2022

Elementary General Education Teachers' Perceptions of Effective Math Instruction for Students with Disabilities

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This is to certify that the doctoral study by

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

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by

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MA, Walden University, 2014

BS, Clayton College and State University, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Barriers to implementing effective math instruction have been a focus of scholars because they are a problem in supporting students with disabilities. Researchers have demonstrated that general education teachers often have little knowledge about effective interventions for students with disabilities and the barriers to achieving such instruction. The purpose of this study was to investigate and understand general education teachers' perceptions of effective math instruction, and barriers to it, for fourth and fifth grade students with disabilities. The conceptual framework was based on Baroody's stages of math fact acquisition, which predicates that three developmental stages should be the basis for developing basic math fact fluency for students with disabilities. The research questions were used to investigate participants' knowledge of barriers to effective math instruction in a large school system in a southeastern state. Using a basic qualitative design, data from interviews with 11 general education teachers were collected and analyzed using open and axial coding. The results indicated that participants are aware of (a) the need for training for effective math instruction, (b) the need for more time to teach and implement math strategies, (c) the need for resources to meet math needs, (d) learning disabilities as barriers to teaching effective math instruction, and (e) challenges with curriculum when implementing math strategies. This study contributes to positive social change because administrators and other stakeholders may gain a greater understanding of teachers' perceptions of effective math instruction for students with disabilities. This will ultimately help to improve math experiences for these students.

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Dedication

First, I would like to thank God, who has given me the strength and persistence to stay focused on my goal of earning a doctoral degree. To my family who sacrificed so much of their time during the last several years. I am so thankful for my dad in heaven and my mom, for always believing in me. Mom, I am so thankful for your valuable editing advice, your unconditional love, and for being my inspiration. I love you! To my husband Frank, thank you for your encouragement and patience through my many years of college so that I could achieve my goal. I am finally done! I love you! To my daughter Ashley, thank you for your editing skills and for your tough love every time I said I was done. To my son Jared, thank you for your positivity and for always asking me how this was going. The two of you have brought so much love, fun, and happiness to my life. I love you both! To my brothers Steve and Buddy, thank you for always making me feel that we are in this together, I love you both! To my best friend Lorraine Canovali, thank you for always being there for me. To Linda Miller, thank you for being a very special part of our family for many years. To my family and friends, I appreciate all of you! Without your support, this goal could not have been achieved! To Biscuit, thank you for being right beside me every day!

To God be the Glory!

Acknowledgments

Always remember that there will be struggles, be patient with yourself, celebrate your accomplishments, embrace your progress, and never give up. I would like to thank you Dr. Brewington for calling me Dr. Denk years before I was even “ready” to begin this journey, your persistence has finally become a reality. To Jacqueline Osborne, thank you for helping me fall in love with teaching math! To Betsy Schroeter, thank you for being my mentor during my first years in special education and for your friendship. I would like to express my deepest gratitude to Dr. Ross, for your ongoing support and commitment to mentor me through this doctoral study. I would also like to acknowledge Dr. Cramer, and Steve Wells for supporting my scholarly efforts, and contributing to the completion of this study. I would like to acknowledge and express special thanks to those that participated in my study and to the participating school district for their assistance during my research.

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Chapter 1: Introduction to the Study

Educators struggle with teaching math to students with disabilities (SWD) which limits their ability to make math relevant to these students (Willingham, 2017). Math is difficult for many students to learn, and it can be particularly difficult for SWD. The subject of math can bring about negativity that can manifest itself through anxiety, fear of failure, doubt and lack of effort, tension, and avoidance of related math activities. Math anxiety and negative beliefs of math have been noted throughout all ages and no specific group is immune to these feelings (Looney et al., 2017). Dowker et al. (2016) is in agreement that mathematics learning can be regarded as complicated and difficult, and that students may express despair, stress, and fear of the subject. Thus, math anxiety may severely disrupt students from being successful with math achievement, especially SWD.

Math instruction typically first occurs in the general education setting with direct instruction model and the small group setting. Mitsch & Rigglemen (2020) explained that direct instruction, or whole group instruction, includes explicit instruction and teaching of discrete skills. In the co-taught inclusion classroom, direct instruction can start out the same for all students but as the level of difficulty increases, some students become lost, distracted, or disinterested. The small group setting can be the optimal place to provide reteaching, practice, and more individualized instruction (Ennis & Losinski, 2019). In both settings, the educator must maintain the interest of students and build on the lesson, based on what the students already know. Students that are below grade level or have gaps in math knowledge may require a great deal of remediation to bring them to the level of understanding needed to grasp a new concept. Researchers have revealed that

SWD in math make fewer math gains in general education classrooms than they do when receiving more targeted, individual instruction. For example, Fuchs et al. (2015) have found that special education certification is associated with improved math outcomes for SWD.

General education teachers may not be able to address every math issue for students in its entirety due to time constraints. Other teachers may not have been exposed to effective instructional strategies such as those needed to assist SWD with understanding the new math information (Gilmore & Henry, 2018). Students with teachers who have general education certification may have more exposure to grade-level content but the instructional strategies of general education teacher may not be reflective of best practices in special education. Students with teachers who have special education certification might be exposed to more effective instructional strategies. As there continues to be an increase in the number of SWD, there is a concern about not being able to meet their math instructional needs with traditional approaches. Accordingly, differentiated instruction with the use of multiple teaching strategies and representation need to be applied (Lai et al., 2020). Research has revealed that SWD make fewer math gains in general education classrooms than they do when receiving more targeted, individual instruction (Bottge et al., 2018). General education teachers who have a special education certification or are dual certified are associated with improved math outcomes for SWD (Feng & Sass, 2013). These findings indicate that additional training for general educators who are not dual certified could increase student math achievement (Gilmore & Henry, 2018). SWD receiving grade-level math instruction from general

education teachers, who may not be prepared to provide the individualized instruction, need all their students to succeed in math. In fact, researchers have shown that general education teachers tend to have less knowledge about effective interventions for SWD than special education teachers do (Lemons et al., 2018) and general education teachers experience the lack of knowledge for teaching SWD (Stites et al., 2021). SWD may receive special education support in general education settings or additional support through resource room instruction, but it is likely that SWD spend a considerable amount time in general education classrooms and receive a large portion of their grade-level academic instruction from general education teachers.

This study needed to be conducted because research of teachers who work with SWD have primarily focused on characteristics of teachers with special education certification (Gilmore & Henry, 2018). There is limited information from the general education teachers' perceptions of math instructional barriers for SWD. This study also needed to be conducted since the general education teacher is the primary instructional leader of the math lessons in the co-taught, inclusive classroom due to experience with the grade-level curriculum (Brendle et al., 2017).

SWD that have math concept deficits are not the only reason for math underachievement. It has been found that many SWD have not committed the basic math facts to memory and continue to "count on fingers etc." well into high school (Nicoladis et al., 2019). This is supported by the Constitution through the Elementary and Secondary Education Act of 2001, also known as the No Child Left Behind Act (NCLBA) that mandated that all students perform at mastery levels schools and ensures that students

with disabilities are on track for post-secondary education and employment (Agoratus, 2016). This study may promote social change by understanding general education teacher's perceptions regarding teaching math to SWD. The findings of this study can provide teachers with a more comprehensive understanding of appropriate strategies to meet the needs of SWD. Additionally, this study has the potential to promote positive social change for students because math fundamentals are a critical part of academic preparation of the elementary school child (Conner et al. 2018).

Background

Mathematics education is provided to students to assist them with the basic understanding of quantity, structure, space, and change and to develop higher-order thinking skills so that mathematical reasoning becomes part of daily function (Ozkaya & Karaca, 2017). It can be extremely difficult to meet the math learning needs of SWD (Eskelson & van Ingen, 2017). The perceptions of teachers of math in the inclusion classroom reported that some methods are not adequate for SWD (Moreno-Rodriquez et al., 2017). Teachers shared that when a process of steps is used for teaching math interventions to SWD, more favorable math expectations were achieved. Inquiry-based curriculum is taught more effectively when teaching SWD in general education classroom when teachers provide explicit instruction.

Krawec and Steinberg (2019) discussed the need for more engaging, effective, and feasible math instruction for teachers to use when teaching mathematical content to SWD. Teachers have revealed the need for training to meet these specific student needs when teaching math interventions to students with learning difficulties. It is important to

understand how to engage all students in activities to cultivate successful partnerships among SWD. van Garderen et al. (2019) discussed that gaining insight into teacher perspectives can provide invaluable information that can lead to appropriate training opportunities that will improve outcomes for SWD. This study addressed math instructional barriers of general education teachers who work with SWD.

Problem Statement

The problem is that general education teachers experience barriers for implementing math instructional strategies to support academic achievement of fourth and fifth grade SWD. Bishara (2016) found that teaching math to SWD is particularly difficult as compared to the general education population. The need to meet the educational curriculum requirements makes the task even more challenging. SWD continue to demonstrate math underachievement as compared to their general education peers. The Georgia Department of Education requires that the Georgia Milestone test be administered each year to determine content mastery. The Georgia Milestones is a comprehensive summative assessment that measures how well students have learned the knowledge and skills in the content standards. The comparison of Milestone math scores for SWD and all students tested from the chosen district are presented in Table 1. These test score data clearly represent math underachievement among SWD.

Table 1

Content Mastery Comparison of Students with Disabilities and All Students Tested

Student Area	2015	2016	2017	2018	2019
Students with Disabilities	39.83%	37.31%	36.98%	34.89%	37.25%
All Students Tested	59.77%	62.21%	61.90%	60.27%	64.73%

Note. From Georgia Department of Education (2020). College and career ready performance index: Content mastery.

Freeman-Green et al. (2018) stated that the general education approach to problem-based learning requires students to gain new knowledge by gathering information, identifying possible solutions, and drawing conclusions. Students who struggle with mathematics may have difficulty knowing which solution method to utilize for a given problem. Will (2020) expressed a concern that general education teacher preparation in math content is weak to teach math. A synthesis of literature reveals that this is a current and meaningful problem in education and is a gap in practice in special education. McKevett and Codding (2020) examined this problem and provided different views on the effectiveness of math interventions and students with learning difficulties. McKevett and Codding reported that the math interventions did not match the needs of the SWD. Hudson et al. (2018) explained that structured instruction may lead to greater progress in math for SWD. Kaur (2017) discussed that the use of iPads in the general education classroom may aid SWD to understand math concepts more effectively. Kaur

indicated that future research is needed to determine effective strategies that may include the use of iPads for students with math disabilities to use across educational settings.

General mathematics instruction has not been effective in teaching SWD (Hughes 2020). Hughes further stated that it is necessary to explore the needs of students who struggle with math concepts and then match instructional strategies accordingly. Dozier (2019) supports this through administrator interviews that revealed that there is limited planning for math instruction for diverse groups of students and a lack professional learning to address the needs of different subgroups. Loedding (2015) revealed that instructional changes need to be made in order to increase student achievement in math for SWD. Professional learning opportunities can increase instructional math strategies leading to achievement for SWD.

Purpose of the Study

The purpose of this basic qualitative study was to investigate and understand general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth grade SWD. The teachers' perceptions of instructional practices and related barriers in math for SWD were identified. The research questions were used to investigate participants' knowledge of barriers to effective math instruction in a large school system in a southeastern state. Standardized assessment measures for the past 5 years indicate lower math scores for SWD in fourth and fifth grade in the system. The results of this study have identified factors for improving math achievement of SWD in the inclusion classroom.

