

St. Catherine University

SOPHIA

Masters of Arts in Education Action Research
Papers

Education

8-2022

The Relationship Between Multisensory Learning and Phonemic Awareness and Letter Identification in Kindergarten

Justine J. Beyer

Follow this and additional works at: <https://sophia.stkate.edu/maed>



Part of the [Education Commons](#)

The Relationship Between Multisensory Learning
and Phonemic Awareness and Letter Identification in Kindergarten

Submitted on 08/03/2022

in fulfillment of final requirements for the MAED degree

Justine Beyer

Saint Catherine University

St. Paul, MN

Advisor: Catherine Kelly

Date_____

Acknowledgements

I would like to thank my husband and son for their support and understanding throughout my program. I would also like to thank the participants for their excitement and willingness during the intervention period. Finally, I would like to thank my principal for supporting my idea and my classroom para for his willingness to be flexible throughout the day so that the interventions could occur.

Abstract

The purpose of this paper is to evaluate the relationship between multisensory learning and phonemic awareness and letter identification in Kindergarten. The researcher wanted to determine the positive or negative correlation between a multisensory approach to teaching and a student's overall ability to increase retention capabilities. The seven-week intervention took place in an elementary school located in the Midwest. The intervention participants were six Kindergarten students from the researcher's classroom. The students were selected based on their past assessment data, specifically regarding letter names/sounds. Instructional methods used were small group, teacher lead, hands on activities that qualified as a multisensory approach. Data was collected in the form of assessments that focused on letter names/sounds, student created journal pages and informal teacher observations that were recorded in shorthand in the teacher journal. Results support the theory that multisensory teaching methods positively affect a student's ability to increase his/her letter names/sounds identification skills. There is reason to believe that using the multisensory approach to teaching has positive effects and could be replicated in future interventions.

Keywords: multisensory, effects, letter names, letter sounds, student identification and retention

Kindergarten students are expected to achieve far greater things today than they once were. State standards have matured, the length of the kindergarten school day has grown longer, and the content matter has become more rigorous. However, what has not changed is the average five and six-year-old child. Though environments and exposure to technology are vastly different, their ability to cognitively understand specific academic concepts is still limited by their brains' natural development progress.

The push to increase academic standards took off back in 2002 when the No Child Left Behind Act was passed by the United States Congress. Though NCLB was directed toward grades 3rd through 12th, the changes had an impact on pre-primary students as well. With the pressure to close the learning gap and increase test scores looming over schools across the country, many school districts were placed in the position of re-evaluating and rebuilding their approach to education within their state.

Kindergarten students were once expected to come to school to learn how to interact appropriately and engage in social situations outside of their home, follow directions and rules of a new environment, learn how to write their names, and engage in extracurricular activities (such as music, art and gym). The academic rigor was not the main focus of the kindergarten classrooms of the past. It was about providing a well-rounded experience for children, being exposed to new topics at school, and gaining confidence in learning away from home (Constantino-Lane, 2019).

In today's world of education, the expectations go far and beyond what they once were. Depending on a child's state, the standards that guide their learning vary. However, it is pretty standard these days that children are expected to read basic sentences, identify 40+ sight words, and compose thoughtful and fluid sentences by the end of kindergarten. For many teachers, gone

are the days in which they could slow things down and provide a play-based learning experience for their young students.

One can argue that children these days are exposed to so much more at a younger age, so they should be able to master more at a younger age. For some students, this is true. They may naturally hold onto a more incredible wealth of knowledge and have the ability to successfully engage in the higher-level skills that are expected of them. However, not every child is ready or able to meet such high expectations.

Learning to read is a highly challenging task, especially in the English language. There are many different English language rules that a new reader needs to be introduced to, retain, and then apply. The English language has many “rule breakers” that arise as one dives deeper into the mastery of it all. Kindergarten teachers start at the very bottom of the reading pyramid. To already fluent readers, the idea of letter names and letter sounds may seem simple. The fact of the matter is that many people do not remember the initial years of their journey on the pathway to becoming readers.

Some kindergarten students have very little trouble memorizing the sounds each letter makes. They easily classify vowels and consonants, know that all vowels have two sounds (a short and a long) and that though most consonants have one sound, a few out there like to break the rules. However, kindergarten teachers will often have a more significant percentage of students who do not master their letter names and letter sounds with ease (Constantino-Lane, 2019). There are always going to be students who struggle more than their peers. The goal of a teacher is to present information in a manner that provides students with an opportunity to make a connection and solidify their understanding of the information.

Taking all of this into account, one must ask themselves: How can we prepare these young students to acquire new skills in a way that highlights what children love to do so much while still reaching the lofty 21st century (explicitly reading) standards within education? The answer to this question may be more straightforward than most people think: Bring it back to play.

Multisensory learning is an approach to teaching that focuses on activating the whole brain in the learning process. One can accomplish this when multiple areas of a child's brain are involved in the learning activity (waterford.org, 2019). When a child is using two or more senses during a learning activity, they are more likely to be actively engaged. They ultimately may retain the information at a greater level.

This topic of study is essential as it may be a gateway to helping children of all backgrounds and socioeconomic classes learn and retain more rigorous content at earlier ages. Multisensory learning is an approach that may be successfully used during informal activities, but also during more direct teaching moments, such as small group rotations (Neumann, Hyde, Neumann, Hood, and Ford, 2012). This action research project focuses on the effects of multisensory learning on literacy. More specifically: What effects will using a multisensory approach have on phonemic awareness and letter recognition in the kindergarten classroom?

The subjects of this study were six students who were enrolled in kindergarten for the 2021-2022 school year. Over six weeks, the research project's goal was to show an increase in knowledge, specifically regarding letter names and letter sounds. The students engaged in small group interventions, which was an approach already used in the classroom. The students had multiple exposures to literacy activities and games with a wide range of various resources that were used by the students. I directly supervised all activities and games. The study further

explored how multi-sensory-based activities can positively contribute to the overall knowledge of letter names and letter sounds.

Theoretical Framework

There are many different theories one can identify with regarding their teaching method or approach. There is no concrete rule that states all teachers need to format their teaching methods based on a specific theory. That is the beauty of teaching. The experience can be very different based on the idea that all teachers have slightly different approaches to education.

One such teaching method is known as the constructivist theory. The theory states that all individuals actively construct or make their own knowledge. Everything a student absorbs is built upon what they already know. The amount of knowledge that each student absorbs is relative to their experiences as individual learners. “Teachers and instructors that understand the constructivist learning theory understand that their students bring their own unique experiences to the classroom every day. Their background and previous knowledge impact how they are able to learn.” (“What is Constructivism”, 2020)

This theory is an important one, especially among kindergarten students. Kindergarten students always come in on an academic spectrum. Some are closer to one end in which they have a lot of exposure and theoretical knowledge before formal schooling, others are on the other end of the spectrum with little to no academic direction before school, and finally, a whole range of students between the two points on the spectrum. Thus, the constructivist theory fits well when analyzing an approach to educating young students at varying levels of knowledge and academic exposure. Two subcategories of the constructivist theory are cognitive constructivism and social constructivism.

According to the article “What is Constructivism” (2020), cognitive constructivism is based on Jean Piaget’s cognitive developmental research, specifically regarding child cognitive development. It states that the cognitive development of the students should be taken into consideration when one is approaching their lesson plan development. Another category is social constructivism, which focuses more on student collaboration in the learning process. According to social constructivism, people learn best when socially interacting with one another throughout the learning process.

