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Using Multisensory Components to Teach Letter and Sound Knowledge

By Ally Miller

A Professional Project Submitted to Western Oregon University

In partial fulfillment requirements for the degree of:
Master of Education Program.

June, 2022

**WE, THE UNDERSIGNED MEMBERS OF THE GRADUATE FACULTY OF
WESTERN OREGON UNIVERSITY HAVE EXAMINED THE ENCLOSED**

Thesis

Professional Project

Titled:

Using Multi- Sensory Components to Teach Letter and Sound Knowledge.

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ABSTRACT

Using Multisensory Components to Teach Letter and Sound Knowledge

By: Ally Miller

MSED

Master of Education Program.

Western Oregon University

July 27, 2022

The focus of this study is to investigate if using multisensory components can increase students' letter and sound knowledge. Specifically this study probes how effective these multisensory components may be to students learning who have dyslexia or symptoms of dyslexia. This study also investigates if using these multisensory components increases students' engagement during intervention. To investigate this study I selected three focus students, two who were flagged as having dyslexia and one who had symptoms of dyslexia. These students would receive reading intervention to continue learning their letters and sounds only this time using multisensory components. Students would receive two weeks of intervention learning digraphs and consonant blends and taking progress monitoring assessments to analyze their development. In addition, I would observe students during intervention to collect field notes about their engagement during each lesson. Students would also complete an end of intervention engagement survey to collect their own thoughts about multisensory components and their engagement during intervention. After analyzing the data, it was evident that after two weeks of intervention with the three focus students there was not a clear indication that using multisensory components increased students' letter and sound knowledge. However, there was evidence to

provide reason that using the multisensory components helped increase students' engagement during intervention.

Project Introduction

Introduction

Learning how to read and write is one of the most vital developmental skills that is taught through students' academic journeys. If we think about it, without learning how to read and write the ability to meet the needs of desired careers and social aspects are directly inhibited. Most aspects of people's lives require reading and writing skills yet, human development research has shown that not every person will learn these skills the same way.

These skills are pivotal, which is why there is still an expectational amount of research still going into successful phonics instruction; a term that identifies the way we teach students how to read and write. After decades of continuous understanding and revision to curricular design methods, it is evident that students need instruction that may contrast from their peers. This instruction needs to tailor to their own needs and this can be defined as differentiated instruction. Differentiation in curricular design is especially prominent in the way many elementary educators teach phonics instruction. That is why one of my main focuses as an educator is to develop a professional skill set of best practices for teaching students of varying abilities in reading.

What is Dyslexia

In response to this goal, it is important to understand why some students may have difficulties in reading and seek a different approach to their learning. The International Association for Dyslexia (2020) states that 5-10% of the global population has dyslexia. That also means that many students enrolled in schools each year will have yet to be identified with dyslexia.

To better understand just what dyslexia entails, the International Dyslexia Association provides a detailed definition as it follows:

“... 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.” (IDA, 2002, para.1).

It is evident that students with dyslexia who do not receive appropriate learning interventions are at risk of entering adulthood with deficient literacy skills (Gonzalez, 2021). However, even though there may be a variety of appropriate curricular methods and resources to provide this appropriate instruction, I found there are still a limited number of inquiries that provide knowledge of how some of these instructional strategies work. In addition, I found that recent research has shared that many educators have limited understanding as to what dyslexia is and how their students with dyslexia can be supported in their literary instruction. Some states have such limited opportunity for teacher preparation programs for dyslexia that this gap in knowledge leads educators down a road of misconceptions and inability to appropriately teach those students in their classroom with dyslexia (Gonzalez, 2021). Present research shares that approximately 14 states have pre-service, 27 states have in-service and 31 have intervention requirements for dyslexia. Though these numbers have improved overtime, it is only in the best interest of our children that more states continue to implement these requirements to provide the education students with dyslexia need (National Center on Improving Literacy, 2022).

Due to this, I continued my research literature and connected with professionals to further identify best methods for teaching reading to students with dyslexia. This search drew me to what is known as multisensory components or multisensory instruction in education.

Multisensory instruction means instruction that engages students in using more than one sensory input (e.g, listening, speaking, reading, tactile) (*Center for Effective Reading Instruction ,2016*). The various forms of these components fascinated me as it brought so much more to a lesson. Thinking back to my time in elementary education as someone who struggled in reading, I would have loved a hands-on learning approach that used shaving cream as a tactile component to help me learn letters and sounds. The concept of being able to use something other than typical reading instruction supports (e.g, tracing, verbal instruction) would have instantly engaged me in lessons. Thus, this new interest formed my drive to build reading intervention using multisensory components to teach letter and sound knowledge for my focus group of students who are flagged for dyslexia or have dyslexia symptoms.

Project Purpose

What I have experienced as a learner and what I have observed in my clinical and substitute teaching practice motivated me to create a project designed to deepen my understanding of how to improve reading intervention for students with dyslexia (or flagged as potentially having dyslexia). My action research project aims to develop my understanding of reading instruction by using multisensory components to create intervention for my focus students. I will then analyze data collected during this process to investigate how using multisensory techniques deepened my own understanding of designing intervention for students with dyslexia and how my research adds to the conversation in what is currently out there in relevant literature.

As a brand new and highly motivated elementary educator myself, I have found that no matter what school I work in, I will always have the opportunity to learn new skills and further

my education in how to teach effectively and efficiently. Through my time substituting while working towards my MSed degree, I was in a third grade classroom teaching the literacy lesson for the day. During independent work time I was issued to attend to a small group of students who faced challenges in reading and completing independent tasks without help. Instantly, while supporting these students I noticed they were developmentally behind in their literacy skills. These students had a difficult time writing letters in the correct order and direction, putting spaces between their words, reading the texts and spelling most words.

During this time I was taking a course on literacy instruction. One of the course topics related to noticing reading and writing delays and diving into situations in which these delays can be explained. One of these explanations was the disorder dyslexia, which I've heard about many times before but never took much of the opportunity to learn how to support a student who has it. In fact, growing up my father had dyslexia and I knew from conversation with him that learning to read and write was a process but never something that was impossible. However, not until I watched some of these students really struggle to read and write, did it all connect. Because I will be a full time teacher here next academic year rather than a substitute, I used my free time to connect with their English Language Development teacher about these challenges and if it was related to dyslexia. During this conversation the teacher informed me with what I was allowed to know, and that was that three of the students from that group I helped recently got screened for dyslexia. Of those three two of them were flagged as having dyslexia as the other student forgot to hit submit on their assessment and would have to be assessed another time. However, because of that student's strong symptoms of dyslexia and needs, she was still receiving special services with the other two students who were flagged in letter and sound knowledge.

After working with these students I felt I had very limited understanding on ways in which these students needed my help and how although they were not meeting grade level standards, they are still more than capable of learning to read and write. Not everyone is the same developmental wise, but my father stands as a very real example of how learning to read

and write with dyslexia is more than possible. This fascinated me because at that moment I felt small. My ability to appropriately support their needs was limited but my motivation to learn was high. Through the help of these students, learning specialists and my committee team my action research project topic developed.

The purpose of this project is to research and consider a new approach to reading instruction for those who have dyslexia or have symptoms of dyslexia and would value specific instruction in letter and sound knowledge. This approach introduces a hands-on activity to learning using multisensory components that immerse the students in a new intervention process. Using this approach to letter and sound instruction will provide more context as to what effective interventions have the ability to do for students with dyslexia.

After this study I hope to learn and be able to educate others about the value in integrating multisensory techniques in their own curricular design and classroom. In addition, I desire to find instructional ways in which students thoroughly enjoy putting in hard work and learning that continues to engage and motivate them through their challenges. Such learning disorders like dyslexia can derail students from the joy of learning. However, this does not mean it is impossible to learn, rather educators need to find different routes of success with differentiated learning and explicit instruction. There is a load of research surrounding effective reading instruction and the use of the different instructional approaches; however, there is still a faint connection to the effectiveness of using multisensory components in phonics especially after the uprise of educational technology that has taken over students instruction during the COVID-19 pandemic.

In addition to the value this action research project holds for myself, the findings also work to provide more understanding to others within and outside the educational community. Many guardians of students with dyslexia may feel lost when they see their child start to struggle within their academics. Along with this, a good educator wants to meet the needs of their students but may struggle to find effective approaches. By collecting this data I am providing more context to best practices for struggling learners out there, especially those who are dyslexic

or show symptoms of dyslexia. This collection of data could very well add to the effectiveness of a multisensory approach to instruction. There is more opportunity to share new knowledge with others through professional development, thus allowing myself to advocate for students with dyslexia to help further support and understand their strengths and needs.

The concept behind integrating multisensory components to teach letter and sound knowledge, can be supported from big ideas that are currently out there. One of these ideas comes from the Orton-Gillingham approach as it provides a detailed understanding of an approach that aims to help struggling readers progress in their academics. They promote such understanding that those who have dyslexia often face failure when learning the basic principles of the language system of their culture (Orton- Gillingham Academy, n.d). Thus, to further advocate for these students, the Orton-Gillingham approach was developed which is the first approach to really highlight and put significant value into the concept of multisensory activities to teach language instruction. Although this approach was designed for one-on-one teaching, the use of this approach is also seen within small ability groups to focus on the learning needs of specific students. The term multisensory teaching in language instruction started here, which heavily influences the rationale for my research.

Currently, there are still gaps in research when using the multisensory approach in reading instruction; however, there is current literature out there that does contribute to my

mixed understanding of its effectiveness. One of these studies specifically shared that while using multisensory instruction, vowel team picture cards had a positive impact on students' letter and sound correspondence skills (Henry, 2020). While another study shared that the use of multisensory instruction compared to other structured language instruction had little impact. The multi-sensory approach here detailed a very small positive impact over other language instruction but not enough to share an huge overall advantage (Schlesinger & Gray, 2017).

It is also vital to highlight the importance of theory to support this instructional approach. Differentiated instruction tailors to the concept that students learn best when their strengths and needs are being met. Many progressive educators now are integrating differentiated learning into their classroom to support their students. With respect to teaching reading instruction, taking time to research ways in which students who are dyslexic can learn how to read can greatly benefit the outcome of their success. Thus using multisensory techniques to teach letters and sounds to those who are dyslexia, is tailoring instruction to meet the needs of every student. Even though dyslexia is a neurobiological disorder that affects the person's ability to process language learning, that does not mean there aren't alternative ways to learn successfully.

In addition to the alignment of this action research project to the big ideas already out there, this research project also aligns with the goals and learning outcomes for the MSED program at Western Oregon University. These learning outcomes are as follows:

- 1. Effectively use advanced content knowledge and educational technologies.**
- 2. Analyze data and evidence to support learning and engage in change.**
- 3. Apply learning theories and research in education in a variety of contexts.**
- 4. Demonstrate professional growth, dispositions and leadership appropriate to their field in education.**

My project aligns with the first outcome, effectively using advanced content knowledge and educational technologies as during this action research project I will be actively using advanced content knowledge to effectively assess students current letter and sound knowledge. In addition, I will use the data to effectively make instructional decisions to direct which exact multisensory components to utilize that support their learning goals. This action research will integrate educational technologies as I work to effectively incorporate this project into students' daily reading instruction using technology based programs designed to support their language development. As well as use educational technologies to conduct research on my project and

securely store data to analyze for deeper understanding of the impact that using these multi-sensory techniques share.

The second learning outcome, analyzing data and evidence to support learning and engage in change, aligns with my project as this action research project is centered around seeking impact in the educational world. By using my own data collection and evidence of using multisensory techniques for letter and sound intervention, I can deeply analyze the data collected from my focus group of students to discuss its impact. During this project I will conduct informal and formal formative assessments to provide and analyze qualitative and quantitative data. That way at the end of this project I hope to have a better understanding of how multisensory components could influence curricular design for students with dyslexia.