Research Questions

Research Question 1 (RQ1): What are elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD in the inclusion setting in a large school system in the southeast region of the United States?

Research Question 2 (RQ2): What are elementary general education teachers' perceptions toward the barriers of implementing math instruction for fourth and fifth grade SWD in a large school system in the southeastern region of the United States?

Conceptual Framework

The conceptual framework for this study is based upon Baroody's (2006) three developmental stages of math fact acquisition, (TDSMFA). These three stages include the following: (a) the initial phase is counting strategies, such as using manipulative materials, fingers, tally marks, or verbal counting; (b) the second phase involves reasoning strategies to determine an answer, including the use of derived facts, where already known basic facts, composed together, gained the sum or product of an unknown basic fact; and (c) the final phase is mastery, or the efficient solving of the problem. Baroody (2006) stressed that the first two phases were the essential foundation for conceptual understanding to develop the reasoning strategies needed to attain basic fact fluency. Acquisition of basic math facts can increase the likelihood of success in math for SWD.

Nature of the Study

The nature of this study is qualitative. Qualitative research is consistent with conducting interviews with participants to obtain elementary general education teacher

perceptions of math instructional practices for SWD. The participant interview process provides an in-depth understanding of methods leading to a better understanding of the interviewee's knowledge which provides valuable insight (Adham et al., 2018). A qualitative research design is used when a researcher wants to understand the details of an issue. The specific qualitative design was basic qualitative. Data were collected through interviews regarding the research problem and purpose. Twelve general education teachers were recruited from the local district for this study, six were fourth grade general education teachers and six were fifth grade general education teachers. All fourth and fifth grade general education teachers were recruited from within the designated county's 28 elementary schools. Open coding, axial coding, and thematic analysis were used for the data analysis. Interview data from fourth and fifth grade general education teachers who teach math in the inclusion classroom were the source of information.

Definitions

The definitions that revolve around the conceptual framework and terms that pertain to special education are listed in this section were relevant to the study. The purpose of these definitions to provide clarity to the application of the terms in the research. The definitions below were specific to this study.

The Individuals with Disabilities Education Improvement Act (IDEIA; P.L. 108-446): the primary source of federal funding to states for the identification and education of children with disabilities (Dragoo et al., 2020).

Individualized Education Plan (IEP): following an initial evaluation a multidisciplinary team develops an IEP for a child who receives special education

services. The IEP provides educational information that includes a statement of the child's present levels of academic achievement and a statement of measurable, annual goals (Dragoo et al., 2020).

A Free and Appropriate Education (FAPE): the provision that each child with an IEP be afforded the opportunity to make educational progress (Dragoo et al., 2020).

Inclusion: a philosophical approach to teaching where all students are served within a general education setting by providing appropriate educational programs, supports, and assistance (Shamberger & Friend, 2013).

Students with Disabilities (SWD): SWD may include any of the following: specific learning disabilities, emotional behavior disorders, other health impaired, autism spectrum disorders, mild intellectual disability, vision impaired, hearing impaired, and orthopedically impaired (U.S. Department of Education, 2015).

Assumptions

This study was based on the following assumptions: (a) the study participants would accurately answer the questions; (b) the participants would be truthful in their responses to the interview questions; (c) the study participants had an understanding of what effective math instruction is; (d) the study participants had some understanding of TDSMFA. These assumptions are meaningful to this study because data collection is based on teachers' experiences with effective math implementation. Teachers with limited experience with math instruction may provide limited information. It is further assumed that participating teachers understood the questions presented to them and felt comfortable asking clarifying questions.

Scope and Delimitations

The scope of the study included elementary schools that currently mandate the use of co-taught instruction according to student's IEP accommodations. This study was limited to 12 general education teachers, six fourth grade teachers and six fifth grade teachers from within the 28 designated elementary schools of one school district. Detailed information of teacher perceptions of math instructional barriers from the study can provide connections in this district and possibly other similar districts.

Limitations

The researcher must be aware of limitations that occur in the qualitative interview in order to maintain credibility and to protect the participants. Internal validity is increased when limitations are identified (Rumrill et al., 2011). During the interview process, I did not cause the interviewee to cater answers to what I wanted to hear so that responses were authentic. Scheduling issues were managed in order to meet the needs of the participants. Technical difficulties were managed and did not hinder the consistency of the interview. I asked for clarification if I misheard a participant's response. The interviewer must remain focused in order to keep the conversation consistent with answering the questions so that integrity is established (Roberts et al., 2019). Similarly, I included all information when interpreting data, and did not omit undesirable information that would skew the study and or to achieve anticipated results.

Significance

According to the National Center for Education Statistics (2015), an achievement gap exists when a group of students performs better than another group of students on a

test and the difference between the scores is statistically significant. For example, Table 1 indicated that such a gap exists between SWD and all students that took the math Milestone assessment in Georgia from 2015-2019. Although extensive efforts have been made to close this achievement gap, researchers believe that the gap is widening (Tirado et al., 2020). It is critical that educators put forth the best instructional practices to help reduce this gap. By understanding general education teachers' barriers for implementing effective math instructional strategies for SWD, educators may better understand math interventions and practices that can help SWD be more successful with math, thus, aiding in closing this achievement gap.

Summary

The problem identified for the present qualitative study was that general education teachers experience barriers for implementing math instructional strategies to support academic achievement of fourth and fifth grade SWD. The Georgia Department of Education CCRPI percentages are displayed in Table 1 comparing SWD to All Students Tested from 2015-2019 and underscore the relevance of the study. As such, my study sought general education teachers' concerns regarding math instructional practices for SWD. The specific method was the basic qualitative design. This study was grounded with Baroody's TDSFMA. Synchronous virtual interviews were conducted in order to obtain participant's perceptions due to the pandemic. Finally, how the study could contribute to the educational system and instructional approaches were stated.

Chapter 2: Literature Review

A review of the literature was conducted to provide foundational knowledge related to general education teachers and Baroody's TDSMFA. The purpose of this qualitative study was to investigate elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD. Current literature reflects that the general education teacher is expected to meet the educational needs of all students including SWD due to experience with the grade-level curriculum (Brendle et al., 2017). However, teachers may hold negative beliefs about working with SWD and vary in level of skills to effectively support them. Also, general education teachers may not be receptive to the inclusion classroom because they do not know how to teach or how to differentiate for SWD (Chakravarthi & White-McNulty, 2020). Since teacher beliefs are directly related to their perceived competence, teacher competencies may lack motivation along with pedagogical content knowledge and skills (Pit-en Cate et. al., 2018).

The TDSMFA may meet student math needs, but general education teachers may not be adequately trained to effectively teach math instruction to SWD. Understanding the perceptions of general education teachers about TDSMFA and how they are implemented can facilitate the academic growth of SWD. Nilsen (2020) stated that professional development can be crucial to increasing general education teachers' ability to respond to the increasingly diverse math needs of SWD. Lachner and Nuckles (2016) stated that, "teachers should not only be able to explain the algorithmic procedures of solving extremum problems, but also provide conceptual information, such as when and why to accomplish these procedures" (p. 222). This literature review helped clarify and

explore the study's problem of math instructional barriers for SWD. I analyzed TDSMFA by using current and formative research that was applicable to the research problem and the purpose of the study. Professional development can increase teachers' knowledge of math content and pedagogy which will elevate their quality of instruction (Garet et al., 2016; Reid & Reid, 2017). Specific training that increases teachers' understanding of student's thinking can lead to increased understanding and progress for students (Murtafiah et al., 2018).

In the literature review, the components of TDSMFA were identified as a method to help bridge the math gap and enable teachers to remove math instructional barriers for SWD. First, I provide details on the literature search strategy. Second, I discuss the conceptual framework, TDSMFA. Third, I explain the literature related to key variables and concepts. Fourth, I discuss historical significance and legislation. Next, I discuss the math instructional strategies for SWD. Finally, the literature review ends with the summary and conclusions.

Literature Search Strategy

The literature review was conducted using a comprehensive literature search strategy including peer-reviewed journals, books, and government documents from the Walden University library. Research-based scholarly articles were provided for the literature review by gaining access to scholarly databases, as well as searching Google Scholar. The key terms used to search for literature were *differentiated math instruction, math instruction, math interventions, math barriers, strategies, and students with disabilities, learning disabilities, and challenges.* Detailed descriptions of the search

terms are listed in Appendix A. Articles were selected based on authentication of peer review. I selected scholarly articles written from 2017-2022 for the literature review. In certain cases, I incorporated articles written prior to 2017 years based on pertinent information.

Conceptual Framework

The conceptual framework of the study was used to address the theories, assumptions, expectations, beliefs, and expectations that support the research. The conceptual framework of this study was the TDSMF based upon Baroody's (2006) research. According to Baroody, students develop math competency in three stages. The initial phase involves counting strategies, such as using manipulative materials, fingers, tally marks, or verbal counting. The second phase involves reasoning strategies to determine an answer. This includes the use of derived facts, where already known basic facts, composed together, gained the sum or product of an unknown basic fact. The final phase is mastery, or the efficient solving of the problem. Baroody asserts that the three phases of TDMFA, counting, reasoning, and mastery, are an integral part of math competency. The first two phases are the essential foundation for conceptual understanding and developing reasoning strategies in order to attain basic fact fluency (Baroody, 2006). He continued that skipping over the second phase in order to get to mastery was harmful to students' overall mathematical growth. Therefore, those involved in teaching the TDSMFA must understand its individual stages so that students' progress through the reasoning strategies and develop foundational math understanding. According to Baroody, effective implementation of TDSMA, provides SWD instruction

based on a framework that fits student needs, enabling them to be successful in achieving grade-level math standards.

Baroody (2006) stressed the importance of progressing through the stages of the TDSMFA. Acquiring math knowledge begins very early when children learn one to one correspondence with numbers through the fundamental stages that involve reasoning with numbers. These phases play in integral part in how individual students learn. Early mathematical knowledge predicts the rate of growth in mathematics (Collins & Laski, 2016). Math knowledge at or before school entry can predict outcomes across primary and secondary school (Rittle, 2017). Based on the research related to the TDSMFA, I determined the TDSMFA was meaningful to the study and incorporated it into the construction of my research questions.

Literature Review Related to Key Variables and Concepts

For the following section I discussed the relevance of math instructional practices over the TDSMFA. This relates to my study by bringing attention to strategies and interventions that can assist educators in providing effective math instruction for students with disabilities.

Historical Significance and Legislation

Schools are required to teach academic skills to children so that they are successful throughout school and in society. Schools are not only expected to teach academic skills, but they are required to meet the individual needs of SWD. Further, SWD are entitled to a Free and Appropriate Education (FAPE). According to Jameson et al. (2020), the FAPE mandate is the cornerstone of the most recent subsequent

amendment is the Individuals with Disabilities Education Act IDEA of 2004 and our nation's special education law. IDEA ensures that each child with a disability is entitled to a FAPE. IDEA defines FAPE as an educational program that provides the student with an Individualized Education Plan (IEP) the opportunity to make educational progress (Dragoo, et al., 2020). Jameson et al. (2020) further stated that the program must meet state grade-level standards and provide access to the general education curriculum. In order to make strides in academics, interventions and instructional strategies must assist students with learning fundamental concepts.