Regarding multisensory learning, one can draw the natural conclusion that constructivist learning fits well in the multisensory teaching approach. Multisensory learning is about using two or more senses simultaneously when focusing on an academic task over a period of time (Neumann, Hyde, Neumann, Hood, and Ford, 2012). When engaging two or more senses during a learning task, students are more likely to create a muscle memory situation that can help them absorb and retain the information better.

When taking into account what a student already knows, combined with a social constructivist approach to learning (i.e., small group learning in which students are actively involved in the learning process, generally with other peers) and a cognitive constructivist approach (meeting the student where they are at and building upon their knowledge, i.e., leveled groups) a teacher can generally expect students to achieve more tremendous success, this is because the delivery method of the academic content takes into account a lot of different aspects that are important in regards to younger learners.

Hands-on, active, leveled learning that is presented in a manner that is more similar to play than direct instruction will generally have a more positive impact on younger students, especially those who may struggle with retaining information. When a teacher combines all this

knowledge during the planning stages of their lessons, the result of student success can be far more significant than it may otherwise be with a different method or approach. This study aims to evaluate the relationship between multisensory teaching methods and the student retention rate of letter names/sounds.

Literature Review

Literacy is a broad terminology that encompasses many skills and sub-topics, from phonological and phonemic awareness to rhyming and overall comprehension. Students are expected to master skills across a large spectrum, which comes easily to some, but is an everyday struggle for others. Regardless of where you are from or your background, our world is one in which reading fluency is essential in one's personal and professional life. From news articles to text messages, people need to be readers to communicate with others and stay informed about our world effectively.

For most students, the journey on the pathway to reading begins in kindergarten. At this age, the building blocks of learning how to become a reader are formed. This pathway eventually leads to the more complex aspects of being a fluent reader, but it begins with the basics. Students start by learning about speech-to-text correlation, relationships between letter names and letter sounds (phonemic and phonological awareness), and basic concepts of print.

For students to master the art of reading, they need to be allowed to master sublexical skills (letter identification, letter-sound knowledge, and phonological awareness). These are the prerequisites for learning to read and have a solid correlation to more complex reading skills in the future (Ritchey, 2004, "p. 374", as cited by Hurd, 2018).

At times, some reading curriculums seem more focused on the quantity of literacy instruction rather than the quality of literacy instruction. It also appears that many curriculums

approach literacy instruction with the majority of the lessons being whole group, teacher-led lessons. If these curriculums are developed using best teaching practices, then why is it that roughly 15% to 20% of elementary students experience difficulty mastering the literacy skills of reading and spelling? (Lyon, Gray, Kavanagh, & Krasnegor, 1993; Stedman & Kaestle, 1987 as cited by Joshi, Dahlgren, & Boulware-Gooden, 2002, “p. 230”)

Educators' significant challenge with teacher-centered lessons is keeping the students fully engaged during a whole group lesson. It has been determined that connecting a child's emotions to the learning will drive a child to be more connected to the learning experience, hence more invested (LeDoux, 1996, as cited by Mathison, Wachowiak & Feldman, 2007). One method of creating this emotional connection to learning is by incorporating multisensory learning into your lessons.

Multisensory learning is defined by Neumann, Hyde, Neumann, Hood, and Ford (2012) as "the simultaneous stimulation of two or more of the sensory receptors...visual, auditory, kinaesthetic and tactile information converges in the brain...so that an object may be efficiently and accurately perceived “(p. 197).” In other words, it is when an individual is activating two or more senses simultaneously when completing an activity.

Building lessons around a multisensory approach provides the students with opportunities to connect with the task on a deeper level, forging a relationship with the material at hand, which is due to the sensory aspect of the activity. By interacting with the material in this manner, students are more likely to retain the information learned more accurately and remain on task for a more extended period (Korkmaz and Karatepe, 2018).

The process of learning should actively engage a student. When a student is a passive learner, the information presented may fail to “stick” with a child. Baines (2008) argues that the

proposed techniques can transform the teaching process for educators who incorporate multisensory learning into their lesson plans. The multisensory approach can take a lesson that may otherwise be “mundane” and turn it into an entertaining learning experience for the students.

The memorization of letter names and sounds is something every successful reader needs to master before moving on to the more advanced aspects of reading. The English language can be very challenging for some young students to learn. Without the base of mastering letter names and sounds, children cannot strengthen and grow upon the pyramid’s base.

Another critical aspect of reading is identifying multiple examples of a specific letter that align with a particular onset sound. Studies indicate combining phoneme awareness instruction with letter names/sounds instruction can “significantly improve early reading and spelling skills of children” (Ball & Blachman, 1991). By providing students with multiple forms of exposure in regards to phoneme matching, letter names/letter sounds, combined with the multisensory teaching approach, one can monitor the retention rate of the students and whether or not it improves over long-term exposure.

A historical method of teaching letter names and sounds included rote memorization of each letter and its corresponding sound. Historically presented in a whole group setting, students were passively taking in information from a teacher who was engaging students in a “whole group”, teacher-led lesson. Though this approach can work for students, it is far less enjoyable than a more active and hands-on method.

Furthermore, some students have difficulty paying attention to a lesson in which they are not actively engaged in the learning process. This can result in a percentage of students who show little to no growth over a long period.

However, suppose students can combine the use of their senses while learning about letter names and their corresponding sounds. In that case, the likelihood is that their brain will make a deeper connection to the material at hand. As Baines (2008) notes, a teacher who purposefully includes multisensory learning in their subject matter may increase students' overall interest in the subject matter. This can aid in transforming a student who may otherwise sit and do nothing into a student who eagerly and willingly participates in an activity that will solidify their understanding of specific content.

For instance, rather than having a child write the letter Tt repeatedly while saying the name and sound out loud, an educator could build a more active lesson around the letter Tt. For example, one of the intervention activities presented in pursuit of answering the noted research question (What effects does a multisensory approach have on retaining letter name and letter sounds?) was using kinetic sand.

In addition to the multisensory-focused lessons, the activities tend to be more effective when completed in a small group setting. This method is becoming increasingly common in the general education setting because the teacher can more personally tailor lessons to meet the students where they are at in terms of their skill levels. A small group setting can also contribute to a more actively engaged learner, as the students do not have to sit and wait for long periods to be actively engaged as they would have to be in a whole group setting. This helps minimize classroom delays due to refocusing, interruptions, and tailoring to the shorter attention span of younger children.

There have been multiple studies on the effectiveness of using multisensory learning with all students, including general education classrooms and special education classrooms. Positive

correlations have been made with young students and older students, with a range of needs, from students needing little to no support to those who need one-on-one help.

One such study evaluated the effects of multisensory learning and its impact on students with autism. The study included ten subjects, all of whom were clinically diagnosed as having autism. The students were learning English letter names and letter sounds using a variety of multisensory approaches, including engaging students visually, kinesthetically, auditorily, and tactically in a variety of activities. The students were given appropriate pre and post-tests to track their progress while using these interventions. The final results indicated that including multisensory teaching methods in one's lessons positively affects the emerging literacy skills of students with autism (Mostafa, 2018).

Suppose one reflects on the results of the use of multisensory learning. In that case, they will generally conclude that if the approach is successful for students with various learning challenges, why wouldn't it be effective with students within the general education setting?

