educators in this study indicated that RTI2 enabled teachers to connect learning to students' everyday lives and help students with mastering skills.

Study findings indicated that RTI2 is helpful to students and teachers who can connect learning to students (Burnley, 2019). Findings also revealed that RTI is a multitiered approach to the early identification and support of students with learning and behavior needs that help teachers connect learning to students (Burnley, 2019). Implementing RTI2 provides high-quality instruction and universal screening of all students in the general education classroom, thus helping teachers identify students' learning needs and create a substantive connection to the learning practices and outcomes (Missall et al., 2021). This study's findings confirm Coyne et al.'s (2018) results by revealing that under the RTI framework, struggling learners are provided with interventions at increasing intensity levels to accelerate their learning rate (Coyne et al., 2018).

My research findings also demonstrated that the assessments associated with RTI2 were helpful in promoting student learning, and teachers had the resources they needed to enhance student learning. According to TNDOE (2013, 2016, 2018) assessments help teachers to determine the tier level of the student and provide resources to support student learning. Studies in the literature review demonstrated that some students might be diagnosed with a learning disability in mathematics or dyscalculia, while other students might demonstrate below-grade-level mathematics performance without a disability diagnosis; however, RTI2 can help teachers connect learning to students (Nelson & Powell, 2018). The implication is that RTI2 helps students connect to their learning practices and understanding of learning concepts for improved academic performance.

Teachers within this study were further assisted in enhancing student learning through PD and building relationships with students' parents. Hamukwaya and Haser (2021) reported similar findings to this study, which revealed that PD is recommended to support mathematics teachers and pass on information learned from teacher to student. Many students were not performing at grade level in mathematics, an even larger problem among SPED students (Irwin et al., 2021). Previous research reveals that multiple factors may be associated with low mathematics performance by SPED students, including learning disabilities among students implementing RTI2 ineffective (Craig & Marshall, 2019; Parhiala et al., 2018).

Regarding educator challenges when implementing RTI2, this study revealed that educators felt RTI2 was difficult due to needing additional support for content, lacking personnel support, no time for math, PD was not helpful, difficult in making work engaging for students, needing more computers in the classroom, and requirements for meeting RTI2 expectations was a stumbling block. These were supported by the literature review through studies completed by Hudson and McKenzie (2016), Lambert et al. (2018), Lawson et al. (2022), and Grapin and Sulkowski (2022),

Findings in the Context of the Conceptual Framework

The conceptual framework for this qualitative study was implementation science, which includes implementation drivers and evidence-based methods. The drivers include core components to facilitate the support of changes on the class, building, and district levels, all based on empirically supported research studies showing they are effective (National Implementation Research, 2021). The three drivers involved in the conceptual framework of implementation science for this study were these: competency, organization, and leadership (National Implementation Research, 2021). These drivers can be applied to intervention and implementation of RTI2. The drivers helped maintain, develop, and improve the ability to implement innovation that is beneficial to students and teachers. By ensuring the fidelity of implementation, professional development, and instructional practices can determine the degree to which it was implemented as intended. Systems intervention, facilitative administration, and decisions that support data systems enable the successful implementation of the three drivers within the organization. These challenges arise as change management is instituted so decisions, guidance, and support will be provided to maintain the functioning of the organization while going through a change and transforming systems (National Implementation Research, 2021).

To be competent, teachers must have the knowledge and skills to utilize implementation science for the benefit of their students in the RTI framework (Hamukwaya & Haser, 2021). Professional development can be short-term courses, mentoring, conferences, workshops, seminars, reflective and exploratory studies, individual research or reading, online courses, or peer group discussions to help teachers enhance student learning (Rosli & Aliwee, 2021). Rosli and Aliwee's (2021) findings contribute to this study by establishing that teachers were further assisted in enhancing student learning through PD and building relationships with students' parents. The framework implementation driver on PD applies to competency driver which is important in getting educators trained on the use of the RTI2 program.