According to Georgia Standards for Mathematical Practice (2020), teachers should seek to develop problem solving skills, reasoning and proof, communication, representation, and connections with math fundamentals with their students through each grade level. Baroody's (2006) TDSMFA is critical to this process because students must be able to understand basic counting and reasoning with numbers in order to solve math problems. As students' progress through school, it is essential that they are able to apply transfer of training with math concepts from year to year. Nelson and Powell (2018) stated that the identification of math difficulty is strongly related to math performance in subsequent grades. Due to this difficulty, many students with disabilities fall even further behind in mathematics in later grades. Regardless, educators are still mandated to meet the needs of SWD even as this longitudinal gap increases.

Math Instructional Strategies for SWD

As educators strive to meet the math needs of students with disabilities, it becomes even more challenging when these students have not grasped concepts from

previous years. There are many strategies that can be used to assist teachers with this challenge. The Conceptual Framework for this study is the TDSMFA which included counting and reasoning as critical factors in learning math fundamentals (Baroody, 2006). The way that students learn how to count and reason mathematically has been the topic of countless research studies. One math intervention that is usually implemented in early elementary school for SWD is the Touch Math program. This program allows students to interact with a drawn number that is on white cardboard sheets with color coated visible dots that represent the given number (Kat et al., 2018). Students learn to associate the number with its value and eventually scaffold away from the touch points. After students have become familiar with where the dots are, they begin touching the numbers on assignments that correspond with the Touch Math number in order to answer basic math questions and to solve one digit addition problems. Students that learn counting this way have a visual representation of each number that will help them make valuable connections. This transfers to specific visual memorizing that is stored in the student's memory for use with learning and recalling subsequent math concepts (Rumanová & Drábeková, 2019).

In order to assist teachers across schools many systems have math coaches. One of the strategies that math coaches may use to broaden math understanding is Number Talks (May, 2020). Math coaches may visit classes on a regular basis or periodically to provide Number Talks lessons that can help build math foundations or classroom and special education teachers may provide Number Talks instruction. The Number Talks program stresses the importance of presenting problems using real world type situations,

this may be known as Problem Based Learning PBL (May, 2020). Number Talks leads to open discussions with the class to develop reasoning skills and to introduce new math strategies as well as apply them to the real world problem. The National Council of Teachers of Mathematics (2019) has targeted mathematical communication as a goal for students and it states that "Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge" (p. 1). This understanding and being able to interpret their learning by making real-life connections is directly related to the goal of the Number Talks program. Benson-O'Conner et al. (2019) emphasized that students that can connect prior math knowledge with new strategies, using familiar representation, their math confidence will increase as the level of difficulty increases.

Connecting real-life with math is an important ingredient for improving math instruction for SWD. The Upside-Down program brings another light to this foundational premise. The Upside Down method, according to Seeley (2017), breaks away from the traditional teaching model and allows the students to attempt the problem before explaining how to solve it. The Traditional Teaching model introduces and explains the lesson, then examples are worked together, and students apply the newly learned concept to solve a word problem (Bauwens & Hourcade, 1991). In contrast with Upside-Down Teaching, students are encouraged to engage with a problem that they may not be able to solve yet (Seeley). Crooks and Alibali (2014) stated that mathematics understanding can be defined in terms of the number or kind of connections constructed by the learner. With Upside-Down Teaching, after students are given a designated period of time, students

share their thinking on how they propose to solve the problem. The teacher walks around the class assessing student progress and choses a student to share their thinking with the class. Based on students' results, the class discussion may lead directly to the mathematical connection that the teacher wants to make, since mathematics is a connected subject that progresses through the grade levels (Fyfe, 2016). Understanding these connections is fundamental to having a deep, conceptual understanding of mathematics especially for SWD. If the students did not make the appropriate association with the problem, the conversation will need to be directed on how to solve the problem correctly. This method, regardless of the outcome, allows students to become engaged in their thinking about the problem. Becoming engaged in the problem will very likely aid in their understanding of mathematics as opposed to just being instructed on how to solve the problem.

The Thinking Classroom encourages students to gain a deeper understanding of math outside of the Traditional Teaching classroom (Winters & Lynn, 2020). This type of classroom goes one step further than the Upside Down model by allowing students to collaborate with other classmates. These connections bring together previous and new math knowledge from individual students and are shared through interaction with the ideas of others. Rittle (2017) stated that by interactively comparing and contrasting incorrect procedures to correct ones, students gain valuable conceptual and procedural knowledge. This model is unique because students have the freedom to explore their thinking by writing down and working out problems on standing or seated dry erase tables and boards. Johnsen et al. (2020) explained that this flexibility affords students the

opportunity to move freely to practice independently, collaborate among peers, or to have one-to-one instruction with the teacher. These differentiated learning styles may help to close the achievement gap of math understanding for SWD.

Math understanding is much more than solving a problem. The process of understanding qualities, mainly through visualization, starts very early in math development (Nicoladis, 2019). As students enter school, the new information is added to what the student has already learned. This progression continues throughout the student's academic years and beyond. Foundational math understanding becomes part of how connections with math are made with the world. Spatial ability is the perception of math connections that enable successful navigation through simple and complicated math tasks (Geer, 2019). Math understanding comes easier for some than for others as these connections are made. One to one correspondence, counting, and sorting are fundamental concepts of math understanding. The significant progression between spatial skills in kindergarten and mathematics achievement in first grade was brought together by through foundational knowledge of the counting sequence (Zhang et al., 2020). SWD have deficits with spatial ability and visual representation that are a key component when learning new math concepts. Iori (2017) discussed Duval's perspective that signs and representations may aid in the cognitive processes involved in teaching and learning mathematics. These interventions promote math understanding for those with even the deepest math difficulties.

Math instruction can be delivered directly through worked examples that provide step-by-step solutions to a problem (Manson & Ayres, 2021). Examples provide a model

for SWDs to use as they learn new concepts. Research indicates that for novice learners, worked examples lead to greater learning outcomes for novice learners. SWD need further instruction and practice with feedback to ensure understanding of the new information. Chen et al. (2019) stated that worked examples warrant positive effects for learners who are new to a specific task by reducing the unnecessary load. Working examples together with SWD provides visual representation that can increase confidence when learning and practicing new math concepts.

The Cover, Copy, and Compare (CCC) math fact intervention, according to Stocker and Kubina (2017) helps to increase math fact fluency for SWD. CCC is a self-managed practice of math facts that uses repetition by looking at the fact and solution together in order to increase fact fluency independence. The CCC intervention is unique in that the student develops fluency through increased opportunities to respond, repeated exposure to problems and solutions, and immediate feedback for accuracy. According to Skinner et al. (2017) the five steps of CCC include: (1) look at the multiplication fact and solution on the left-hand side of the page, (2) cover the math fact and solution, (3) write the fact and solution on the right-hand side of the page, (4) uncover the original fact and answer, and (5) compare. If the answer is incorrect, the student can complete an error correction procedure to become more familiar with the incorrect fact by writing the correct answer three times. Codding et al. (2019) found that the effectiveness of CCC may be due to the model problem including the correct answer allowing the students to practice the facts correctly from the very start. Multicomponent motivational

interventions with immediate feedback can greatly increase math performance for SWD (Grunke et al., 2019).

The Antecedent Behavior Consequence A-B-C teaching sequence employs explicit, systematic, and intensive direct instruction. The A-B-C model uses high-probability instructional sequences to teach the unknown math multiplication facts (Leach, 2016). First, instructional procedures are given as an antecedent or cue that evokes a response from the student. Second, a prompt is delivered if the student is unable to respond to the antecedent independently. Third, the student demonstrates the expected behavioral response and answers the fact correctly. Fourth, positive reinforcement is delivered to the student for demonstrating the expected behavior. Lastly, a brief break is taken before delivering the cue for the next set of facts. This format uses a quick pace of instruction, repetition of trials that provides increased learning opportunities, and instruction that occurs in the context of a structured teaching session. This intervention increases math fact fluency and assists SWD with basic calculation skills and overall mathematics performance (Thomas, 2021).

The CCC intervention can be adapted to meet the individualized needs of SWD. The Model M-CCC adaptation, encourages the student to look at and then write the problem and solution before covering the problem and solution during step two; the participant therefore writes the problem twice during the sequence. Riccmini et al. (2017) stated that modified activities that require students to vocalize (verbal-CCC) or mentally rehearse the answers (cognitive-CCC) eliminates the difficult writing piece for SWD. Researchers suggested that verbal-CCC and cognitive-CCC can yield up to two to three

times more opportunities to respond, which in turn can result in better performance outcomes (Skinner et al., 1997). An example during the third step of traditional CCC, verbal-Cover Copy Compare includes vocalizing the problem and answer, providing the verbal response accommodation. The other adaptation of Cover Copy Compare, Cognitive Cover Copy Compare, has the student voice the response only. Other modifications can be added to meet the needs of SWD. The basic skills instilled through the CCC process may assist SWD with self-monitoring skills. By working through the visual and interactive steps of CCC, SWD can increase the level of self-confidence and motivation with overall math achievement.

Visual representation through schema-based instruction benefits SWD in the math problem solving process. Peltier et al. (2020) explained that schema-based instruction consists of defined steps using visual models to identify the underlying structure of a math problem. The steps of Schema-based instruction include a drawn schematic diagram, placing the quantities in the appropriate place within the schematic diagram, writing an accurate number sentence to compute the solution, and providing the correct solution. This early mapping skill assists SWD with the subsequent spatial steps needed to compute math tasks (Mix, 2019). The diagram is then used as an example for students to use as they work through the steps of the problem. Once the answer is achieved, teachers and SWD discuss the overall process for reasonableness. This skill assists SWD with attentive deficits. Powell et al. (2015) explained that Schema-based learning applies systematic reasoning to help the new information become part of the working memory.

As students work through logical relations of a math problem to determine what is relevant and what is not, students begin to interact with the problem. Key words are underlined and numbers are labeled. Mix et al. (2017) explained that by developing the skill of visualization and mental rotation, SWD obtain significant improvement in mathematics scores. This process builds number sense because students begin to replace the representative letters with the appropriate numbers eliminating superfluous information in order to compute accordingly. The Schema-based combination of visual and interactive strategies provides SWD with a sustained intervention that can lead to computational math progress (Bailey et al., 2018).

The process of connecting working memory with mathematics is significant for SWD. Many students with and without disabilities have difficulty with learning math facts to memory. Students who lack mastery on basic facts continue to experience failure with subsequent math instruction (Miller & Mercer, 1997). Mnemonics improve math performance (Boon et al., 2019). The word mnemonic is derived from the Greek word mnēmonikós, meaning “relating to the memory” (Liddell & Scott, 1889 as cited in Boon et al. 2019). Learned mnemonics are recalled from the memory and then linked to the math process needed to solve the particular problem. The letter strategy is commonly used to correlate a concept with the letter in sequence, for example (Betz, 1929) coined the FOIL method, which stands for First, Outer, Inner, and Last, that helps students recall the ordered steps of solving algebraic problems. Mnemonics that were previously created can be used or new ones can be designed with student participation in order to aid SWD with understanding a math process. Tisdell (2017) stressed the importance of teaching the

new mathematical process before explaining the mnemonic. This fundamental understanding of the newly learned math skill is critical so that students do not simply parrot the mnemonic. Acronyms are to be used to initiate recall of the steps in the process from their memory in order to compute the steps accordingly. The use of mnemonics can boost interest and engagement with mathematics which can lead to positive outcomes for SWD (Scruggs & Mastropieri, 1990).