Another study focused on using multisensory learning in providing additional lessons before school to students, focusing on improving phonological awareness among the participants. Three groups participated in this study; one group focused on improving phonological awareness via the use of objects boxes. Object boxes are small boxes filled with fine motor tactile learning activities that correlate to the subject at hand. Another group focused on using verbal and kinesthetic learning methods, including songs, literacy card games, word games, and writing activities. The control group was taught literacy skills in the traditional Title 1 setting and a classic Title 1 approach to teaching.

The students participating in the study took both pre- and post-tests before and after the intervention period. The object box and the kinesthetic-based groups both tested within the same

range during the pre-test; the control group tested significantly higher. After the intervention, both the object box group and the kinesthetic group made substantial test score gains. In contrast, the control group made half as significant gains compared to the two groups that focused on using multisensory learning (Rule, Dockstader, and Stewart, 2006).

Educators always need to be searching for new and effective ways to increase a student's level of skill, engagement, and understanding. This can be a difficult task for learning to read—acquiring the skills needed to learn how to read is not what is known as a "primary process for the brain"(Sweller, 2020 as cited by Veronen, 2021, "p. 5"). Primary information is processed quickly by the brain and "without a conscious effort by the learner" (Sweller, 2020 as cited by Veronen, 2021, "p. 5"). Speaking is a primary process; it comes naturally to a child simply by living within their setting, being spoken to, and responding to those around them. The human brain is already pre-fitted with the skills to grow in that specific area successfully.

Reading, however, is secondary knowledge. This form of learning places greater demands on the student. Absorbing and retaining information that is considered secondary knowledge is more challenging for the average student. The act of reading is a task that places a much greater demand on the learner's working memory. Because of this, a more significant amount of conscious awareness (in regards to learning new material) is needed in the learning process, which can be a very exhausting task for students of all ages (Sweller, et al., 2020).

Working memory is a part of the human brain's cognitive system with a minimal capacity to hold onto information learned and can only retain information temporarily (Bullock, 2021). One approach that seems to reduce the cognitive load placed upon a student's working memory is when they are learning to read by incorporating kinesthetic methods of learning. When a teacher makes extra effort to incorporate multisensory learning methods into the students' day, especially

kinesthetic learning models, those activities help trigger the prior knowledge of our memory (Rusinko, 2011, as cited by Veronen, 2021).

Another way to think about this is muscle memory. When a child has the repeated opportunity to complete a task, that child is more likely to remember how to complete the job in the future, improve upon their prior skills in regards to that skill and express increasing enjoyment as one improves ones' skills in regards to the task at hand.

This analogy holds for a young child working towards learning how to read. Not only are the expectations placed upon the child already great, but they are expected to be improved upon (or shaped in some students' situations) in nine short months. Though most children are unaware of the time constraints, their educators certainly are. There have been multiple studies and/interventions that have experienced great success with increasing literacy scores, which means an increased knowledge and understanding of the material among the students.

Interventions can take on many different forms and use a variety of learning manipulatives to complete the intervention. Some interventions are tactile, while others are auditory and visually based. One such study monitored the effects of using e-books to help children with disabilities improve their phonological awareness and concept of the print itself.

E-books are a digital option for learning. The content and level of interaction on the students' part can vary from book to book and platform to platform. So, results may vary depending on the type of e-book platform one is using. However, most e-books provide a multisensory approach to reading that activates the visual, auditory, and occasionally tactile senses. Auditory is used via listening to the narrator read the story or captions to you. Visually, because often e-books have brightly colored photos and occasionally even animated portions of

the book. Finally, tactile senses could be considered a part of these learning methods as a child will have to operate the device.

One study focused on using e-books with a population of students who have a learning disability. One hundred ten kindergarten students were assigned to one of three groups: children using an e-book for learning, a group reading the same story from a printed book, the control group, which participated in regular classroom activities involving literacy-related books.

Though no overall significant gains were noted for any of the special education students participating, there was a difference. The assessment scores between the pre-test and post-test given to the e-book group regarding phonological awareness and vocabulary increased more significantly than the identical scores obtained by the printed book group and the regular classroom group (Shamir, Korat, and Fella, 2010).

Again, the results above indicate that incorporating e-books into the learning rotations within a classroom could result in positive outcomes. Even if the growth attributed to the e-books alone is not significant, the difference between the pre and post-tests and the other learning methods is substantial. Ultimately, we want to see growth, for that is what keeps us moving forward.

Assessments are an essential aspect of any study or intervention; the methods, tools, and focus topics should be appropriately aligned with your student's academic levels. For instance, when assessing a younger child with limited exposure and fewer skills regarding literacy, the test should not be overly complex to the point in which the student will lack any understanding of what is being asked of them. Ensure that the assessments are appropriate for the age that makes up the subjects and are thorough enough to help track student progress accurately throughout the study/intervention.

Several studies have reported an increase in student knowledge that is favorable to the multisensory approach to teaching. Hurd (2018) noted a rise in student letter names and letter sound identification. However, a more significant amount of growth was observed by the students who were struggling readers beforehand than the readers who were not struggling with reading. This is something that is expected to occur when comparing those two student populations.

Two separate studies that focused on incorporating more large body kinesthetic learning saw similar results in the after-effects of the research and intervention. Rule et al., (2006) and Mathison et al., (2007) noticed increased student engagement, understanding, participation, or pre- and post-testing after the students engaged in multisensory, kinesthetic learning activities.

Based on the many sources indicating one degree of success or another in using a multisensory approach to educating children, it is evident that using a multisensory approach to learning can be a massively successful way to educate students. It can provide a deeper connection to the material at hand and increase student engagement by providing fun, interactive, auditory, kinesthetic, tactile, visual, and emotionally connective activities to enhance and guide learning. A final benefit of using the multi-sensory approach is that the learning method provides a fun and attention-holding experience.

Methodology

Over the course of one's teaching career, an educator will discover something they are specifically passionate about within the world of education. My specific passions within education are: hands on learning, STEM and literacy. Thus, my action research question evolved into this: What effects will a multisensory approach have on phonemic awareness and letter names/sounds recognition in the kindergarten classroom? The study that resulted was an

experimental one in nature. It involved engaging a select group of students in hands-on, multisensory-based interventions. The individual daily activities of each intervention varied. However, the content focus remained the same: identifying letter names and corresponding letter sounds.

This study aimed to determine the effects a multisensory teaching approach would have on a kindergarten student's ability to retain specific academic information. In this case, the information was narrowly focused on letter names and sounds. Multisensory learning is when a student actively engages in the learning process while activating the use of two or more senses. The theory behind this research is that when an educator presents information to a student using a multisensory approach, that student may interact with the information on a deeper level (than they otherwise would have) had the information been presented in a fashion that activates only one sense at a time.

Participants

The student participants of this study were current students of an urban school, located in a Midwestern elementary school during the 2021-2022 school year. Each student was carefully selected based on the results of multiple classroom-based assessments, specifically regarding letter name and letter sound recognition. Six total students participated in the 7-week intervention, three girls and three boys.

These six students had previously shown less than expected academic growth throughout the school year. For this particular study, the results of their assessments regarding letter names and sounds were the determining factor of their participation in this intervention. None of the students in the group were SPED students, and four were participating in Math Corps.

Methods

To answer the research question, the study incorporated various multisensory-based activities throughout the seven-week intervention. The activities combined the senses of sight, hearing, smell, and touch. “It is through the reciprocal relationship between sensory input and thinking that multisensory techniques gain their power” (Baines, 2008, p. X).

