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THE IMPACT OF A MULTISENSORY INTERVENTION ON LITERACY ATTITUDES OF STUDENTS WITH DYSLEXIA

A Thesis

by

LORENA DE LA CRUZ

Submitted to the Graduate College of The University of Texas Rio Grande Valley In partial fulfillment of the requirements for the degree of

MASTER OF EDUCATION

May 2020

Major Subject: Reading

THE IMPACT OF A MULTISENSORY INTERVENTION ON LITERACY ATTITUDES OF STUDENTS WITH DYSLEXIA

A Thesis by LORENA DE LA CRUZ

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May 2020

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ABSTRACT

De La Cruz, Lorena., <u>The impact of a multisensory intervention on literacy attitudes of students</u> with dyslexia. Master of Education (MEd), May 2020, 73pp and 59 references.

The purpose of this qualitative multiple case study was to explore the impact of a pull-out multisensory reading intervention on the attitudes towards reading and writing of fourth-grade students identified with dyslexia. Students identified with dyslexia must receive an evidencebased reading intervention as required by Texas educational state law. The multisensory reading intervention utilized in this study and known as Structured Literacy, included explicit instruction in phonological awareness, sound-symbol association, syllabication, orthography, morphology, and reading comprehension. The researcher focused on a variety of data sources including field notes, audio-recorded interviews, reading interest survey responses, and spelling assessments. The data collected was analyzed holistically for an in-depth exploration leading to a rich interpretation of emerging themes. Four themes emerged from this study and are as follows: (a) participant self-awareness of reading and writing improvement; (b) increased classroom participation; (c) positive literacy attitude; and (d) an awareness and confidence of ability to learn with dyslexia. Findings from this study have the potential to inform educational decisions for teachers, administrators, and policymakers concerned about improving literacy achievement in students identified with dyslexia and related language disabilities in the elementary grades.

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DEDICATION

The completion of my master studies would not have been possible without the love and support of my family. I especially want to thank my husband, Luis Landeros, for his unconditional love, encouragement, and unwavering support throughout my educational journey. To my son and daughter, Damian and Kassandra, you are my inspiration and fill my heart with joy every single day. I would also like to acknowledge and thank my parents, my late father, Jose De La Cruz, and my mother Maria Angelica De La Cruz for their love and support

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CHAPTER I

INTRODUCTION

The purpose of this qualitative multiple case study was to explore the impact of a pull-out multisensory reading intervention on the attitudes towards reading and writing of fourth-grade students identified with dyslexia. Students identified with dyslexia struggle with reading, writing expression, and spelling (Shaywitz, 2004; Lyon et al., 2003). Secondary consequences such as poor vocabulary and diminished reading comprehension stem from reduced reading experiences early in their education (Ozernov-Palchik et al., 2017; Lyon et al., 2003). The 2019 National Assessment of Educational Progress (NAEP) indicated that fourth grade students with disabilities scored 184 on a 500-point scale, which is well below the Basic reading score of 208 (National Center for Education Statistics, 2019).

Reading is the fundamental skill necessary for all students to do well in all subjects in school and excel in their lives (Moats, 1999). It has been well documented that if students do not master basic reading skills by the end of third grade, they have a high risk of school failure (Morris et al., 2017; Snow & Mathews, 2016). However, Ferrer, et al. (2015) found that the reading achievement gap between typical and dyslexic readers is evident as early as first grade and persists into adolescence. Therefore, the importance of early identification of dyslexia is crucial in the early elementary grades. Students should not have to suffer reading failure before they are assessed for dyslexia. Ferrer et al. (2015) stated, "implementing effective reading

programs early, even in preschool and kindergarten offer the potential to reduce and perhaps even close the achievement gap between dyslexic and typical readers" (p. 1124).

Students who have poor reading skills in fourth grade invariably had difficulties with critical phonological skills in kindergarten and first grade (Torgesen, 2004). Torgeson (2004) described children's decoding difficulties and poor sight word reading as a problem that spirals when children begin to avoid reading. This affects children's attitudes and motivation to read (Oka & Paris, 1986). Although there is no cure for dyslexia, research suggests that reading skills can be increased with the right early intervention programs (Birsh, 2018). Early intervention programs such as Structured Literacy are well suited for students with dyslexia because it directly addresses core weaknesses in phonological skills, decoding, and spelling (Moats, 2017). Structured Literacy builds students' knowledge of language at all levels by using methods that are explicit, systemic, cumulative, and diagnostic-prescriptive (Moats, 2018). The term diagnostic-prescriptive means that teachers identify students' strengths and weaknesses and then prescribe an appropriate course of instruction to address areas of weakness.

According to Lyon (2019), reading is not innate in the same way that language is innate; rather, reading is a skill that requires instruction taught by parents or teachers. Wolf (2018) stated that reading is an "unnatural cultural invention" and it is a mistake to assume that it will simply emerge like language. (p. 13) Students with dyslexia fail to thrive whilst receiving instruction via typical reading approaches such as standard phonics instruction, guided reading, or a balanced literacy approach in the general education classroom (Spear-Swerling, 2019). According to the International Dyslexia Association, these approaches are not effective for students with dyslexia (IDA, 2019).

The Dyslexia Handbook, updated in November 2018, by the Texas Education Agency emphasizes that interventions for students with dyslexia should be highly structured, explicit, systematic, intentional, and implemented with fidelity (Dyslexia Handbook, 2018). Furthermore, Torgesen (2004) emphasized the need to increase the intensity of instruction for students at risk of reading failure. This may be provided with increased instructional time in terms of frequency or with intervention in small groups of no more than three students.

The terms "Structured Literacy instruction" and "Multisensory Structured Language Education" have been used interchangeably. The International Dyslexia Association (2019) adopted the term Structured Literacy to encompass all programs that teach reading with a multisensory, explicit, and systematic instructional approach, such as Orton Gillingham and Lindamood Bell. Structured Literacy approaches are often recommended for students identified with dyslexia (Spear-Swerling, 2019). A multisensory structured language instructional approach builds connections by simultaneously engaging at least two or more sensory pathways such as visual, auditory, kinesthetic, and tactile (VAKT) modalities. Structured literacy is explicit, systemic, and cumulative. It is systemic in that it follows the logical order of language, and cumulative in that each step is based on previously learned concepts. Structured Literacy instruction encompasses several elements: phonology (i.e., sound structure of spoken words), sound-symbol association (i.e., decoding and encoding), phonics and syllables (i.e., vowelconsonant-e, r-controlled, open syllables, closed syllables), morphology (i.e., roots, prefixes, suffixes), syntax (i.e., grammar, sentence variation), fluency (i.e., accuracy, automaticity, prosody), semantics and comprehension (i.e., meaning) and writing (Farrell & White, 2018). Formal and informal assessment is central to Structured Literacy and continuous. The content

presented must be monitored to inform planning and adjustment of instruction as needed until the level of mastery is achieved (Farrell & White, 2018).

Understanding dyslexia is one way to have a sophisticated understanding of the reading process (Birsh, 2018). Current research in cognitive science and neuroscience has greatly improved our understanding of skilled reading in children with and without reading disabilities (Shaywitz &Shaywitz, 2008).

The importance of scientific evidence in reading research has captured the attention of not only teachers but also government officials on the federal, state, and local levels (Birsh, 2018). Over the last two decades the federal government has taken steps to discover the reasons why so many students struggle with reading. Findings from the National Reading Panel identified the most beneficial and effective methods and approaches for all students (Birsh, 2018). Most states have passed laws to identify students with reading disabilities in the early primary grades so that they may receive reading interventions before reading failure occurs (Eide, 2019).

Statement of the Problem

There is a problem in the educational school system. Typically, in public schools, students with dyslexia are not identified early such as in kindergarten. Students may start exhibiting difficulty with reading as early as kindergarten. The problem specifically is that students are usually identified with dyslexia in the third or fourth grade. This problem impacts students with learning disabilities such as dyslexia and related disorders. Participants in this study were identified with dyslexia in fourth grade and were receiving a Structured Literacy (SL) intervention with multisensory strategies. Structured Literacy is effective evidence-based reading

instruction for students with dyslexia because it directly addresses core weaknesses in phonological skills, decoding, and encoding for spelling (Moats, 2017). Furthermore, Structured Literacy instruction emphasizes direct, explicit, sequenced, systematic, cumulative and intensive reading lessons in all components of reading (i.e., phonology, phonics, syllables, morphology, fluency, and comprehension). Writing lessons that incorporate multisensory strategies are an essential component of Structured Literacy (Birsh, 2018). Currently, new laws targeting early identification and early intervention regarding students with dyslexia are being implemented. It is of the utmost importance to identify students at risk for dyslexia as early as possible and before formal reading and writing instruction to prevent reading failure (Lyon, 2019). In a 2017 study, Ozernov-Palchik et al. found that early identification and early intervention can yield the best outcomes for students at risk for dyslexia through targeted interventions.

Statement of the Purpose

The purpose of this qualitative multiple case study was to explore the impact of a pull-out multisensory reading intervention on the attitudes towards reading and writing of students identified with dyslexia in fourth grade. The researcher received training in Structured Literacy with multisensory strategies as required by law for dyslexia interventionists. This study is significant because it will contribute to the current body of knowledge related to effective interventions for fourth grade students identified with dyslexia. Additionally, the researcher endeavored to provide study participants with additional opportunities for success and motivation to read by providing engaging texts based on their interests. Gambrell et al. (1996) found that third- and fifth-grade students were motivated to read by prior experience, choice, and access to books. In this study, students had access to a variety of books based on their interests and were given a choice to read any book they preferred. The results of this study have the

potential of informing educators, administrators, and policymakers concerned about improving literacy outcomes of students identified with dyslexia in the elementary grades.

Research Question

What is the impact of a multisensory reading intervention on attitudes towards reading and writing of students identified with dyslexia?

Theoretical Framework

The two theories that framed this study are Double Deficit Hypothesis (Wolf & Bowers, 1999) and the Parallel Distributed Processing Model (Rumelhart & McClelland, 1986). The Double Deficit Hypothesis explains the cause of reading disability as a phonological awareness (PA) deficit, a rapid automatized naming (RAN) deficit, or both PA and RAN deficit (Wolf & Bowers, 1999). The Parallel Distributed Processing Model is a cognitive-processing perspective of reading with two important features: (1) information is stored as a series of connections between neural units in the brain and (2) these connections between units become stronger with repetition.

Definition of Terms

- **multisensory** referring to any learning activity that includes using two or more sensory modalities (i.e., visual, auditory, tactile, and kinesthetic) simultaneously for taking in or expressing information (Birsh & Carreker, 2018).
- **multisensory strategies** explicit instructional procedures using visual, auditory, tactilekinesthetic, sensory systems to learn the phonological, morphemic, semantic, and syntactic layers of language along with the articulatory-motor components of language (Birsh & Carreker, 2018).

• **Multisensory Structured Literacy**- Instructional approach that incorporates systematic, cumulative, explicit, and sequential approaches taught by teachers trained to instruct language structure at the levels of sounds, syllables, meaningful parts of words, sentence structure, and paragraph, and discourse organization (Birsh & Carreker, 2018).