The third outcome, apply learning theories and research in education in a variety of contexts, aligns with my project as I conducted a plethora of literature and research to better understand dyslexia, history of multisensory usage, and the value of it today for student progress and engagement. Current education is deeply rooted in history as we work to understand where our education system and knowledge started and how it evolved. Without learning and sifting through theories and research of these topics, I would not be able to build a possibly effective intervention. These resources provided myself and my project an outline to engage in and gather

research to improve my own and others' understanding of dyslexic and instructional benefits for these students who face its challenges.

The final learning outcome my project aligns with is how demonstrating professional growth, dispositions and leadership is appropriate to their field in education. To do so, I have appropriately immersed myself to better understand what dyslexia is and how this disorder affects learning language. It is evident that if not explicitly instructed it can take a toll on the students ability to further participate in their education and become career ready. With this advanced understanding I can find ways in which reading instruction can be differentiated for students with dyslexia using multisensory components. In addition, I can use this advanced

understanding to share with education professionals and continue to advocate for students with dyslexia and how pivotal it is that their educational needs are being met. This disposition of leadership can benefit not only my own teacher toolbox but also influence others as well to learn more about their students' needs, dyslexia and using multisensory techniques to teach reading.

Some foreseeable limitations in this study may include any multisensory components specifically chosen to teach letter and sound knowledge. In contrast to the benefit of using the components as a multisensory way to teach students, they may have their own sensory decisions about the shaving cream and sand that I plan to introduce as our tactile components in intervention. Some students may dislike the feel of these and use them to learn. No guardians or students themselves expressed any concern; however, that does not mean these sensory issues or dislikes can't develop during the instruction. Multisensory components can lead to lots of fun in learning; however, they may not thoroughly engage students and turn out to be a very distracting idea which may cause a loss of instructional time. In addition to these limitations, I only have 35 minutes daily at the end of their school day with these students. This could cause students to be burnt out by the time they reach instruction with me which may lead to insufficient data.

In this project I will be sharing how I integrated multisensory components in students' everyday letters and sound intervention. Currently, students are receiving literacy instruction in their ELD classroom that is located across the hall from their home classroom. In the ELD classroom, students worked with their specialist to complete any academic activities requested by the teacher. In addition, they do their technology educational programs called A-Z reading, Word Study and worksheets to work on letter and sound knowledge. I used multisensory techniques to add to the instruction these students were currently receiving in reading. However, before I did this, I also assessed these students' current letter and sound knowledge using appropriate assessment methods. This helped me identify the starting point for the focus group collectivity. In addition, I also use this action research project to analyze the effectiveness of using such components to engage these students in their learning. Finally, in order to stay

relevant throughout the project I used field notes and formative assessments to assess students' letters and sound progression and engagement with the components.

In the next four chapters following, I will discuss each element of my project. In the next chapter, I will focus on the literature review of multisensory instruction that gives a rationale for developing my action research project. In chapter three I will share the methodology of my study and discuss my intervention process and design. In chapter four I will dive into data collection by sharing the findings I received from each assessment and interpret those findings in a discussion. Finally, in chapter five I will wrap up my action research project by reflecting on why my research matters to my own understanding of reading intervention and to others who desire to deepen their own understanding of using multisensory components in reading intervention.

Literature Review

Purpose

In this literature review I will be taking a comprehensive look at multi-sensory components and how they may be useful to teach students with dyslexia letter and sound knowledge. To do so, I will first be taking a deep dive in what dyslexia is and how it affects a student's ability to learn. This draws up not only understanding dyslexia from an external view but also an internal one. Which encompasses the science behind the neurobiology of dyslexia to further recognize those with the disorders learning behaviors. Secondly, I will review the history of multisensory teaching techniques and how they developed overtime to seek better instruction for those with dyslexia or possible reading disabilities. Thirdly, I will probe into what is believed to be the efficiency of multisensory techniques to teach dyslexic students reading. Finally, I will

further investigate the value of multisensory techniques through the angle of motivation and engagement.

I have carefully selected this literature review approach for my action research study as each big idea is intertwined with one another. To fully understand best practices it is imperative that investigators seek just why their time and efforts towards using said practice may be developmentally appropriate for their students. After this investigation the reader will have a comprehensive understanding of how multisensory instruction was developed and why it even relates to and impacts students who are dyslexic or have a reading disability. Educators should aim to meet the needs of all of their students by selecting best practices that are a good use of instructional time for all participants. That is why these big ideas are the most important compared to other routes I could have gone. For example, the use and importance of using multisensory techniques to teach students with dyslexic letters and sound knowledge may not be as clear if I took the opportunity to discuss best teaching practices for typically developing students. Rather this study investigates a dyslexic students' struggles in learning and how the use

of a multisensory component could be imperative to integrate into these students' weekly teaching and learning.

Methods

Several procedures were taken in order to ensure a high quality review of literature on multisensory techniques to teach students with dyslexia letter and sound knowledge. First, I did a detailed search of peer-reviewed journals, selecting only the ones written within the last 10 years. The databases used to conduct my research were ERIC, Google Scholar and the Hamersly Library to find and access peer reviewed journals and websites. In addition to using these databases, I also carefully examined the authors' use of references to find additional valuable and frequently referred to peer-reviewed journals. Additionally, I used reliable websites to continue to investigate and receive the best information about dyslexia and a multisensory approach.

These websites were the International Association of Dyslexia, Reading Rocket and the Orton-Gillingham Academy website. Which all provided relevant, critical information to my literature review.

During my critical review of literature I used many search terms to narrow down my research and conduct an exhaustive review. I began with taking a detailed look into dyslexia to better understand the route of my research project. I started with searching terms like *dyslexia*, *dyslexia in elementary school* and *dyslexia in the classroom*. Using these search terms provided a lot of relevant literature, some timely and some outdated, about what dyslexia looks like in the learner. While reviewing these articles I expanded my understanding of dyslexia and best practices by using the search term neurobiology studies of dyslexia. This search term brought great success, providing me with substantial information about what dyslexia is. During these investigations of dyslexia, I found a lot of research that brought up the value of multisensory instruction as a way to teach a student with dyslexia letters and sounds. I then used multisensory

as a search term to better investigate this role; however, found this was not specific enough. I then started using search terms such as multisensory in the classroom and multisensory instruction which brought up the very few relevant literature applicable to my study. However, the investigation of this term provided me with more insight about its origin, Orton Gillinham (OG). Which I then used as a search term to find more information. Using this term I found many authors discussing what the OG approach is and how educators must be trained in it; however, neither search term of multisensory or Orton-Gillingham provided many examples of others using said approach. Finally, using the said importance of engagement in dyslexic retrieved from other literature I used engagement theories, engagement for dyslexia and dyslexic engagement in the classroom as search terms. These search terms brought no luck so I expanded my investigations to motivate a dyslexic learner, which brought a very limited literature. Moving forward to using reliable websites, I was able to find more useful information about multisensory, Orton-Gillingham, and engagement for dyslexic students.

While I searched for related literature, I only reviewed literature that was written over a 10 year time span. During this time I found many challenges that inhibited me from including more relevant references. First, many of the resources out there that involve the investigation of multisensory components and reading development were outdated. In addition to this issue, when I reviewed the reference list from the literature I could use, many of their references were outdated. As well as the abundance of outdated literature, there was also a significant lack of research studies about the use of multi sensory components in the United States to English speaking students to begin with. I did not have a large amount of literature available that physically studied the effects of the approach to dyslexic students themselves. There were more resources out there that talked about said efficacy but did not investigate the technique themselves. Often I also found that many who did seek their own study using this approach focused on primary elementary school students rather than third grade and up. Which made me consider the effectiveness of said approach for older students. This led me to discover current

gaps in research about multisensory learning techniques. In addition to these gaps, I found those studies who did use multisensory components in their reading intervention did not investigate the efficiency of tactile components such as shaving cream or sand. The digging of reliable and timely literature out there was tough, but led me to believe that my time and efforts probing the effectiveness of multisensory components to teach letter and sound knowledge was more than worth my time and resources. As I investigated the use of multisensory techniques other authors offered explanations similar, stating the importance of every new study out there to continue to critically review best practices.

Dyslexia

Dyslexia is one of the most common learning disabilities, yet its brain basis and core causes are not yet fully understood (Norton, 2014). Current literature shares 5- 17% of school aged children in the United States have dyslexia and these children are currently learning in our classrooms today (Gonzalez, 2021). On the contrary, the International Dyslexia Association website states that 15 -20% of the human population may have symptoms of dyslexia. In addition

to this statement the association also shared that not all of these symptoms actually need special education (Cowen, 2016; Youman & Mather, 2015). Some symptoms of dyslexia include issues with learning to read and spell correctly and quickly, as well as issues with learning to write. Many of these people who are dyslexic do not need special education and can simply benefit from explicit instruction in reading, writing and language (Cowen, 2016). However, even though this knowledge is public there is still a lack of appropriate curricular choices and instructional materials that many students who have dyslexia are not receiving. Thus, limiting them to their full learning potential.

To fully understand dyslexia and why those with this disorder struggle to learn to read, It may be imperative to understand the basic concept of what is happening inside the reader's brain

and why reading interventions are critical in their education. Neurobiologists have done studies to compare a reader with dyslexia and a typical reader. Results indicate that the primary difference between them is that individuals with dyslexia show less increase in brain activation in the temporoparietal regions and the occipitotemporal regions when doing reading and rhyming tasks. (Kearns et al., 2019; Martin et al., 2015) In addition, other neurobiology studies on a dyslexic brain have shown less brain tissue in the temporoparietal regions, which is the area of the brain responsible for decoding ability. The area of the brain which creates the ability to learn sight word reading, is the occipitotemporal region. Studies indicate that a lack of tissue in this area of the brain can also contribute to reading difficulties (Kearns et al., 2019; Richlan et al., 2013). This disorder challenge's the person's ability to properly hear and blend letter sounds. As well as directly impacts their ability to rapit name, auditory short-term remember and articulation speed. (Johnston, 2019) All of these challenges combined interfere with the dyslexic person's ability to increase comprehension and fluency in reading. The importance behind this information helps the specialist and educator understand that a student with dyslexia has less gray matter which aligns weaker decoding skills and difficulty recognizing words by sight compared to a typical reader. Therefore, describing why students with dyslexia struggle to learn how to read and need explicit interventions to create connections to learn language.

Though it is important to understand what dyslexia is internally and externally as well as what it looks like as a reader compared to a typical reader, it is also important to identify the misconceptions about dyslexia. Many may define dyslexia as an individual who sees specific letters backwards. Although this may be a component of someone's dyslexia challenges and story, it is not a defining factor nor does it have enough depth to gauge just what dyslexia truly is. Those with dyslexia struggle to learn how to read because of the deficiency factors that come with this disorder. Which also means those with dyslexia should not be automatically labeled as just being a poor reader. In fact, poor reading correlates with variables such as a weak stimulated

environment during early developmental years, low intellectual quotient (IQ), or low motivation. (Mills, 2018). However, compared to someone with dyslexia who may struggle to read due to the disorder, that does not mean they have a low IQ, or low motivation to read or learn how to read because of their environment or disorder. In addition, dyslexia isn't the result of neglecting a child. In fact, dyslexia is something that a person is born with and studies have shown that children with a first-degree relative (i.e parents) who were diagnosed with dyslexia are actually four times more likely to have dyslexia, compared to a family who had no risk of dyslexia. (Gonzalez, 2021; Snowling and Melby-Lervae, 2016) Which means this disorder plays a huge role in genetics, not the environment a child was raised in. To fully invest in advocating for those with dyslexia, we must not inhibit the community by sharing false information and labeling those with this learning disorder. As those who hold onto misconceptions about dyslexia may not be able to provide a successful and clear learning environment with effective instruction to teach those with the disorder. (Gonzalez, 2021)

One of the first steps for a specialist or educator should be to ensure they clear their mind from misconceptions that could ultimately reflect poorly on their ability to find and teach with the most reliable and effective instructional methods out there. This is important because if a student doesn't respond well to their explicit instruction they should persist in finding appropriate methods that do work, rather than giving up on the child by using lame excuses such as their upbringing or low IQ. Using what scientists and educators have uncovered about dyslexia

overtime, we know their deficiencies cause reading to be a complex and slowly learned skill requiring the integration of multiple visual, linguistic, cognitive, and attentional processes. (Norton et al., 2014) And with this information studies have uncovered what are said to be effective instructional methods to reading instruction that work to increase phonology and orthographic knowledge such as the multisensory approach.