The activities included, but were not limited to: writing letters in shaving cream while orally stating what the letter name/sound was, engaging in a letter dodgeball game in which I gave the student a letter and the student needed to throw the ball at the correct letter poster on the wall, playing memory letter games, using kinetic sand to build letters and structures that began with the given letter, building letters with Play-Doh while identifying each and the correlating sound, letter BINGO, and tracing letters with race cars during the identification process.

After the initial introduction of the letter and its sound, I told the students that they were to use the kinetic sand to build objects that began with the letter Tt. For the intervention, and considering the students’ skill level, the teacher provided a dictionary picture page of the letter Tt. On that page, nine examples of objects that began with the letter Tt.

The students were encouraged to start with the dictionary page and, afterward, branch out to brainstorming what other words also started with that specific onset sound. A hands-on approach that combined four senses (hearing, seeing, touching, and smelling) most likely made a lasting connection for students regarding identifying words that start with the letter Tt.

Another example of how I incorporated phoneme matching and letter names/sounds was the intervention activity labeled musical letters. Taped to the floor was a large ring of 15 pictures. The large group of images started with one of three letters (Aa, Mm, Dd). The directions were similar to musical chairs. When the music was playing, the students hopped

from picture to picture. As soon as the music stopped, the students needed to stop moving. Their task was to identify the letter name/sound at the beginning of that particular word. Five pictures representing each letter. The repeated exposure to different words that begin with each letter provided the students with an opportunity to improve their phoneme matching, letter name, and letter sound identification skills.

The study was an intervention-based model. Each day (barring absences), the group of students was pulled out of the classroom and worked directly with me for fifteen minutes. The students engaged in a series of multisensory activities; the overall academic focus of each intervention was identifying letter names and letter sounds.

The daily fifteen-minute intervention consisted of Alphabet Quick Look and a focus letter multisensory activity. The “Alphabet Quick Look” was a fast “repeat after me” activity. Using letter cards, I ran the students through the entire alphabet, focusing on all the letters. To modify this activity based on student skill level, I did not incorporate long vowel sounds.

The second part of the daily intervention was the multisensory activity, built around a focus letter(s). This portion took up most of the intervention time slot. There was a different activity each day. Each activity was specifically chosen based on how the activity stimulated two or more senses simultaneously during the intervention. Some example activities include (but are not limited to): building letters with Play-Doh, writing letters in salt, letter stamping, painting your ABCs, dobbing the alphabet, musical letters, ABC Bingo, and “Aim, Throw and Hit” the letter.

Along with engaging in multisensory-based academic activities, multiple forms of data were collected throughout the 7-week intervention. To achieve triangulation, this data included:

Observational data, informal student interviews, student-generated artifacts, teacher-generated artifacts, and formative and summative assessments.

Gathering the observation data occurred during the active 15-minute intervention. I noted each student's type and length of engagement in each activity. This allowed me to reflect on the success or lack thereof regarding the activities themselves. If one student who is usually very engaged displays a lack of excitement and desire to participate, it could indicate that the intervention was less successful. Alternatively, if one of the students who usually took more prodding to participate was particularly engaged during a session, that could indicate that that activity was highly successful.

I also had 1:1 informal conversations with each of the six students. These conversations did not occur during the active sessions but during free time at another point. The interview questions were simple due to the age of the participants (see Appendix A). During these interviews, I could confirm my earlier observations based on a student's active participation during the intervention. Generally, the informal discussion was congruent with the individual student observational data.

Another form of data collected was student-generated artifacts. Some of this data included artifacts that were permanent products (student journal pages and cut and glue activities). In contrast, other artifacts were specific to an activity using reusable materials (Magic Sand structures and writing with shaving cream). I also kept a teacher journal (see Appendix D), in which I wrote quick notes about each session. This allowed me to have a reference point when thinking back on the sessions during the data evaluation phase of the study.

I completed formative and summative assessments during the 7-week intervention period. The formative tests consisted of using the planned activities and actively conducting formative

assessments during the exercise. I would then mark the results in my teacher journal (see Appendix D) for the day. This tactic was a quick and effective way for me to track the weekly progress of the students without it taking a considerable amount of time outside of the intervention. The teacher journal served an additional purpose, it was used to record teacher-based observations that included overall student interest and daily achievement information.

Additionally, students made weekly journal entries (see Appendix C). These journal entries were simple in context and were meant to be used as a formative assessment tool. At the top of each journal page, I wrote a letter. The student needed to identify the letter and then draw a picture of something with that letter as the onset sound. They then were asked to practice letter formation at the bottom of the journal page.

Lastly, the summative assessments were a simple letter name and letter sound check-ins on a piece of paper that all students had previous exposure to (see Appendix B). These tests were conducted at the beginning, midway through and then again at the end of the 7-week intervention period. Each time, assessments were proctored during a 1:1 session with the teacher. I evaluated the data during and after the 7-week intervention period. It was actively used as a guide in making needed adjustments to the interventions.

Categorizing the study was difficult, as it included qualitative and quantitative action research aspects. Though there was data related to observation and informal interviews, most of the information was a variety of teacher-made assessments. To this nature, I determined that the study was a mixed method study, though it relied more heavily on the quantitative data gathered.

Though the group size was small, the data produced provides a starting point for an intervention on a larger scale using similar approaches. The data can help structure future small

group interventions, and also help guide an overhaul of day-to-day teaching practices and procedures within the classroom.

The data provided me with some surprising and delightful results. Several observations can be made from the results of the seven-week intervention. These observations and the data itself is presented in the following section.

Analysis of Data

Every two weeks (roughly), the students were individually assessed on their ability to identify letter names and letter sounds. The students were presented with a page listing all 26 uppercase and lowercase letters (see Appendix B). In an untimed session, they were asked what each letter and its corresponding sound was. I recorded their results by simply underlining the letter if they incorrectly identified the letter names and circling the letter if they correctly identified the sound.

The seven-week intervention included multisensory based activities focused on phoneme matching and incorporated phoneme matching into the assessment process. The students were given a journal page (see Appendix C) at the end of each week. I would choose one of the focus letters from that past week and write it in the top left corner of the journal page. The students were then asked to identify the letter name and sound of the written letter. Additionally, they were asked to draw multiple pictures of words that started with the listed letter. I retained these journal pages throughout the seven-week intervention to monitor the overall progress of each student.

The table below contains the data collected from the letter names/sounds assessment and data from the student journal pages. This data was collected in a fashion that was 1:1 and untimed. Observing the data, one can see a pattern of growth across the board. Though the end

results are not all equal, it is apparent that each student ended the intervention having scored better on their final assessment than they did on their initial assessment. Though two students do show a lull in their progress midway through the intervention period, it is reasonable to assume that their progress suffered due to their extensive absences. Overall, the data indicates that this intervention was successful and could be considered for future use.