Summary

Students identified with dyslexia need to receive an evidence-based reading intervention by law. Students with dyslexia struggle with reading, spelling, and writing (Shaywitz, 2004). The problem is that students with dyslexia are not identified early in their education when reading failure can be prevented. Therefore, the importance of early identification is crucial in early elementary grades. Typically, students with dyslexia are identified in third or fourth grade, when they have already experienced reading failure. Reading is the most important skill necessary for students to thrive in all subjects in school (Moats, 1999). For students identified with dyslexia, the most effective evidence-based reading intervention is Structured Literacy with multisensory strategies. Multisensory strategies utilize two or more senses simultaneously to teach students all layers of language. Structured Literacy differs from typical reading approaches because it is explicit, systemic, cumulative, and intensive reading instruction that targets all layers of language, i.e., phonology, phonics, syllables, morphology, syntax, fluency, and semantics (Birsh & Carreker, 2018). In this study, the researcher will implement a Structured Literacy reading intervention with multisensory strategies to fourth grade students identified with dyslexia. Additionally, literature relevant to students' interests will be provided as a reading motivation component.

CHAPTER II

REVIEW OF LITERATURE

In this chapter, the researcher explored the Nation's Report Card and the trend of reading scores in fourth grade for the past two decades. Moreover, the researcher also explored dyslexiaa specific learning disability, current laws regarding dyslexia, whole language, and Structured Literacy with multisensory strategies, an effective evidence-based instructional approach for students with dyslexia. Finally, the researcher discusses two theoretical frameworks that helped guide the study.

In 1997, the U.S. Congress asked the director of the National Institute of Child Health and Human Development (NICHD) to work with the U.S. Department of Education to establish a National Reading Panel (NRP) to evaluate existing research and evidence on best practices for teaching children to read (NICHD, 2000). Findings from the meta-analyses conducted by the 14 members of the NRP identified five critical components that are essential for teaching children to read: (a) phonemic awareness, (b) phonics, (c) vocabulary development, (d) reading fluency, and (e) reading comprehension strategies. The NRP emphasized the importance of the early identification of children at risk of reading failure and intervening quickly to help them (National Reading Panel, 2000). The NRP's findings clearly show that it is of the utmost importance to identify students at risk for dyslexia early so that their reading skills may be remediated before reading failure occurs, typically by third- or fourth-grade.

The Nation's Report Card

In the two decades since the NRP's findings were published, the reading scores on the National Assessment of Educational Progress (NAEP) have not improved significantly. The NAEP is a congressionally mandated project administered by the National Center for Education Statistics within the U.S. Department of Education and the Institute of Education Sciences (IES). The NAEP reading assessment uses literary and informational texts to measure students' comprehension skills. Students read grade appropriate texts and answer multiple choice and open-ended questions about the texts they read (National Center for Education Statistics, 2019). In the 2017 report of the National Assessment of Educational Progress (NAEP), scores indicated that 67% of fourth-grade students performed at or below basic level, and in the 2019 report that score fell by one percentage point to 66% (National Center for Education Statistics, 2019).

In 2019, the average fourth grader without disabilities scored 226 points on a 500-point scale, well scale while the students identified with disabilities scored 184 points on a 500-point scale, well below NAEP basic level (National Center for Education Statistics, 2019). In Texas, the state in which the study was conducted, the reading scores were 221 points for fourth graders not identified with disabilities and 181 points for students with disabilities (National Center for Education Statistics, 2019). Table 1 provides the National Report Card reading scores for students identified with disabilities and students without disabilities for the last ten available scores both national and state scores for Texas. For their relevance to the current study, only the reading scores for fourth grade students are provided in this chapter.

Table 1

	National Score	National Score	Texas Score	Texas Score
Year	Students with Disabilities	Students with No Disabilities	Students with Disabilities	Students with No Disabilities
2019	184	226	181	221
2017	187	227	186	219
2015	187	228	182	223
2013	184	227	181	220
2011	186	225	188	220
2009	190	224	185	221
2007	191	224	195	221
2005	190	222	197	221
2003	185	221	191	217
2002	187	221	195	219

NAEP Report Card: National and Texas Fourth Grade Reading Scores

NAEP Achievement Level	Cut Score
NAEP Advanced	268
NAEP Proficient	238
NAEP Basic	208

It seems that despite teachers' best efforts, students are not reading on grade level and the reading achievement gap persists. According to Birsh (2018), fourth grade reading scores on the NAEP have changed little since the 1980s. Students who do not master basic reading skills by the end of third grade have a high risk of school failure (Snow & Mathews, 2016). Some

educators believe that the problem may be hiding in plain sight, and it may be the challenge of dyslexia (Berman & Stetson, 2017).

Dyslexia

Dyslexia is a neurological condition characterized by difficulties with accurate and/or fluent word recognition, poor spelling, and poor decoding abilities (Lyon et al., 2003). It is estimated that dyslexia occurs in approximately 5%-17% of the population of the United States (Shaywitz, 1998). According to the Yale Center for Dyslexia and Creativity (YCDC) dyslexia affects 20% of the population (YCDC, 2017). Dyslexia is the most common learning disability affecting over 80% of those identified as learning disabled (Lerner, 1989). According to Birsh (2018), dyslexia varies in severity, and the prognosis depends on the severity, individual strengths and weaknesses, and the appropriateness and intensity of intervention.

The Definition Consensus Project was led by the International Dyslexia Association in partnership with the National Center for Learning Disabilities (NCLD) and the National Institute for Child Health and Human Development (NICHD). The following definition of dyslexia is currently incorporated in many state laws (IDA, 2020). The following definition of dyslexia was adopted by the International Dyslexia Association (IDA) in 2002:

Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (The Dyslexia Handbook, 2018, p. 1).

The first description of the learning disorder that would come to be known as developmental dyslexia was published in the *British Medical Journal* in 1896 by W. Pringle

Morgan as he described his fourteen-year old patient, Percy F. (Shaywitz & Shaywitz, 2008). W. Pringle Morgan (1896) wrote:

He has always been a bright and intelligent boy, quick at games, and in no way inferior to others his age. His great difficulty has been—and is now—his inability to read. He has been at school or under tutors since he was 7 years old, and the greatest efforts have been made to teach him to read, but, in spite of this laborious and persistent training, he can only with difficulty spell out words of one syllable (p.1378).

Historically, there has been much debate surrounding dyslexia including its definition, approaches to remediation, etiology, and even the use of the term dyslexia (Elliot & Grigorenko, 2014). In their book, *The Dyslexia Debate*, Elliot & Grigorenko's (2014) primary argument against using the term dyslexia for diagnostic purposes is that tests for dyslexia are costly to families. Secondly, and perhaps most important, is the reality that many children with reading disabilities who are not tested for dyslexia may not get the diagnosis of dyslexia, and thereby will not receive the benefit of additional resources and accommodations (Elliot & Grigorenko, 2014). It is this need for additional resources for their children that has mobilized many parents, teachers, and researchers to lobby the federal government for dyslexia legislation.

Sally Shaywitz, author of *Overcoming Dyslexia* and co-director of the Yale Center for Dyslexia and Creativity, testified before the Committee of Science, Space, and Technology of the United States House of Representatives in 2014 about advances in brain research and evidence-based interventions for students with dyslexia. Dr. Shaywitz (2014) stated the following:

Science has moved forward at a rapid pace so that we now possess the data to reliably define dyslexia, to know its prevalence, its cognitive basis, its symptoms and remarkably, where it lives in the brain and evidence-based interventions which can turn a sad, struggling child into not only a good reader, but one who sees herself as a student with self-esteem and a fulfilling future (p. 2).

In a functional magnetic resonance imaging (fMRI) study with children with reading disabilities, Shaywitz et al. (2004) used an intensive, phonologically based reading intervention and found, "significant and durable changes in brain organization so that brain activation patterns resemble those of typical readers" (p. 931). The children also made gains in reading fluency and comprehension one year after the intervention had ended. According to Shaywitz et al. (2004) this indicated that evidence-based phonologic reading intervention facilitates the development of fast- paced neural systems that underlie skilled reading. During her testimony before the U.S. House of Representatives on the neurobiology of dyslexia, Shaywitz (2014) added,

Converging evidence using functional magnetic resonance imaging (fMRI) from our own and laboratories around the world has identified three major neural systems for reading in the left hemisphere, one region, anterior, in Broca's area and two regions posterior, one in the parieto-temporal (Wernicke's area), and another, in the occipito-temporal region, often referred to as the word form area...such (fMRI) studies indicate that in dyslexic readers, the posterior neural systems are functioning inefficiently, providing a neural signature for dyslexia (p. 5).

Students with dyslexia struggle with decoding ability, spelling, and written expression (Lyon et al., 2003). In a 2017 longitudinal study of 1,215 kindergarten students, Ozernov-Palchik et al. identified six profiles of reading performance: (a) average performers; (b) below average performers; (c) high performers; (d) rapid automatized naming (RAN) risk; (e)phonological awareness (PA) risk; and (f) double-deficit risk (both PA and RAN). Three of these profiles (i.e. RAN risk, PA risk, and both PA and RAN risk) comprise children who will go on to be diagnosed with some form of reading disability or dyslexia (Wolf, 2018). Ozernov-Palchik et al., (2017) found there was stability in these early literacy predictors for dyslexia from the beginning of kindergarten to the end of first grade. This means that if students had a phonological deficit, rapid naming deficit, or both in kindergarten or first grade it could be predicted that they would be identified with dyslexia or some form of reading disability (Wolf, 2018). Early identification

is important for mitigating the negative effects of dyslexia including reduced educational attainment and increased social emotional difficulties (Ozernov-Palchik et al., 2017). Furthermore, Ozernov-Palchick et al. (2017) found that early identification and early intervention can yield the best outcomes for students with dyslexia through targeted interventions.

In 2016, the United States Senate's Health Education Labor and Pensions (HELP) Committee held a hearing devoted to dyslexia entitled," Understanding Dyslexia: The Intersection of Scientific Research and Education." The goals of the hearing were as follows: (a) raise awareness of the scale and scope of dyslexia; (b) raise awareness of dyslexia as explained by science; (c) early identification; (d) teacher preparation and; (e) the provision of evidencebased reading instruction for students with dyslexia (US Senate HELP committee, 2016; YCDC, 2016). Witnesses included researchers Dr. Sally Shaywitz, co-director of the YCDC, Dr. Guinevere Eden, director of the Center for the Study of Learning at Georgetown University Medical Center, Dr. Mark Mahone, director of the Department of Neuropsychology at Kennedy Krieger Institute, and parents of children with dyslexia, some of whom were adults with dyslexia themselves. Dr. Shaywitz stated, "increasing scientific evidence points to dyslexia as the explanation and potential solution to our education crisis" (US Senate HELP committee hearing testimony, 2016, p. 2). Dr. Shaywitz's testimony included the need for schools to screen early for dyslexia, inform students of their diagnosis (dyslexia) and that they are smart, and teacher preparation in dyslexia training programs. Additionally, due to its high prevalence, scientific validity, and harsh socioeconomic and psychological impact on students, dyslexia must be given prominence in reauthorization of IDEA (US Senate HELP committee hearing).

Dyslexia Laws

There are federal laws that are important to students with disabilities including students with dyslexia and related disorders. These laws are Section 504 of the Rehabilitation Act and the Individuals with Disabilities Education Act (IDEA). Section 504 prohibits discrimination on the basis of disability in programs or activities that receive federal financial assistance from the U.S. Department of Education (Dyslexia Handbook, 2018). IDEA is a federal law that makes a free and appropriate public education available to eligible children with disabilities and ensures special education and related services to these children (Dyslexia Handbook, 2018).