History of Dyslexia Intervention

The history behind the use of the multisensory approach was created by Orton - Gillingham (OG). The OG approach is commonly known by those who support dyslexia students in reading intervention. In fact, Orton Gillingham and dyslexia go hand in hand, however there is a fine line between understanding the two (Sayeski et al., 2019). While dyslexia is a neurological language-based learning disability, (Johnston, 2019) the OG approach was designed to teach individuals with dyslexia to read based on principles established by Samuel T. Orton and Anna Gillingham. In addition, one of the most important aspects of this design is that it is an approach rather than a program or curriculum (Sayeski et al, 2019). The idea behind this is to approach reading intervention for dyslexic students in a highly structured way to slowly learn language. Though the foundation principals to reading were created many years ago by Orton and Gillingham, the methodology development from their work is still very relevant today in challenging reading disabilities (Sayeski et al., 2019). In fact, as this approach has molded into what it is today many educators and specialists use it to teach students with dyslexia currently.

The OG approach is designed to break down reading and spelling into many different skills that involve letters and sounds (Rosen, 2018). These language skills are then paired with instructional activities, such as multisensory activities, to institute learning and engagement for those with dyslexia (Sayeski et al., 2019). The OG's use of a multisensory approach to teaching these broken down language skills pioneered from their original design, creating what many believe is one of the most effective ways to teach students with dyslexia how to read.

Furthermore, the Orton-Gillingham approach was created to focus on using multiple routes to help kids with reading disabilities learn to read at their word level, rather than to help those develop higher reading comprehension (Rosen, 2018). The OG approach also works to answer the questions “why” and “how” of reading by examining consistent rules within the language. For example, a student could investigate why the letter ‘a’ sounds one way in the word cake and another way in the word cat (Rosen, 2018).

To conduct the OG approach, the first step is to determine the students reading skills and their areas of strengths and weaknesses in reading. The approach is designed to use their own methods of data collection and analysis; however, many educators and specialists today only use components of this approach with their own favorite assessments (e.g Words Their Way, dyslexia screeners) to evaluate students strengths and weaknesses. Next, students are taught in small groups with other students who have similar reading skills to create the most efficient ability grouping.. This order is designed to help students learn these skills in a naturally developing way. This structured approach first helps students make connections between the sounds and letters that represent those sounds that they are currently working towards. Next, they work to identify those sounds in specific words. It is important to note that in this approach students do not move on in their teaching unless they have mastered their current skill. That means the teacher needs to assess and reteach when appropriate. The explicit structure of this lesson plan is very specific to this approach. However, many educators and specialists interpret this approach in their own way using the structure and components like multisensory to teach students with dyslexia how to read (Rosen, 2018).

The OG approach taught the educational community that multisensory techniques integrate listening, speaking, reading and writing in reading instruction. Because of this, it allows the teacher to engage students in their learning while using their strengths as a pathway to their own success. The OG approach states that when using multisensory, all modalities of students are engaged in the instructional process thus supporting the repeated practices, varied instruction and multiple representation of concepts (Sayeski et al., 2019) to create autonomy. Multisensory activities can be incorporated in phonology, orthography, morphology, syntax, semantics and

spoken and written discourse (Johnston, 2019). Furthermore, studies using these multisensory techniques have shown developmental growth in students' literacy (Johnston, 2019).

It is noteworthy that the use of multisensory instruction beyond being trained in the OG approach has significantly developed. Many educators are using said multisensory instruction inside the classroom to teach learners of varying abilities. In addition, The OG approach has also inspired other directions for the use of the multisensory techniques. Such as the Barton Reading Program and the Wilson's Reading System, which both integrate the use of the multisensory approach (Rosen, 2018). The OG approach provides a framework for the creation of the term multisensory and the value of it in instruction for those with dyslexia. Specifically ensuring that the use of listening, speaking, reading and writing are integrated in reading instruction when said technique.

Multisensory

Why is it that a multisensory approach to learning is said to be more effective than a traditional teaching approach (e.g instruction through sight and sound, tracing letters on paper), for a dyslexic learners? This may be explained by understanding just how the use of a multisensory technique provides a different learning pathway. For example, current research shows that students with dyslexia need to learn through more than just sight and sound alone that many traditional classrooms may exclusively offer. Rather these students need to learn through multiple sensations simultaneously (Mills, 2018). In addition, the International Dyslexia Association (2020) states that many popular approaches to learning reside in structure teaching of basic language skills; however, the elements of structure literacy which entails multisensory use, is a critical part of learning for students with this disorder.

Moreover, research shares that within a classroom there are two different types of neurological processes for information, these being verbal-linguistic and visual-spatial processing and many students face a balance between the two (Mills, 2018; Norton et al., 2015).

However, for a student with dyslexia they are more prone to process information through visual-spatial processing. That means this person has strengths in visual, spatial, and conceptual processing. (Mills, 2018). Students with dyslexia often struggle to properly process the morphological qualities of words because they rely more on visual-spatial memory. And many teachers do not effectively possess these teaching techniques inside their classroom causing academic problems for students with reading disabilities. However, the use of multisensory techniques provide the ability to access both processing and contribute to all students' needs.

The multisensory approach can be looked at as an efficient reading intervention that requires the ability to form consistent and dependable cross-sensory associations between speech-sounds and letter combinations. This means that as students learn to read they work to remember letters and sounds until they become automatic and just the sight of them creates this instant ability to read over time. (HAHN, 2014) An educator should use an effective reading approach to break down reading and writing into smaller sets of skills centered around letters and sounds. Then throughout a duration of time these skills are continuously built on. (Rosen, 2018)

An example of using multisensory techniques would vary between what specific skills the student needed to learn first and their age; however, the educator may use techniques like incorporating a tactical component (i.e., shaving cream or sand) into a phonics lesson and have students practice writing their letters or decoding words. Additionally, a teacher may have students walk around the floor in a letter pattern to teach patterns in language, use manipulatives to represent letters and sounds (e.g., colored tiles, colored blocks), use letter cards with letter patterns, or use gestures and assign them to sounds. There are so many ways to integrate multisensory techniques into everyday reading instruction. In addition, the International Dyslexia Association (2020) shares effective hands-on, engaging, multimodal methods of instruction. Specific examples include “moving tiles into sound boxes as words are analyzed, using hand gestures to support memory for associations, building words with letter tiles, assembling sentences with words on cards, color-coding sentences in paragraphs, and so forth.” Many educators use more than one multisensory technique to incorporate listening, speaking, reading and writing in their lessons that create a multimodal plan.

Each one of these processing skills asks the student to use more than one sensory input to create connections between letters and sounds. Meaning, the use of visual-spatial processing skills provides a different pathway for students with dyslexia to learn. However, when teachers neglect to accept and incorporate this into their teachings, they may be creating an unfair learning environment for those students who need to process information in a different way. An example of this is if I put the wrong oil in my car when it needed an oil change. It may run but overtime it's ability to perform and continue will be inhibited by my lack of acknowledgement to do what was needed for my car. The importance of this leads to the reason why the majority of states have laws or are processing state laws for dyslexia (Youman & Mather, 2015).

It is also important to note that there is no quick fix to the challenges that dyslexic students face with consistent time and efforts, such as a minimum of 2 hours of one-on-one intervention per week over the course of extended time is where significant progress is seen. However, teachers who manage multiple students at once simply do not have this time (Mills, 2018) This is why the value of multisensory techniques is said to be able to expand and fulfill more of these drastic requirements.

Controversy

To conduct a thorough investigation of using a multisensory approach to teaching and learning it is pivotal to investigate the literature out there that did not find a clear advantage in the use of this approach. Though many educators may feel the effect of including a multisensory component has advantages to learning, there are studies that report little to no substantial effect when using multisensory instruction. Direct support of this claim comes from a study conducted using second grade typical developing and dyslexic developing students to investigate if the use of multisensory instruction supported a better letter name and sound production, word reading, and word spelling compared to structured language alone. Many multisensory components were used in this study such as the use of mirrors, skywriting, 3D plastic letters, and tapping with each part of their fingers. In addition materials like small carpet squares, a tray of sand, and a wipe-off board were also used in this controlled study. The data was analyzed and the study showed no

significant clear advantage of the use of multisensory intervention to structured language intervention for any students within the study. (Schlesinger & Gray, 2017)

However, within the investigation process of this evidence based study inspired by the OG approach, the author provides various limitations and future research to consider as a result of this study. This intervention used many different controlled groups to test various instructional methods and shared that the lack of differentiated instruction could have caused dissatisfied results from poor learning. In addition, the specific participations with dyslexia in this study may have been a contributing factor to the challenges faced.

Another very important aspect of this research worth noting is the discussion surrounding the use of the OG approach. The conductor of this study, stated that the use of multisensory instruction may have shown improved results if the whole OG approach was used. In other words, the OG approach is a specific approach that uses multisensory techniques to teach students on top of other defining factors of analyzing and decision making within student academic progress. The use of multisensory techniques today are not all constructed using the OG approach as this approach is something educators need to be trained to use. In this specific study, the author states that other components of the OG approach that were not used in this study may play more critical roles than realized to effectively teach. (Schlesinger and Gray, 2017)

Though this study does not show the effectiveness of the use of multisensory approach to learning, it does not hinder the importance of my personal study. There is still very limited research on implementation of multisensory approaches for students who are dyslexic. Especially using the approach with third grade students who are struggling to learn basic orthographic and phonological skills such as letter and sound knowledge. Before making overall conclusions that multisensory techniques are not effective without the use of the whole OG approach, it is important that more studies are done to provide such a strong statement. Not all schools have the resources to train educators in the OG approach and although these costs should not get in between the quality of education that students receive and deserve, they unfortunately do. There are so many resources online that are free such as Reading Rocket that share multisensory

techniques for educators to use for free. Though we do not know everything there is to know and understand about dyslexia, it is evident that instructional materials, strategies, understanding and assessments for dyslexia have been around for almost two decades yet, the curriculum of teacher preparation programs and professional development (PD) have yet to include it. (Johnston, 2019) These are the factors of academic success that should be taken into consideration.

Motivation and Engagement

Within understanding the complexity of dyslexia it is also important to note challenges this disorder brings to students' lives. Using literature that provides a comprehensive study of dyslexia, it is evident that this disorder interferes with students ability to perform academic tasks and learn through the use of many traditional methods. In addition, due to these challenges the brain differences have caused difficulties in the ability to learn and create self esteem. These issues often trickle into their own life outside of school as children with dyslexia often do not read as much at home, causing a greater gap in their reading skills. (Norton, 2014) Thus, the impact of this may directly affect many students' motivation and engagement inside the classroom. (Łodygowska et al., 2017) In a study conducted to examine students with dyslexia academic motivation, the conclusion shared that it was evident that those students with dyslexia who received aid positively impacted the motivational system in children with dyslexia, compared to children who did not receive aid. (Łodygowska et al., 2017) Children with dyslexia face a lot of challenges that can ultimately lead to failures when compared to other typically performing students. These differences may become more evident as the child develops, which can drastically shape their self esteem and directly impact their motivational tendencies. Often when a child is unmotivated their desire to continue and engage in their learning suffers. Thus, why finding these aids to support and re-engage students in their academics is pivotal to success.