Table 1*Letter Names and Letter Sounds Untimed Assessment Results and Writing Journal**Results*

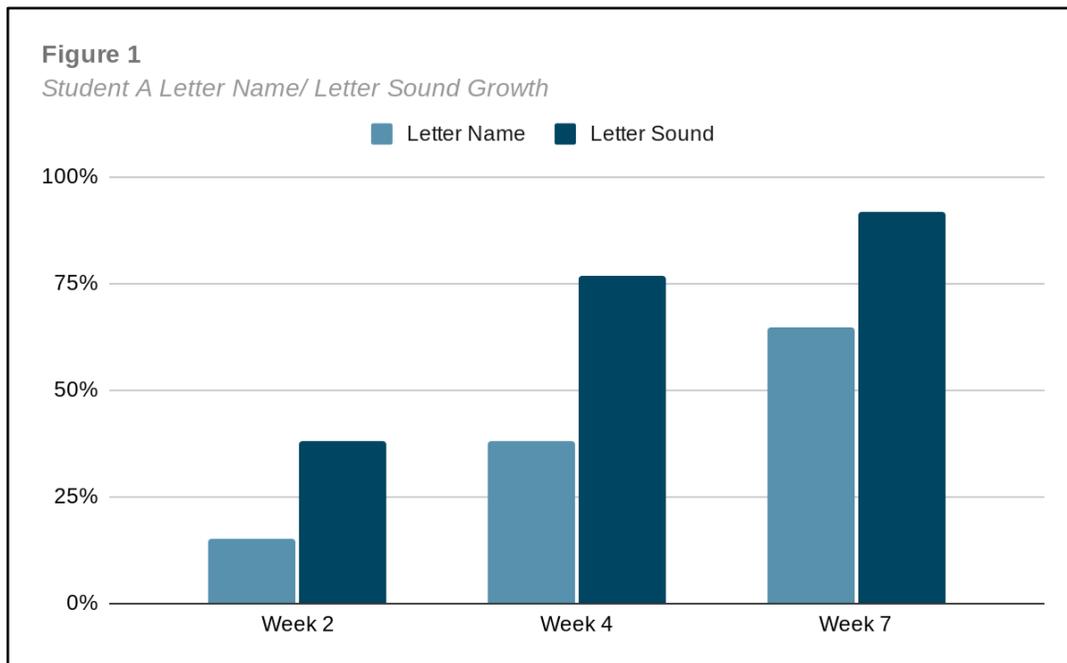
Student	LN W2	LS W2	LN W4	LS W4	LN W7	LS W7	Phoneme Matching
A	4/26 (15%)	10/26 (38%)	10/26 (38%)	20/26 (77%)	17/26 (65%)	24/26 (92%)	6/7 (86%)
B	6/26 (23%)	7/26 (27%)	5/26 (19%)	10/26 (38%)	7/26 (27%)	14/26 (54%)	3/7 (43%)
C	1/26 (4%)	0/26 (0%)	1/26 (4%)	3/26 (12%)	3/26 (12%)	14/26 (54%)	2/7 (29%)
D	4/26 (15%)	2/26 (8%)	7/26 (27%)	10/26 (38%)	10/26 (38%)	12/26 (46%)	4/7 (57%)
E	10/26 (38%)	9/26 (35%)	9/26 (35%)	20/26 (77%)	14/26 (54%)	18/26 (69%)	4/7 (57%)
F	0/26 (0%)	0/26 (0%)	0/26 (0%)	0/26 (0%)	4/26 (15%)	3/26 (12%)	2/7 (29%)

Note. This table is displaying the reported results of the untimed letter names/sounds assessment. The assessment had a total of 26 uppercase and lowercase letters. The abbreviations are as follows: LN-letter names, LS-letter sounds, W-week. It is important to note that only short vowels were assessed in regards to the letter sounds tested. This is due to the

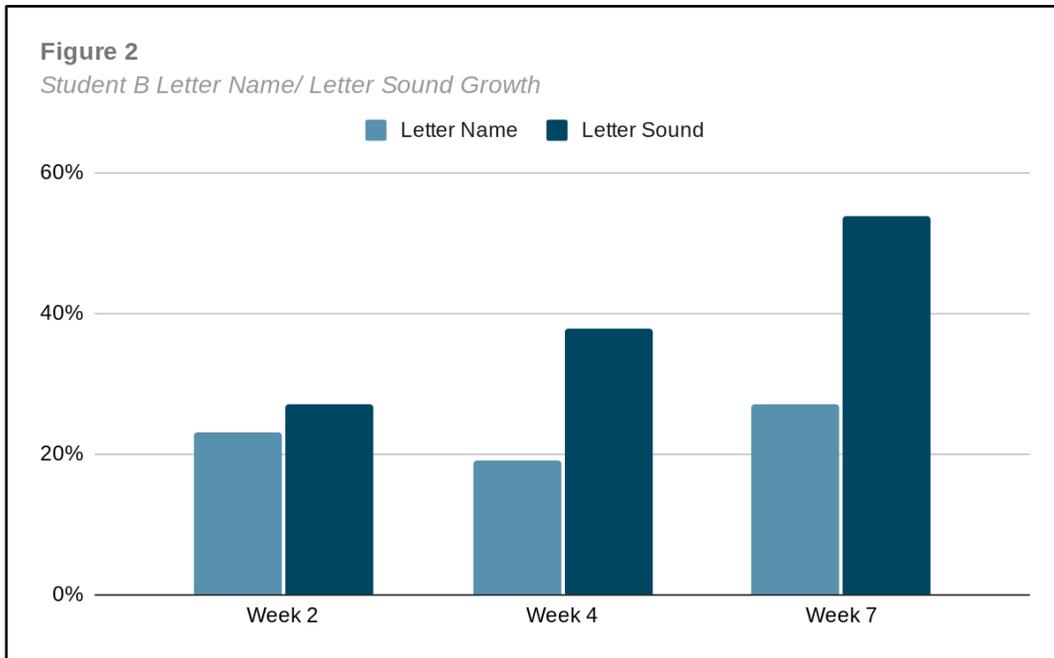
starting point of the intervention group as a whole. Initially, the group members had a relatively low percentage of letter names and letter sounds correct. Because of that, they were explicitly chosen for participation in the multisensory interventions.

Student Letter Names and Letter Sound Growth Graphs

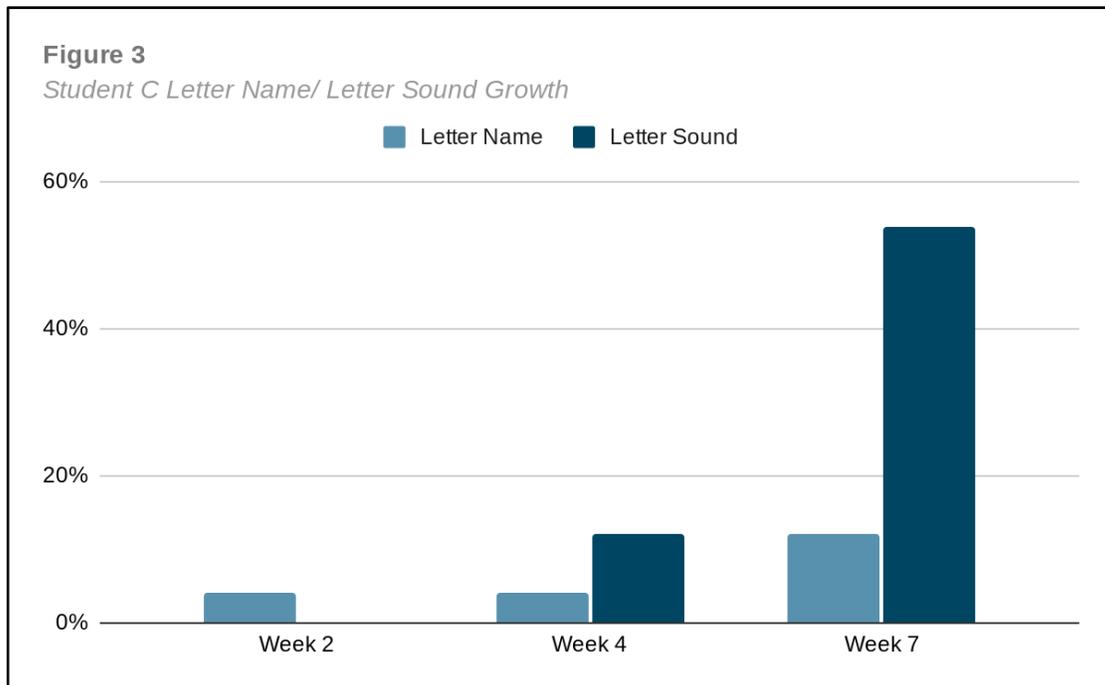
When evaluating the data in the table above and the graphs below, it should be noted that most students achieved consistent growth concerning letter names and sounds throughout the seven-week intervention. The two students that showed a decline in their growth regarding letter names midway through the seven-week intervention had extenuating circumstances that may explain the decline. Both those students had a high number of absences during the intervention period. As with any intervention, there will be challenges that are out of the control of the teacher.