IDEA lists thirteen conditions that can make students eligible for special education including a specific learning disability such as dyslexia (Morin, 2020). However, IDEA does not define dyslexia or inform schools on how to address dyslexia. For example, it does not address that each student identified with dyslexia requires differing levels of support and intervention. State dyslexia laws aim to provide more detail, and thus, provide additional rights and protections for students (Morin, 2020). Laws regarding dyslexia vary from state to state. Only seven states in the United States have no dyslexia-specific laws (Eide, 2019).

According to the Dyslexia Handbook updated in 2018 by the Texas Education Agency (TEA), parents or guardians have the right to request a referral for a dyslexia evaluation under IDEA or Section 504 at any time. The importance of early intervention for reading difficulties cannot be overstated. Recent research encourages the early identification and early intervention for students at risk for dyslexia prior to formal reading instruction (Catts, 2017). Research has confirmed that teacher knowledge determines the success or failure of even the best reading programs (Shaywitz, 2003). Texas Education Code §38.0032 is a state law that offers professional development for teachers in the area of dyslexia and dyslexia intervention programs.

In 2017, the 85th Texas Legislature passed House Bill (HB) 1886, amending Texas Education Code, Chapter §38.003, which now requires that all kindergarten and first grade students be screened for dyslexia and related disorders. Additionally, the law requires that all students beyond first grade be screened or tested as appropriate.

Whole Language Theory

In his book, *Reading Without Nonsense*, psycholinguist Frank Smith (2006) stated, "the notion that children can have a specific learning disability exclusive to reading as a consequence of brain malfunction is a fable" (p. 144). Frank Smith and Ken Goodman's writings laid the foundation for *Whole Language Theory*, a theory of literacy learning and instruction that has had a powerful impact on literacy education since the 1980s (Tracey & Morrow, 2017). Whole Language Theory suggests that reading is a natural process that children will acquire if they are immersed in high quality literature and exposed to authentic literacy experiences (Tracey & Morrow, 2017). In the whole language approach, there is no explicit instruction on phonics principles (Wolf, 2018). Phonics methods were erroneously labeled "drill and kill," (pp.15-16) and teachers of phonics were labeled as less progressive and child-centered (Wolf, 2018). Wolf (2018) wrote:

A large, fundamental mistake—with many unfortunate consequences for children, teachers, and parents around the world—is the assumption that reading is natural to human beings and that it will simply emerge "whole cloth" like language when the child is ready. That is not the case; most of us must be taught the basic principles of this unnatural cultural invention. (p. 13)

In a whole language approach to teaching reading, Wolf (2018) explains that learning is meant to be implicit or inferred by the child and little to no explicit teaching of decoding the phonemes is provided. Instead, emphasis centers on engagement in stories, authentic literature, word meaning, and imagination to the exclusion of phonics principles (Wolf, 2018). Although it may appear that

good readers guess at words or that they read whole words as units, good readers in fact process every letter of the words they read (Adams, 1990). Good readers are able to translate print into speech rapidly and efficiently allowing them to attend to meaning (Farell & White, 2018). Effective instruction for poor readers should therefore focus their awareness on phonemes and other linguistic units until the child reads with sufficient fluency to aid comprehension (Farell & White, 2018).

Dr. Louisa Moats is a nationally recognized researcher and an authority on how children learn to read and why some fail to learn. Dr. Moats (2000) contends that the whole language approach to reading instruction has been disproved by scientific research but still pervades textbooks for teachers, classroom materials, states' language arts standards and policy documents, teacher licensing and preparation programs, and professional development. Moats (2000) stated that almost every premise advanced by whole language proponents about how reading is learned has been contradicted by scientific investigations. Valuing ideology over evidence is one reason why whole language and whole language incarnations such as Reading Recovery (RR) and guided reading, an extension of RR, persist (Moats, 2000).

Seidenberg (2013) asserts that connecting reading science and educational practice would be beneficial. However, contemporary reading science has minimally impacted educational practice because of the harmful debate between "phonics" and "whole language" approaches, separating science and education (Seidenberg, 2013, p. 340). Seidenberg (2013) states, "current practices rest on outdated assumptions about reading and development making reading harder than it needs to be, a sure way to leave many children behind." (p. 340)

Structured Literacy

The terms Structured Literacy instruction and Multisensory Structured Language Education have been used interchangeably (Farrell & White, 2018). An effective reading intervention for students with dyslexia is "multisensory instruction which utilizes all learning pathways in the brain (visual, auditory, kinesthetic-tactile) simultaneously in order to enhance memory and learning" (Birsh, 2018, p. 2). In the book, *Multisensory Teaching of Basic Language Skills* (2018) Birsh stated, "Listening and speaking are hardwired into the brain, but written language has to be acquired through instruction" (p. 2) Structured Literacy (SL) instruction is an approach grounded in scientific research for acquiring literacy skills that emphasizes explicit, sequenced, systematic, and intensive lessons, while incorporating multisensory instructional strategies (Birsh, 2018).

According to Louise Spear-Swerling (2018), Structured Literacy (SL) differs from typical approaches, such as guided reading, that do not emphasize highly explicit teaching of phonics skills and may utilize leveled and predictable texts (i.e., texts in which words are predictable based on sentence structure, repetition, or pictures). Additionally, spelling may not be taught explicitly in typical reading approaches such as whole language approach; instead, students may learn word lists that exemplify no phonics pattern or spelling rule. In contrast, key features of Structured Literacy include the following: (a) explicit, systematic, and sequential teaching of literacy at multiple levels—phonemes, letter-sound relationships, syllable pattens, morphemes, vocabulary, sentence structure; (b) cumulative practice and on-going review; (c) a high level of student-teacher interaction; (d) carefully chosen examples and non-examples; (e) decodable text; and (f) prompt, corrective feedback (Spear-Swerling, 2018).

In a meta-analysis, Weiser and Mathes (2011) found that all effective interventions shared explicit and direct instruction of phoneme-grapheme correspondences, encoding and writing activities, word study, and guided writing practice with spelling patterns. Structured Literacy interventions for dyslexia contain all these components.

In a two-year study with kindergarten children and their teachers, Montgomery (2017) found that a lack of attention to early handwriting and spelling skills can directly impair and/or prevent reading development for students with dyslexia. Handwriting rarely gets the attention it deserves in language arts programs because it is regarded as a mechanical skill rather than a written language skill (Wolf &Berninger, 2018). Bosse et al. (2014) found that handwritten practice of spelling words connected to reading activities is beneficial for orthographic (i.e., written language) memory. Furthermore, a study by James and Engelhardt (2012) found that when pre-literate five-year old children printed, typed, or traced letters and shapes then were shown images of these stimuli while undergoing fMRI scanning, a previously documented "reading circuit" (p. 32) was recruited during letter perception only after handwriting, not after typing or tracing experiences.

Teacher Preparation

Teacher training and professional development help teachers make instructional decisions in the classroom. Birsh (2018) emphasized that it is time to merge evidence from the science of reading with research on best practices in the classroom to better prepare preservice teachers for the demands of reading instruction. Moats and Foorman (2003) found a correlation between student achievement and teacher preparation specifically domain-specific knowledge of language and reading. They found that teachers are often licensed without acquiring content knowledge of language and reading development (Moats & Foorman, 2003). In her position paper, *Teaching*

Reading is Rocket Science: What Expert Teachers of Reading Should Know and Be Able To Do, Louisa Moats (1999) called for improved teacher preparation programs to prepare teachers for the complex task of teaching reading.

Research on dyslexia and reading disabilities can help improve our teaching practices. Preparing teachers to detect reading difficulties early and provide interventions to prevent reading failure is critical (Birsh, 2018). She stated, "Teachers must adopt more effective instructional practices and policies to close the reading gap and solve the problem of pervasive, persistent reading failure." (p. 7) When teachers learn about instructional strategies in the components of reading, accompanied by comprehensive instruction and practice, they utilize these ideas in their everyday work in classrooms and student achievement improves (Moats & Foorman, 2003). The International Dyslexia Association (IDA, 2018) created the Knowledge and Practice Standards for Teachers of Reading to support teachers. These standards outline what the knowledgeable and skilled teacher of reading should know and be able to do to teach students to read well. Additionally, the Certification Exam for Educators of Reading Instruction (CEERI), which aligns these standards provides evidence of teacher knowledge (IDA, 2018).

Theoretical Framework

The framework for this study consists of cognitive-processing perspectives of reading such as the Parallel Distributed Processing Model and the Double-Deficit Hypothesis.

Parallel Distributed Processing Model

The Parallel Distributed Processing Model (Rumelhart & McClelland, 1986) is a cognitive-processing perspective of reading with two important features: (1) information is stored as a series of connections between neural units in the brain and (2) these connections between units become stronger with repetition. The Parallel Distributed Processing model

suggests that the reading process involves four primary processors: the orthographic processor, the meaning processor, the phonological processor, and the context processor. The reading process begins in the orthographic processor with print recognition (i.e., letter recognition to form words). The reading process continues in the meaning processor where meaning is connected to the words (i.e., vocabulary). Next, is the phonological processor where the sounds associated with words are processed. This is where the reader decodes or "sounds out" the word and uses the sounds to identify the word and connect meaning to the word. The final processor is the context processor, where meaning is constructed for phrases, sentences, paragraphs, and whole texts. In order to be successful, the reader must have automatic letter recognition, phonemic awareness, vocabulary, and the ability to construct meaning during reading. For young students at risk for dyslexia the importance of early automatic letter recognition and phonemic awareness is critical.

Double-Deficit Hypothesis

The Double-Deficit Hypothesis (Bowers & Wolf, 1999) posits that difficulties with Rapid Automatized Naming (RAN) and Phonological Awareness (PA) can cause greater impairments in reading ability compared to children with single deficits (i.e., either difficulty with RAN or difficulty with PA). According to the definition of dyslexia by the International Dyslexia Association, there are secondary consequences associated with dyslexia such as less exposure to vocabulary and less opportunity to develop reading comprehension skills due to a more severe reading impairment. Additionally, children with dyslexia may develop a negative attitude towards reading and try to avoid reading altogether (Oka & Paris, 1987). For example, Riddick et al. (1999) found that college students with dyslexia scored significantly lower in self-esteem than matched control groups.
These theories influence this research in important and interrelated ways. The Parallel Distributed Processing Model stresses that a child must have, first and foremost, language ability and print recognition for decoding to be successful readers. For students with a phonological processing disability, such as dyslexia, decoding and print recognition are difficult to achieve, and without adequate reading interventions, may lead to reading failure. Double-deficit hypothesis explains the cause of reading disabilities as a phonological deficit or naming speed deficit or both deficits at once. Double-deficit hypothesis stresses the need for ideally matched interventions for these disabilities (Tracey & Morrow, 2017), which this research addresses

CHAPTER III

METHODOLOGY AND FINDINGS

This study explored the effects of a multisensory reading intervention on the attitudes towards reading and writing of fourth-grade students identified with dyslexia. The delayed identification of dyslexia until fourth grade indicates that students have already experienced significant struggle with reading in the early primary grades, kindergarten through second grade (Torgesen, 2004). If dyslexia is not identified early, students may fall behind in early reading ability, vocabulary, and reading comprehension (Ozernov-Palchick et al., 2017). These children tend to acquire negative attitudes towards reading (Oka & Paris, 1987). Therefore, it is a matter of the utmost urgency to provide fourth-grade students with dyslexia evidence-based, effective reading instruction such as Structured Literacy. The International Dyslexia Association explains that this type of reading instruction is the most effective approach for students who experience unusual difficulty learning to read and spell (IDA, 2019).