This drives the use of multisensory techniques because as teachers effectively integrate these components into their reading instruction for their students who are dyslexic, they are said to be providing an outlet designed to wire their brain to make connections in reading. Using a multisensory approach merges listening, speaking, reading and tactile components into instructional activities to learn. (Center for Effective Reading Instruction, 2016) Thus, the added

benefit of the use of multisensory instructional techniques is engaging the student and motivating them to keep pushing through their challenges. (Center for Effective Reading Instruction, 2016) Studies have shown that generally student engagement ties to better performing academia, which narrows down to better grades and assessments scores. (Bundick et al., 2014)

Conclusion

Within my own personal life I know many people who are dyslexic, in fact one of these is my own father. Growing up I always took opportunities to hear about the challenges he faced in his own academics. I also got to see my father commit every single day to taking dedicated time for reading. He thoroughly enjoys it because according to him he mastered the skills but in order to obtain those skills he must keep up with it. If he spends a multitude of days not reading, often revisiting it is challenging. This study is important to me because as I grow as an educator I meet more and more individuals with dyslexia. And rather disregarding their challenges, I use my own personal understanding of the value of explicit instruction to drive my investment into learning more about how to support the various reading disabilities out there. Because everyone deserves a high quality education no matter the challenges they face.

This all- inclusive literature review encompasses the important themes of first understanding dyslexia internally and externally. Second, the history behind the use of multisensory approach to teaching the dyslexic learner. Third, the investigation of the multisensory approach and what that looks like in the classroom. Finally, the impact this approach is said to have on students with dyslexia motivation and engagement in their instruction. Through the investigation of these themes I have found that dyslexia is a complex learning disorder that affects more humans than many might know. However, dyslexia does not stop someone from learning rather it just makes it more challenging to learn in a classroom with traditional educational techniques. Using such approaches like multisensory activities work to incorporate all senses and create autonomy in learning a language. In addition, such aid like multisensory techniques are said to be more effective for the learner as they also work to motivate and engage students better in their teaching and learning.

This review of literature has helped inform my understanding of dyslexia and how the most effective approach to teaching letters and sounds to a student with dyslexia is said to need to incorporate multisensory techniques. Using this understanding, I designed a reading intervention plan for my focus students who are dyslexic by using multisensory techniques to teach letter and sound knowledge.

In the next couple of chapters I will introduce my methodology in detail. Sharing the specific steps I took to use my new understanding of teaching letters and sound knowledge using multisensory techniques and how I curated the invention plan. Then I will dive into my project design where I will share the results obtained from the exhaustive plan. All of which is supported by using a comprehensive study of the literature out there.

Methodology

Introduction

The purpose of this chapter is to address the nature of the research, the description of methods used to drive my study, the research design process and rationale for each instructional choice. Within this chapter I define the procedures to collect, analyze and report collected data. The purpose of conducting this research was to investigate if using multisensory components in reading instruction would benefit those with dyslexia or those who have symptoms of dyslexia, learn letters and sounds.

The main quantitative research question for this action research study is as follows:

1. Does using multisensory components increase students' letter and sound knowledge?

The second question that also guides my research is:

2. Does using multisensory components help increase students' engagement in the lesson?

This study uses quantitative and qualitative research methods, otherwise known as a mixed methods process for data collection. The quantitative research methodology was used to select three focus students used to represent young students who are learning with a reading disorder. This study collects numerical data using educational assessments to determine the effectiveness of multisensory components. The qualitative research methodology was used to determine non-numerical data collection. This data comes from field notes collected during the intervention and a survey I gave to each student to complete at the end of their intervention to determine the effectiveness of using multisensory components to increase engagement from their perspective.

To study dyslexia and the effectiveness of multisensory components in intervention, I chose to implement action research design (AR). Recent research states that AR is a functional methodology for educators like me as it directs a process many already use in their field to

improve my own pedagogy (Clark et al., 2020). In other words, AR aims to prompt continuous reflection and improvement in what is being studied. Much like the education field facilitates in order to make the best choices for students' development. I choose to implement this study method because it allows me to dive deep into what is currently out there in literature about ways to best support students with dyslexia. The importance of this also benefits the next individual who researches multisensory components in intervention and wants to understand how to better support their struggling readers.

Context of research

The collection of my research took place at a large school district in the Western United States that I will refer to as Sky Elementary school. This elementary school provides education from kindergarten through fifth grade. Currently this elementary school has 636 students. Of

those students 99 are third grade students. The three focus students for my study are all white, monolingual English speaking third grade students. Of the three students, one of them is male and the other two are twin females. Sky Elementary school is a new school that just got developed three years ago. Within the last three years, much of that time spent settling into the school took place during the COVID-19 pandemic, in which students did not physically attend their new school. This year was the first full year all students physically attended the school throughout the whole year. Of those who attend Sky Elementary, 76% of these students receive free and reduced lunch. Based on this percentage, many families who filter into this school are lower to middle class. In addition, 66% of the students that attend are Black, Latinx, Native American or Asian.

The three focus students used to conduct my research and inform my research questions are all third grade students who are currently aged 9. In a conversation with their special education teacher, I was told that each student received the universal dyslexia screener called

NWEA MAP reading fluency dyslexia screener (NWEA, 2022). However, during this screener only two of the students got flagged for dyslexia as one of the females forgot to hit submit which led to incomplete results. This student is still receiving dyslexia support due to the many symptoms she shows of dyslexia and severe need for reading instruction. Each of these students struggles to learn to read and write, often mixes up letters and letter patterns and traditional classroom instructional methods do not seem to work for them.

Personal Connection

As I work towards my Masters degree in curricular instruction with a focus area in reading, I wanted to devote some of my time to substituting to stay involved in my local education community and further my knowledge and skills in teaching. I eventually started solely substituting for Sky Elementary, accepting several short term substitute teaching positions at various grade levels. During this time I also got to interview for a full time teaching position next year in 4th grade which I received. I desired this role as I just completed my year long clinical

teaching in a 4th grade classroom to graduate with a BS in elementary education and an endorsement in ESOL.

My immediate passion for this study followed my limited understanding of what it takes to support students with dyslexia. As I mentioned, my own father has dyslexia and growing up I always listened to him share his own experiences of learning to read with dyslexia and how he became and stays the fluent, high level reader he is today. I strongly believe that if we want to better our education system, it is imperative to uncover realms of teaching that we personally do not have the primary understanding to support specific learners. Currently, 15 -20% of the population is claimed to have dyslexia or experience dyslexic symptoms (International Dyslexia Association, 2020). That large percentage means that it's almost impossible to not have at least

one student with dyslexia in my future classroom which I should have enough understanding and skills to be able to support.

Intervention Design

The drive to conduct this study evolved from a substituting position I took a couple of months ago in a third grade classroom. During a literacy lesson I took a small group of students to support them in their independent reading and writing tasks. During this time I worked closely to support this small group of students and noticed that three of them really struggled in reading and writing. While supporting these students to read and answer related questions about the passage, I observed their abilities. All of them struggled to write a complete sentence without writing letters backwards, forgetting spaces between their words and misspelling words. I noticed their frustration with the tasks and how unengaging the work we were doing was for them. Later that day one of the students voiced to me how he just found out he has dyslexia and that's why he struggles so much, but he is trying his best to learn.

Taking an opportunity to learn more about dyslexia and ways these students are supported, I sought out their ELD teacher. During my conversations with the ELD specialist, I

asked questions about what dyslexia symptoms traditionally look like and how a student is ultimately determined to have dyslexia. The specialist informed me that students at Sky Elementary use the NWEA MAP (NWEA, 2022) reading fluency dyslexia screener. In order to get screened, students' reading and writing development are observed and then tested if they match many symptoms relating to dyslexia like writing letter and or number backwards, problems with vision that can lead to headache, and having a hard time learning letters and sounds.

During this conversation I found out that the students I was supporting in class who fit this description were recently screened for dyslexia. All met the criteria for the screener. Though all students took the online screener, only two were flagged. This was due to a mistake in the screening process as one student forgot to hit the submit button. This student will be screened again; however, as her symptoms line up with the dyslexia narrative and her twin sister was one of the candidates that did get flagged, she is receiving intervention.

I proceeded the conversation to probe what these students were currently working towards and what support was being provided to them. The specialist informed me that these three specific students spent the majority of the school day in her ELD classroom. In fact, the ELD classroom is so close to their initial classroom that whenever these students needed support they could access it. Currently, the specialist stated that she is working on the fundamentals of reading with them. She focuses on developing their letter and sound knowledge using virtual learning programs such as A-Z reading and Word Study, Epicbooks and worksheets.

I used this information to begin forming my study question tailored to dyslexia. I knew I wanted to first hand work with students to increase their letter and sound knowledge. However, I needed to identify the best procedures and a starting point. I extended my conversations to those I felt could help me design my methods. I started by reaching out to my committee team members, one of which has a background in dyslexia education. During this time I found out

about multisensory instruction and claimed benefits of this technique to support students with dyslexia and reading disorders develop letter and sound knowledge. I furthered my research about multisensory components and discovered how accessible these methods were to everyday teachers to implement into their own interventions.

The explicit design method for lesson planning is supported by major literature. Studies conducted by neurobiologists have discovered deficiencies in a dyslexic brain that challenges

their route to properly learn letters and sounds as well as directly impacts their ability to rapit name, auditory short-term memory and articulation speed (Johnston, 2019). This current understanding forces a primary focus on planning intervention for students with dyslexia to be able to wire the brain to make these connections in reading. Currently the Orton Gillingham provides professional training for those who want to learn how to use their distinctive learning approach (Rosen 2018). However, the concept of multisensory has since expanded and morphed into teaching techniques that claim to benefit learning using multisensory components that combine listening, speaking, reading, and a tactile or kinesthetic activity. (Center for Effective Reading Instruction, 2016). Using this understanding to inform my decision making, I started working with my committee members to design my study questions and develop appropriate consent forms for the school and the students' parents.

I continued to develop my intervention plan using many resources to inform my decision making. My first motive was to determine where exactly my focus students needed to start their instruction. I used educational assessments to identify this starting point. I started the assessment process using the San Diego quick assessment (Pray and Ross, 1969) to provide a better understanding of their reading development. Results from this data shared that each student was hitting frustration with a first grade word list. Which was one identifier that their current reading level was at a primary level. I then used this understanding to make decisions for the next assessment. This assessment was the Words Their Way spelling inventory (Bear et al., 2016). To conduct this assessment I identified that the primary spelling list would be the most appropriate to test students on. The results shared that each of these students had letter correspondences and

short vowel knowledge but needed to start their letter and sound intervention with common digraphs. This was identified as each student got more than two of the digraphs wrong on their spelling list. The results of these assessments shared that I would build their intervention on common digraphs.

My proceeding process was to design a week one intervention plan for these three students that incorporated multisensory techniques to teach common digraphs. I utilized a backwards design method to develop my instructional plans. This method aims to identify what students will be asked to do on their final assessments after learning, which helps to determine what students need to know in order to reach mastery by the end of the unit or session. Discussing this procedure with my committee member again, she provided me with knowledge and access to an assessment from Path to Reading Excellence at School Sites (PRESS, <https://presscommunity.org/>). The PRESS digraph CB1 assessment is a formative assessment This assessment tested students over the three sounds, /th/, /sh/, /ch/. I determined these would be the three focus common digraphs we worked on. From here I developed week one's learning goal: *students will be able to know the spelling-sound correspondences for common consonant digraphs.*

Once I determined our focus digraphs and learning goal, I started designing the intervention using multisensory components. The idea behind multisensory components is very brief as that simply means combining listening, speaking, reading, and a tactile or kinesthetic activity. (Center for Effective Reading Instruction, 2016). I sought out more research using current literature and websites to examine which types of multisensory components I wanted to use to construct my plans. Two of the most usual websites during this process were Reading Rockets (website) and the International Dyslexia Association. Using these websites, I furthered my knowledge to understand the process in which students learn letters and sounds. Initially it is imperative to understand that phonology is the study of sound structure and is an umbrella term for teaching students sound in spoken words. Diving deeper into this concept, phonemic awareness constructs the ability to be able to segment words into sounds also known as

phonemes. (International Dyslexia Association, 2020) For digraphs we want students to understand that there are letter patterns that when combined create only one sound. So even

though they may segment the words chin into /ch/, /i/, /n/ or three phonemes, there are four letters that make up those phonemes.