Note. Notice the consistent growth across both focus areas.

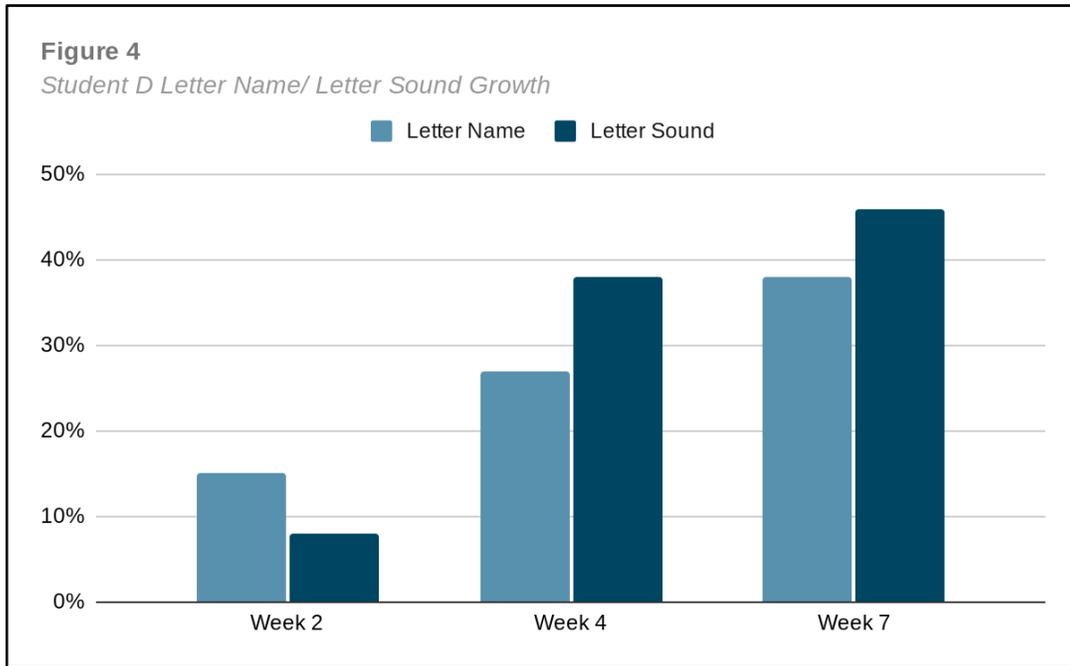


Note. This student’s attendance was very poor. That may be a contributing factor to the mid intervention lull. There was consistent letter sound growth throughout the entire intervention.

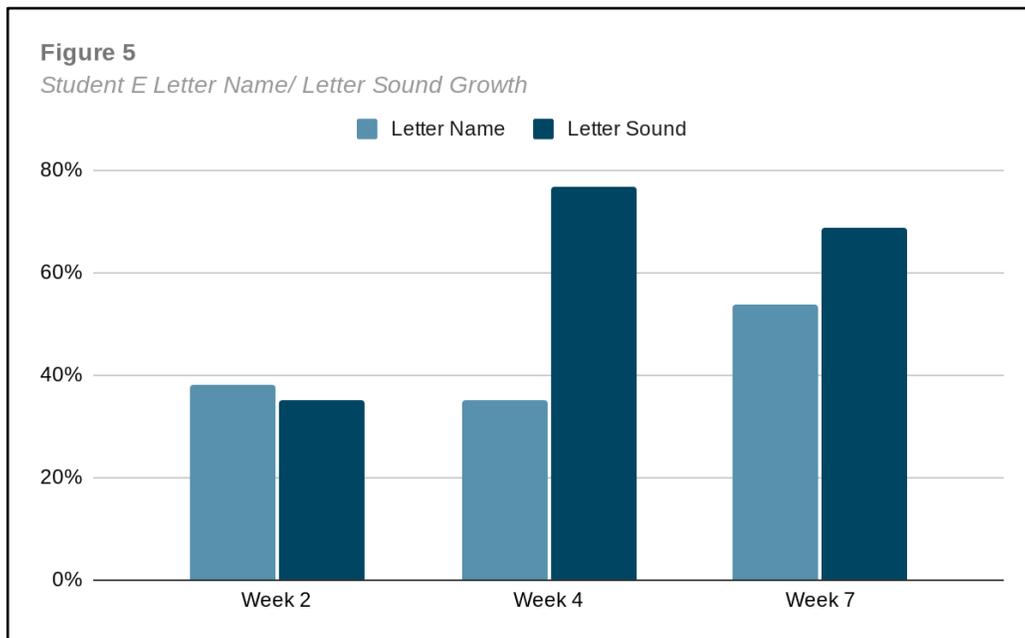


Note. This student had very low attendance rates throughout the entire year. The student was dealing with other life changing experiences throughout the year. Even with these factors

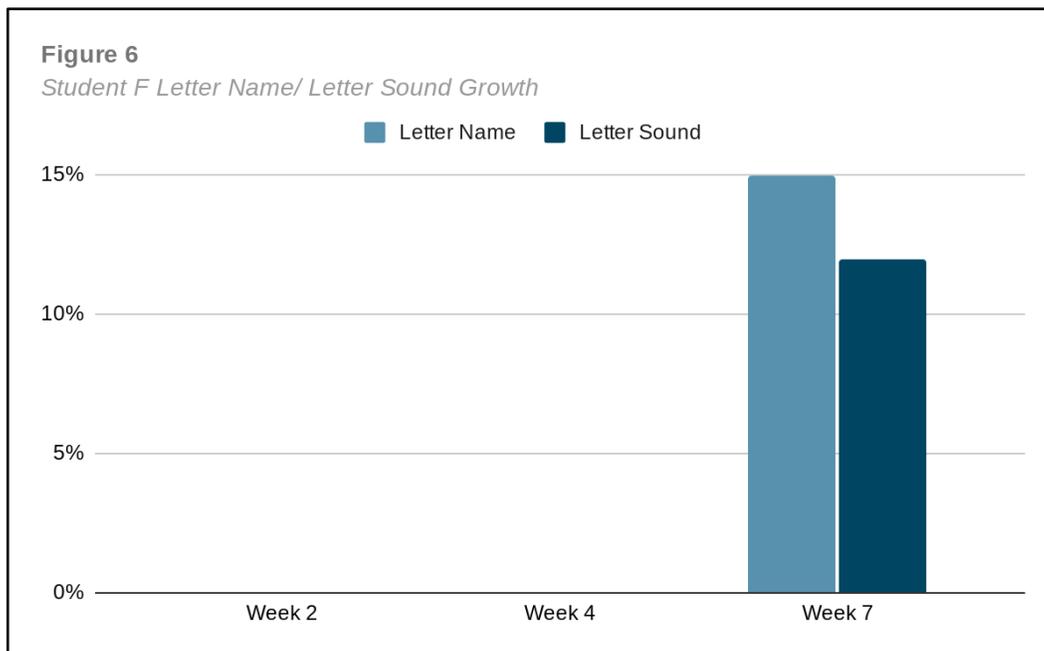
affecting the academic growth of the student, the individual still made incredible growth in the area of letter sounds.