This study was conducted in the context of a mandatory pull-out reading intervention for students identified with dyslexia. As a dyslexia interventionist, the researcher was especially interested in learning more about the effect of a Multisensory Structured Literacy (SL) approach on students identified with dyslexia. Structured Literacy instruction emphasizes direct, explicit, sequenced, systematic, cumulative and intensive reading and writing lessons that incorporate multisensory strategies (Birsh, 2018). According to Birsh (2018), "the term multisensory

strategies means the use of direct instructional strategies involving visual, auditory, and tactilekinesthetic (VAKT) sensory systems to learn the phonological, morphemic, semantic, and syntactic layers of language along with the articulatory-motor aspects of language" (pp. 2-3). According to Spear-Swerling (2018), SL differs from typical approaches such as guided reading that do not emphasize highly explicit teaching of phonics skills and may utilize leveled and predictable texts (i.e., texts in which words are predictable based on sentence structure, repetition, or pictures). Additionally, spelling may not be taught explicitly; instead students may learn word lists that exemplify no phonics pattern or spelling rule.

Research is limited on the effects of a pull-out multisensory reading intervention on fourth graders identified with dyslexia, which thereby presented a need for this study. In this chapter, the researcher describes the design of this study, its context and participants, intervention activities, the data collected, data analysis, measures taken to ensure validity, and limitations.

Research Design

The research question that guided this study is as follows: *What is the impact of a multisensory intervention on attitudes towards reading and writing of fourth-grade students identified with dyslexia?*

This study was conducted using a qualitative research approach which is well-suited to promote a deep understanding of a social setting or activity as viewed from the perspective of the research participant (Bloomberg & Volpe, 2016). The researcher's purpose was to strive to understand how students identified with dyslexia perceived the pull-out multisensory reading intervention and how this affected their attitudes towards reading and writing. According to

Creswell (2014), the researcher is the key instrument in qualitative research as he stated, "qualitative researchers collect data themselves through examining documents, observing behavior, or interviewing participants" (p. 185). In this qualitative study, the researcher endeavored to understand the perspectives of students with dyslexia and collected multiple forms of data to analyze including audio recorded interviews, observations, spelling assessments, and reading interest surveys.

Case study was identified as the most appropriate qualitative research methodology for this study. Yin (2009) defined a case study as "an empirical study that investigates a contemporary phenomenon in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (p. 18). In this research, a multiple case study research design was chosen for its exploratory form of inquiry that affords significant interaction with research participants (Bloomberg & Volpe, 2016). Multiple case study was most appropriate for this study as each student identified with dyslexia in the fourth grade comprised a single case. Evidence from multiple cases is often considered to be more compelling and robust through its reliance on evidence from several cases (Herriot & Firestone, 1983). The analytic strategy for examining multiple cases is to provide detailed description of themes within each case (i.e., within-case analysis), followed by thematic analysis across cases, i.e., cross-case analysis (Bloomberg & Volpe, 2016).

Context & Participants

This study was conducted in the dyslexia interventionist's classroom in a public elementary school located in a South Texas school district. This district receives funding from Title I, Part A of the Elementary and Secondary Education Act, which provides financial assistance for schools with a high percentage of children from low-income families. At the time of this study, 764 students attended this school across Pre-K3 through fifth-grade classrooms.

At the time when the study began, three students had been identified with dyslexia in this school. The students were receiving the multisensory reading intervention prior to participating in the study. These students were selected for participation in this study based on this preidentified criterion for purposeful sampling. Patton (1990) wrote, "Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research, thus the term purposeful sampling" (p. 169).

The dyslexia interventionist had received the required training on Structured Literacy and multisensory methods and strategies provided by the school district as required by state law. First, the dyslexia interventionist was trained on *The New Herman Method*, a multisensory reading program. The training was a three-day program designed to familiarize dyslexia interventionists with the scripted program chosen by the district for students with dyslexia. Subsequently, the dyslexia interventionist began training to be a Certified Academic Language Practitioner (CALP) with the Structured Literacy Institute, which was training provided by the school district but not necessary to begin implementing the dyslexia intervention class. For this study, the researcher implemented *The New Herman Method* multisensory reading program and supplemented the instruction with literature relevant to students' interests for reading fluency practice and comprehension. The Structured Literacy reading intervention with multisensory strategies was provided to students in this study and it is different than the typical reading approaches (i.e., guided reading) that the students received in their general education classroom.

Participants

The participants in this study were two fourth-grade students and one fifth-grade student. These students were identified with dyslexia when they were in the fourth grade, which is typically the earliest at which students with dyslexia are identified. To protect the privacy of research participants all names used in descriptions are pseudonyms.

Alan. The first participant in this study was Alan. He was a cheerful, talkative, fourth-grade student. He was nine years old and enjoyed reading Dr. Seuss books. Dr. Seuss was his favorite author as he indicated on his reading survey. Alan also liked to read informational text about animals and the Earth. Alan said that he would usually take books to the park so that when he was done playing, he had a book to read. Alan's parents encouraged him to read books to his younger brother who was in kindergarten. Alan received all English instruction in school and spoke about speaking Spanish with his grandparents at home. Alan started receiving the multisensory reading intervention in the fall semester of 2018 approximately four weeks before the study began.

Joey. The second participant in this study was Joey. Joey was a shy, quiet, fifth-grade student. Joey was ten years old and enjoyed reading a variety of genres such as chapter books, funny books, and fantasy stories. Some of his favorite books included the *Goosebumps* series by R.L. Stine, *Harry Potter* series by J.K. Rowling, *Diary of a wimpy kid* by Jeff Kinney and Dr. Seuss. He said that he liked to read in places that were quiet. Joey received all English instruction in school and mentioned that some members of his family spoke Spanish. Joey had received the multisensory reading intervention in his fourth-grade academic year. He started receiving the multisensory intervention again in the fall semester of 2018 approximately four months before the study began.

Bobby. The third participant in this study was Bobby. Bobby was a fourth-grade student. One of his favorite authors and illustrators was Dr. Seuss. He said he liked to read Dr. Seuss books because they are funny, and they rhyme. He was nine years old and loved to read about dinosaurs because those were his favorite animals. He said he wanted to be a paleontologist when he grew up and one of his favorite movies was *Jurassic Park* directed by Steven Spielberg. He would say that he liked to search for more information on books that he read in class on websites like *You Tube*. Bobby received all English instruction in school and spoke about some members of his family speaking Spanish at home. Bobby started receiving the multisensory reading intervention in the fall semester of 2018 approximately four months before the study began.

Procedures and Duration

A Multisensory Structured Literacy lesson comprises several components of language: phonology, phonics, syllables, morphology, etymology, syntax, fluency, semantics (comprehension), and handwriting (Farell & White, 2018). In this study, the students received a reading intervention for forty-five minutes, four times a week, for twelve weeks. The study began on January 8, 2019 and ended on April 5, 2019.

A typical lesson began with a review of previously taught letters and sounds with picture letter cards. The researcher instructed the students to look at the picture, say the name of the letter or letter groups, say the key word, and say the sound. The visual (letter card), auditory (sound), and tactile-kinesthetic-motor articulation (tongue, lips, teeth) focus attention on the feel of pronouncing speech sounds (phonemes). This was followed by the introduction of a new phoneme and new letter or group of letters (e.g., vowel team or digraph). The students received mirrors and were instructed to repeated five words that had the same phoneme while they looked

at their mouths in the mirrors. The students would identify the target phoneme in words and the position of the phoneme in the words (e.g., initial, medial, or final position).

The students then played a rapid naming word game with a partner, usually a card game with the previously learned letters and sounds and the new letters and sounds to read words. The students were instructed to monitor each other for accuracy and fluency while the researcher monitored for the same. The next step was reading words and answering questions about phonology, morphology, or syntax. (e.g., I have a question about phonology. Which word begins with /sh/?) The next step was spelling words aloud or spelling words with letter tiles. Students identified what type of syllable they were working with (e.g., closed syllable, open syllable, silent e). The researcher instructed students to use Simultaneous Oral Spelling (SOS) procedure to spell words whether using letter tiles or writing with pencil. In SOS procedure, the student listens to the word while looking at the speaker's mouth, segments the word by tapping out each sound with hand or fingers, names the letters, then names and writes the letters, and finally decode to read the word to check for accuracy.

After spelling, students practiced skywriting and handwriting of cursive letters. When introducing a new letter, the researcher taught students a chant to remember how to write the letter correctly, e.g., the letter is h: up, around, down, hill, release. The researcher wrote the letter on the whiteboard while repeating the chant. The chant was written on the white board. Then, the students were instructed to look and listen while the researcher used her arm to write a giant letter in the air engaging the large muscles of the arm and repeating the name of the letter and chant three times. Then, the students would stand up and do the procedure for skywriting three times repeating the name of the letter and the chant three times, close their eyes, and skywrite again three times repeating the name of the letter.

The next step was finger writing the letter on the table three times while saying the name of the letter and the chant then, with eyes closed, write the letter three times on the table saying the name of the letter. Then, students would trace a large copy of the letter repeating the name of the letter three times with a pencil. Then, with eyes closed, the students would make their best copy of the letter. By this time, the students could practice the letter on whiteboards with a marker or on lined paper with a pencil. If the letter was not mastered the researcher would reteach the procedure the following day. Students practiced writing their spelling words with the new letter and previously learned letters. Spelling assessments were administered individually to each student and students received feedback immediately. The researcher used spelling assessments to assess mastery of spelling and handwriting before proceeding to next level of instruction. At the end of the lesson, the students would read a book of their choice and the researcher would monitor for accuracy, fluency, and comprehension. The students were instructed to monitor their decoding for accuracy and comprehension.

Data Collection

According to Bloomberg and Volpe (2016), data collection in case study research involves multiple methods including document review, observations, interviews, focus groups, surveys, and critical incidents. Yin (2009) stated that, "the most important advantage presented by using multiple sources of evidence is the development of *converging lines of inquiry*, a process of triangulation and corroboration" (p. 115). Bloomberg and Volpe (2016) add that triangulation is critical in attempting in-depth understanding of the phenomenon under study. Marshall and Rossman (2016) explain triangulation as the act of bringing more than one source of data to bear on a single point. Marshall and Rossman (2016) further stated, "multiple cases, multiple informants, or more than one data-gathering method used can greatly strengthen the

study's usefulness for other settings" (p. 262). Over the course of this study, varied forms of data were collected to facilitate triangulation, including: (a) reading interest survey; (b) participant interviews; (c) observations; and (d) spelling assessments.

Reading Interest Survey

The researcher created a reading interest survey (see Appendix B) to ascertain research participants' reading preferences, favorite authors, or genres. The reading interest survey consisted of seven open-ended questions. The researcher read the reading interest survey aloud to study participants because the students had trouble reading the questions themselves. Participants' responses to the survey questions were recorded by typing their individual responses on a Microsoft Word document during the reading interest survey interview. The purpose of the reading interest survey was to provide participants with texts they enjoyed and found interesting so that they would be motivated to read more books. The researcher sought to provide relevant literature, both in print and digital formats, to the participants in this study based on their interests and preferences. Participants read books or listened to books read aloud by the researcher or audible books on a digital device. The researcher endeavored to create opportunities for success and motivation to read by providing texts based on student interests. Gambrell et al. (1996) found that third- and fifth-grade students were motivated to read by prior experience, choice, and access to books.