Understanding this concept first is imperative as there are more sounds in the English Language than there are letters. I chose to start teaching and reviewing this concept with a phonemic awareness activity. I would ask students to segment spoken words I provided them into each phoneme. This introduced or reiterated the concept that some words contain digraphs or two consonant letter patterns that create only one sound. And when we hear or see these patterns we know this rule. I furthered this understanding by introducing Elkonin Sound Boxes with a 3 box pattern (Elkonin, 1971; https://www.readingrockets.org/strategies/elkonin_boxes) Using small, colorful pom pom balls to represent one sound, I ask students to yet again segment words into each phoneme only this time putting the pom pom ball into a box each phoneme they sounded. At the end, they would repeat the word by blending each phoneme together to read the word.

After this activity, I moved onto introducing a tactile component. Once students develop the awareness of phonemes in the spoken words I provided to them, the student then needed to learn how to use that awareness to construct phonemes to graphemes (printed letters). (International Dyslexia Association, 2020) This process of sound-symbol association can be referred to as phonics instruction. To continue the same process of segmenting words into their individual sounds, I provided students with a spoken word and continued to ask them to segment it. Once they completed this activity, they were then instructed to use a finger to spell the word in the shaving cream and blend each phoneme together to read the word once they were done. This helped them develop the ability to blend all sounds and letters into words. We did this same intervention both day 1 and day 2 of learning; however, day 1 we focused on digraphs that come at the beginning of the word and day 2 we focused on digraphs that come at the end of the word.

On the third day I reiterated that exact same phonemic awareness and phonics lesson structure, except this day we worked on both initial and final digraphs together. In addition, during instruction I also added another activity to day three once I noticed students were getting the sounds /ch/ and /sh/ confused. Using the website Reading Rocket I found a multisensory strategy using gestures. I asked students to collectively decide a gesture for each sound /th/, /ch/, /sh/ that I would have them use to remember how to pronounce each sound and what two letters make up each sound. Students came up with three different gestures: the /th/ sound was using our index finger to point to our brains like we were thinking, the /sh/ sound was putting a finger to our lips and making the shhh sound like we were sounding like a baby to sleep and the /ch/ sound was using a finger to point to our chin.

Finally, on the third day I also introduced letter cards. To continue to teach phonics and develop students' sound-symbol correspondences, I printed out letter cards. Three of the letter cards were of our focus digraphs, /th/, /ch/, /sh/, and the other 26 cards were alphabet cards. Students would work together to spell a spoken word I provided them using the correct digraph card and letter cards.

For the fourth and final day of this week's intervention, I wanted to spend more time doing the letter card activity at the end as students would be assessed in reading the following day. I started our final lesson asking students to show me our gestures, then followed this activity with the shaving cream activity. From here I introduced the letter card activity that we did for the remainder of the lesson.

To plan the time allotted for my intervention, I discussed this with the specialist and planned to come for 35 minutes each day for 4 days a week. Then if I felt students were ready, I would assess their progress on the 5th day using the progress monitoring tool, the PRESS assessment.

Week 1 Lesson Objective: Students will be able to know the spelling-sound correspondences for common consonant digraphs.

Initial digraphs word list: Then, This Them Ship Shut Shop Chin Chat Chip

Final digraph word list: Bath Math Path Dish Lash Mash Inch Rich much

Day 1: Initial sound digraphs

Introduce digraphs by explaining what they are. Ask if they remember learning them before?

Have they ever done a multisensory activity with shaving cream? With sound boxes?

Start with a phonemic awareness activity using initial digraphs list

- What is the first sound you hear in the word...? (see list)

Sound boxes using color pom pom balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word.
- Students will repeat the word again and use the color balls to place inside the corresponding box from left to right.
- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream using fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, students read the word

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Day 2: Final sound digraphs

Start with a *phonemic awareness activity using final digraphs list*

- What is the final sound you hear in the word..? (see list)

Sound boxes using color pom pom balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word.
- Students will repeat the word again and use the color tiles to place inside the corresponding box from left to right.
- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream using fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, students read the word

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Day 3: Using initial and final digraphs

Start with a *phonemic awareness activity*

- What is the first sound you hear in the word: (see list)

- What is the final sound you hear in the word: (see list)

Gestures:

- Help students come up with a gesture for each digraph

- Ask students to make the gesture for each sound numerous times to ensure they know the gestures.

Quick review: Sound boxes using color balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word.
- Students will repeat the word again and use the color tiles to place inside the corresponding box from left to right.
- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream using fingers:

- Using the previous list with both initial and final digraphs, start pronouncing the words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will make the gesture of the digraph sound they hear in the word.
- Students will work on writing the letters that correspond to the sounds until they write the word from left to right.
- Students will read the word.

Phonics letter cards activity:

- Have students use the letter cards to create as many words as they can as a group.
- Take observational notes on their ability to create these words using the digraphs.

Day 4: Review and reiterate

Gesture:

- Review each gesture for the focus digraphs.

Shaving cream with fingers:

- Using the previous list with both initial and final digraphs, start pronouncing the words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will make the gesture of the digraph sound they hear in the word.

- Students will work on writing the letters that correspond to the sounds until they write the word from left to right.
- Students will read the word.

Phonics activity with letter cards:

- Have students use the letter cards to create as many words as they can as a group.
- Take the opportunity to ask students to sound and spell words independently.
- Students will make the gesture for each digraph before they spell the word.
- Review any words that are troubling students with sound or spelling.
- Take observational notes on their ability to create these words using the digraphs.

At the end of day four's lesson, I would use field notes to determine progress students made. I felt all students were ready to move forward and be assessed using the C1 digraph PRESS assessment. To perform the assessment I would provide students with a list of words and cover up the list as I explain the directions. Students would be asked to read the list of words from left to right for a total of one minute. During this time I would time the minute assessment and make marks on my part of the assessment paperwork to show which phonemes and words were pronounced correctly.

Moving forward to the second week of intervention using multisensory components to teach letter and sound knowledge, I continued to use a backwards design method. During this time, I communicated students' progress to my committee member where she helped me decide to move onto consonant blends. She then provided me access to the appropriate CB1 consonant

blends progress monitoring tool. Upon evaluation of this assessment I noticed the extensive amount of blend it tested. I knew immediately that I would not try to overload all of these blends in one weeks sessions. However, one of the most important properties to teaching letters and sounds is helping students develop skills that they can access later on when they stumble upon an unknown word and need to segment and blend sounds in order to read words.

I analyzed the assessment to determine what specific initial and final consonant blends we would focus on during instruction. The initial blends I chose were br, fr, cr, and tr. The final blends I chose were st, and ft. My week 2 lesson goal was: *Students will be able to know the spelling-sound correspondences for common consonant blends.*

Initial consonant blends word list: *Brat, Brag, Frog, Fret, Trap, Trip, trot, Cram, Crab, Crow*

Final consonant blends word list: *List, Nest, Past, Vest, must, Lift, Left, Soft, Gift, loft*

Day 1:Initial blends

Introduce consonant blends by explaining when there are two consonants together, they each make their own sound.

Introduce new blends:

Br, cr, tr,fr

Start with phonemic awareness activity using initial blends list:

What is the first sound you hear in the word...?

What is the second sound you hear in the word..?

What is the vowel sound..?

What is the final sound..?

Hands activity:

- Put two hands up. Create each sound in the blend with a hand. Showing each letter represents one sound, unlike digraphs.

Sound boxes using color balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word. (4)
- Students will repeat the word again and use the color tiles to place inside the corresponding box from left to right.

- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream with fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, read the word

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Day 2: Introduce final blends

Introduce new blends

st, ft

Start with phonemic awareness activity using initial blends list:

What is the first sound you hear in the word...?

What is the second sound you hear in the word..?

What is the vowel sound..?

What is the final sound..?

Hands activity:

- Put two hands up. Create each sound in the blend with a hand. Showing each letter represents one sound, unlike digraphs.

Sound boxes using color balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word. (4)

- Students will repeat the word again and use the color tiles to place inside the corresponding box from left to right.
- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream with fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, read the word

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Day 7: Review both initial and final blend

Hands activity:

- Put two hands up. Create each sound in the blend with a hand. Showing each letter represents one sound, unlike digraphs.

Sound boxes using color balls

- Pronounce a word from the list slowly, stretching out each sound as you say it.
- Students will repeat the word and use their fingers to identify the number of sounds they hear in the word. (4)
- Students will repeat the word again and use the color tiles to place inside the corresponding box from left to right.
- Finally, pull the sound together while using their finger to glide across the page from left to right

Shaving cream with fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.

- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, read the word

Phonics activity with blends and final consonant letter cards

- Have students use the letter cards to create as many words as they can as a group.
- Take the opportunity to ask students to sound and spell words independently.
- Review any words that are troubling students with sound or spelling.
- Take observational notes on their ability to create these words using the digraphs.

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Day 4: Review and reiterate

Hands activity:

- Put two hands up. Create each sound in the blend with a hand. Showing each letter represents one sound, unlike digraphs.

Shaving cream with fingers

- Return to the same list and start pronouncing the same words slowly, stretching out each sound as you say it.
- Students will repeat the word and identify the number of sounds in the word.
- Students will do the same activity as above, however they will work on writing the letters that correspond to the sounds in shaving cream to spell out the word.
- Finally, read the word

Phonics activity with blends and final consonant letter cards

- Have students use the letter cards to create as many words as they can as a group.
- Take the opportunity to ask students to sound and spell words independently.
- Review any words that are troubling students with sound or spelling.

- Take observational notes on their ability to create these words using the digraphs.

Discussion:

- Talk about activities today. Ask students how they felt about the shaving cream? Was it fun? Could they engage in the activity well?

Data collection

Field Notes

During the collection process of my study, I focused on capturing informal and formal data to address my action research questions. The process of data collection started with understanding the best place to start students' letters and sound knowledge for intervention. Moving forward in data collection, through the process of my intervention I also collected data using many other methods. Such as field notes to guide my curricular design. Each day I came to the intervention with a notes organizer. This method allowed me to take notes on students' performance and engagement during the intervention. Whenever I observed a student's learning and engagement, I wrote a note in my organizer. This allowed me to stay organized during

intervention as well as easily reflect back to notes to provide further context in how the integration of multisensory techniques was working.

Progress Monitoring

In addition, I also assessed students' learning progress at the end of each week using a PRESS assessment. At the end of week one on the fifth day, each student met with me individually for a short period of time. During this assessment process students read a list of words that had the three digraphs we just worked on during intervention. Students read as many words from left to right in one minute. Once they completed the minute of reading, they were done with the assessment. This same process was repeated at the end of week two, instead students were assessed on consonant blends; some taught during intervention and some not. The process of this data collection was to inform me about how students were responding to multisensory techniques in their letter and knowledge intervention. In addition, I used this data to

inform my instructional choices. At the end of week one, before I moved students onto learning consonant blends, I used the PRESS assessment to determine if moving on from digraphs would be effective in their reading progress. If students did poorly on the assessment, I would've continued our digraph lessons while bringing in different multisensory techniques. However, this was not the case. Students did very well and with the help and communication with my commit member, I decided to move forward with introducing common consonant blends. As this is a natural progression to reading progress.

Survey

Finally, at the end of the interventions I assess students one last time using a survey. During the intervention I did use field notes and student quotes to inform whether or not I thought these specific multisensory components were engaging and motivating for students. However, I wanted to get more authentic feedback from students of this progress. To do so, I constructed a survey of five different questions using visuals to represent each answer. I did this

because these students are still developing in their reading and wouldn't be able to answer questions appropriately on the survey if they had to remember what all the options were after I read them. I constructed a survey that would be fair and ethical for them to complete. The first question asked students which tactile sensory method they preferred, sand or shaving cream. All students would circled the picture of the component they felt best represented their feelings. The next four questions used a different answering process. Students were to circle or color in which animated facial expressions supported how they felt about the question. There was a smiley face to represent yes or liked, a neutral face to represent middle or unsure and a sad face to represent did not prefer or no.