The Clothesline Math: The Master Number Sense Maker program provides math number sense lessons with the visualization of a clothesline and number/fraction card sets (Shore, 2018).The teacher places the number/fraction cards on the clothesline in relation to each other based on the lesson being taught. The visual display of numbers or fractions assists SWD with understanding beginning basic number sense through more difficult concepts in later grades. The clothesline can be modified to include any math areas. By visualizing, manipulating, and making sense of the solution, students can use the clothesline visual to solve the problem for themselves (Bonin-Ducharme, 2017). Teacher and student interaction with the number cards along the clothesline can help build conceptual understanding for SWD and allow students to become more confident with new math instruction.

Computers have become a part of implementing academic interventions (Rich el al., 2017). Computer based programs paired with conceptual daily math instruction helps bridge the achievement gap for SWD. Digital instruction can provide math practice with immediate corrective feedback, engaging activities, and individualized targeting of skills, build understanding of concepts that classroom instruction cannot (Hawkins et al., 2017).

The MathFacts in a Flash online intervention has shown to increase math fact recall through its interactive activities. Supplementing math curriculum with digital-based interventions can lead to higher overall math achievement for SWD (Musti-Rao & Plati, 2015).

The addition of computer-based interventions to pencil-paper practice increases math understanding for SWD (Rich et al., 2017). The Imagine Math Facts by Imaging Learning is a Computer Assisted Instruction CAI program that caters to individual ability levels (Berrett & Carter, 2018). This program consists of educational video games designed to improve math fact fluency and automaticity Imagine Math Facts differentiates instruction for each user and focuses practice on unlearned math facts. The interactive nature and format promotes attention that can be critical for SWD. The Timez Attack provides individualized instruction through modeling correct answers and gives immediate, corrective feedback for errors. This activity is very beneficial to SWD because it allows a considerable amount of time to practice math facts and it is not limited to the usual response conditions (Musti-Rao et al., 2015).

Computer assisted instruction and traditional instruction are more effective when used together to meet the math needs of SWD (Chekour, 2017). The use of both methods provides more balanced instruction. Computer based instruction is especially essential for developmental math classes, where students often lack motivation, maturity, and time management skills. Math objectives are targeted to effectively match the needs of students, instructors, and the course curriculum in a blended format of instruction. The

use of technology for math instruction creates an environment of effective interaction, active participation, constructive feedback, and significant learning outcomes for SWD.

Computer-based math instruction practice that includes automatic feedback greatly benefits SWD. Immediate feedback allows teachers to make changes to instruction efficiently (Hensley et al., 2017). The I CAN Learn® computer-based math curricula provides math instruction through individual interactive lessons. SWD can be more successful because this program allows SWD to move at their own pace. Students must demonstrate mastery of each concept before progressing to the next lesson (What Works Clearinghouse, 2017). Teachers can provide further assistance through direct, individual, or small-group instruction based on student's results.

The use of visualization assists SWD with understanding math concepts. Delgado and Prieto (2004) indicated that visual representation during math instruction is considered to be effective. Teachers that support productive struggle in learning mathematics with visuals encourages student thinking. According to (Fuson, 2019), the connection between visual images through modeling and explaining thinking builds conceptual knowledge and bridges the math gap for SWD.

Educational technology provides interactive instructional and student response opportunities for SWD (Cabus et al., 2017). Kaczorowski et al. (2019) discussed the differentiation benefits of the eWorkbook. The eWorkbook was developed within the Universal Design for Learning UDL framework. The UDL incorporated evidence-based teaching practices to meet the needs of all learners. The eWorkbook assists SWD with math achievement because it offers embedded flexible scaffolding, student choice,

support, multi-step problems broken down into smaller parts, and additional practice. Instructional technology has demonstrated promise in delivering targeted and individualized mathematics instruction for SWD (Shanley et al., 2019). The use of differentiation is necessary to meet the math instructional needs of SWD (Blazar & Archer, 2020). Multiple interventions have shown that conceptual and cognitive instruction leads to higher student achievement. Differentiation leads to self-efficacy and engagement in teacher instruction for students with IEPs resulting in higher academic gains in math. Studies indicate that state math assessment scores of SWD increased over the implementation period of multilevel modeling instruction. The use of multiple math instructional methods increased fidelity for SWD (Choi et al., 2020).

The Purposeful Movement PM intervention is an effective instructional strategy for SWD that are kinesthetic learners (Snyder et al., 2017). This approach encourages students to learn through touch, physical movement, and hands-on activities. Irvine (2019) explained that movement and activity increases student engagement and potentially has a positive impact on student's attitudes toward math. When students use their hands, arms, and legs while learning math, a connection is being made with the math content (McMurtrie & Coleman, 2020). Physical movement during instruction is an effective delivery model that leads to increased math retention for SWD.

The JUMP program is an effective program for SWD since it aims to limit working memory and language demands (Solomon et al., 2019). Direct instruction is provided so that teachers can control the timing and the amount of information the children receive. Students receive extensive practice working with the lesson ideas in

practice and assessment books that contain worked examples and include real world problems pared down to the essential text (Craig, 2019). Algorithms with practice taught along with conceptual understanding is a key component for proficiency to for acquiring fact fluency.

Effective instructional planning is very important in order to meet the needs of SWD in the inclusion classroom (Alsarawi, 2019). This co-planning time requires a shared vision involving a time commitment of meeting monthly, weekly, and daily to clarify the roles and responsibilities of both teachers. Regular collaboration provides teachers the time to address concerns, coordinate, and organize work to best utilize their strengths, skills, and roles in order to meet he the math needs of SWD. Planning needs to be shared in order to meet the needs of SWD. Individual planning leads to less effective instruction for SWD (Nilsen, 2017).

Math instruction begins at an early age, from the time children make mathematical connections with the world around them through their academic years and beyond. There are many formats in which math instruction is delivered either formally or informally for SWD. Teachers engage students through the Three Developmental Stages of Math Fact Acquisition TDSMFA (Baroody, 2006). Various forms of math instruction include the initial phase that involved counting strategies, such as using manipulative materials, fingers, tally marks, or verbal counting. Many instructional math methods encompass the second phase that involved reasoning strategies to determine an answer. This included the use of derived facts, where already known basic facts, composed together, gained the sum or product of an unknown basic fact. More involved math

instruction may be necessary to include the final phase of mastery, or the efficient solving of the problem. This assumption shows that TDMFA is an integral part of math instruction (Baroody, 2006). Math instruction must include the progression through the stages of the TDSMFA especially for SWD since further deficits can lead to an increased math achievement gap.

Summary and Conclusions

The importance of math instruction through a structured framework as evidenced by TDSMFA is outlined in Chapter 2. The variety of math instructional practices creates an opportunity for students to engage in learning to grow academically to be successful with grade level standards. However, there is a gap in practice between expected math instructional practices and what is actually being implemented in the classroom. The literature in Chapter 2 established relevance of math instructional practices over the TDSMFA. This study addressed the gap in practice regarding the teacher's experiences as well as barriers with math instruction for SWD.

Chapter 3: Research Method

The purpose of this basic qualitative research study was to investigate general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth grade SWD. I investigated and explored elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD through the components of TDSMFA. In this chapter, I describe the role of the researcher, methodology that was used to select participants, and data collection. This chapter also includes an explanation of trustworthiness and ethical procedures to protect the participants.

Research Design and Rationale

Merriam and Tisdell (2016) defined basic qualitative design as focused analysis of a situation or issue which includes detailed interviews of the participants. Therefore, this study aligns as a basic qualitative study design. The research questions are focused on teachers' perceptions of effective math instruction and teachers' perceptions of barriers to implementing math instruction for SWD. Data was collected through teacher interviews which provided a wide range of responses regarding experiences as well as the challenges with meeting the math needs of SWD. Answers to the research questions were provided. The results of this study have identified teacher perceptions of effective math instruction and barriers to such instruction. These results can improve future math instruction for general education teachers and fourth and fifth grade SWD. I conducted the study in elementary schools in a southeastern U.S. school district.

I did not choose other qualitative designs, such as grounded theory, ethnography, or phenomenology. A grounded theory design would not match this study because I was not developing a theory or explaining a process. An ethnographic study explores cultural groups and their interactions and influences by the greater society (Rayan et al., 2019). Because I did not focus this study on a cultural group, an ethnographic study was not appropriate. A phenomenological study is like a case study as it allows the researcher to learn about the phenomenon through the eyes of the participants' actual experiences (Creswell, 2017). Due to time constraints with this study, a phenomenological study was not used. Based on the various criteria of each study type, I considered a basic qualitative study design to be the best design choice.

Quantitative designs such as experimental, correlational, and surveys, were not applicable to this study as they would have yielded numerical results. Neither numerical data nor statistical analysis were used for data analysis in this study. I used only narrative data that I collected through interviews. Based on the narrative data collection, a qualitative design was appropriate because data collected from this study were presented through narrative descriptions. The following research questions addressed the purpose of the study:

RQ 1: What are elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD?

RQ 2: What are elementary general education teachers' perceptions toward the barriers of implementing math instruction for fourth and fifth grade SWD?

Role of the Researcher

During the time of the study, I had been an employee in an elementary school in a large Southeastern U.S. city since 2006. In this basic qualitative research study, I took the role of the interviewer. My relationship with the participants was on a peer-to-peer colleague level. I conducted semistructured remote interviews. 12 general education teachers were recruited from the local district for this study, six of whom were fourth grade general education teachers and six were fifth grade general education teachers who have worked with SWD in the inclusion setting. My goal was to focus only on the data that was being presented during the interviews.

Methodology

Participant Selection

A purposeful sampling strategy was used for the study. Participants in this study were fourth and fifth grade elementary general education teachers. These general education teachers had experience with math instruction in the inclusion classroom. The county contains 28 elementary schools with at least one fourth grade and one fifth grade general education inclusion classroom where the general education teacher provides math instruction to SWD. I recruited 20-30 of these teachers to account for attrition. By widening my sample size across the county, I was able to obtain six fourth grade teachers and six fifth grade teachers to participate. I did this by staying within the guidelines of the Walden University Institutional Review Board. I sought permission from the designated school district in order to conduct interviews. To maintain confidentiality, I asked the

teachers to provide contact information and complete a demographic questionnaire via Google Forms through the password secure platform.

I retrieved the information from teachers who had implemented math instruction in the inclusion classroom in a participant pool via Google Forms. I contacted all teachers who responded to the demographic questionnaire through their preferred contact method about their selection in the study. The participants were given 2 weeks to respond to the demographic questionnaire.

Instrumentation

Interview questions for the participants served as the sole instrument for this study. The interview questions that I used for this study were an extension of the research questions and aligned with the research problem and purpose of the study. I created the interview questions shown in Appendix C based on the research questions. Participants were asked interview questions via Google Meet. The interview questions involved perceptions of effective math instruction and barriers to math instruction. Additional questions inquired about the teachers' role in math literacy, barriers to math strategies, challenges to gaining knowledge, and barriers to training. These questions allowed me to understand the teachers' perceptions of effective math instruction and what barriers that participants faced when teaching math to SWD.

Procedures for Recruitment, Participants, and Data Collection

After completing the demographic questionnaire, I selected teachers by notifying them by their contact method of choice. I collected initial email addresses through the demographic survey. The email contained an attachment with a letter of consent to

participate in the study. The participants were instructed to reply to the email with “I consent.” All 12 participants replied “I consent”. A thank you letter and compensation in the form of a $20 gift card was provided to each participant. No participants chose to withdraw from the study.

The email was sent to each participant with three dates and times that fit their schedules as well as mine. Interview times and dates were scheduled within 3 weeks. I offered flexibility to accommodate scheduling time. I conducted interviews remotely through a synchronous service. The time of the interviews varied based on participant availability. I conducted interviews after school, and I asked that the participants please eliminate all possible distractions that could impede the remote interview process. The average length of the interviews was 14.2 minutes, and the total data collection took about 1 month. I gave ample time for the participants to be interviewed.