The researcher created a classroom library with a variety of books from different genres based on student interests. Students were able to pick the books that they wanted to read or they could listen to digital texts via Learning Ally, which provides audio books for students with print-based disabilities so that they may have access to grade-level books. According to the National Institute of Child Health and Human Development (2000), studies have found that

adding speech synthesis to the print material presented on computers is an effective practice for reading instruction. Thus, Learning Ally provides equitable access to curriculum-aligned textbooks as well as books students with reading disabilities need to and want to read.

Interviews

Interviews have the potential to capture perceptions, attitudes, and emotions of research participants (Bloomberg & Volpe, 2016). Interviews can provide important insights and are essential to case study research because most case studies are about human affairs or behavioral events (Yin, 2009). The researcher conducted two individual structured interviews with the three participants. The interviews were conducted in the same classroom where the students had their reading intervention. The interview questions were developed with the research question in mind, and each participant was provided the same questions. The structured interview protocol consisted of ten open-ended questions found in Appendix A. The researcher audiotaped each interview to ensure accuracy of students' responses (Yin, 2009). In January 2019, an interview was conducted with each participant prior to his participation in the observed multisensory intervention. The questions in the interview protocol were developed by the researcher and include questions about how participants think or feel about the type of instruction they are receiving, how they feel about reading, writing, and dyslexia. In April 2019, a second interview was conducted with each participant following his or her participation in the multisensory intervention. The questions asked were the same as those posed during the pre-intervention interview. The purpose of conducting pre-intervention and post-intervention interviews was to gain further insight into students' perspectives about literacy, dyslexia, and multisensory instruction.

Direct Observations

In case study research, direct observations in the natural setting are valuable sources of data by which to capture the social and environmental conditions relevant to the study (Yin, 2009). The participants were observed in the classroom where the multisensory reading intervention took place; this was a natural setting for them as it was a familiar classroom for the participants and used in their daily routines. The researcher would go to the students' general education classroom and pick them up in the morning every day at the same time for their reading intervention, which took place in another classroom. Marshall and Rossman (2016) stated that when working with children creating a natural context is crucial, but what constitutes natural depends on the age of the participants. Naturally, when creating an environment that is appropriate for students the first thing one needs to consider is their age. A classroom for kindergarten students is very different than a fourth- or fifth-grade classroom.

In this study, the researcher took the role of participant observer. In participantobservation, the researcher may assume a variety of roles within the case study situation (Yin, 2009). As the dyslexia interventionist providing the multisensory instruction, the researcher had the opportunity to observe the events from the teacher's perspective. According to Bloomberg and Volpe (2016), this raises the issue of positionality, that is the researcher's relationship with the participants. As the dyslexia interventionist, the researcher's positionality was that of an authority figure and leader in the classroom. As the teacher in the classroom, the researcher was aware that students would see her as an authority figure. The researcher was able to provide a classroom setting for the participants in which they felt comfortable, safe, and valued, which was essential for establishing trust.

Observation is an important method in qualitative inquiry because it can be used to discover complex interactions in natural social settings (Marshall & Rossman, 2016). The researcher kept a journal to record observations and organize field notes collected during the multisensory interventions. Creswell (2014) notes that a qualitative observation is when the researcher takes field notes on the behaviors and activities of individuals at the research site. Observations are open-ended in that the researcher asks general questions of the participants allowing the participants to freely provide their views (Creswell, 2014). The purpose of writing the field notes was to accurately capture participants' response to intervention, behaviors and attitudes towards literacy, multisensory instruction, and dyslexia. Field notes consisted of observations of the behaviors of the participants during multisensory instruction, student conversations with each other and the researcher about literacy, as well as comments made by participants during activities or classroom discussions. The researcher recorded observations in a journal after every class. The researcher also found it useful to record her thoughts, ideas, and reflections after each class as well. Lincoln and Guba (1985) recommended several types of journals including a personal log or a kind of diary in which a researcher may record anything from introspective notations to a cathartic section for venting one's frustrations and anxieties. Marshall and Rossman (2016) stated that whether enacted formally or informally, observation entails the systematic noting and recording of events, behaviors, interactions, or artifacts. Therefore, it is crucial that these observations be recorded or written down.

Spelling Assessments and Handwriting

Spelling assessments are part of the multisensory reading intervention and serve to analyze handwriting legibility and mastery of spelling skills. In this study, spelling assessments were a formative assessment used for progress monitoring that aided the researcher in planning

instruction. Spelling, by its nature, is a multisensory skill because it involves taking the auditory sounds of language and translating them into visual symbols by the kinesthetic act of writing (Birsh & Carreker, 2018). Students with dyslexia need spelling instruction that is closely integrated with reading instruction. In a two-year study with kindergarten students and their teachers, Montgomery (2017) found that a lack of attention to early handwriting and spelling skills can directly impair reading development and in students with dyslexia can even prevent reading development. Students must be explicitly taught about language structure for spelling and must be actively engaged in thinking about language (Birsh & Carreker, 2018).

Researchers studying word memories have identified four interrelated aspects of word knowledge and language processing: (a) phonological form; (b) orthographic form or spelling; (c) semantics or word meaning; and (d) morphological structure and grammatical role (Adlof & Perfetti, 2014; Treiman, 2017). Reading words is easier than spelling words because one can rely on partial word memories to read but require full and accurate word memories to spell (Moats, 2019). Therefore, this is the reason why students with dyslexia can learn to read well but may still struggle with spelling.

Writing legibly and efficiently is an important skill for students in fourth grade. In the state of Texas, fourth grade students are assessed on their writing skills with the State of Texas Assessment of Academic Readiness (STAAR). In this study, students practiced cursive script and their written spelling assessments were completed in cursive. Wolf & Berninger (2018) argue that handwriting is not given the importance it deserves in language arts programs for typical students or students with learning disabilities. The authors Wolf & Berninger (2018) state, "specific learning disabilities can affect the subword level of language (handwriting), the word level of language (word reading and spelling), or the syntax level of language (sentence

understanding and construction)." (p.435) For these reasons, the researcher felt that including written spelling assessments as a data source for this study was important.

Data Analysis

For the data analysis, a multi-step data analysis approach was used for assigning codes to the data. In the first cycle codes were assigned to the data from interviews, field notes, and reading survey. The researcher identified patterns from the assigned codes for the second cycle, and identified themes in the third cycle (Miles, Huberman, & Saldaña, 2014). The three cycles of coding were conducted on each of the three types of data collected. In the first cycle, the researcher transcribed, read through the data several times, and hand-coded the data collected from interviews, reading interest surveys, and field notes of direct observations. Marshall and Rossman (2016) recommend immersion and "intimate engagement" (p. 217) with the data through reading, rereading, and reading through the data once more. They state that, "researchers should think of data as something to cuddle up with, embrace, and get to know better" (Marshall & Rossman, 2016, p. 217). Subsequently, the researcher highlighted relevant text and assigned codes to the textual data with terms based in the actual language of the participant (Creswell, 2014).

The researcher also created memos to help organize her thoughts and stay on track with the analysis of codes to identify patterns, categories, and themes. Saldaña (2015) explained that themes can be derived from analytic work with codes and categories or may be independently constructed from holistic review of the data corpus from patterns alone. The data collected was analyzed holistically for an in-depth exploration leading to a rich interpretation of emerging themes.

Findings

The following themes emerged from the analysis of the data collected for this study: selfawareness of reading and writing improvement, increased classroom participation, positive literacy attitudes, and an awareness and confidence of ability to learn with dyslexia. All names used are pseudonyms in interviews or field notes to protect identity of participants. The researcher will use each participants' pseudonym or use the term students instead of the term participants in descriptions.

To provide some background information about the researcher's experience with students' attitudes towards reading prior to multisensory intervention classes, the researcher recalled that when she asked students to read a book for her, the students became visibly nervous or made statements such as, "Miss, I'm not a good reader" and "I don't know how to read." The following statements are from entries in the researcher's field notes:

Today a student said, "When the teacher asks me to read in class, I get nervous."

Today, I asked a student to read to me. He became visibly upset and filled with anxiety. I could tell because his breathing started to change, and he started looking around the room as if he was nervous. He told me, "I don't read good."

These observations recorded in field notes by the researcher are provided to illustrate for the reader the typical attitudes towards reading that were first observed by the researcher when the reading interventions began, shortly after dyslexia identification, prompting the researcher to feel there was a need for this study.

Theme 1: Self-Awareness of Reading and Writing Improvement

Students in this study had an awareness that their reading and writing had improved after participation in the multisensory intervention class. The following quotations are from the data in

individual interviews, observation field notes, or reading interest surveys conducted for this study. The researcher's questions and student responses are included in the analysis and discussion.

Alan. In his first interview, Alan mentioned that he likes cursive handwriting and reading because he feels that he is learning more. Alan states that his reading fluency has improved when he reads in his fourth-grade classroom.

Researcher: Okay, Alan, I wanted to ask you, what do you think or feel about the way we learn to read and write in this class?

Alan: I like how we do cursive, and I like how we read because it feels like when I read, I'm learning more than just reading by myself.

Researcher: Has the writing that you have learned in this class helped you with reading in your fourth-grade class?

Alan: Yes

Researcher: How?

Alan: Because when I read at...when my teacher tells me to read, I read with a little bit more fluency and then and then [I read] more.

Alan realizes that he can read with more fluency when his teacher asks him to read in his regular education classroom meaning that he is decoding faster to achieve fluency. His response indicates that he is participating in class when the teacher asks him to read. Alan also states that he feels that he is learning more than just reading by himself. Alan's answer indicates that he is aware that his reading and comprehension have improved because he is not "reading by himself" indicating he feels the support of the teacher is important in this context.

In his second interview, Alan, mentioned how he used to have trouble reading books to

his little brother before but now it is easy. Alan also stated that reading and writing in his fourth-

grade class is easier now that he's been coming to this class.

Researcher: Do you think that this class helps you with reading? **Alan:** Yes

Researcher: How?

Alan: Because...like my parents always tell me to read books for my little brother, and I used to have trouble reading them for him, but now I can read them easily for him.Researcher: Why do you think reading is a little bit easier?Alan: Because reading is a little bit hard for me and now that I've been coming to this class it's easier to read and other things

Alan exhibits an awareness that his reading has improved due to his participation in this class. Alan states that he used to have trouble reading for his little brother but now he can read easily for him. Alan realizes that there is improvement in his reading due to his time in this class. His statement that he can read easily now indicates improvement in his attitude towards reading. In his reading interest survey, Alan also mentioned that he read books for his little brother so that he (little brother) could AR test. Accelerated Reader (AR) is a reading comprehension test. Alan is applying the reading skills that he has learned in this class to help his little brother comprehend the story or book that he is reading to him. The following quotation is an entry from the researcher's observation field notes:

Today, Alan said he's worried about going to middle school because he will not be here to help his little brother with reading. Alan said his parents always ask him to read books to his little brother and now he likes to read to him.

Alan's reading has improved due in part to his parents' request that he read to his little brother. Alan's statement that now he likes to read to his little brother indicates a positive attitude towards reading. Alan stated that reading is easier now and he likes to read to his little brother indicating reading improvement and a motivation to read.