Data analysis

During each week's PRESS assessment I was looking for a score of 80% or higher on the assessment overall. To score the assessment I looked at how many words each student was able to read correctly out of the words read in total and how many sounds the student was able to read correctly out of the number of sounds read. At the end of week one, I used the PRESS

assessment to assess students' letters and sound knowledge of common digraphs. The results of this assessment indicated all students had a good understanding of sounds but needed more intervention in learning how to blend sounds together to make words. Each student scores above an 80% on the amount of sounds read in a minute and scores below an 80% for the amount of correct words read within a minute. Using this data, I decided that because students were developing in sound knowledge I would move onto the next lesson, consonant blends. Where students could continue to learn more sounds and be able to practice blending sounds to make words.

In the second week of intervention, one of my students got sick and was unable to progress with us. However, I still continued on with the two females and after intervention I used

the PRESS assessment to assess students' letters and sound knowledge of consonant blends. However, this assessment assessed more blends than we worked on so I took this into consideration when analyzing students progression. At the end of the assessment, I scored students on the same two themes, sounds and words read. For each student, both of their scores were below 80% which indicates that each student was still working on understanding sounds and blending sounds to make words. Even though some of the blends were not blends we worked on, my observation of students during their assessment showed me that blends in general needed more intervention.

Lastly, at the end of all intervention I provided students with an engagement survey to complete. From this assessment I was looking for students to indicate that multisensory methods did help their learning in the way that they enjoyed using them and they supported their understanding in the lessons. It is so important that students' engagement and enjoyment is factored into teachers' curricular design methods. I was able to give all three students this assessment individually and each student answered the questions the same.

Conclusion

Throughout this chapter I have shared how I used data to inform my intervention design. In addition, I shared the data collection process I conducted throughout intervention with the three focus students that helped inform my study. I then briefly shared the data from the assessments that started to inform the claims of using multi sensory components to teach letter and sound knowledge. As well as using the components to increase engagement.

In chapter 4, I will dive deeper into the data results I received from my intervention and assessment process. Afterwards I will develop a discussion to interpret the data results. During

this time I will apply context to the results from the data and bring awareness to why these results matter.

Results

Purpose

The purpose of this study is to examine the effectiveness of using multisensory components to help students with dyslexia or dyslexia symptoms further develop their letter and sound knowledge. In addition, this study also reviews the value of multisensory components for engagement purposes with a students perspective in mind.

I will be analyzing the data using a mixed methods process. Quantitative methodology will be represented by numeral data retrieved from assessments used to determine students progress with letters and sounds during intervention. Qualitative methodology will be represented by non-numerical data to further analyze the use of multisensory components for engagement through field notes and a survey taken by students.

Findings

The main quantitative research question for this action research study is:

1. *Does using multisensory components increase students' letter and sound knowledge?*

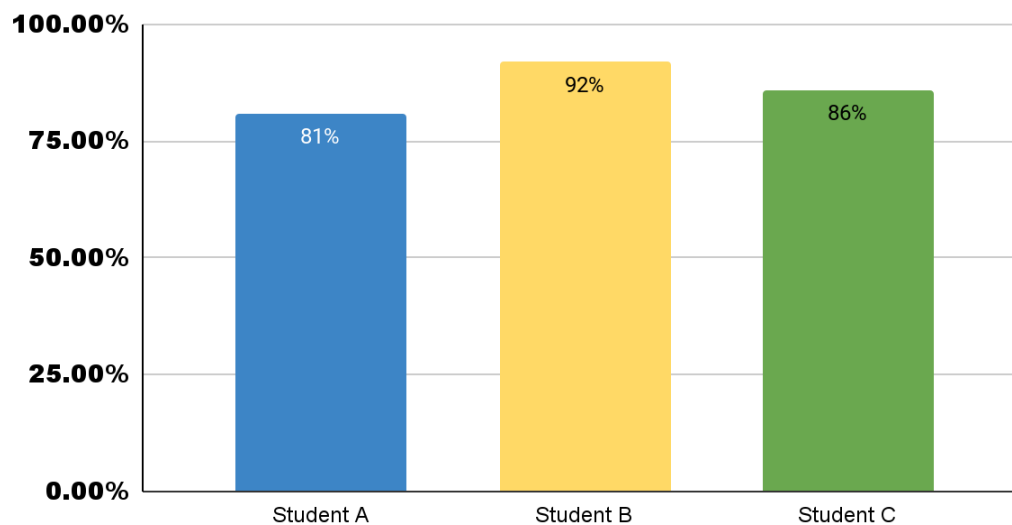
To conduct this part of the research I collected qualitative and quantitative data to represent students' progress during intervention. The quantitative data was collected using a formative assessment tool used to monitor progress of early reading interventions (PRESS,

2019). I used this assessment at the end of both weeks of intervention to assess students progress with the focus digraphs /th, /ch/, and /sh/ as well as the focus consonant blends br, fr, cr, tr and st, ft.

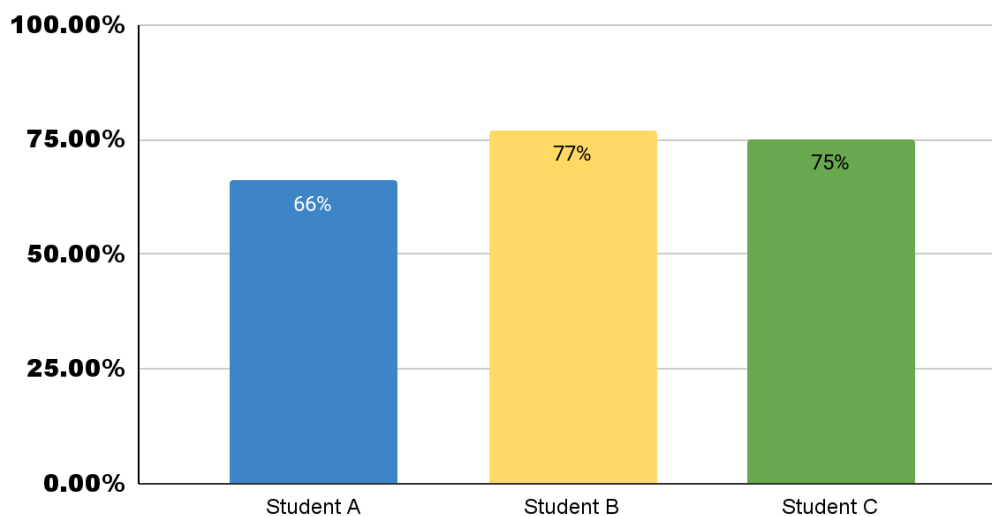
Week 1 assessment

After the first week of intervention, I was looking for students to score an 80% or higher in sounds read and words read on the digraph formative assessment (PRESS, 2019). This would help me further determine how the multisensory intervention is working to help each student progress in learning letters and sounds. In addition, I would use the assessment to inform my instruction and make decisions for the second week of intervention.

PRESS Digraph Assessment: Sounds Read



PRESS Digraph Assessment: Words Read



My interpretation of both charts is that each student has a good understanding of sounds but needs more support in blending sounds together to make words. This can be seen when analyzing each of the following charts above. In the first chart, PRESS Digraph Assessment: Sounds Read, one can see that each student received a score of 80% or higher. This score was received by determining the number of sounds the student read correctly over the number of sounds students read in total on the assessment. Each student was able to indicate that they did have a strong understanding of the sounds they were reading. However, when analyzing the second chart, PRESS Digraph Assessment: Words Read, one can see that each student scored below an 80%. This indicates that these students do not yet have a strong understanding of being able to take those sounds they read and blend them together to make words. This data is calculated by looking at the number of words read correctly over the number of words read in total.

Due to these results, I decided to move forward in letter and sound intervention and introduce consonant blends with all three students. I made this choice because students were progressing in learning letters and sounds but they are struggling in blending those sounds together to make words. This is a skill we can continue to practice and hone in on using the multisensory techniques of Elkonin sound boxes, shaving cream and letter cards to continue to study the effectiveness of multisensory techniques. So although we will be moving forward in learning more letters and sounds, we will still be practicing blending letters and sounds to make words.

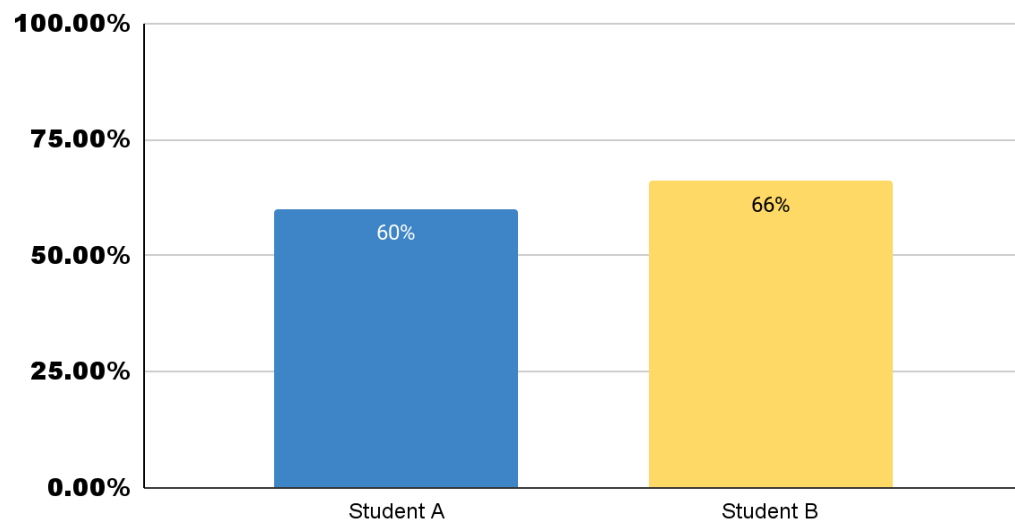
Week 2 assessment

After the second week of intervention, I was again looking for students to score an 80% or higher for sounds read and words read on the PRESS assessment that went over blends. This would mean that students were continuing to progress in their letter and sound knowledge during intervention and were improving on blending sounds to make words. However, one important thing to note about this PRESS assessment compared to the digraph PRESS assessment is that there are blends students have learned and have not yet learned during intervention with me. This means that during this assessment students will be assessed over blends they did and did not learn during the week, which may have affected their scores. Though, the value of this is that I can further determine if students are able to use the multisensory techniques outside of intervention when faced with challenges in their learning. I want students to not only learn letters and sounds with the multisensory components but also gain reading skills that they can use when they are unsure of how to pronounce a word in the future.

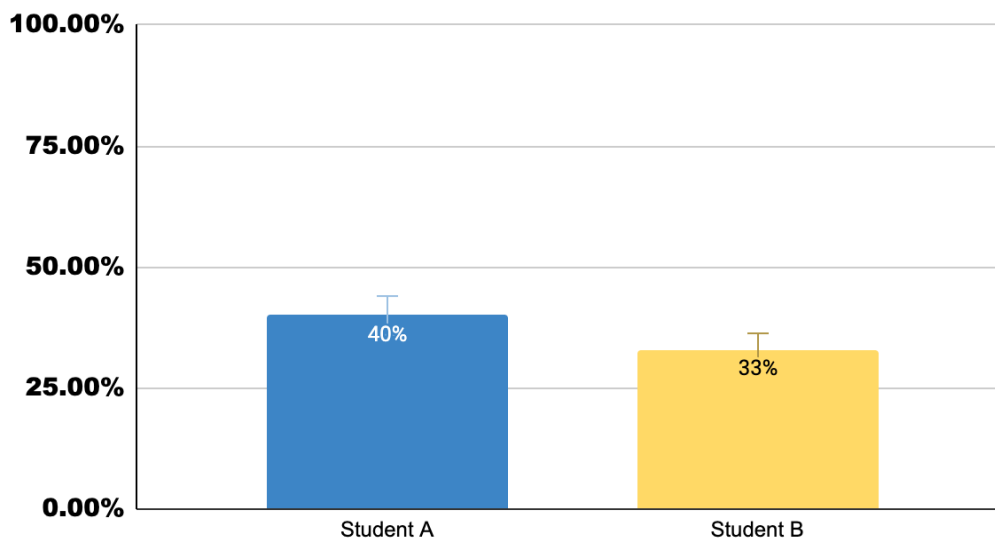
In addition, It is imperative to also note that student C, the only male in the group, was not involved in the week two intervention so he was not assessed this time around. This was due to some health issues unrelated to the study and because this intervention took place at the end of

the school year, there was no remaining time to provide a week's worth of intervention and assess the student.

