

Multi-sensory Approaches to Spelling and Reading Instruction for
Students with Learning Disabilities

A Master's Research Project Presented to
The Faculty of the College of Education
Ohio University

In partial fulfillment
of the Requirements for the Degree,
Master of Education

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May, 2008

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Abstract

This paper investigates why students with learning disabilities tend to be further behind their peers when it comes to overall reading abilities. Because the preferred learning style for the study participants was not incorporated into the classroom, multi-sensory literacy interventions were introduced. The participants in this study were immersed into activities that incorporated visual, auditory, and tactile/kinesthetic learning styles. Running records were used as pre and post tests throughout the study. Students began the study at a pre-primer level 1 and improved the equivalent of one full school year by the end of the study. Students improved not only in measures of overall word accuracy, but also in comprehension skills, and overall reading fluency. Appendices include sample running records and examples of reading interventions used in the study.

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Throughout the history of the United States there has been debate over the best way to teach children to read. Within many elementary schools today, there are countless children with learning disabilities who struggle to acquire basic reading and spelling skills. Throughout elementary school, literacy instruction is at the core of every student's daily instruction. If students are unable to successfully read and comprehend what they read, they will not only struggle in the language arts content area, but also in mathematics, science, and social studies. Reading is an integral part of everyday life. It is a lifelong skill that children must acquire to become successful working adults. One of the main questions at the center of much debate in literacy instruction is which approach seems to work the best?

Statement and Significance of Problem

Many educators tend to teach and assess their students based primarily on linguistic intelligences. For example, throughout the school day a student may be required to read information from a textbook, look at diagrams, or read what has been written on the chalkboard by the teacher. While having to acquire most information visually, the typically developing student will also need to listen to what the teacher is saying. However, if the student has poor visual perception or weak auditory memory processing, there are other modalities of learning that may need to be utilized. All of today's high stakes achievement tests for reading, mathematics, writing, science, and social studies require students to read many questions and passages. Due to the high readability levels of these tests, a struggling reader is almost guaranteed to not succeed. Even students who receive special education accommodations will be required to read parts of the tests on their own (i.e., reading passages on tests of reading comprehension).

Every student that passes through an educational system is unique and has his or her own personal learning style. Unfortunately, many educators may not recognize or consider the learning styles of each individual student when planning and implementing their daily lessons. Educators can become established in their own personal routines and teaching styles and become unwilling to modify or adapt their daily lessons to their students' learning styles. Many students who struggle to read are often tactile kinesthetic learners who need hands-on approaches to learn (Bear, 2000). A true balanced literacy program should cater to all learning styles through a variety of teaching methods and modalities.

According to the National Center for Education Statistics, approximately thirty-six percent of the nation's fourth graders are unable to read at a basic level (Somers, 2006). With the growing number of students struggling to gain basic reading and spelling skills, a multi-sensory instructional approach to reading and spelling instruction is more beneficial. A specific combination of visual, auditory, and kinesthetic learning might allow some students who struggle to read to become successful and retain the required information faster. Also, it may be possible that a student could learn better through tactile experiences that are an integral part of a multisensory approach. This study was designed to answer the following research question: Is a multisensory approach to literacy instruction more beneficial for students with learning disabilities who are struggling to read?

A quasi-experimental research design was used for this study. This design was chosen because it provided the best fit with the natural environment of the special education classroom and the question being studied.

Definition of Terms

Several terms are used throughout this paper and have been defined to establish a common understanding of their use in the reporting of this case study.

Analytic Instruction: Presents the whole and teaches how this can be broken down into its component parts (Multisensory Structured Language Programs, 1995).

Auditory Learner: A learner who learns the best through listening to directions, taking notes, and is able to follow verbal directions very well. He/she enjoys activities like talking on the phone and when reading, sounds out the words phonetically (Kramer, 2007).

Kinesthetic/ Tactile Learner: A learner who likes to learn by doing and moving. He/she enjoys manipulating objects and using hand gestures when speaking. He/she learns language best by getting together with a partner for a conversation (Kramer, 2007). This learner has a difficult time sitting still for auditory lessons.

Learning Style Approach: Instructional approach that focuses on efficient ways to learn, rather than on curriculum. This approach includes specific techniques for organizing, actively interacting with material, memorizing, and monitoring any content or subject (Lockerson, 1992).

Multisensory Learning: An instructional approach that combines auditory, visual, and kinesthetic elements into learning a task (Lockerson, 1992).

Phoneme: A phoneme is the smallest unit of sound in a given language that can be recognized as being distinct from other sounds in the language (Multisensory Structured Language Program, 1995).

Phonemic Awareness: The ability to segment words into their component sounds (Multisensory Structured Language Programs, 1995).

Phonological Awareness: The understanding of the internal linguistic structure of words (Multisensory Structured Language Programs, 1995).

Phonology: The study of sounds and how they work within their environment (Multisensory Structured Language Programs, 1995).

Specific Learning Disability: The official terms used in federal legislation to refer to difficulty in certain areas of learning, rather than in all areas of learning (Lockerson, 1992).

Synthetic Instruction: Presents the parts of the language and then teaches how the parts work together to form a whole (Multisensory Structured Language Programs, 1995).