In his second interview, Alan stated that he thought writing had become easier since coming to the class. Alan mentions that in his class they do a lot of writing. Alan is in fourth grade. Fourth grade students practice more guided writing with the teacher in preparation for state testing. **Researcher:** Okay, so what about writing? Do you think that writing has become easier, more difficult, or stayed about the same since you've been coming to this class? **Alan:** Easier.

Researcher: Can you tell me why you think it's easier?

Alan: Because when we write at our class, we do a lot of writing, and it's easier to catch up to the teacher so that's...

Alan states that writing is easier because he can catch up to the teacher now indicating his

writing speed has improved. The following quotations are from the researcher's observation field

notes:

Today while students were practicing their cursive handwriting, the students asked for homework to practice their cursive writing. If students are asking to take homework for writing practice, this indicates that they enjoy the practice. I see students writing more, I see them experiencing success, so I think that's why they want to keep learning.

Students enjoyed the cursive writing practice in the classroom but also wanted to take it for

homework. The researcher deduced that the students enjoyed practicing cursive since they kept

asking to have more of this practice for homework.

In his second interview, Joey described how writing had helped him with reading.

Joey. Joey spoke about decoding, or chunking text or letters, when the researcher asked

him if writing had helped him in reading. Joey explains that you "break up" words and then "put

them together".

Researcher: Has the writing that you have learned in this class helped in Reading?

Joey: mm hmm (nods affirmatively)

Researcher: Can you tell me how?

Joey: I think some of the hard words like you have to break them up in pieces and then just say them like like the pieces that you break...and then you put them together and you say the word. (indicates with his hands)

Joey is describing in his own words that he has learned to decode and blend the sounds of language (phonemes) to read by breaking the word up into pieces and putting it back together to

say it. Joey is thinking about and manipulating the individual sounds of language. This is important for students with dyslexia because they struggle with phonological awareness.

Joey demonstrates an awareness that he knew he was struggling with reading when he states that, "last year I was doing really bad in reading" and "having a lot of trouble." However, he realizes and has an awareness that his reading has improved because of his participation in the intervention as he states in the following responses from the interview:

Researcher: Do you think that reading has become easier, more difficult, or stayed the same since you've been coming to this class?Joey: EasierResearcher: Can you tell me how?Joey: Because last year I was doing really bad in reading, having a lot of trouble, but now I started coming to this class, and I did really good as soon as I came to your class.

Joey indicates that he has a stronger knowledge of phonemic awareness and phonics when he mentions learning letters and sounds, including the use of digraphs to spell the words *who, what,* and *that* for writing and spelling tests in his regular education classroom. In this part of his interview Joey is indicating increased classroom participation when he states, "when they say to write" and "I already know the sounds." He has an awareness that he is experiencing success with writing in his regular education classroom indicating writing improvement due to the intervention that he has received with explicit and direct phonics instruction.

Researcher: Do you think that writing has become easier, more difficult, or stayed the same since you've been coming to this class?

Joey: Easier

Researcher: Why do you think it's become easier?

Joey: Because you help us like learn like the sounds of like the letters and so now like whenever like when like they say to write *the*, *who*, where, and *that* like I already know the sounds and spelling tests, too.

When Joey states that he already knows the sounds of the letters and he can write *the*, *who*, and *that*, he is referring to consonant digraphs *th*, and *wh*, which were sounds that he had learned and practiced during the intervention.

In his second interview, Joey spoke about fluency and accuracy with reading and writing.

He stated that his reading was faster with no mistakes indicating that he is aware that his reading

is more fluent and accurate. Joey states that he used to read with mistakes but now can read with

no mistakes.

Researcher: So, do you think that this class helps you with your reading? **Joey:** Mmm hmm (nods)

Researcher: Can you tell me how?

Joey: It helps me read with no mistakes and helps me read fluent, and I read faster with no mistakes.

Researcher: Do you think that reading has become easier, more difficult, or stayed about the same after coming to this class?

Joey: Easier

Researcher: Can you tell me how? Or can you tell me how or why? **Joey:** Because I used to read like with a lot of mistakes, but now I can read with no mistakes.

In the following entry from the researcher's field notes, Joey, talks about how it is easier to

concentrate now.

Today, Joey, said that he used to have trouble paying attention during reading instruction but since coming to this class he finds it easier to concentrate now. Joey said, "I don't know why but now it's easier to concentrate."

Joey also indicates that his cursive writing has improved in speed, accuracy and legibility.

Researcher: Okay, do you think that writing has become easier, more difficult, or stayed about the same after coming to this class?Joey: EasierResearcher: Okay, why?Joey: Because I write in cursive more because it's faster and easier and it's understandable.

In the following quotations from the researcher's observation field notes, Joey is thinking about and talking about another student who had started receiving the multisensory reading intervention but then unexpectedly withdrew from school.

Today, while Joey was working on spelling activities with cursive handwriting practice, he stopped and seemed deep in thought. Then Joey said, "it's too bad that Danny (pseudonym) is missing this." When I asked him, why? He said, "because Danny could be learning all this like us." He sighed, shook his head, and went back to his writing.

Joey was expressing concern for a student who was no longer at school and possibly "missing this" because he could be "learning all this like us." Joey has the self-awareness that he is learning something valuable in this class about reading and writing that could benefit a student who is no longer here.

Bobby. In the first interview, Bobby expressed feeling confused with writing in his

fourth-grade class. However, he expressed an awareness that his reading and writing had

improved. The following is an excerpt from his first interview:

Researcher: Do you think that this class helps you with Reading [class]? **Bobby:** Yes **Researcher:** How?

Bobby: Because they help you read, and they show you a lot to help you learn how to read more.

Researcher: What do you think or feel about writing in your fourth-grade class? **Bobby:** Confused sometimes...it's confusing to write because you have to write the whole pages.

Researcher: Do you think that this class helps you with your writing? **Bobby:** Yes

Researcher: How?

Bobby: Because sometimes when I write I know how to write more than I used to **Researcher:** Has the writing that you have learned in this class helped you in Reading [class] in fourth grade?

Bobby: Yeah, yes.

Researcher: How?

Bobby: Because sometimes when we read, she calls some of us and she calls me, too, so I read more than I used to last year.

Bobby feels that he has improved in reading and writing because he is aware that he can write more than he used to when he does write. He talks about the teacher calling on students to read including himself. His statement, "I read more than I used to last year" indicates an awareness that his reading has improved.

In the following entry from the researcher's field notes, the researcher reflects on Bobby's reading behavior towards books chosen based on his interests from the reading interest survey:

Bobby is very enthusiastic about coming to class. He particularly likes cursive writing and he enjoys reading the Dr. Seuss books in the classroom library. Some of these books were borrowed from teachers and some from the school library. Bobby asks to read these books over and over. He likes the rhyming and the funny animals. Bobby read *Green Eggs and Ham* by Dr. Seuss with my assistance. It was challenging for him, but he was so happy! He said, "I can't believe I'm reading this whole book!"

Bobby was motivated to read by having access to books that he was interested in reading and found appealing. Bobby felt surprised and happy that he was reading the whole book having not been able to read a whole book before. This finding indicates improvement in reading and a positive effect on self-esteem. When Bobby expressed confusion with fourth grade writing, it was due to the writing being on fourth grade level which is too difficult for him at this time. However, he experiences success with texts that are appropriate for his level of development. In the following quotations from his first interview, Bobby stresses that he reads a lot and writes more including on writing tests for his class. Bobby is referring to writing tests in his fourth-grade class.

Researcher: Do you think that reading has become easier, more difficult, or stayed the same after coming to this class?Bobby: More easierResearcher: Why? How do you know?

Bobby: Because I read a lot and now, I used to not read a lot, and now I read more than I used to read.

Researcher: Do you think that writing has become easier, more difficult, or stayed the same after coming to this class?

Bobby: Easier

Researcher: Can you tell me why?

Bobby: Cause now I write more here, and I write more now at my class when we have writing tests.

In his second interview, Bobby spoke about feeling that reading and writing was fun now.

He also expressed an awareness that his reading and writing has improved in both classrooms.

He stated that, "it is easier to write over there, too." Bobby is referring to writing in his fourth-

grade classroom.

Researcher: What do you think or feel about the way we learn to read and write in this class?
Bobby: Good, because it's really, really, fun to read and write together now.
Researcher: What do you think or feel about writing in your fourth-grade class?
Bobby: Well, now that when I come here to write it feels easier to write over there, too.
Researcher: Do you think that this class has helped you with reading?
Bobby: Yes.
Researcher: Can you tell me how?
Bobby: Because sometimes, last year, I was bad at reading then this year I got better at reading.
Researcher: Do you think that this class has helped you with your writing?
Bobby: Yes.
Researcher: Can you tell me how?
Bobby: Yes.
Researcher: Can you tell me how?
Bobby: Secause when we write here it's fun to do it, like the things that we do. Writing is the best, like the second best one that we're doing here

In the second interview, Bobby emphasized that he thought reading and writing was more fun now, both, in the intervention class and in his fourth-grade class. Overall, Bobby mentioned that reading and writing is fun six times in the second interview. Furthermore, Bobby stated that, "writing is the best" reinforcing the positive attitude towards writing and reading that he feels when he says that it is fun now.

Theme 2: Increased Classroom Participation

Participants reported an increase in classroom participation with literacy activities such as reading and writing improvement in their fourth-grade classroom as discussed within Theme 1: Self-Awareness of Reading and Writing Improvement. Additionally, in the following examples, participants reported participating in literacy games, thinking of joining clubs, reading cursive writing, expressing that classwork was fun, and feeling happy to be chosen first to read

Alan. Alan is describing a reading game played in his fourth-grade classroom and earning points by reading words correctly. Alan talks about taking turns playing the reading game indicating increased classroom participation with his peers.

Alan: Because last time, we played a game, it was like a reading game with 100 thru 500 [points] and we were playing it, and when it was my turn to read, I tried to read it and I got it correct!

Alan: I'm thinking of joining the Chess Club, but they practice really early.

The following is an entry from researcher's field notes:

Today, Alan said he wanted to join the Chess team at school. I notice he is feeling more confident in his abilities to participate in school activities. I am going to ask the sponsor for details about the Chess Club.

Alan explains what he enjoys about writing in his fourth-grade classroom in his first interview.

He states that writing is more challenging in his fourth-grade class and he likes it.

Alan: I like writing over there because it gives us more challenges to write more new things and other things.

Joey stated that he could read the teacher's cursive handwriting. Interestingly, he stated the same

about reading his parents' cursive writing and expressed that he felt it was easier and he could

write faster in cursive.

Joey: I can understand my teacher's cursive and sometimes they send me a letter in, cursive and I can read it.

Joey: It feels like it's kind of faster and it feels like it's a little bit easier and its great cause mostly my parents always write in cursive and so I can understand the cursive and they kind of help me on the cursive more.

When the researcher asked Bobby to read first during a partner reading activity. Bobby stated the following:

Bobby: For the first time, I'm happy being the first.

The following entries are from the researcher's field notes:

After I asked Bobby to read the book with his partner he asked," Can I go first, again?"

During a dictionary activity, Bobby said, "You know. This is really fun."

Theme 3: Positive Attitudes Towards Literacy

As previously discussed, Bobby's positive literacy attitudes towards reading and writing were emphasized by his statements that these activities were fun. Bobby's affinity for cursive handwriting is a key motivator for him. This is evident in the following statements from his second interview and observations:

Bobby: Because like when we read here, it's fun and then when we read over there in my regular class it's fun, too. If I'm reading trying to sound it out and say the words that we practiced, the letters.Researcher: So, can you tell me what do you think or feel about your writing in cursive?Bobby: Fun! Because, I like to write in cursive now. I like it because it's really fun to learn new letters each day and how to write better in cursive so you can write your name

if they tell you to.