PRESS Blends Assessment: Sounds Read



PRESS Blends Assessment: Words Read



My interpretation of this data shares that both of these students need further support in understanding consonant blends. In addition, this data also reflects back to the previous week's intervention data when I noticed that the students needed to further work on blending sounds to make words. It is evident that there is still progression to be made here as this is a challenging concept for students. Though there was a mix of both learned and not learned blends during this week's intervention on the assessment, I still believe the data shares firm results that there is more progression to be made in letter and sound knowledge.

Field notes

To further interpret students progress during both weeks of multisensory intervention, I collected qualitative data using field notes. During and after each day of intervention I used a graphic organizer to collect notes on students' responses to the intervention. While collecting these notes, I was specifically looking for areas in which students seemed to be doing well with

the multisensory component to learn letters and sounds as well as areas where students seemed to have been struggling in the intervention. It helped inform my future lesson planning to appropriately support students' learning and effectiveness of instruction.

During week 1 of intervention of this note taking process I collected lots of valuable information. Right from the start of intervention I noted how excited students were to be in intervention with me and be able to learn with shaving cream. They told me, "I am so excited to use the shaving cream!" and I didn't know you could use shaving cream in learning!" This tactile component in the lesson was such a hit that I noticed each student wanting to prepare their own sensory tray to get ready for the lesson and desire to help me clean it up at the end.

My biggest take away from day one was how quickly students were learning the steps to each activity. In fact, all of the students were able to remember a time they used Elkonin boxes in their learning so they showed me how well they could complete each step. Common errors I noticed during intervention were getting confused between letter patterns and sounds. Due to this, I introduced the gestures activity where students created a gesture for each letter sound or pattern. This significantly improved their ability to differentiate each letter pattern /th/, /ch/, and /sh/ and the /t/ sound. One student came back the next day and told me, "I have been practicing the gestures at home, let me show you!" Often, students would jump to make gestures during their learning without asking.

The second question that also is guides my research is:

2. Does using multisensory components help increase students' engagement in the lesson?

In addition to taking notes of students' letters and sound progression, I also took notes on students' engagement during the intervention to determine if using multisensory components was valuable to the teacher and students' instructional time. I wrote down student quotes about the

materials and activities used and any form of engagement or distraction students were faced with during each lesson.

Initially when I introduced the shaving cream activity to students I noticed an increase in off task behavior. Of course, this was day one so I expected this type of reaction. However, I continued to collect notes on this off task behavior as I was challenged with refocusing students. One reason for this behavior was because after students would write in the shaving cream, they would have to “erase” their writing and “clean” their board to be read for another word. This caused students to have to use a large part of their hand to prepare their board again for the next word, which took instructional time. Because of this I decided on day four to introduce sand. The value of sand is that it not only can be written on but also can be shaken to “erase” what was written. This component saved a lot of instructional time and was cleaner for the students' hands. So I brought it back on day 5 but the students were not thrilled. They missed the shaving cream. I then decided to bring back the shaving cream but bring in a rubber spatula that students could use to whip away their marking. In addition, I also did not prepare the shaving cream boards until it was time to use it. Brining in these steps increased engagement where students were not distracted from the tactile component.

During the intervention I also took further notes on engagement. Starting with the phonemic awareness questions for students, brains activated and made a smooth transition into using the Elkonin sound boxes. These boxes were well received by students and they appeared very engaged in the lesson and eager to use them to learn. During the intervention process as students got more and more familiar with sounds and letter patterns, students started to want to have the opportunity to complete the tasks themselves. Often after I asked students to complete an activity as a whole a few times, I would individually focus on one student and give her the opportunity to show me her learned skills independently. This really engaged students in the

activity as they felt comfortable in their group to take risks and make mistakes but were confident enough in themselves to go for it.

Survey

To continue to dive even deeper into interpreting students' progress during the multisensory intervention, I collected qualitative data using a survey at the end of all intervention. To do so, each student individually came to meet with me during our designated intervention time. I provided a paper survey that includes visuals to support them. The survey was composed of five questions, which I would read to the student one at a time before they answered the question. To help students choose the answer that best described their feelings towards the intervention, I added visuals. The first question asked students to choose if they preferred the sand or shaving cream more? I provided students with a visual of sand and shaving cream to circle. The next four questions were provided in the form of statements that students would either agree, disagree or have a neutral feeling about to each one. These questions were, was I able to stay engaged during our learning sessions together, I learned a lot from our learning sessions together, I tried my best during our learning sessions, and I would like to do more activities like this during my learning? To help students answer each question, I provide a visual of a smiley face, neutral face and sad face that students would circle or fill in to make a choice.

The survey

Name:

1. Did you like learning with the sand or shaving cream more?



Sand



Shaving Cream

2. I was able to stay engaged during our learning sessions together?



3. I learned a lot from our learning sessions together?



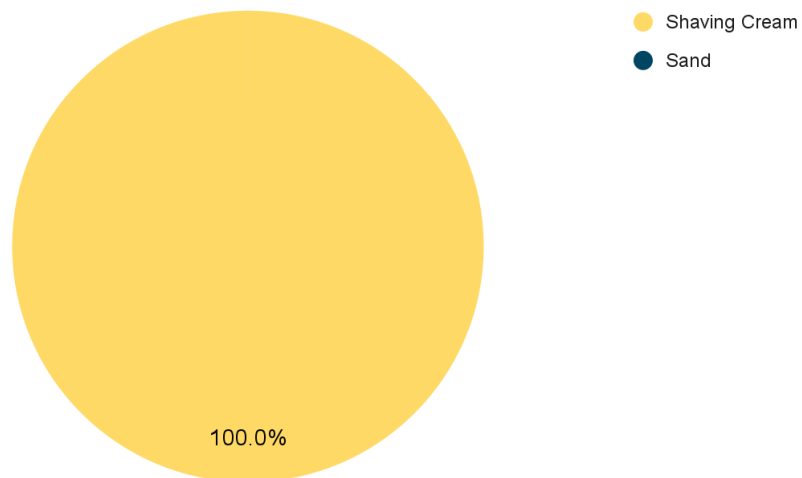
4. I tried my best during our learning sessions?



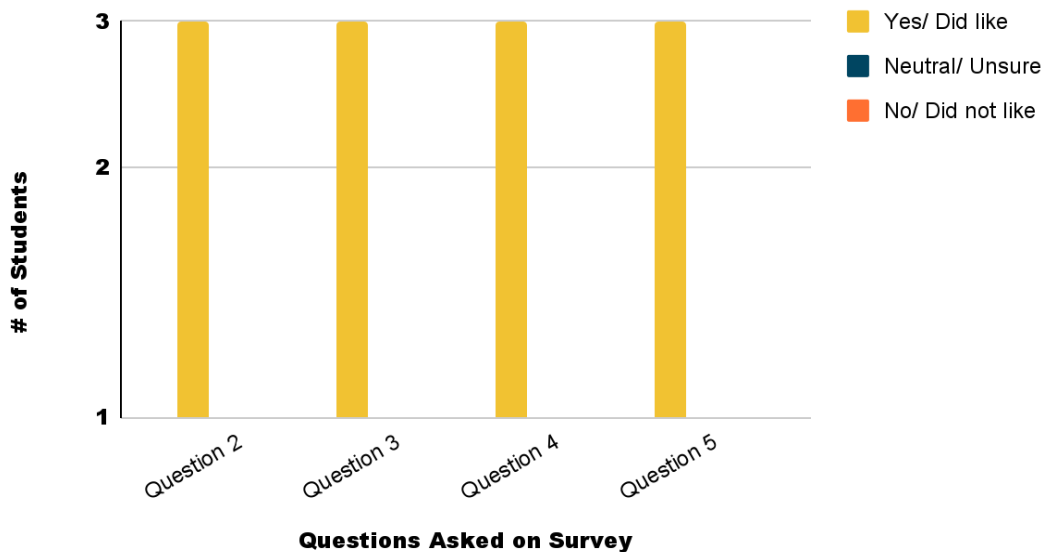
5. I would like to do more activities like this during my learning? (teacher elaborate to student)



Survey Results Q 1



Survey Results for Q's 2-5



My interpretation of both data charts share that students genuinely enjoyed intervention and using the multi sensory components in their instruction. Although they answered each question the same way, they all completed the survey independently and they took their time. This means that I believe each answer was authentic and that these students are starving for engaging lessons. Often these students face not being able to fully participate in their classroom tasks, but they desire to. The lack of letter and sound knowledge has shifted their development and created challenges for them to face in their academics.; however, when my students were engaged in a lesson that was not only designed to tailor to their instructional needs but also designed to be fun and engaging, I observed a lot more participation and desire to be there. All of these students stated that they were able to engage in these activities and wanted to do more activities like this in their future lessons. I even got a quote from one student where he said, “yes, yes, yes, I loved them!” In response to the last question, if he wants to do more activities like sound boxes, writing in shaving cream, using gestures and making words with letter cards. I saw the joy in their faces and they reiterated it on paper.

Discussion

After collecting the data, graphing and analyzing it, It is imperative to discuss how my findings connect back to current literature already out there and how it contrasts. Referring back to the literature I collected on a dyslexic brain, neurobiologists have studied and found that there is less brain tissue in the temporoparietal regions challenge’s the person's ability to properly hear and blend letter sounds (Kearns, 2019; Richlan et al., 2013). Using the progress monitoring assessments (PRESS,2019), it is evident that after each intervention these students are still struggling to learn how to blend sounds together and make words and read. This is why best practices for instructing students with dyslexia is so pivotal and why multisensory instruction has become the face of instructing those with a reading disorder to help create autonomy in their learning.

The International Dyslexia Association (2020), shares the importance of multisensory techniques to teach students with dyslexia by stating that those who are dyslexic face many learning challenges that makes learning through traditional structured teaching of basic language skills more difficult. However, it is the elements of structure literacy which entails multisensory use that is a critical part of learning for students with this disorder. This is due to how the dyslexic brain works to learn. Some researchers note that there are two different types of neurological processes for information: verbal-linguistic and visual-spatial processing (Mills, 2018; Norton et al., 2015). Many students with dyslexia are more prone to process information through visual-spatial processing. That means this person has strengths in visual, spatial, and conceptual processing (Mills, 2018). This brings focus and relevance to why multisensory intervention should work to help support a student with dyslexia over time.

Progress Monitoring Assessment

The data from the progress monitoring assessment shares that students did learn during the two weeks of intervention using many multisensory techniques; however, reflecting on the data it is evident that they did not walk away from the intervention with significantly stronger letter and sound knowledge. Rather I believe the PRESS assessment data serves as a good understanding that more progress may only be made over longer periods of time and in possible one-on-one scenarios. This connects back to literature about the design and use of the OG approach. It is said to be designed for one-on-one intervention and this may serve as a purpose for why students may not respond as well to the intervention as I hoped for. Referring back to my field notes, I noted the differences in strengths and support among the students and this may be

why students did not come out of this instruction having even stronger skills in letter and sound knowledge.