Note. This student had steady growth in the area of letter names and magnificent growth in the area of letter sounds. This may indicate that this child is an auditory learner.



Note. This student enjoyed the intervention period, but struggled with confidence regarding academics. There was minimal growth in terms of letter names, but significant growth in the area of letter sounds. With more time, this child would probably have continued to show consistent growth in both areas.



Note. This student started the year late, was frequently absent and this school year was the first time the individual had been exposed to a setting outside of the home. The growth that was made was significant for this particular student, taking into account the individual situation and circumstances.

After evaluating the assessment data above, one can conclude that this particular intervention was a success. The question that initiated this action research project was, what is the relationship between multisensory learning and phonemic awareness and letter identification in kindergarten? An evaluation of the data leads one to the conclusion that the relationship between the two is a positive one. It is a relationship that leads to a growth in identification skills as related to letter names and letter sounds.

One could take this data and either implement this exact intervention or modify it and run a similar intervention. Simple modifications could be made, such as repetitive use of activities, or increase the intervention time to 20 minutes a session. However, one should make an effort to maintain the underlying approach to this intervention, which is to ensure that the approach is multisensory in nature.

Conclusions and Recommendations

The purpose of this study was to determine what effects a multisensory approach to teaching would have on kindergarten students' retention rate of letter names/sounds. The initial hope was that there would be a noticeable and positive effect on the five and six-year-old students who participated in the intervention. The six students selected for the study were chosen because of a consistent history of low classroom letter names/sounds assessment scores. This same assessment was used throughout the intervention.

As indicated above, one can conclude from the data that the overall effects across the six students were positive. Considering that all students start at varying points and have individual circumstances that affect them differently, one can evaluate the presented data and conclude that the end results tell a story of improvement.

Evaluating the graphs, it can be seen that 100% of the students displayed growth throughout the seven-week intervention. Improvement is noticeable in one or both focus areas (letter names/sounds). The level of development did vary across the group, but this is to be expected in any intervention.

Another collected data piece was the overall level of enjoyment the students seemed to display during the 15 minutes interventions. This data was emotional at its core, with the central questions presented to the students being: Did you enjoy having our daily small group time?

What were your favorite activities from our small group time? Would this be something you would like to do again in the future?

The questions were intentionally simple due to the ages of the participants. The answers were pretty general but wholesome and truthful. The majority of the interventions were rated positively by the students. However, I noticed that the interventions that required doing something that they did not usually get to do in the classroom were more highly praised.

Examples of the most popular activities include:

- Throwing a ball at the wall.
- Hitting the letter that matches the clue provided.
- Writing in shaving cream.
- Building letters and objects out of Kinetic Sand.
- Musical letters.
- Letter name/sound BINGO.

There also seems to be a trend in the activities noted as most enjoyable by students. That is, they were either whole body movements or activities that did not require the use of pencils and paper.

One heartwarming moment I experienced was when the students would specifically come and check in about the intervention plans for the day. They wanted to make sure we were going to do it, and then they wanted to know what we would do. When circumstances arose where the intervention had to be moved or shortened in length (due to a fire drill, etc.), the students were disappointed that their small group time was affected.

When students enjoy the task at hand, when it feels more like play than work, it can be assumed that the overall enjoyment of the activity will be higher. It is also well known that

when students are active participants in their learning, they will be more likely to retain the information over time.

One limitation in the study was low attendance for some participants. This factor is a genuine challenge that has drastic effects on the intervention's effectiveness and the overall school experience for the students. As all educators know, academic success hinges on student presence. For something new to stick, a student needs to be exposed to it multiple times in various ways and have the opportunity to practice the skills in order to master them.

Taking the results from this seven-week intervention, one can reasonably assume that it could be a classroom intervention that could be incorporated into the daily routine of the classroom. A few modifications may be needed, but the transition would be reasonably smooth. A teacher can incorporate multisensory learning into Daily 5 rotations (or another version of group rotations). All new activities should first be played under the supervision of a teacher or classroom para. Then gradually, those activities could be transitioned into independent group activities.

Small group approach to learning is a powerful tool to use on the pathway to student achievement and success. A small group approach allows for a deeper teacher/student connection and a stronger connection between the student and the academic focus/materials.

Adding a multisensory approach to that small group session is an incontestable benefit. It should be noted that the multisensory component does not need to be changed as often as it was throughout the action research intervention period. This was something that was observed throughout the seven weeks. Several of the participants enjoyed certain activities much more than others. There were occasions when the students specifically requested to complete certain activities a second time within one week.

A multisensory approach does not necessarily equal a significant monetary expense on the teacher's part. There is some necessary financial investment, but this can be pretty minimal as long as one utilizes resources that are already present in one's classroom or connects with others in the building to share resources between classrooms. However, to complete some of the activities presented in this research intervention, one would need to invest between \$30 and \$50. That could be seen as a drawback to some, but in the long run, the learning opportunity this investment creates is well worth the investment.

Another benefit to the multisensory approach is that it is versatile. It was explicitly used regarding letter names/sounds throughout the seven-week study. However, it should be noted that this approach can be used with higher academic standards, tasks, and across subject matter. The limitations are your imagination when it comes to multisensory instruction. Though, it is suggested to contain multisensory learning to small group learning. With the setup and clean-up, it may be too time-consuming to run as a whole group learning activity.

One final note about the research project, I found the experience more enjoyable than whole group learning. It gave my students and me a few moments to have fun together. As all teachers are well aware, creating and strengthening your bond with your students will often have other positive ripple effects. Several things occur when the students, especially younger ones, feel like they get to come to school and learn through play. They are active members of your learning community, may be happier coming to school, and social bonds between peers will be formed and supported by the teacher on a more personal level. Ultimately, the benefits of incorporating multisensory learning into the classroom outweigh any potential hurdles one may encounter.

References

- Baines, L. (2008). *A teacher's guide to multisensory learning improving literacy by engaging the senses*. Association for Supervision and Curriculum Development.
- Ball, E. W., & Blachman, B. A. (1991). Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly*, 26(1), 49–66. <https://doi.org/10.1598/rrq.26.1.3>
- Costantino-Lane, T. (2019). Kindergarten then and now: Perceptions of ten long term teachers. *Early Childhood Education Journal*, 47(5), 585–595.
<https://doi.org/10.1007/s10643-019-00949-1>
- Graduate Programs in Education Goucher College. (2021). Improving Long-Term Memory in Students in Early Childhood Education Through The Use of Multi-Sensory Interventions. *Graduate Thesis*. Angelique Bullock.
- Graduate School of Education City University of Seattle. (2018). Kindergarten Letter-Sound Fluency and Multi-Sensory Intervention. *Graduate Thesis*. Zina Hurd.
- Joshi, R. M., Dahlgren, M., & Boulware-Gooden, R. (2002). Teaching reading in an inner-city school through a multi-sensory teaching approach. *Annals of Dyslexia*, 52(1), 229–242. <https://doi.org/10.1007/s11881-002-0014-9>
- Korkmaz, S.C., Karatepe, C. (2018). The Impact of Multi-sensory Language Teaching on Young English Learners' Achievement in Reading Skills. *Novitas-ROYAL*, 80-95.