McGrath et al. (2019) stated that qualitative interviews allow researchers opportunities to gain insight into experiences and perceptions of the interviewee. Through the interview process I wanted to gain understanding of what the interviewees reported. Before each interview I discussed with each participant the expectations and purpose of the study as stated in the Interview Protocol (Table 2). I reminded participants that their responses remain confidential and that their names remain confidential. I also reminded the participants that their participation was voluntary and that the interview was going to be recorded. I also explained to the participants that they could decline answering questions or cease participation at any time. All participants continued to the end of the interview process. All interviews were recorded using the Google Meet recording feature

and I took notes during the interviews. I used Sonix transcription application to ensure that all participants' responses and information were captured. Recording the interviews provided a reliable source of information. During the interview, I asked participants to clarify or expand on their responses. Table 2 shows the interview steps that were followed for all participants.

Table 2

Interview Protocol

Step	Procedure
1	Introductions were made of researcher and participant.
2	Expectation and purpose of the study were clearly stated.
3	Review of confidentiality
4	Participant questions and clarifications
5	Interview questions given in order
6	Open for additional participant discussion
7	Thank the participant for their time

Data Analysis Plan

Data analysis is the process of collecting and interpreting the data to gain understanding and to produce findings from the study (Aktan, 2020). The research questions for this study provided a focus for the data collection and they helped to construct the interview questions. The research questions guided the interview questions by providing a connection between the framework, the theory, and the data collection.

Open coding, axial coding, and thematic analysis were used to analyze data. First, I organized the data and compared the notes that I took during the interviews to the digital recordings. Next, I reviewed all data to become familiar with it and reflect on the information that was collected. In the next three steps, I conducted open coding, axial coding, and thematic analysis. According to Clark and Veale (2018) open coding, axial coding, and thematic analysis will be conducted accordingly. In open coding, data was placed in broad categories and the categories was condensed into subcategories. In axial coding, similar categories were combined to further reduce the data. Finally, in thematic analysis, emergent themes were identified from the axial codes. Data was further separated and organized in order to analyze for themes.

In qualitative research, it is important for the researcher to minimize their own assumptions while collecting, coding, and sorting data (Clark & Veale). Member checks validated the main themes that emerged. This allowed the researcher to develop a deeper understanding of the data and to bring light the nature of knowledge (Regan et al., 2017). Participants were asked to look over the themes and respond if they were in agreement or not with the themes. All participants were in agreement with the themes. Participants were given 3 weeks to provide feedback regarding the emergent themes.

Trustworthiness

Trustworthiness is necessary in qualitative research in order to maximize credibility and dependability in the study (Flynn et al., 2019). Ongoing reflection and thoughtful decision-making throughout the inquiry process makes the study

credible (Hong & Cross, 2020). Trustworthiness procedures in the study increased rigor by analyzing for transferability, dependability, credibility, and confirmability.

Credibility

The information gathered through the data collection process must demonstrate confidence in the truth of the study and its findings (Connelly, 2016). In order to ensure credibility in the study, the researcher was aware of any threats that may affect the interpretation of the participant's results. Participants were asked to member check which aided in the research credibility process. Member checking asks participants to review the main themes and to give feedback (Stahl & King, 2020). The findings were sent to the participants via email. Participants were asked to return their responses via email within 3 weeks.

Transferability

To warrant that the results in a study have relevance, the study must have transferability in that the findings are applicable to other situations or settings (Merriam, 1998). The results should establish external validity and transfer to different settings, groups, or populations (Maxwell, 2021). Transferability can pose challenges if external validity in qualitative research cannot be established. Transferability can be increased by providing thick descriptions to the findings. A thick description provides the reader with quality details into what is being explored thus making the study more credible (Stahl & King, 2020). Through detailed information provided in the study, connections can be made between math instruction implementation at this district and with other similar districts.

Dependability

In order to establish dependability in qualitative research, records of the research are kept by the researcher through notes. I kept detailed notes through the research and data collection process. The step-by-step process gave me a description of what I was experiencing during the actual interviews. The notes included participant responses, ethical issues, and other issues that may have taken place during data collection and analysis.

Confirmability

Confirmability in qualitative research concerns the aspect of neutrality (Ravitch & Carl, 2016). To establish confirmability, I kept a journal that reflected on my own perceptions throughout the research process. I explained each step of the study so that I stayed focused to ensure credibility. The journal helped me confirm and justify that my decisions were derived from the data (Korstjens & Moser, 2018). The notes helped me reflect on my own beliefs and values in order to guide the direction of the study with neutrality.

Ethical Procedures

As a researcher, I was able to abide by the principles of ethical research methods that reflect respect for justice, autonomy, beneficence or do good, and/or do no harm when conducting research with human participants (Sales & Folkman 2000). In following Walden University's policy, I completed the required Collaborative Institutional Training Imitative Doctoral Student Researchers Basic Course. This course helped ensure that several steps were taken to respect the principles for the ethical protection of participants

including (a) informing participants of the purpose of the study, (b) sharing information about the study with participants, (c) respecting the thoughts and feedback of the participants, (d) using ethical interview practices, (e) maintaining confidentiality, and (f) securing all collected data. Prior to starting the interview, I let the participants know that their participation was strictly voluntary. Participants were made aware of their participation through electronic mail. A voluntary consent letter, Appendix D, was acknowledged through email. Each participant responded "I consent" to the email that contained the consent form.

To provide fair and ethical treatment of the human participants, I followed IRB protocols and procedures to receive permission to conduct the study. The permission was granted by the participating school district. All collected data was held in the strictest confidence and participants' identity will remain confidential. Data from the study will be kept confidential and secure for a minimum of 5 years after the completion of the study and subsequently destroyed. Overall, the research methods ensured that I will respect the confidentiality of the participants

Summary

This chapter provided a detailed description and justification of the research design, methodology, data collection, data analysis, trustworthiness, and ethical procedures. The purpose of this basic qualitative research study was to investigate elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD. The participants were selected by using a purposeful sampling method to identify fourth and fifth grade elementary math teachers who teach

SWD in the inclusion classroom. Teachers took part in semi-structured interviews to obtain their perceptions of barriers for implementing math instructional practices for SWD in the inclusion classroom. Open coding, axial coding, and thematic analysis were used for the data analysis. Chapter 4 addressed the results of the data collected and analyzed.

Chapter 4: Results

The purpose of this basic qualitative research study was to investigate and understand general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth grade SWD. Teachers can use these results to improve future math instruction by identifying trends in their perceptions and to further explore the problems that result during math instruction when they do not meet the math needs of fourth and fifth grade SWD. I used semistructured interview questions in this study to help identify barriers that may occur throughout the process of implementing math instruction. I developed two research questions for this study to gather general education teachers' perceptions of barriers for implementing math instruction in the classrooms of fourth and fifth grade SWD in their respective schools:

RQ1: What are elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD?

RQ2: What are elementary general education teachers' perceptions toward the barriers of implementing math instruction for fourth and fifth grade SWD?

The conceptual framework of the study and the basis for the research questions was guided by Baroody's (2006) research. Baroody (2006) asserted that TDSMFA is an integral part of math competency. Baroody's conditions identified in the TDSMFA were appropriate for this basic qualitative study because effective implementation of TDSMFA focuses on instruction based on a framework that fits student needs of fourth and fifth grade SWD enabling them to be successful in achieving grade level math standards. I used the framework to support the research questions because Baroody's theory

supported understanding and developing reasoning strategies in order to attain basic math fact fluency so that students' progress through the reasoning strategies and develop foundational math understanding.

In Chapter 4, data collection and analysis procedures throughout the study are discussed. The participants setting, the method in which data were generated, collected, and recorded are also explained. Any unusual circumstances that I encountered throughout the data collection process are discussed. I then explain how open coding, axial coding, and thematic analysis strategies were used to analyze the data. Each research question with data to support each finding is addressed. Evidence of trustworthiness, including credibility, transferability, dependability, and confirmability, followed by a summary of Chapter 4, are provided.

Setting

Conditions

On October 15, 2021, Walden University's IRB approved my application (Approval Number 10-15-21-0436074) to conduct my research study at selected elementary schools in a large school system in the southeastern region of the U.S. After the approval, I began to recruit current and previous fourth and fifth grade general education teachers who had taught math to SWD in the inclusion classroom. This data collection resulted in teachers' responses regarding the number of years of teaching experience and their perceptions of barriers to math instruction for SWD in the inclusion classroom.

Participant Demographics

To determine participant eligibility, I emailed a potential participant letter that included the demographic questionnaire via the Google Forms link to each teacher at the schools that had been approved for my reasearch. I located teacher's email information through the participating county website. Once the participants completed the demographic questionnaire, I sent an email that included a consent form and asked each participant to respond to the email with "I consent" and to select from an interview time that was included in the body of the email. I placed in the participant pool those teachers who had completed the questionnaire and were present or past general education math teachers in the fourth or fifth grade co-taught classroom with SWD. The selection of participants across both grade levels contained fourth grade teachers and fifth grade teachers. The participant number and their years of experience of teaching are presented in Table 3. To ensure confidentiality, grade levels were not identified with the corresponding participant.

Table 3

Participant Number of Years' Teaching

Participant Number	Teaching experience
1	5+ Years
2	1-5 Years
3	1-5 Years
4	1-5 Years
5	1-5 Years
6	5+ Years
8	1-5 Years
9	1-5 Years
10	1-5 Years
11	5+ Years
12	1-5 Years

Data Collection

Participants

I notified a total of 12 teachers who had responded to the demographic questionnaire (See Appendix B) via email regarding their selection to participate in the study. I asked participants to email the words "I consent" in response to the email that included the Consent From. All 12 participants gave consent with the understanding that participation was confidential and voluntary.

Participation in the study included a semistructured, virtual interview through the use of Google Meet. Interviews were scheduled via email and phone calls, with the information obtained through the demographic questionnaire. Participant 7 had to drop out of the study because she was not able to meet face to face. I followed the interview protocol in Chapter 3 for every interview. I did not schedule any interviews during instructional time. All interviews were held after school hours so that research activities

were kept separate from participants' regular activities. I interviewed 11 general education teachers. The average length of interviews was 14.2 minutes. The participant's answers were specific, to the point, and with minimal or no elaboration. I routinely asked participants if they had any additional information that they would like to share. Some participants did provide minor additional points. The participant with the shortest interview (5 minutes) provided brief, specific answers and did not feel that there was anything else to add to the responses. The time of the interviews was left to the discretion of the participant. Since the interviews were conducted through Google Meet, the location was left to the participant's discretion. With participant permission, I used the voice record feature of Google Meet to record the interviews on my password protected computer and I took notes during the interviews. I transferred the voice recordings through the transcription service, Sonix, and printed the transcription to help me capture all the participant's responses. There were no variations in the actual data collection from the data collection plan presented in Chapter 3.