Survey

In addition to the study done to further analyze letter and sound knowledge, I also gathered data on how using multisensory instruction may provide a new element of engagement and motivation to students' learning. Current literature suggests that the impact using multisensory components may directly affect many students' motivation and engagement inside the classroom (Łodygowska et al., 2017). This claim is supported by a relevant and timely past study that shared that when using multisensory instruction, those who received aid showed a positive impact in their motivation in academics, compared to children who did not receive aid (Łodygowska et al., 2017). Referring back to the engagement survey I did to further analyze this same effect, my results support this claim. Students shared that they felt using the multisensory components helped them stay engaged in their learning and strengthen their learning. Though the PRESS assessments results may not share significant process in letter and sound knowledge, it is evident that these students found value in the instruction. My notes shared that these students wanted to be there and that even in times of distraction, they knew the time spent there with me trying hard was not only fun for them but worth being there to help process them in their reading.

Conclusion

In this chapter I analyzed the results gathered from my intervention using multisensory instruction to teach letter and sound knowledge and how it affects engagement. I provide a detailed investigation using visuals and words of what was found and what those results ultimately claim for the work I have done.

In the fifth and final chapter I will wrap up my final thoughts in a conclusion. I will consider the limitations of this study and how I would do things differently next time. This will help to further understand the value my own study serves to literature already out there and those that want to understand the value of multisensory intervention for a student with dyslexia better as well.

Conclusion

Reflection

In this action research project I used mixed methods to study the question: does using multisensory components increase students' letters and sound knowledge? In addition, I also studied how using these multisensory components could increase students' engagement in the lesson.

My participation in this project helped build myself as an educator as it allowed me to further understand what it means to support a student with dyslexia (or who have symptoms of dyslexia) in reading intervention. I created this action research project after first hand working with these students while substituting in their third grade classroom. During this time I acknowledged that my ability to appropriately support these students in their academics was not good enough. My understanding of dyslexia started and ended with my own father's journey with dyslexia. Although his perspective helped increase my understanding of what dyslexia could look like, it is only one person's story. As literature discusses, dyslexia is not a one size fits all language disorder. There are variations of what exactly a student with dyslexia may face as a symptom from this disorder; however, no matter what challenges the student faces from the disorder it is what educators can do to support the student that can really impact their academic growth and I wanted to be a part of that understanding.

My goals for this project were to increase my understanding of dyslexia and ways in which multisensory components could increase students' letter and sound knowledge as well as further engagement their learning. At the end of this project my data collection shows that there was no significant impact in using the multisensory components to increase letter and sound knowledge; however, that does not mean there was no impact at all. This data was collected in a two week period and throughout that time my observational notes and qualitative data do support multisensory components as a method to teach letter and sounds. The engagement I saw with each component during the lesson as we worked together to decode sounds and blend sounds back together to make words. The data from week 1 intervention progress monitoring showed that all students had a good understanding of sound knowledge; however, they needed further

support in blending those sounds back together to make words. Growth was shown using the multisensory intervention but growth was not consistent in week two as no students scores above and 80% in decoding and blending sounds to make words.

In addition to this small growth using multisensory intervention, I also collected observational notes and provided students with a survey to complete at the end of their intervention to study engagement. Though this was not the main focus on my project, it is still important to give any educators who read this study insight as to how valuable using multisensory components was to their time. There are a lot of demands on time for many educators and what we do should be supported by ROI (return of investment). From what my observation notes state and what students stated about the intervention process, the components helped to further engage students in their academics. All of these students stated that they want to do more intervention processes like we did together and they felt it did learn from this design.

Literature Review Connections

Letter and sound knowledge

After analyzing the data collected during this study, it is evident that there are many areas in which my own data supports and conflicts with the current literature I found out there. While working in intervention with these focus students all of them struggled to properly hear and blend sounds. This was evident also in their PRESS assessment results as I watched students struggle to decode and blend sounds to make words. Literature supports that this challenge is directly associated with dyslexia because of the reduced brain tissue in the temporoparietal regions of their brain (Johnston, 2019; Kearns et al., 2019; Richlan et al., 2013). Noting this connection to literature during intervention reiterated the challenged students with dyslexia face

and just how important it is to be teaching these students with supports that tailor to their needs to create autonomy in reading.

Due to this need for support, I studied ways in which neurobiologists and educators feel are the best methods to intervene for reading for those who are dyslexic or have symptoms and characteristics of dyslexia. Current literature suggests multisensory methods to teaching letters and sounds as a brain with dyslexia deficiencies cause reading to be a complex and slowly learned skill requiring the integration of multiple visual, linguistic, cognitive, and attentional processes (Norton et al., 2014). In addition, using reliable websites, such as the International Dyslexia Association (2020), supports these claims in intervention stating that effective hands-on, engaging, multimodal methods of instruction are what students with dyslexia need in their learning. Some of these specific examples include sound boxes, gestures and letter cards which all were components I used in my intervention design (International Dyslexia Association, 2020).

Using reliable and current literature helped me form my intervention plans that I used to conduct my own research; however, it is evident that there was no significant impact in my own data collection rather than small growth. Although, literature also states that there is no quick fix to the challenges that dyslexic students face, but with consistent time and efforts, such as two hours of intervention weekly, students with dyslexia can make growth. This aligns with my results because though there was not significant growth made, we did see growth in sound knowledge with digraphs. This encourages me to further understand that consistently and a duration of time may be just what students with dyslexia need to see even greater improvements in small, chunked up language skills.

It is imperative to note that in my literature review I discussed a controversial opinion about the value of using multisensory components to teach letters and sounds compared to structures language supports from another researcher. Schlesinger and Gray stated that by the end of her study the data analyzed showed no significant clear advantage of the use of multisensory intervention to structured language intervention for any students within the study (Schlesinger & Gray, 2017). Personally, I feel a lot of my own data collected supports this claim she made as I

too did not find any significant impact in using multisensory intervention for the short time I collected the data. This research also brings up a brilliant understanding that when designing the intervention, the OG approach that was not used in this study. This factor may play a more critical role than realized to effectively teach (Schlesinger & Gray, 2017). Much of my literature about the history of multisensory instruction comes from the OG approach; however, I was not trained in using this approach. This literature suggests that this approach may be what places more effective measures in using multisensory components in reading intervention for students with dyslexia. Professionally, I would love to get trained in this approach and further uncover ways in which my design may have contributed to the lack of further impact in the two weeks of intervention I conducted.

Engagement

Along with these connections made to my literature review I also briefly studied how using these multisensory components could increase students' engagement during the intervention process. One study I found examined students with dyslexia's academic motivation through aid. By the end of this study it was found that students with dyslexia who received aid positively impacted the motivational system in children with dyslexia, compared to children who did not receive aid (Łodygowska et al., 2017). On top of that, studies from other sources claim that the added benefit of the use of multisensory instructional techniques engages the student and motivates them to keep pushing through their challenges (Center for Effective Reading Instruction, 2016). Using observational notes and the survey taken by each focus student, my data found supports these claims. The use of these multisensory components to increase letter and sound knowledge, engaged students in their academics. Each focus student themselves stated they wanted to continue future interventions with multisensory components. As well as, during intervention they felt engaged in the lesson and the components helped them learn. My observation notes always share that students seemed to like being in intervention. They were excited to use the tactile component to practice spelling and writing and they loved interacting with their academics in different ways.

MSED Learning Outcomes

While working through this action research project, I also aligned my study to the goals and learning outcomes for the MSED program at Western Oregon University which influenced my professional development in education. The learning outcomes are as follows:

- 1. Effectively use advanced content knowledge and educational technologies.**
- 2. Analyze data and evidence to support learning and engage in change.**
- 3. Apply learning theories and research in education in a variety of contexts.**
- 4. Demonstrate professional growth, dispositions and leadership appropriate to their field in education.**

My professional development was influenced by the first learning outcome, effectively using advanced content knowledge and educational technologies, as I increased my understanding on how to use appropriate assessment resources to test students' letters and sound knowledge at the beginning and throughout the duration of the project. Using the San Diego quick assessment, Words Their Ways spelling inventory, and the PRESS progressing monitoring tool, I was able to further address the needs and growth of these focus students in letter and sound knowledge. In addition, while I collected and graphed this data I used google technologies to keep the data secure as well as be able to analyze the data more effectively throughout the project.

My professional development was influenced by the second learning outcome, analyzing data and evidence to support learning and engage in change, as I worked to add to what is already out there in knowledge and understanding of multisensory intervention. Especially for third grade students who have a reading disorder. In addition, as I worked to analyze all the mixed data I collected, my own understanding of the multisensory components and advocacy for students with dyslexia has increased. I can now take these new understanding and apply them to my own teaching practice. So when I get a student with dyslexia in my classroom, I now know what challenges they may face and how to advocate for them in their academic growth.

My professional development was influenced by the third learning outcome, applying learning theories and research in education in a variety of contexts, as I took my time to research what current understanding of dyslexia and multisensory intervention was already like there. Then use that understanding to apply it to my own intervention process for the study as well as my own professional development inside the classroom. My literature review provided me amazing insight as to what dyslexia is and the differences in a brain with dyslexia compared to a neurotypical brain development. This understanding provides me greater insight as to what future students of mine with dyslexia or symptoms of dyslexia may be facing in their academics and how what I do to support them can greatly impact their academic development and enjoyment in learning.

Finally, my professional development was influenced by the fourth learning outcome, demonstrating professional growth, dispositions and leadership appropriate to their field of education, as the learning process throughout this study has helped me better understand what it means to support dyslexia and advocate for students with dyslexia. My quantitative data may not show a significant impact in letter and sound knowledge; however, students stated their enjoyment and engagement within the process and I first hand show the impact these components can have on students' ability to work on decoding sounds and blending sounds to make words in the short amount of time we were together. I feel confident that my professional development of understanding dyslexia more and intervention processes have grown and I will advocate for students with dyslexia or who show signs of dyslexia because their academic growth may solely depend on those willing to appropriately support their needs in learning.

Limitations

During this study I analyzed ways in which limitations may have skewed the results of my project. This project was completed at the end of the school year, which impacted my ability to be more flexible with my data collection time. Due to one of my focus students getting sick at the second week of our intervention process, I was unable to provide him with the blended intervention when he finally felt better. There was not enough time in the school year as many teachers were scrambling to get state testing completed and end of year priorities. This means I

was a student to analyze how effective multisensory components may be to increase students' letter and sound knowledge.

In addition to this, my intervention was only two weeks of data collection. If my time teaching digraph and blends were longer durations of time, I may have collected different results. Students' understanding may have improved further. I also found that because I did my intervention at the end of the students' school day, students' ability to focus better and invite new information may have been greatly impacted. I myself know what I feel like at the end of a long day of learning and it can be more challenging to refocus on important information at this time.

It is also important to address as a limitation that in the first PRESS progress monitoring assessment I used to assess digraphs, only digraphs students learned in intervention were on the test. However, for the second PRESS assessment students were tested on more blends than what was taught in interjection. This was because there were a lot of blends reviewed on the assessment, more than what could appropriately be taught a week. Because I only had another week of intervention I taught only a fraction of the blends assessment which meant students may have been introduced to new blends on the assessment they have never worked with before. This may have impacted their results on the assessment when compared to the assessment in week 1.

Next Steps

My next steps after this project will be reflected in my own teaching practices. Each of these students will be in fourth grade next year continuing this intervention process at our school. I plan to meet their ELD teacher and discuss what my intervention process showed as well as discuss how the students felt about the intervention process. It is important that I use what I learned to continue to further support these students' needs even if I do not independently work with them again.

I also desire to continue my study with dyslexia and work towards further advocating for student reading support to colleagues that want to learn more about it. Reading intervention does not always start in primary grades. There are students like these focus students who may never

get tested or start to receive intervention services until later on in their academics. Although this is not ideal, it is a reality and I would love to use what I have learned through literature and my own data collected to further support and advocate for students with dyslexia. To ensure that they know they may face challenges unlike others in their learning but that does not mean they can not learn how to be a fluent reader. Dyslexia creates challenges, it does not completely prevent all growth.

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