In my research study, I also addressed whether RTI2 provided teachers with the tools to identify struggling students through monitoring progress with data and observing students. The results imply that teachers can use RTI2 to identify and assist struggling students. The study findings concur with Reinhardt (2018), who demonstrated that assessments are valuable tools, such as RTI2, for measuring current academic achievement and can play a pivotal role in selecting effective interventions. Identifying which students need help has been assessed with the use of a new assessment tool such as RTI2 that covers not only reading, but other subjects in which educators place a student in an RTI band in addition to providing a list of skills the student has mastered (NWEA, 2018). Teachers use RTI2 assessments to show what skills students should be working on, and the data can also help create applicable curriculums (NWEA, 2018).

The findings from this study shows that when struggling students are identified, effective differentiated support is provided to meet students' individual needs. The participants perceived they had the tools they needed to help struggling students. Consistent with current study findings, past research indicated that using NWEA MAP assessments in combination with RTI2 programs can help struggling students improve academically based on their needs and strengths (Smyth et al., 2022). As confirmed by the current study results, Reinhardt (2018) concluded that RTI2 program leaders make informed decisions on which students need assistance and what the assistance should be and make educational placement based on results from NWEA MAP assessments.

RTI2 also helps teachers connect learning to students by giving an accurate assessment of mathematics so teachers may provide their expertise on how RTI2 works for their students. To confirm current study results, previous studies demonstrate that while there are various methods of implementing RTI and RTI2, one common factor is using assessments to identify students needing additional support (Hjalmarson et al., 2020). Pellegrini et al. (2018) study's findings revealing that a successful implementation of RTI helped students in mathematics and was also linked to positive student achievement outcomes were consistent with the current study findings. RTI2 approaches to mathematics education have the strongest chances of succeeding if they include personalization to meet the students' needs. For students with a dismal performance in math, a combination of motivation, behavior, and social-emotional skill-building should be included in mathematic improvement interventions (Pellegrini et al., 2018).

However, RTI2 is a tool that is used to determine if a child qualifies for SPED services and this process can complicate whether students should receive services or not (Smyth et al., 2022). According to Hendrickson and Lumpe (2021), students are identified or referred for SPED services through RTI, which may be used to inform the implementation and effectiveness of RTI. Hendrickson and Lumpe (2021), also stated that controversy remains regarding whether the evaluations of RTI measure the program's effectiveness. However, this research study has provided significant insight into how RTI2 can improve student learning.

The second research question in my study indicated seven main challenges to implementing RTI2: content support, additional personnel support in the classroom, the need to address deficits in student engagement, more computers needed for students, RTI2 is a stumbling block due to requirements. PD is not helpful, and lack of time for math. The results agree with Vollmer et al. (2019), who revealed that lack of support, such as training, is a critical factor impeding the successful implementation of RTI (Vollmer et al., 2019). Vollmer et al. indicated that preservice teachers received little-to-no training related to the fidelity of implementation of RTI. Bugg (2020) confirmed the current research findings by establishing that professional development where teachers became learners in the intervention would change their perceptions. Thus, professional development designed to support teachers as they learn how to implement RTI and RTI2 for SPED students is essential (Alahmari, 2019; Sharma et al., 2017).

This study's findings were also consistent with Alahmari's (2019) study, which revealed that educators lacked resources, training, personnel, cultural collaboration, and experience to assist with the implementation and fidelity of RTI2. Zhang et al.'s. (2019) research is consistent with the current study's findings in demonstrating that many teachers had an insufficient understanding of the RTI model despite their open attitude because the educators had insufficient expertise in formulating and implementing individualized instruction, student engagement, and inadequate personnel, which was a factor in teachers' low confidence in RTI implementation. Results add to the previous empirical research by revealing the need for content support, additional personnel support in the classroom, and the need to address deficits in student engagement. Findings demonstrate that RTI2 could be a stumbling block for meeting requirements for teachers unfamiliar with it and who have not received proper support for implementation. Current findings confirm the previous research findings, which indicated that a lack of consistency in implementing EBIs of the RTI2 model, limited training for teachers, a lack of support for teachers, and a lack of education leaders who address implementation concerns were key barriers to implementation of RTI2 (Lawson et al., 2022). Although lack of support is a challenge for RTI2 implementation, RTI2 itself was a challenging system to master as per the current study findings; other studies indicated that a lack of resources and confusion from the high turnover of staff and teachers have contributed to difficulties in implementation of RTI2 (Grapin & Sulkowski, 2022).