Data Analysis

Interviews

I used open coding, then axial coding, and finally thematic analysis. Because I only interviewed 11 participants, the sample size was small enough that I could analyze the data without assistance of a computer program. Based on the qualitative analysis methods described by Creswell (2018), I followed these steps to analyze the data:

- Step 1: I organized the transcribed interviews. I compared the notes and recordings to make sure that I did not miss any information that was shared during the interview.
- Step 2: I reviewed the transcripts to become familiar with what the participants were trying to convey and to provide an overall reflection of the information presented. Creswell (2018) stated that taking notes on overall impressions of the data can help shape ideas about the data presented.
- Step 3: In this phase of data collection open coding segmented the data into broad categories. This process was done on paper. I color coded each code with a highlighter and gave it a category title. I sorted the data on a large sheet of paper with columns containing each separate code. I placed the highlighted data under the matching column. I created subcategories to provide more detail in the broad category.
- Step 4: The next step in the data analysis used axial coding to create the categories developed from the open coding. Similar categories were merged with those that were similar in nature, which required further reduction of the data.
- Step 5: Using thematic coding, I then looked for interrelationships that emerged from the categories developed during axial coding. I identified emergent themes. I examined each of the categories and generated the themes that appeared to incorporate the major findings from the data.

I asked the participants to provide a member check to review the findings once thematic data analysis was completed. Member checking is considered an important

process in the credibility of a qualitative study (Rumrill et al., 2011). The themes of the data were emailed to the participants to complete the member check. Participants were given 2 weeks to review the main themes and to acknowledge or refute those themes. This member check review allowed me to include the participants in the analysis and in the interpretation of the data. The participants responded via email that they reviewed the themes. All participants agreed with the themes.

Discrepant Cases

Discrepant data should be noted during qualitative methods analysis (Creswell, 2018). Thus, all participant perspectives are important in basic qualitative research. No discrepant data were discovered during the interview process or during data analysis.

Results

Interview Results

The interview data were sorted and grouped. This open coding stage allowed me to segment the data into broad categories. Interview data revealed answers to RQ1: What are general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD? Participants shared that they were trained to teach Tier 1 students that required only minimal interventions, not SWD. General education teachers stated that they did not receive specific training to effectively provide math instruction and strategy implementation for SWD. The participants also felt that they did not understand the meaning of the various disabilities. This knowledge would help increase teachers' awareness of individual disabilities; this information would lead to positive math outcome for SWD. Participants shared that their previous trainings were not practical

because they were not hands on. The instruction did not lead to an effective transition of the content, nor did it provide follow up for teachers after completion of the course. Participants added that specific training price and the materials to implement the content were not cost effective.

Interview data revealed answers to RQ 2: What are elementary general education teachers' perceptions toward the barriers of implementing math instruction for fourth and fifth grade SWD? These barriers included that SWD had low prerequisite skills, making it difficult for SWD to understand grade level material. Other barriers included that SWD could not use manipulatives that they had learned to use to help them on tests. Participants shared that SWD could not keep up during math instruction, have low focus ability, and low reading skills, which make it difficult for teachers to maintain the pace of the curriculum.

Teachers shared that the curriculum is fast paced, rigorous, included too many concepts, and is not differentiated. Participants stated that the curriculum assumes that SWD have critical thinking skills and are expected to move on before they are ready. Interview data revealed that teachers were overwhelmed with time constraints to search for and to teach meaningful strategies that include making real life math connections for SWD. Teachers found it difficult to have time to pull students for small group instruction as needed. Participants also discussed the lack of time to plan and collaborate with their co-teacher and they felt a lack of support and guidance.

Participants discussed that the lack of resources and limited access to meaningful resources are barriers that impede their ability to effectively teach math to SWD.

I used thematic coding analysis to identify the main themes in the study. Five themes from the research questions emerged from the thematic analysis. The open coding results that were gathered from the interviews are listed on Table 4.

The open codes were grouped into categories and themes were revealed from the codes. Based on the interview data and RQ 1: general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD in the inclusion classroom in a large school system in the southeastern region of the United States, the training theme emerged. This theme encompassed the participants concern with understanding individual disabilities and how to how to effectively teach math instruction to SWD. The interview data also demonstrated themes for RQ 2: barriers that general education teachers encounter when implementing math instruction to SWD. These themes included the learning obstacles that impeded SWD from being successful with math instruction. The limited resources theme covered the lack of materials needed to teach math to SWD. The theme of time included time for instruction and planning in order to help SWD be successful with math. The curriculum theme covered the issues of rigor, fast pace, and differentiation, that are barriers to effective math instruction for SWD. Table 5 lists the axial coding and the themes related to the research questions that emerged from the open codes.

Table 4

Open Coding

Code Number	Code Name
Code 1	Low prerequisite skills
Code 2	SWD cannot use manipulatives on test
Code 3	SWD cannot keep up
Code 4	SWD have low critical thinking skills
Code 5	Low focus ability
Code 6	Low reading skills
Code 7	Training to teach SWD
Code 8	Training for Tier 1 not SWD
Code 9	Prerequisites and Grade Level
Code 10	Training follow-up
Code 11	Understanding disabilities
Code 12	Modeling/scaffolding
Code 13	Training is not hands on
Code 14	No manipulatives
Code 15	Not enough resources
Code 16	Real life connection resources
Code 17	Cost for training/materials
Code 18	Meaningful strategies
Code 19	Lack of support/guidance
Code 20	Planning time Gen Ed/ESE
Code 21	Overwhelmed
Code 22	Time to teach strategies
Code 23	Collaboration
Code 24	Time to move from concrete to abstract
Code 25	Too many concepts
Code 26	Specific small group time
Code 27	Curriculum fast paced
Code 28	Moving on before SWD is ready
Code 29	Curriculum not differentiated
Code 30	Curriculum to rigorous/rigid

Table 5

Theme Relationship to Research Questions

Associated RQ	Theme number	Theme name
RQ1	Theme 1	Training
RQ2	Theme 2	Time
RQ2	Theme 3	Limited Resources
RQ 2	Theme 4	Learning Obstacles
RQ2	Theme 5	Curriculum

Theme 1: General Education Teachers Have Limited Knowledge and Need Training to Provide Effective Math Instruction to SWD in the Inclusion Classroom

Theme 1 informed RQ1. General education teachers expressed the need for specific training in order to have the necessary skills to meet the math needs of SWD. Training of teachers is considered a key aspect for the inclusion of diverse learners in general education setting (Batool & Khawaja, 2021). Participant 10 stated, “In my math endorsement course, we never focus on the SWD. Tier 1 students can benefit from those strategies as well.” Participant 3 stated, “Finding the right training is a challenge and trainings that do offer good information leave me wondering, how do I take this back to my students? Are they going to give me resources to take back to my students?” Participant 2 stated, “After trainings we don't have anybody to go back to or get feedback from to help us along the way.” Participant 2 added, “I think OK, I'm going to do this on my own but when you don't have anybody to bounce ideas and reflect with, that makes it more challenging.”

Participant 1 stated, “Trainers are not listening to trainees. If we could learn about each disability and teach to that disability versus teaching to the grade level.” Participant 2 stated, “Training gives you the concrete, representation, and re-teaching but not the necessary strategies.” Thus, teacher training is considered a key aspect for the inclusion of diverse learners in general education setting (Batool & Khawaja, 2021). General education teacher participants shared that they have attended professional development classes that were not specific to the math needs of SWD. Participant 4 stated, “I have not had any math instruction that was just for SWD.” Participant 4 added, “I think that if the professional development was designed around SWD, the teachers will get more because that is all that you are there for.” General education teachers need to receive specific training in order to effectively provide math instruction and strategy implementation for SWD.

Theme 2: General Education Teachers Need Time to Teach Math to SWD

Themes 2 through five addressed RQ2. For Theme 2, general education teachers expressed concerns over limitations to properly implement math instruction for SWD. It was unanimously agreed by the general education teacher participants that there was not enough time in their schedule to provide the missing foundational skills that SWD lack in order to provide grade level math instruction leading to math achievement. As participant 2 stated: “The challenge is when they are two or more grade levels below and trying to give them fifth grade instruction, but then try to close that gap.” General education teachers need time to provide effective math instruction to SWD. Participant 4 stated, “If

they did not get those skills in previous grades, it is probably impossible for them to do grade level work until they acquire those skills."

All participants agreed that it is a time-consuming process to meet the students where they are to progress with the expected grade level math instruction. Participant 1 stated, "It takes time to understand the student's learning style in order to meet them where they are, meet their needs, and understanding how to basically modify the lesson to accommodate their needs." These results are consistent with Nelson's et al. (2018) findings that the amount of time that it takes a student to reach mastery in math is an inherent student level issue. General education teachers expressed that it takes time to understand how students learn. Participant 3 stated, "Sometimes I wonder what is the child hearing every time I explain this? I don't want to push too hard." Participant 3 added, "Am I asking them for something that they cannot accomplish?"

Participant 10 stated, "Trying to take professional development to understand how they're processing things is a challenge." Participant 5 stated, "It takes time to understand their reasoning, how they manipulate numbers, to figure out how they are trying to solve a problem, and then to help them solve it correctly." Participant 6 stated, "An area of concern is being able to adjust instruction around what they may need to be successful." Participant 11 added, "The biggest barrier for teaching math is lack of time to teach a skill to mastery before being told to move on to the next standard." Participant 2 stated, "There is not enough time to spend at each level of the math process." Participant 1 added, "Not having the time to do the necessary research, in order to meet the needs of the student is challenge".

Theme 3: General Education Teachers Lack Resources to Meet Math Needs of SWD in the Inclusion Classroom

A lack of resources to help meet the math needs of SWD was a major concern from teachers. The availability as well as the accessibility of relevant and appropriate recourses were the belief of all teachers. Participant 2 stated, “I need something for my beginning learners.” Participant 6 stated, “The resources are not diversified and adjusted for SWD.” Participant 10 stated, “Resources are not on their level or something they can relate to.” Additionally Participant 12 stated, “I think students should have and use manipulatives every day.” Participant 12 added, “I know that there is a leap towards digital but it does not seem the same to teach with a digital model versus manipulating with your hands.”

These results are consistent with Hensley and Huddle (2021), when teachers feel that they have curricular resources, they may spend less time searching for and creating material for instruction. This access to resources can also create an increased perception of well-used planning time for teachers. Participant 8 stated, “SWD don’t usually have the natural ability to visualize, so math can be difficult for them. You have to have more time to use manipulatives so that SWD can get concrete understanding.” Participant 11 stated, “If you don’t have all of those different resources, it limits you on how you can support the student who needs all those different resources.” General education teachers need appropriate resources to effectively meet the math needs of SWD.

Theme 4: General Education Teachers Need Time to Address Learning Obstacles in Order to Provide Effective Math Instruction

As evidenced by the general education teacher participants, time and resources can be barriers to teaching math strategies to SWD. General education teachers may have strategies that will work but not enough time to implement them. Participant 1 shared, “I need to work with them in a smaller group to get them to where they need to be as far as delivering that difficult lesson.” Participant 4 stated, “Some administration would not allow us to use certain strategies like flash cards.” Participant 1 stated, “There is a lack of strategies and not being taught number talks correctly. Number talks is one of the things that will help them explain and understand math.” Participant 5 stated, “A barrier for teaching different strategies is fully understanding all of the strategies enough to be able to scaffold, teach, and support students.” Participant 5 added, “So if the strategies in my toolbox aren't working for a student, that doesn't mean they can't learn it. It just means I need to find some new strategies.”

The math teacher’s goal should not just be for the student to understand the concept or strategy but for the students to be interested in the learning process, (Ludwig, 2018). This is disclosed as Participant 1 stated, “Books can bring math to life. You read a book to the class before the lesson then they are able to make real life connections.” Participant 10 stated, “There are so many math books that the teacher can use to incorporate fractions and into area and perimeter. Participant 10 added, “I'm connecting it to show them how people use this in their home decorations and in their careers and when they're building things. So definitely making those connections, those real world connections helps.”