Students enjoyed the cursive handwriting, which was an important part of the intervention, given that cursive handwriting is not taught in regular education classrooms, it was a novelty. Students requested to take cursive writing practice home including name writing practice. In the following observational field notes, the researcher documented several instances where students spoke

about cursive handwriting and the way it made them feel.

Students asked to take homework for name practice in cursive today. They asked, "Can we take it for homework?" Alan said, "I want to learn to write my name in cursive." Then the others chimed in unison, "me, too!"

Today, Bobby told me that he showed his mom his cursive writing. He said, "She gave me a high five!" and "It made me feel happy, nice" My mom said we should only do cursive.

Bobby told me that he showed his cursive handwriting to other students in his class. He said, "Can you believe they don't even know how to write in cursive!" "They wanted me to teach them."

Bobby's positive attitude and self-esteem has improved due to his ability to do something that's

rather unique in this setting-cursive writing.

Teachers reported to the researcher regarding their students' positive attitudes and

improved self-esteem. In the following entry from researcher's field notes, Joey's teachers

commented on improved reading ability and self-esteem.

Today, one of Joey's teachers said that she noticed that Joey had improved a lot in reading and self-esteem. She said, "I can see that his reading has improved, and he feels good about himself."

Today, Joey's Reading teacher approached me and said, "I wanted to tell you that Joey has really improved in his reading and in his self-esteem, I can see it in the way he acts. We can all see it."

In the following entries from the researcher's fieldnotes, Bobby and Alan ask for more

books to read and express feeling happy about reading and writing:

Today, Bobby said, "For the first time, I'm happy being the first." Bobby was expressing feeling happy to be the first student chosen to read aloud. After asking Bobby to read the story again with his partner. He asked, "Can I go first, again?"

Bobby is always enthusiastic about coming to class. He requested more Dr. Seuss books from the library.

Today, Bobby said, "When I come here now, it made me like writing and reading. It's more funner."

Theme 4: Awareness and Confidence of Ability to Learn with Dyslexia

Participants demonstrated an understanding and a confidence of their ability to learn with dyslexia. The following are their answers to the question in the interview about whether they felt that this class had helped them with dyslexia.

Alan. Alan feels that the open dialogue about dyslexia in the classroom helps him to

understand that he can be a successful learner with dyslexia.

Researcher: Do you think that coming to this class has helped you with dyslexia? **Alan:** Yes.

Researcher: How?

Alan: Because when you tell me about dyslexia and some other things, I get to understand how I could like learn with dyslexia.

Alan talks about the conversation between researcher and participant regarding dyslexia when he

mentions, "when you tell me about dyslexia."

Joey. Joey feels that the instruction in this class has helped him to focus and learn. The

following is Joey's explanation, from his second interview, about how he knows that the class

helped him with dyslexia:

Researcher: Okay, so do you think that coming to this class helped you with dyslexia? **Joey:** Mmm hmm (nods)

Researcher: How? Can you tell me how?

Joey: I was really having trouble in 5th when I barely, but then cause of my dyslexia wasn't really like my brain couldn't focus at all. So then, when I started coming to this class my brain like it, I don't know, but I really wanted to listen more for some reason so then it's easier now just cause I have dyslexia but, now, I really don't have difficult times anymore.

Researcher: Oh, that's good.

Joey realized he was having trouble with reading. He stated, "my brain couldn't focus." He credited receiving the multisensory reading intervention with his perception of improved attention and focus. Research has found that when students with dyslexia are provided sufficient phonologically based, structured intervention reading improves but also changes the brain so that it begins to resemble the brain of a typical reader. Joey had spoken in class about being able to concentrate now, "I don't know why, but now it's easier to concentrate." It is important to note that Joey had participated in the multisensory intervention longer than the other participants because he was in fifth grade but had been identified with dyslexia in fourth grade. He was the only participant speaking about experiencing increased focus and concentration during instruction.

Bobby. Bobby feels that he is able to read more in this class than in his fourth-grade classroom and that is how this class has helped him with dyslexia. Having an open dialogue about dyslexia in the classroom has helped students to realize that successful adults have dyslexia but that does not stop them from learning.

Researcher: Do you think that coming to this class has helped you with dyslexia?Bobby: Yes.Researcher: How?Bobby: From reading more than I used to and read more here than at my class because we had to do reading, math, and grammar a lot more than third grade.

From the researcher's field notes after a conversation about dyslexia:

The students were surprised to find out that Steven Spielberg has dyslexia. We talked about other famous and successful people who have dyslexia. I thought the conversation was important because the students realized that people with dyslexia are successful readers and writers such as Steven Spielberg, a movie director whom they admire because they know and like his movies.

Research Validity

There are several steps that a researcher can take to strengthen the validity of research findings. Creswell (2014) lists triangulation, using rich, thick description to convey findings, and clarifying bias. The researcher established validity by triangulating the data from different data sources, including interviews, fieldnotes, and reading surveys, and spelling assessments. Another procedure used to strengthen validity was providing rich, thick descriptions of the setting, intervention activities, and participants. The researcher acknowledges that as the participants' teacher, her bias and belief that the multisensory intervention and remediation activities are beneficial for students with dyslexia may have influenced the research findings.

The researcher ensured the validity of the research by maintaining fidelity to implementation of Structured Literacy instruction with multisensory strategies. This is especially important because multisensory instruction is vital to the study's research question: *What is the impact of a multisensory intervention on attitudes towards reading and writing of fourth-grade students identified with dyslexia*? Furthermore, the researcher ensured documentation of observations by writing field notes after every intervention session. Additionally, the researcher had significant interaction with student participants thereby creating rapport. Establishing rapport with participants builds trust and makes participants feel comfortable when disclosing information to the researcher (Creswell & Miller, 2000). The researcher endeavored to create an environment where students felt comfortable speaking candidly and sharing their thoughts about having dyslexia and the reading intervention that they must receive because of their diagnosis. For this reason, creating a rapport with research participants was important to the study.

Limitations

This study had several limitations including a convenience sample of students identified with dyslexia in fourth grade. Time constraints due to the time of year when the study took place and state-mandated testing time, also influenced the duration of this study. Due to the qualitative nature of the study, it is not generalizable to other contexts because of utilization of purposive sampling of students with dyslexia. According to Lincoln and Guba (1985) the purpose of purposive sampling is to maximize information and not facilitate generalization. Additionally, Yin (2009) identified reflexivity as a limitation of relying upon interviews in case study research as the researcher may inadvertently influence the study participants in individual interviews.

CHAPTER IV

SUMMARY AND CONCLUSION

The purpose of this chapter is to provide a summary of the study including theoretical framework, context and participants, summary of findings and discussion, limitations and recommendations for future research.

Context of the Study

In this qualitative multiple case study, the researcher explored the impact of a multisensory reading intervention on the attitudes towards reading and writing of fourth grade students identified with dyslexia. The researcher provided a multisensory reading intervention to students and added a motivational component by providing a variety of literature based on student interests as determined by a reading interest survey. The aim of the study was to explore student attitudes towards reading and writing in the context of a "pull out" reading intervention mandated for students identified with dyslexia. The students were picked up in the morning, by the researcher, from their regular education classrooms. Students accompanied the researcher, also their dyslexia interventionist, to another classroom to receive the mandated reading intervention. The study was conducted in the dyslexia interventionist's classroom in a school in South Texas. The participants in this study were two fourth-grade students and one fifth-grade student. All students were identified with dyslexia when they were in fourth grade. The researcher

question that guided this study is as follows: What is the impact of a multisensory intervention on attitudes towards reading and writing of fourth-grade students identified with dyslexia?

Theoretical Framework

The theoretical framework for this study consisted of two theories used to guide this study, the Double Deficit Hypothesis (Wolf & Bowers, 1999) and the Parallel Distributed Processing Model (Rumelhart & McClelland, 1989). According to Wolf and Bowers (1999), students with a reading disability such as dyslexia fall into three categories, a phonological deficit, a rapid automatized naming deficit, or both deficits combined making the reading impairment more severe. Teachers often use assessments of these skills to determine which children are at risk for reading difficulties. This is important because the outcomes of assessments on these two areas will determine the course of interventions. Two central features of the Parallel Distributed Processing Model are (1) information is stored as a series of connections between units, and (2) these connections are strengthened with repeated connections. Multisensory reading interventions require explicit and systemic reading instruction. Following this theory, the neural connections made in the brain with repeated and intense reading instruction of sounds (phonemes) and symbols (letters) strengthens these neural connections in the brain leading to improvement in sound-symbol correspondence and rapid naming.

Multisensory Intervention for Dyslexia

The standard protocol for dyslexia instruction is to provide evidence-based, multisensory structured literacy instruction for students with dyslexia that is explicit, systematic, and intentional (TEA Dyslexia Handbook, 2018). Evidence-based components of dyslexia instruction

include the following: phonological awareness, sound-symbol association, syllabication, orthography, morphology, syntax, reading fluency, and reading comprehension (TEA Dyslexia Handbook, 2018).

According to the International Dyslexia Association (IDA), Structured Literacy (SL) is the most effective approach for students that experience unusual difficulty learning to read and spell. SL means the same kind of instruction as the term multisensory structured language education. Multisensory instructional strategies incorporate visual, auditory, kinesthetic, and tactile modalities into reading and writing lessons. The content of Structured Literacy instruction comprises the following components: phonology, phonics and syllables, morphology, syntax, fluency, comprehension, and handwriting (Farrell &White, 2018). The principles of SL instruction are explicit and direct instruction that is sequential, systematic, cumulative, and diagnostic-prescriptive (Farrell & White, 2018). The researcher provided the SL reading intervention for forty-five minutes, four times per week for twelve weeks from January 8, 2019 thru April 5, 2019.

Dyslexia reading interventions are explicit but also intensive and concepts are taught to mastery assessed with a spelling test. The multisensory reading interventions are provided in a small group, preferably of no more than three students. In this study, the interventions were conducted in a small group with three participants. Small group instruction allows the teacher to give students immediate corrective feedback. In small groups of one-to-one or one-to- three with intensity guided by student progress, students with reading difficulties could close the reading gap with peers in reading accuracy and comprehension (Vaughn & Linan-Thompson, 2003).

Students with dyslexia have difficulty gaining access to and manipulating the sound structure (phonemes) of spoken language (Birsh, 2018). This leads to poor decoding ability.

According to Shaywitz et al. (2004), when students with dyslexia are provided sufficient phonologically based, structured intervention reading improves but also changes the brain so that it begins to resemble the brain of a typical reader.

Spelling assessments are an important diagnostic tool to use for planning instruction. If spelling tests are not mastered the concepts must be retaught as many times as necessary based on student needs. According to Birsh and Carreker (2018), spelling is a multisensory activity because it involves auditory and kinesthetic modalities such as listening to sounds and writing the corresponding letters for each sound.