As reported by participants, RTI2 could be a stumbling block for meeting requirements for teachers unfamiliar with it and lacking implementation support. In this regard, having a clear vision, full commitment and support of all stakeholders, sufficient staffing, appropriate budget, and available resources have been identified as building blocks to successful implementation (Morse, 2019). The RTI2 model concentrates on students obtaining social and emotional skills, along with technical knowledge and skills to help students to be productive members of society, contributing to the economy, and was found to be successful (TNDOE, 2016). The strongest factor contributing to math achievement was the personalization of education to meet the students’ needs (Pellegrini et al., 2018). The results add to the previous empirical research by revealing that RTI2 could be a stumbling block for meeting requirements for teachers unfamiliar with it and lacking support for implementing RTI2.

Limitations of the Study

The limitations of this study were associated with the sampling and instrumentation selected for this study. I used qualitative methodology for this study, the sample included 10 elementary (i.e., Grades 3-5) teachers from an elementary school in a SUTSD. Thus, the generalization of this study was limited to this population and the geographical location of southwest urban Tennessee, which may not apply to other regions or countries.

The second study limitation was associated with semistructured interviews, which I selected as the instrumentation for data collection. The basic qualitative research design included collecting participants' perspectives through in-depth interviews. Thus, the limitation was that the study and data collection were limited by the individual integrity and sincerity of each study participant's responses to interview questions. As participants were asked to discuss perceptions, perspectives, and experiences associated with their occupation, participants may have felt the need to misrepresent their teaching abilities, RTI2 implementation success, or other relevant details. To mitigate this limitation, I reassured participants that their responses were confidential, so they became comfortable answering truthfully.

Recommendations

The results of this study indicate that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and help students with mastering skills. The three main challenges to implementing RTI2: content support, additional personnel support in the classroom, and the need to address deficits in student engagement. Based on these findings, the following recommendations are made.

Recommendations for Further Research

This basic qualitative study aimed to explore SUTSD upper elementary such as Grades 3-5 teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The recommendations are based on the strengths and limitations of the study. Based on the findings from this study, educators stated that PD was not helpful in learning how to use RTI2. One recommendation for future research is to do a quantitative study to uncover the connection of this study's findings with improving the implementation of the RTI2 learning model. A quantitative study enabled the use of a large sample size to enhance the generalizability of research findings to other populations and locations. The study findings also indicated that educators revealed that RTI2 requirements are a stumbling block. Another recommendation would be for future researchers to conduct a qualitative study to examine strategies schools may use to implement the RTI2 learning tool to keep it from being a stumbling block for teachers to implement with fidelity. Leaders must support general education teachers and mathematics specialists concerning technology and provide professional development for implementing the RTI2 learning model (Hjalmarson et al., 2020; Swars et al., 2018).

Implications

The findings of this study have contributed to the understanding that RTI2 enables teachers to connect learning to the students and assist them in mastering mathematics skills. This study concurs with and provides practical and theoretical implications for those in the field of education.

Implications for Positive Social Changes

The findings of this qualitative study had several implications for positive social change. Teachers reported that RTI2 is helpful in supporting students academically. However, they still shared challenges such as needing additional support for content. Education leaders may consider providing content support and additional personnel support in the classroom and addressing deficits in student engagement by implementing RTI2 in SPED, especially in mathematics education for SPED students. Alahmari (2019) recommended professional development as well as exploring the perceptions and concerns of educators with implementing RTI as a form of support for educators.