Participant 11 stated, “So if you have a student who didn't get repeated addition as the step to multiplication, then you can show them an array using manipulatives. You can use a video game” Participant 11 added, “You can use pictures that you can draw through a digital game all on a piece of paper. If you don't have all of those resources, then you are limited.” Participant 9 added, “Some students cannot grasp more than a couple strategies. They can get overwhelmed and confused when they are given too many strategies to solve a problem.” General education teachers need time and resources to teach specific math strategies to SWD in the inclusion classroom.

Theme 5: General Education Teachers Experience Challenges with Curriculum When Trying to Provide Effective Math Instruction to SWD in the Inclusion Classroom

General education teachers shared that the math curriculum causes many challenges. Participant 1 stated, “The curriculum can be fast paced, for example you have the time frame in which the standard should be taught and if there is a gap in learning there is an obstacle.” Participant 12 stated, “The curriculum always seemed very overwhelming to me. You should be here on some calendar, yet I know these children need more time. There is just never enough time.”

Participant 2 stated, “The curriculum assumes that all students learn at the same pace. It does not take into account anything that is going on with that student.” Participant 9, “SWD usually need more time to master a skill than the pacing guide allows.” Participant 10 stated, “The curriculum assumes that students will have critical thinking skills. SWD may be unable to think logically.” Participant 6 stated, “The curriculum may be a little bit too rigorous and on a higher level than they are able to do.”

Participant 6 added, “I think that most of the curriculum is set for Tier 1 students. It should be a more diverse and differentiated as far as when they are telling us what we need to teach them.” Tier 1 students are working at grade level with minimal interventions. A general education teacher should be involved in the curriculum process from the beginning to the last stage (Cobbold, 2017). By taking part in curriculum development, teachers can review and revise their teaching, and this may help general education teachers provide effective math instruction to SWD.

Evidence of Trustworthiness

Throughout this study, procedures were in place to help ensure credibility. Those procedures were conducted for evidence of credibility, transferability, dependability, and confirmability. Qualitative research must include trustworthiness to ensure that the findings of the study are credible (Flynn et al., 2019). This study used member checks and thick description of the results to validate trustworthiness of the study.

Credibility

Member checking was used to verify credibility and internal validity. I included participant input regarding data analysis (Anney, 2017). Member checking allows the participants the opportunity to provide feedback of the themes to ensure accuracy (Stahl & King, 2020). The researcher is able to better understand the result of the data through member checking.

Transferability

Transferability implies that the results of a study can be transferred to other contexts and situations beyond those directly studied (Maxwell, 2021). I provided a thick

description of the findings in order to help increase potential transferability of the findings to other contexts (Miles & Huberman, 2017). Thick description can provide subjective explanations, meanings, and interpretations making the collected data of greater value to others who are interested in similar phenomena (Hong & Cross Francis, 2020). For this study, I applied a thick description of the findings and provided excerpts from transcripts to support the findings, data interpretation, and explanation of the findings. Participants and other audiences can understand the relevant issues from this information which will allow them to transfer the findings to their settings. These findings could be transferable to fourth and fifth grade general education teachers in an elementary school in a large southeastern US city. There were no adjustments or changes to the transferability strategy stated in Chapter 3.

Dependability

Dependability in a study is important because it ensures constancy between one researcher's methods as compared to other researchers (Creswell, 2017). To establish dependability in this basic qualitative research study, I kept an audit trail by taking notes throughout the research process. These notes were taken during the data collection and interview process. Each step in my research was documented and my notes became an accurate description of what I observed and learned from the interviews. The audit trial provided a description of the steps that I took throughout research project and it was supported by relevant documentation (Carcary, 2020).

Confirmability

In addition to the audit trails, I kept a journal to keep a record of my experiences as a researcher. The documentation of my experiences helped me to understand my own influences, perceptions, and background knowledge. Reflection during the study, built credibility-based consistency and insight to verify the process (Creswell, 2017). The notes taken during the interviews, transcription review, and through the coding process helped to maintain focus on the purpose of the study and to remain objective with the approach. Participants were asked to review as part of the member check protocol to confirm the accuracy of the themes (Candela, 2019).

Summary

Data were collected using semistructured virtual, Google Meet interviews in this basic qualitative descriptive research study. Five themes were identified. The information in Chapter 4 included the data collection process and analysis including participant information, the setting, data collection procedures, data analysis, results from data collection, and evidence of trustworthiness. The participants revealed answers to the first research question. General education teachers need training in order to gain knowledge of effective math instruction to support math achievement for SWD. Interview data helped to answer the second research question. General education teachers encounter barriers when teaching math to SWD. Time is needed to teach and prepare for math instruction. Participants need resources to effectively teach math to SWD. General education teacher's encounter learning obstacles when teaching math to SWD. The curriculum creates barriers when providing effective math instruction to SWD. A discussion of the

findings was presented in Chapter 5 along with interpretation of the findings and limitations to the study.

Chapter 5: Discussion, Conclusions, and Recommendations

The problem that I addressed in this basic qualitative research is that general education teachers experience barriers for implementing math instructional strategies to support academic achievement of fourth and fifth grade SWD. The purpose of this basic qualitative study was to investigate and understand general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth SWD.

The methodology of this study was basic qualitative inquiry. I used teacher interviews as data sources. The information that I gathered was used to analyze for common themes. In Chapter 5, I discuss an interpretation of the findings with a comparison of literature related to effective math instruction and implementation, limitations to the study, recommendations based on the findings, and implications for positive social change.

Interpretation of the Findings

I intended for this research study to investigate and understand general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth grade students with disabilities SWD. I used the findings in this study to answer the research questions based on that intention. The interview data revealed the following themes to the research questions.

Participants answered the first research question that training is needed to explain their knowledge of effective math instruction to support math achievement SWD. General education teachers revealed some barriers that they encounter with teaching math

to SWD which answered the second research question. Participants need time to teach and implement math strategies to SWD. General education teachers need resources in order to effectively meet the math needs of SWD. Participants addressed learning obstacles in order to provide effective math instruction to SWD. General education teachers experienced challenges with curriculum when implementing math strategies to SWD in the inclusion classroom.

The research questions provided the momentum to investigate and understand teachers' perspectives of barriers to effective math instruction for fourth and fifth grade SWD in the inclusion classroom in their respective schools. The conceptual framework of this study was guided by Baroody's (2006) research. Baroody stressed that the three phases of TDSMFA are an integral part of math competency; this framework fits SWD needs, enabling them to be successful in achieving grade-level math standards. Baroody's theory supports understanding and developing reasoning strategies in order to attain basic math fact fluency so that students' progress through math concepts and develop foundational math understanding. Teachers can use this framework when implementing effective math instruction to fourth and fifth grade SWD.

Findings

The themes that emerged from this study were used to answer the research questions. Interview data revealed that general education teachers need training, time, resources, and assistance with learning obstacles and curriculum in order to provide effective math instruction to SWD. The first theme emerged after participants stated that training is needed in order to explain their knowledge of effective math instruction. The

first theme answered the first research question. General education teachers need specific training to meet the math needs of SWD in the inclusion classroom. Mertafiah et al. (2018) stated that specific training increases teachers' understanding of student's thinking can lead to increased understanding and progress for SWD. Professional development can increase teachers' knowledge of math content and pedagogy which will elevate their quality of instruction (Garet et al., 2016; Reid & Reid, 2017). According to Nilsen (2020), professional development can be crucial to increasing general education teachers' ability to respond to the increasingly diverse math needs of SWD. The second research question is answered through Themes 2-5.

The second theme emerged after participants stated that time is a barrier when teaching math to SWD. The second theme answered the second research question. General education teachers need time to teach and implement math strategies to SWD is confirmed with the literature since effective instructional planning is very important in order to meet the needs of SWD in the inclusion classroom (Alsarawi, 2019). This co-planning time requires a shared vision involving a time commitment of meeting monthly, weekly, and daily to clarify the roles and responsibilities of both teachers. Nelson and Parker (2018) stated that time is needed to remediate gaps in math skills among students who are at risk for math problems.

The third theme emerged after general education teachers discussed the need for resources in order to meet the math needs of SWD. The third theme answered the second research question. May (2020) stated that math coaches may teach strategies general education teachers are not familiar with and broaden math understanding through

Number Talks. In addition, according to Benson-O'Conner et al. (2019) students that can connect prior math knowledge with new strategies using familiar representation will increase their math confidence as the level of difficulty increases. These new strategies may not be available to general education teachers that teach math to SWD.

The fourth theme emerged after participants discussed learning obstacles that create a barrier to teaching effective math instruction. The fourth theme answered the second research question. Nelson and Powell (2018) stated that the identification of math difficulty is strongly related to math performance in subsequent grades. Zhang et al., (2020) stated that the significant progression between spatial skills in kindergarten and mathematics achievement in first grade was brought together by through foundational knowledge of the counting sequence. Theme 4 was also confirmed in that SWD have deficits with spatial ability and visual representation that are a key component when learning new math concepts. Iori (2017) discussed Duval's perspective that signs and representations may aid in the cognitive processes involved in teaching and learning mathematics.

The fifth theme emerged after participants discussed challenges with curriculum when implementing math strategies to SWD. The fifth theme answered the second research question. Since the general education teacher is expected to meet the educational needs of all students including SWD due to experience with the grade level curriculum (Brendle et al., 2017). According to Georgia Standards for Mathematical Practice (2020), teachers should seek to develop problem solving skills, reasoning and proof,

communication, representation, and connections with math fundamentals with their students through each grade level.

Every general education teacher whom I interviewed reported that SWD did not have the needed skills to understand grade level math instruction and math fact knowledge. General education teachers stated that they would benefit from professional development that was specific to the math needs of SWD. This training theme relates to first research question. This professional development might help to close the learning gaps. In order for professional development to be beneficial, the goals and focus of the agenda should be clearly stated. All of the general education teachers stressed that trainings have not encompassed information to assist with teaching effective math strategies to SWD. The general education teachers felt that training should include understanding the different types of disabilities and learning differences. Teachers also pointed out that training to assist SWD with critical thinking skills would prove beneficial. In order for professional development to be effective, it should concentrate on the renewal of teachers' knowledge and skills related to teaching the specific subject matter (Alamri et al., 2018). General education teachers shared that professional development should provide time for teachers to learn and work with the new information and to be given materials so that proper implementation occurs upon return to the classroom. It was suggested that follow-up sessions be provided to ensure understanding of new material. One teacher shared that having a point of contact would benefit the teachers in case any questions would arise after the professional development is complete.

Every general education teacher whom I interviewed expressed that time is needed in all aspects of teaching effective math strategies to SWD. This time theme relates to the second research question. Several of the general education teachers shared that time is needed to teach missing prerequisite skills in order for SWD to understand new concepts. Participants shared that they need time to teach math skills and new concepts to mastery. Some students learn the first time a topic is introduced, others learn after many repetitions (Goksoy, 2018). Time is needed to allow students to work with manipulatives so that concrete understanding can transfer to abstract problems. Hands-on or concrete representation of operations should be provided to assist students in their initial understanding (Milton et al., 2018).

Participants reported that time restraints created frustrations with researching strategies to assist SWD with new concepts or prerequisite skills. This limited resource theme relates to the second research question. Additional, time challenges arise with finding time to teach these strategies to SWD. It was also difficult for teachers to find time to collaborate with other teachers to discuss math strategies that would be effective for SWD. Research indicates that the realities of planning for student-centered learning can be difficult and time-consuming (Davidson, 2019). The general education teachers expressed concern about having time to do everything that they need to do each day in addition to providing effective math instruction for SWD.