- Mathison, C., Wachowiak, S., & Feldman, L. (2007). School in the Park Bridging Formal and Informal Learning Environments. *Childhood Education*, 83(4), 206–210.
<https://doi.org/10.1080/00094056.2007.10522914>
- Mostafa, A.A. (2018). Investigating the Effect of Multisensory Approach on Improving Emergent Literacy Skills in Children with Autism Disorder. *International Journal of Psycho-Educational Sciences*, 94-99.
- Neumann, M. M., Hyde, M. B., Neumann, D. L., Hood, M., & Ford, R. M. (2012). Multi-sensory methods for early literacy learning. In G. Andrews & D. Neumann (Eds.), *Beyond the lab: Applications of cognitive research in memory and learning* (pp. 197–216). Nova Science Publishers.
- Rule, A. C., Dockstader, C. J., & Stewart, R. A. (2006). Hands-on and kinesthetic activities for teaching phonological awareness. *Early Childhood Education Journal*, 34(3), 195–201. <https://doi.org/10.1007/s10643-006-0130-y>
- Shamir, A., Korat, O., & Fellah, R. (2010). Promoting vocabulary, phonological awareness, and concept about print among children at risk for learning disability: Can e-books help? *Reading and Writing*, 25(1), 45–69. <https://doi.org/10.1007/s11145-010-9247-x>
- Veronen, J. (2021). The Effects of Multi-Sensory Structured Literacy Instruction on Promoting Word Recognition in Elementary Schools. *SOPHIA*.
<https://sophia.stkate.edu/maed/422/>
- Western Governors University. (2020, October 21). *What is constructivism?* Western Governors University. Retrieved July 17, 2022, from <https://www.wgu.edu/blog/what-constructivism2005.html#close>

Why Multisensory Learning is an Effective Strategy for Teaching Students How To Read.

Waterford.org. (2019, March 5). Retrieved July 17, 2022, from

<https://www.waterford.org/education/why-multisensory-learning-is-an-effective-strategy-for-teaching-students-how-to-read/>

Interview Questions

Action Research Student Interview

Did you enjoy having our daily small group time?

What were your favorite activities from our small group time?

Would this be something you would like to do again in the future?

Letter Assessment Sheet

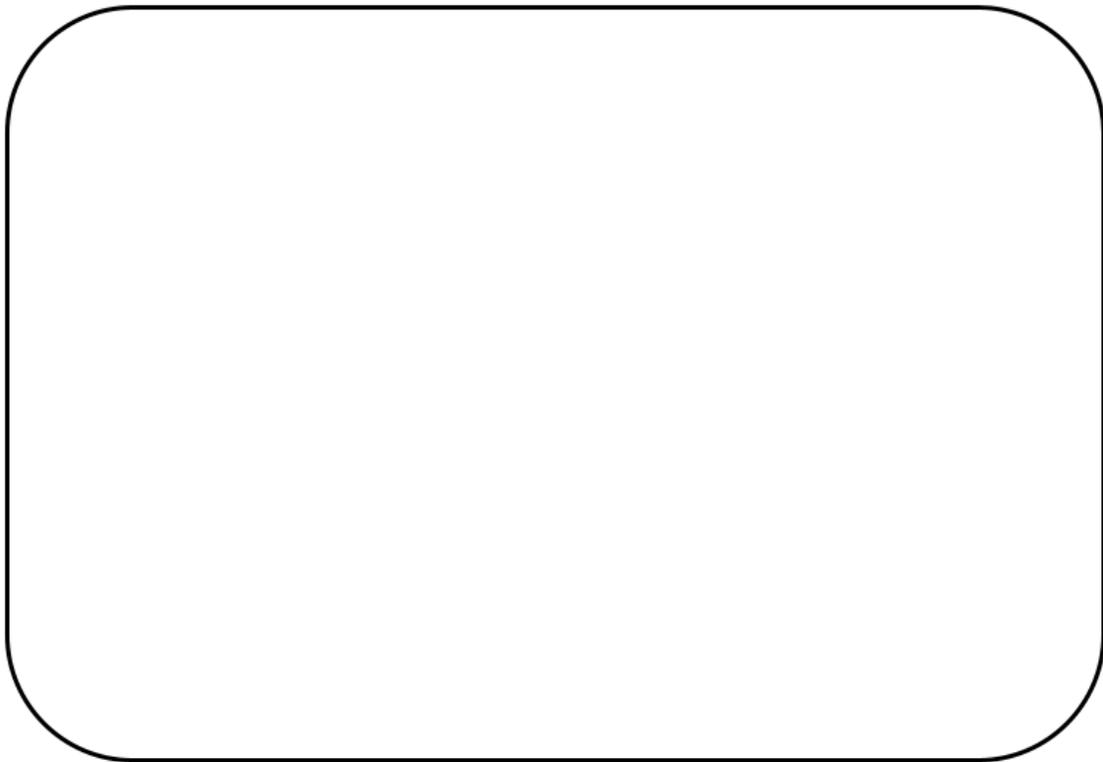
My Letters

Hh	Ee	Mm	Tt
Ii	Pp	Qq	Uu
Oo	Cc	Ww	Bb
Xx	Vv	Jj	Ss
Gg	Nn	Yy	Kk
Zz	Rr	Aa	Ff
Ll	Dd		

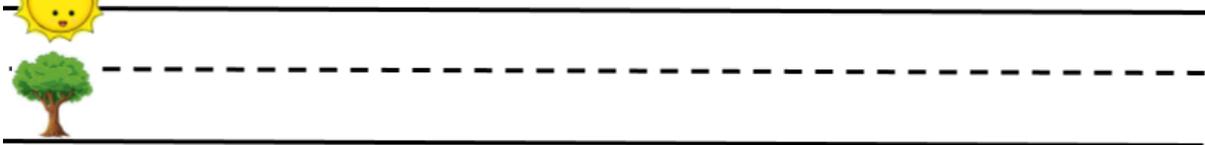
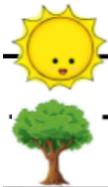
Student Journal Page

Letter:

Draw a picture below that begins with the letter/letter sound shown to the left.



Practice writing the letter below, create a pattern with uppercase and lowercase.



Teacher Journal (Part A)

Daily Teacher Journal

<p>Date _____ Student _____</p>	<p>Date _____ Student _____</p>
-------------------------------------	-------------------------------------

<p>Date _____ Student _____</p>

Teacher Journal (Part B)

Daily Teacher Journal

<p>Date _____ Student _____</p>	<p>Date _____ Student _____</p>
-------------------------------------	-------------------------------------

<p>Date _____ Student _____</p>

Example of Weekly Plan

Focus Letters - Week 1
Individualize focus letters. Pick letters from each student's name.

Day	Multi-sensory Activity
Monday (15 min)	Play-Doh letters: Say, form and smooch the letter/sound.
Tuesday (15 min)	Salt tray: Say letter and sound, trace into salt.
Wednesday (15 min)	Bejeweled Letters: Glue and decorate your letters. Identify letter and sound.
Thursday (15 min)	Race Car Trace: Drive your car on the letter, say name and sound.
Friday (15 min)	Dob the Letter: Use a Bingo dob to dot the letter. Identify sound and letter.