Education policymakers may also consider training and development programs to impart the necessary skills needed for RTI2 implementation in the classroom among the teachers. Professional development, while provided to teachers in this study, was deemed not helpful and would need to be strengthened to fully support teacher's implementation of RTI2. Vollmer et al. (2019) recommended RTI training for teachers as it was required to advance teachers' RTI knowledge and competencies to deliver the model effectively. While research evidence reveals few attempts have been made to explore the implementation of RTI2 in the mathematics classes for SPED upper elementary students at a SUTSD, current findings reveal a lack of support to be a challenge for RTI2 implementation. Therefore, education policymakers should create policies to enhance training about RTI2 knowledge and competency for its implementation.

The results of this study may also influence positive social change in students and educational practices on several levels. Schools that implement RTI2 to benefit students struggling in mathematics may enable those students to participate in more effective interventions by harnessing relevant findings from this research. The TNDOE could also use this study's findings to inform new or revised laws and initiatives that govern the implementation of RTI2 within the state's elementary schools. All students must be provided educational opportunities to be successful by adopting and implementing the RTI2 learning model for struggling students.

Educational leaders, teachers, and policy decision-makers could constructively influence students' well-being by using the strategies based on the findings to encourage positive social change, including the potential to increase awareness of common issues related to adequate differentiated supports provided to meet students' individual needs. Alahmari (2019) revealed that educators lacked the resources, training, personnel, cultural collaboration, and experience to assist with the implementation and fidelity of RTI2.

Theoretical Implications

The conceptual framework for this study was implementation science, which includes implementation drivers and evidence-based methods. Implementation drivers are the components of infrastructure needed to develop, improve, and sustain the ability of teachers and staff to implement innovation as intended and create an enabling context for the new ways of work. Three drivers are involved in the conceptual framework of implementation science: competency, organization, and leadership (National Implementation Research, 2021). Competency drivers help develop, improve, and maintain the ability to implement an innovation that benefits students. The findings add to this theory of implementation science by establishing that implementation challenges include content support, additional personnel support in the classroom, and the need to address deficits in student engagement.

Fidelity of implementation, coaching training, and selection are involved in developing competencies. Fidelity means measuring an instructional practice or innovation to determine the degree to which it was implemented as intended. Organization drivers help create and maintain enabling context in organizations and systems to provide effective educational services. Systems intervention, decisions that support data systems, and facilitative administration enable the successful implementation of these drivers within the organization. Organization drivers are also involved in the fidelity of implementation. Leadership drivers provide the appropriate leadership strategies for a variety of leadership challenges. The implication is that the findings provide insight into how RTI2 is important because it enables teachers to connect learning to the students and assist them in mastering mathematics skills. Lack of resources, training, personnel, cultural collaboration, and experience to assist with the implementation and fidelity of RTI2, which according to the theory, challenge the implementation of the RTI2 learning model.

Recommendations for Practice

This study recommendations for practice to educational leaders is for them to look at ways strategies to implementing RTI2 learning models for students in schools can be enhanced. The potential positive social change is that district leadership could use the findings to strengthen the implementation of RTI within the SUTSD and prepare SPED students academically.

Leadership drivers focus on providing the right strategies for challenges such as lack of resources and limited training and development of teachers. These leadership challenges often emerge as part of the change management process needed to make decisions, provide guidance, and support organization functioning (Nilsen, 2020; Rapport et al., 2018).

I recommend for practice that the knowledge gained from teachers' perceptions may be shared with district leadership and used to strengthen the implementation of RTI within the SUTSD. The study's findings could also inform leadership in school settings like the study schools. The potential positive outcomes of improved RTI implementation include preparing SPED students to compete academically. The ripple effect of improving the educational outcomes for students includes the benefit of a better prepared future for SPED students. The findings indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and helped students with mastering skills.

I also recommend for practice that future leaders may use the study findings to develop appropriate strategies for the implementation of the RTI2 model of learning for students with special needs. Leaders must support general education teachers and mathematics specialists concerning technology and provide professional development (Hjalmarson et al., 2020; Swars et al., 2018). The findings of this study could benefit educational leaders, teachers, and policy decision-makers by providing insights into the areas of RTI2, SPED, and mathematics education for SPED students.