Participants identified that low prerequisite math skills are a learning obstacle when teaching effective math instructional to SWD. This learning obstacle theme relates to the second research question. The components of TDSMFA may assist teachers

address learning obstacles. TDSMFA provides explicit instruction through demonstration, providing feedback, and allowing student exploration when needed which may help provide effective math instruction for SWD. Teachers can use Baroody's (2006) framework, TDSMFA, to assist SWD with the missing prerequisite skills so that SWD can progress with grade level math. When TDSMFA is implemented, SWD can receive specific interventions that would address specific needs (Lloyd & Lloyd, 2017). This framework can help SWD with reasoning strategies that can help develop foundational math understanding. Fundamental math interventions can produce favorable outcomes in student achievement for SWD. Taking this time to teach the foundational concepts will ensure that SWD will be prepared to learn and retain new math strategies.

During the interviews, I asked participants about the challenges with curriculum when trying to provide effective math instruction to SWD. This curriculum theme relates to the second research question. Most of the participants reported that the curriculum is too fast paced for SWD to keep up with due to learning gaps. Andrietti and Su (2019) stated that the same curriculum may present a learning pace that is just right for some, but too fast or too slow for others. General education teachers stressed that the math curriculum is geared toward Tier 1 students and is not differentiated to meet the needs of SWD. Math curriculum does not take into account the learning gaps of SWD, it continues on as if the skills are mastered on time according to the progression. General education teachers shared that keeping up with the curriculum, when working with SWD, involves concise planning to decide when more time is needed with a concept and when to move on. Teachers are to effectively stay on track with the math curriculum that is on grade

level yet most SWD are not working on grade level. Baroody's framework can assist teachers with progressing toward grade level standards by using the TDSMFA. This framework can assist teachers with implementing strategies that can benefit SWD when learning new concepts.

Effective implementation of strategies takes time and resources. General education teachers shared that it takes time to find resources that are specific for SWD. Certain strategies can assist SWD at the beginning stage and as new concepts are added and students begin to understand the concept, additional strategies can be taught. Lai et al., (2020) stated that multiple teaching strategies and representation may need to be applied to ensure understanding.

Teachers need to understand the strategy themselves before implementing the concept with SWD. General education teachers stated that there are many different strategies that should be taught to SWD so that they can choose which is best for them. The challenge comes with finding the specific strategy that works for certain SWD, one strategy may not work for all students. Nelson and Parker (2018) suggest that task difficulty be included as a consideration for the amount of time needed to remediate gaps in math skills among students who are at risk for math problems. Implementation of Baroody's TDSMFA can assist general education teachers with bridging the learning gap for SWD and so that they can gain confidence in teaching grade level math instruction. Several teachers stated that there are many basic strategies that can be implemented that assist SWD with step-by-step directions, for example having students write the steps to

work a division problem on an index card for them to use. This can help SWD while working on prerequisite skills or when learning new concepts.

Every general education teacher whom I interviewed expressed frustration when I asked the question: What barriers were caused by learning and teaching resources or materials or the lack thereof for SWD? During interviews, general education teacher participants expressed their concerns about having limited resources in addressing effective math instruction for fourth and fifth grade SWD. Unfortunately, the high level of frustration expressed by the general education teachers strongly suggests that Baroody's TDSMFA is not being used to assist teachers with closing the learning gap for SWD. The effective implementation of Baroody's TDSMFA allows for an educator to tackle differing levels of intervention specific to each student to address individual student needs (Hunter et al., 2017). General education teachers stressed that the deficits in prerequisite math concepts for SWD is an issue that limits these students from being successful with grade level math curriculum. When implementing Baroody's TDSMFA, teachers would be delivering specific, targeted interventions. This framework could help build math understanding; therefore, assisting with the closing of the math gap for SWD and reducing the challenge for teachers when delivering effective math instruction (Lloyd & Lloyd, 2017).

Teachers can use Baroody's (2006) framework as an effective implementation of ongoing instructional strategies, which, ultimately, can be used as an effective tool to teach counting strategies, reasoning strategies, and efficient problem solving skills. Research shows that that it may be worthwhile to remediate select subskills that fall

outside of the grade-level curriculum before providing additional instruction on grade-level content (Nelson et al., 2018). General education teachers were concerned about locating the resources from one, two, and even three grades prior to the current year. This differentiated instruction can be used to fit each learner's needs. This valuable resource could effectively assist teachers with closing the learning gap for SWD and help them gain math knowledge and understanding.

Limitations of the Study

Limitations can include participant experience, participant size, and setting of the study. One limitation of the study included that one participant had to drop out because she was not able to meet face to face. The small sample size could reduce the ability to transfer the findings to other settings, but it can still provide insight into effective math instruction for SWD in the inclusion classroom. The second limitation of the study was limited time duration which spanned 5 to 25 minutes. The participant's answers were specific, to the point, and with minimal or no elaboration. I routinely asked participants if they had any additional information that they would like to share. Some participants did provide minor additional points. The participant with the shortest interview [5 minutes] provided brief, specific answers and did not feel that there was anything else to add to the responses.

Recommendations

Based on the findings, data analysis, and current literature, I am recommending additional research within this scope of study. Recommendations for further investigation are as follows:

1. This study was limited to fourth and fifth grade SWD in the elementary setting. It is recommended that a study to investigate general education teachers' underlying perceptions of implementing effective math instruction to SWD be expanded to middle and high school general education teachers that teach math to SWD in the inclusion classroom.
2. It is recommended that studies of this nature be replicated to contribute to the breadth and depth of this topic and for comparative analysis. This could be accomplished through qualitative studies focusing on the perspective of special education teachers, administrators, and by expanding the study to general education teachers in other school districts. A quantitative study may expand into multiple regions measuring the prevalence of general education teachers' perspectives regarding effective math instruction for SWD.

Implications

The purpose of this qualitative research study was to investigate and understand general education teachers' perceptions of effective math instruction and barriers to effective math instruction for fourth and fifth grade SWD. Data collected from the study allowed me to explore two research questions posed in the study and the findings can contribute to the current literature on effective math implementation. Interview data revealed that training is needed to explain their knowledge of effective math instruction to support math achievement SWD. This result relates to first research question. Interview data showed that time is a barrier when teaching math to SWD. This result relates to the second research question. Participants discussed that the lack of resources is

a barrier in meeting the math needs of SWD. This result relates to the second research question. Interview data revealed that learning obstacles create barriers to teaching effective math instruction. This result relates to the second research question. Participants discussed barriers with curriculum when implementing math strategies to SWD. This result relates to the second research question. The findings in this study revealed both positive and negative components to math instruction implementation for SWD.

This study has the potential to promote social change among school districts, administrators, and teachers to help promote effective math instruction for SWD in the fourth and fifth grade inclusion classroom. The first element of social change is to embrace teachers' perceptions about effective math instruction for SWD. The answers to the research questions in this study could potentially lead other school districts to more effective implementation of math instruction in elementary schools.

The second element of social change is to bring awareness to teachers about the effective implementation of math instruction for fourth and fifth grade SWD. The intent of the present study was to bridge the gap in practice between expected math instructional practices and what is being implemented in the classroom. By increasing teacher awareness, general education teachers could use the data from this study to become more motivated into bridging the gap between what should be implemented and what is being implemented.

The third element of social change is to help general education teachers overcome barriers and challenges to the implementation of effective math instruction for math instruction. Ideally, this study will inform and influence administrators and teachers

about the benefits of understanding the concerns related to effective implementation of math instruction for SWD in hopes that trainings with be provided.

The fourth element of social change is to improve general education teacher's ability to teach effective math skills to SWD. By increasing general education teacher's confidence with teaching math strategies and interventions, the level of frustrations will decrease. This increase in confidence will benefit SWD and general education teachers, and will result in an overall positive attitude toward math.

Conclusion

The purpose of this basic qualitative research study was to investigate and understand teachers' perceptions of effective math instruction for fourth and fifth grade SWD in the inclusion classroom. Results illustrated how the challenges and teachers' perceptions about the effective implementation of math instruction inhibited them from providing effective math instruction to fourth and fifth grade SWD. The analysis of teachers' perceptions of barriers to effective math instruction suggests the need for planning and the appropriation of time, training with curriculum to meet the math needs of SWD, and for training of strategies to meet the specific math needs of SWD.

The problem in this basic qualitative research study is that general education teachers experience barriers for implementing math instructional strategies to support academic achievement of fourth and fifth grade SWD. General educators work tirelessly with limited resources to provide effective math instruction to SWD. These teachers face barriers with SWD being up to two grade levels behind in math competency. General education teachers experience time constraints that limit their ability to research effective

specific strategies, attend professional development, plan effectively, decompose the curriculum, and bridge the math learning gap of SWD so that they are successful with grade level math instruction.

The nature of this basic qualitative research study was based on qualitative methods that involved an in-depth understanding of effective math instruction for fourth and fifth grade SWD in the inclusion classroom. During the Google Meet interviews, I was able to witness how time limitations, curriculum, limited resources, and gaps in foundational math concepts increase general education teachers' frustration and hinder their ability to implement effective math instruction for SWD in the inclusion classroom. Positive social change will be realized as the findings of this study will produce a greater understanding of teachers' perceptions with meeting the foundational math needs of SWD and will essentially help improve the math instruction for SWD.

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Appendix A: Terms

Term	Description
Differentiated Math Instruction	Adjusting teaching and learning methods to accommodate each child's math learning needs.
Math Instruction	Teaching to engage students in learning math.
Math Interventions	An extension of the regular grade level math instruction that provides students who need it additional focused instruction and support at the needed level of intensity.
Math Barriers	Something that prevents or makes math instruction difficult or impossible.
Strategy	Careful plan or method for achieving a particular goal.
Students with Disabilities	Students that have been evaluated and have eligibility for any of the following: specific learning disabilities, learning Disabilities, Emotional Behavior Disorders, Other Health Impaired, Autism Spectrum Disorders, Mild Intellectual Disability, Vision Impaired, Hearing Impaired, and Orthopedically Impaired
Underachievement	Inability to achieve at the potential level or does not do as well as expected as by peers.

Appendix B: Participant Demographic

1. Name
2. Home Email Address
3. Home or Cell Phone Number
4. Preferred method of contact (Home E-mail/Home or Cell Phone number)
5. Grade Level
    a. 4
    b. 5
6. Number of years' experience with teaching math instruction in the inclusion classroom with fourth or fifth grade students with disabilities?
    a. 0-less than a year
    b. 1-5 years
    c. 5+ years
7. Thank you. You will be contacted with more information regarding the research study.

Appendix C: Interview Questions

RQ 1: What are elementary general education teachers' perceptions of effective math instruction for fourth and fifth grade SWD in the inclusion classroom in a large school system in the southeast region of the United States?

RQ 2: What are elementary general education teachers' perceptions of implementing math instruction for fourth and fifth grade SWD in a large school system in the southeast region of the United States?

1. What can be the challenges encountered in delivering math instruction to SWD?
2. What obstacles can be caused by math curriculum for SWD?
3. What barriers are caused by learning and teaching resources or materials or the lack thereof for SWD?
4. What can be the teacher's role in the development of mathematical literacy?
5. What can be the barriers to teaching math strategies to SWD?
6. What are the challenges to gaining the necessary knowledge, skills, and competencies to teach math to SWD?
7. What are the barriers to teacher training programs to support math instruction for SWD?