Teacher Preparation

The researcher received training on the multisensory reading program requirement to teach students with dyslexia, provided by the school district and required by law for dyslexia interventionists. The multisensory reading program chosen by this school district for dyslexia intervention is *The New Herman Method*, a scripted program. Although the researcher was required to implement the scripted program, she supplemented the scripted program with relevant literature for reading fluency and comprehension. Moreover, the researcher applied for admission and was accepted to the Structured Literacy Institute training for Certified Academic Language Practitioner (CALP) training which is not required for dyslexia interventionists but is important for a teacher's knowledge of the content they are teaching. In this study, the researcher was the teacher providing the multisensory intervention to students identified with dyslexia. According to Moats and Foorman (2003) there is a correlation between student achievement and teacher preparation specifically in knowledge of language and reading.

Discussion

As previously stated, the aim of the study was to explore student attitudes towards reading and writing in the context of the mandated reading intervention while also providing students with literature based on their interests. The researcher collected qualitative data from interviews, reading interest surveys, field notes of classroom observations, and spelling assessments. Keeping the research question in mind the researcher analyzed the data and four themes emerged from the data collected: these themes were (1) self-awareness of reading and writing improvement, (2) increased classroom participation, (3) positive literacy attitudes, and (4) an awareness and confidence in the ability to learn with dyslexia.

In qualitative data analysis, the researcher acknowledges that there are inherent biases that factor into the analysis and interpretation of data. Saldaña (2015) wrote that qualitative inquiry, by nature, is an emergent process that permits the researcher's personal signature in study design, implementation, and write up. As the teacher in this study providing the dyslexia intervention services, the researcher acknowledges that her own biases also have an influence on the analysis and findings of this study. Therefore, the discussion presented is only one perspective. The discussion that follows is a summary of the most salient themes the researcher has identified. These are presented by theme and there is overlap between themes. All names used in discussion are pseudonyms to protect the identity of participants.

Theme 1: Self-Awareness of Reading and Writing Improvement

Students reported knowing that they were having trouble with reading before they were identified with dyslexia and prior to beginning the reading intervention class. Students shared in their interviews that they noticed reading and writing improvement after starting the
multisensory reading intervention. Students' decoding ability improved in reading and spelling ability also improved in assessments. The researcher documented that handwriting speed and accuracy improved with spelling and name practice. Students enjoyed cursive handwriting so much that they asked for extra homework for additional practice at home. Students' cursive handwriting legibility improved, and students reported that parents helped and encouraged them with cursive handwriting.

A conclusion to be drawn from this finding is that students experienced success in their reading intervention class due to improved decoding ability and encoding ability for spelling reinforced through handwriting. Farrell & White (2018) state," English has 40 phonemes and more than 250 graphemes to spell them" (p. 38) so students must be capable of decoding and encoding strategies. The ability to think about and manipulate the individual sounds of language is critical for older struggling readers because without it they may never catch up to their peers (Birsh, 2018). Although, the reading level and writing level was not on grade level for fourth grade, the improvement was noted as also contributing to self-esteem due to visible improvement. In one case, Joey, whose regular education teachers reported to the researcher that they noticed reading improvement as well as a positive change in self-esteem. The students' enjoyment of the cursive handwriting also was experienced at home and they were able to share this with parents. Bobby reported getting a "high five" from his mother for his writing.

Theme 2: Increased Classroom Participation

Students spoke about activities that they participated in within their general education classes. These included read aloud activities in the classroom when the teacher asked students to read. Students volunteered to be first to read aloud in partner reading activities. One student, Bobby, expressed that he was happy about being chosen to read first. Students spoke about

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writing more than they used to on their fourth-grade writing tests. One student, Bobby, quantified his improvement by saying, "half a page more." This finding reveals that the implications of reading and writing improvement in the reading intervention class led to instances of student participation in reading and writing activities in the regular education classroom. Students were able to participate to a higher degree with the reading and writing curriculum in their regular education classroom including test practice for the state mandated fourth-grade writing test. Christensen et al. (2010) found that students respond best when their work is challenging but at a level where they can be successful.

One student, Alan, reported playing games in his regular education class and provided details about one of the games. Additionally, Alan demonstrated an interest in joining other school activities such as Chess Club. Alan was able to participate in games with his peers and spoke about his experiences. Alan also aspired to participate in extracurricular activities such as Chess Club and spoke about it in his intervention class. Alan spoke about reading books to his little brother and grew to enjoy the activity because the reading became easier, in his own words: "now it was easy". Gilson et al. (2018) in a study of reading motivation in adolescent struggling readers found that parents and other family members influenced students' motivation to read. In this case, the implications of reading improvement extended to improved participation with family reading activities and extracurricular activities outside the classroom as well.

Theme 3: Positive Literacy Attitudes

The qualitative analyses of interview responses and researcher's field notes of observations indicated positive literacy attitudes. The students were enthusiastic about reading literature based on their interests and engaged in repeated reading of the same books. Requests for more books by the same author were also documented by the teacher. These findings are comparable to a study by Gambrell et al., (1996), which found that third- and fifth-grade students were motivated to read by choice, access to books, and teacher recommendations.

Students' decoding abilities improved and with that an improvement in reading fluency was evident during reading activities in the intervention classroom. Students reported that they were able to read more than before. One student, Alan, reported reading with more fluency in his fourth-grade classroom. Additionally, analyses of interview responses and researcher field notes revealed that students used the word "fun" to describe reading and writing activities and students described feeling "happy". One student, Bobby, used the word "fun" to describe reading and writing a total of six times, in just one interview.

All students asked for additional cursive writing homework for writing practice and name practice. All students reported that parents helped and encouraged them with cursive writing. One student, Bobby, reported that his mom gave him "high five" for his cursive writing and this made him feel "happy" and "nice." Another word used was the word "cool" to describe reading and writing activities. The language students used to describe reading and writing activities had a positive connotation and thereby supported a positive attitude towards literacy. One parent, reported to the researcher that her son's reading had "improved a lot." She said her son's grades had improved and she knew this because she had his report card. The student spoke about getting A's and B's.

Theme 4: Awareness and Confidence of Ability to Learn with Dyslexia

All students indicated that they felt that the reading intervention class helped them with dyslexia. One student, Joey, spoke about being able to focus and concentrate now after coming to this class. One student, Alan, spoke about understanding that he could learn with dyslexia and

credited the dialogue spoken in class regarding dyslexia. Bobby stated that he knew the reading intervention class had helped him because he was able to read more now. Conversations about dyslexia and multisensory learning interventions created a dialogue about learning, specifically, that there is more than just one way to learn. Additionally, conversations about famous people with dyslexia created a discourse about dyslexia in adulthood. Students spoke about future aspirations for themselves, for example, two students spoke about wanting to grow up to be paleontologists and go to college. The other student spoke about probably being a teacher and mentioned that his mother was going to school to be a teacher. Creating an environment where an open discourse about dyslexia was fostered was not specifically planned for this study but it naturally occurred in this setting. Upon reflection, the researcher believed that this was due in part to continued professional development for the teacher, and thus, a better understanding of the importance of talking about dyslexia in the school setting.

Limitations

This study had several limitations including a convenience sample of students identified with dyslexia in fourth grade. At the time when this study began, only three students had been identified with dyslexia in this school. The duration of this study was shortened by the time of year when the study took place, which was state mandated testing time for students in fourth grade. Furthermore, due to the qualitative nature of the study, it is not generalizable to other contexts because of utilization of purposive sampling of students with dyslexia.

Since there is a lack of research in this area, the study provides insight and information about students who have been identified with dyslexia in fourth grade and their attitudes towards literacy. According to Lincoln and Guba (1985) the purpose is to maximize information and not facilitate generalization. Additionally, this study used interviews as a data source. Yin (2009) identified reflexivity as a limitation of relying upon interviews in case study research as the researcher may inadvertently influence the study participants in individual interviews. Despite these limitations, the researcher ensured fidelity to the principles of Multisensory Structured Literacy which is explicit, systematic, and intensive. This is especially important because multisensory instruction is vital to the study's research question.

Recommendations

Recommendations for future research include provision of multisensory reading interventions in the early elementary grades such as first grade for students diagnosed with dyslexia. Research has found that the reading achievement gap is evident as early as first grade (Ferrer et al., 2015). Providing students with an evidence-based reading intervention as early as first grade can prevent or mitigate reading failure. Additionally, more studies on reading and writing attitudes of students with dyslexia are needed.

Conclusion

The aim of this study was to explore the impact of a multisensory reading intervention on the attitudes towards reading and writing of students identified with dyslexia in fourth grade. As part of their multisensory reading intervention, students also were provided with a variety of literature based on their interests. It was hoped that providing literature based on student interests would spark their motivation to read. A reading interest survey was used for this purpose. Students had the opportunity to self-select texts for reading.

Students in this study reported positive attitudes towards reading and writing after receiving the multisensory reading intervention. Moreover, students showed significant improvement in their decoding ability for reading, encoding ability for spelling, and handwriting.

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The confidence gained from academic improvement was evident in students' positive attitude towards reading and writing activities. Students requested more books similar to the ones provided based on their interests and often read the books provided several times. These findings suggest that students were motivated to read by having access to books they were interested in reading. An unplanned effect was the teacher's continued professional development on dyslexia served to facilitate conversations about dyslexia in the school setting.

It is important to note that federal and state laws have been enacted for early identification, early intervention, teacher training and professional development of dyslexia and related reading disabilities (TEA Dyslexia Handbook, 2018). Students identified with dyslexia must receive an evidence-based reading intervention as required by law. With federal and state laws in place to ensure early identification, evidence-based reading instruction can be implemented as early as first grade provided students are identified.

In addition to contributing to the educational body of knowledge, findings from this study have the potential of informing educational decisions for teachers, administrators, and policymakers concerned about improving literacy achievement in students identified with dyslexia. Educational stakeholders, such as administrators and school boards in school districts make decisions regarding when and how to conduct reading interventions and regarding teacher's professional development trainings. The findings of this study have the potential to build teacher capacity to better serve students with dyslexia and related language disabilities.

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APPENDIX A

APPENDIX A

INTERVIEW QUESTION PROTOCOL

1. What do you think and/or feel about the way we learn to read and write in this class? Why do you think and/or feel that way?

2. What do you think/and or feel about writing in your 4th grade class with (teacher's name)? Why do you think and/or feel that way?

3. Do you think that this class helps you with your reading? If so, how? If not, why not?

4. Do you think that this class helps you with your writing? If so, how? If not, why not?

5. Has the writing that you have learned in this class helped you in reading or in (teacher's name) class? If so, how? If not, why not?

6. Do you think that reading has become easier, more difficult, or stayed the same after coming to this class? Why?

7. Do you think that writing has become easier, more difficult, or stayed the same after coming to this class? Why?

8. What do you think and/or feel about writing in cursive? Why do you think and/or feel that way?

9. What do you think and/or feel about writing in print? Why do you think and/or feel that way?

10. Do you think that coming to this class helped you with dyslexia? If so, how? If not, why not?

APPENDIX B

APPENDIX B

READING INTEREST SURVEY

- 1. What type of books do you like to read?
- 2. What do you like to read on the computer or electronic device?
- 3. Do you have a favorite book or series?
- 4. Who is your favorite author?
- 5. Where is your favorite place to read? Describe your favorite reading place.
- 6. Do you prefer fiction (stories) or non-fiction (real information)?
- 7. Is there anything else about reading that you would like to tell me?
- 8. Which of the following types of books would you like to read?

Mystery	Adventure	Newspapers	Science books
Folk Tales	Picture books	Fanta	Magazines
Poetry	Animal Stories	Funny books	Chapter books

BIOGRAPHICAL SKETCH

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