Conclusion

RTI is a multitiered approach to identifying and supporting students with learning and behavior needs (Burnley, 2019). This basic qualitative study aimed to explore SUTSD upper elementary such as Grades 3-5 teachers' perceptions about the usefulness and challenges of implementing RTI2 for SPED students in the mathematics classroom. The findings indicated that RTI2 was useful to SPED students in mathematics classrooms because it enabled teachers to connect learning to students' everyday lives and help students with mastering skills. RTI2 can assist teachers in enhancing student learning through PD and building relationships with students' parents.

The research indicates that RTI2 provides teachers with the tools to identify struggling students through monitoring progress with data and observing students. Participants indicated that when struggling students were identified, effective differentiated support was provided to meet students' individual needs. The main challenges to implementing RTI2 included content support, additional personnel support in the classroom, and the need to address deficits in student engagement. RTI2 could be a stumbling block for meeting requirements if it did not receive proper support for implementation. Although lack of support was a challenge for RTI2 implementation, RTI2 itself was challenging to master. This study could benefit educational leaders, teachers, and policy decision-makers by providing insights into RTI2, SPED, and mathematics education for special education students. Future researchers should conduct a qualitative study to examine strategies schools may use to implement the RTI2 learning tool.

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Appendix: Interview Questions

1. Can you explain to me why you decided to become a mathematics teacher for special education students?
    a. What is it that you hope to accomplish with your students, and can you give me an example of where you think that happened in your classrooms? If not, can you explain to me why you think it has not been accomplished?
    b. When you teach mathematics do you try to connect what they are learning to their everyday lives?
2. What do you think would improve students' learning of mathematics?
    a. Is there one resource you use or would like to use in your classroom that you do not have access to? Do you know why that resource is not available?
    b. Do you think the use of more technology would improve the learning of your students and what kind of technology would be the most useful?
3. Can you give me an example of a student who made significant improvement after implementing an intervention that was tailored to their needs?
4. What would you say is your biggest challenge in trying to implement RTI2 in mathematics?
    a. Is there anything that could make it easier to implement RTI2 in mathematics?

   b. Have you found RTI2 to be helpful for mathematics teachers for special education students or has it been more of a stumbling block of trying to meet requirements?
   c. How do you go about deciding what intervention would help one of your students the best?
   d. Are there ways to improve upon interventions that you have used?
5. Have you participated in any professional development and if yes did you find it helpful for you to be able help your students?
   a. Was what you learned in professional development difficult to put into practice in the classroom and do you think teachers not teaching students in special education has the same difficulty?
6. If you could teach mathematics in any way you liked without the restrictions of regulations or mandates what would that look like?
   a. Is there a particular process you go through to help a struggling student, and can you give me an example?
   b. When you are observing a student that is struggling what is it that stands out to you?
7. How do you find the assessments of students helpful in determining how to help special education students learn mathematics?
   a. Are there assessments that you think might be better to add to the ones already given to students to identify their reason for lack of learning or inadequate academic achievement?

   b. Do you think you have all of the information or tools you need to decide what would help one of your students the best who was struggling in mathematics?

8. How do you go about soliciting the support of parents or guardians of special education students in learning mathematics?
   a. Have you ever had to tell a parent or guardian that you think their son or daughter has a learning disability and how did you go about doing that?
9. Is there anything that would make teaching special education students mathematics easier for you?
10. How do you go about involving parents or guardians to give more help to a student that you have found to be struggling learning mathematics? Can you give me an example?
    a. Can you give me an example of how the school or school district goes about involving parents or guardians to give more help to a student that you have found to be struggling learning mathematics?
11. If you could have anything you wanted to teach mathematics to special education students what would that be?
12. In your opinion what is the most common challenges for special education students?
    a. Have you had any cases where a student has a learning disability but did not qualify for special education for mathematics?
13. Is there anything you would like to say before we close the interview?