Visual Learner: A learner who learns the best by looking at charts, pictures or diagrams. He/she remembers from seeing rather than through listening (Kramer, 2007). The visual learner is able to follow step-by-step illustrated directions to put items together successfully.

Limitations of the Study

The limitations of this study are related to time constraints and resources. The resources were limited because new and current information regarding multi-sensory literacy instruction is constantly appearing. Much of the information and research regarding multi-sensory literacy instruction was focused on assisting the adolescent reader or the English as a Second Language (ESL) reader. The time constraints were due to the standard school year calendar and a limited amount of time allotted throughout the school day to work with the students on literacy.

Review of Literature

Many educators tend to teach concentrating on the learning style that works best for them personally. However, that style may not be appropriate for every child. Educators need to remember to incorporate literacy activities that are multi-sensory including all of the learning styles.

Characteristics of Learning Styles

Not everyone learns in the same mode or manner. Individuals develop their own learning styles that work well for them, but may not work as well for someone else. In fact, there are three main learning styles that most people use: visual, auditory, and kinesthetic/tactile. Everyone uses these learning styles in some sort form, but one style is often used more predominantly than the others. The importance of knowing which learning style a student utilizes during the elementary school years is crucial to that student's success.

The most widely used learning style is visual. Visual learners make up approximately sixty percent of the population (King, 1996). Visual learners acquire knowledge best by using their sight and by looking at new information. Visual learners have typical characteristics such as a preference for sitting in the front of the class, taking detailed notes, and may be easily distracted by things they see when they look out the window. When learning, they benefit most by writing things down and by looking at illustrations.

The second most common learning style is auditory. Auditory learners make up thirty percent of the population (King, 1996). This type of learner prefers to hear or listen to new information. Auditory learners will sit where they can hear the speaker well, but

not necessarily in the front of the classroom. They will generally sit towards the middle of the room as it is where sound can be picked up the best. Students who are auditory learners will often hum or whistle to themselves. They acquire knowledge by reading aloud, listening to lectures or by hearing or singing songs.

The last of the most common learning styles is the kinesthetic/tactile learner. Only ten percent of the population is considered kinesthetic/tactile learners (King, 1996). Kinesthetic/tactile learners learn through hands-on methods where they can touch or manipulate materials. These learners need to be active and take frequent breaks. Students who are kinesthetic/tactile learners will often tinker with items or doodle when they are bored.

In the classroom, the kinesthetic/tactile learners tend to sit where they can easily exit the room, such as on the end of rows. They are often uncomfortable in a classroom setting that lack hands-on experiences. Some activities kinesthetic/tactile learners enjoy include cooking, construction, and art. These activities ultimately help them comprehend and learn because they involve hands-on activities.

As ninety percent of the population utilizes a combination of visual and auditory methods as learning styles, it is fairly evident that many teachers present material in their classrooms most often in a visual or auditory manner. It is always important to keep such information in mind when creating instructional lessons. There have been several studies that address ways to incorporate more multi-sensory literacy activities into the classroom.

Tactile Spelling

Murphey and McLaughlin (1990) examined the effects of a tactile and kinesthetic approach on the spelling performance of students receiving special education services.

This study was a single case partial replication that occurred over a span of twenty-eight weeks. The participant was chosen from the author's regular education class, a mixture of both fourth and fifth grade students. Based on the scores provided by the *Woodcock Johnson Tests of Cognitive Ability*, the student was identified as functioning below average.

The intervention in the study was based on a multi-sensory technique developed by Grace Fernald. Fernald's multi-sensory method involves seeing a word, saying the word aloud, tracing it with a finger using the student's dominant hand and then writing the word. This method is known as VAKT, which stands for *visual, auditory, kinesthetic and tactile*. The VAKT method is used not only to teach children with learning disabilities how to spell, but also how to read. It utilizes not only the visual and auditory senses, but the tactile and kinesthetic as well. Other methods similar to VAKT have been developed, but they eliminate the visual component all together by blindfolding the students during the auditory and tactile stage of implementation. However during the study, the visual component was stressed less rather than being eliminated altogether.

In order to establish a baseline, the student participated in twenty minute spelling lessons and took weekly spelling tests in the regular education classroom. A spelling pretest was given at the start of the week followed by a culminating test on Friday in the regular education classroom. The baseline was performed twice followed by two different intervention methods. Throughout the interventions, the student was provided four different twenty minute spelling lessons in the special education resource room before school began.

The first intervention was a tactile approach that required the student to look at the spelling word written in cursive, say the word aloud, and trace the word with the index finger of their writing hand. This procedure was continued several times with different target words. On the following day, a quiz was given. With any words the student had spelled incorrectly, the tactile procedure was used to reinforce the correct spelling of those words. Results indicated that during the time the tactile intervention was implemented, the student's performance increased. However, when a final assessment was given for all the spelling words used during the tactile intervention, the retention of the spelling words was weak.

During the second intervention, the tactile component was combined with dictation. The instructor dictated sentences that contained the spelling words as the student wrote them. If the student made a mistake, it was corrected immediately and then written properly three times. During this phase, the student continued to take weekly spelling tests with the regular education class. Similar to the tactile intervention there was a final assessment for all of the spelling words used during the intervention. Results indicated when the tactile component was combined with the dictation from the teacher; there was a greater retention of the spelling words.

One of the benefits of this tactile and kinesthetic spelling study was that it required no additional cost for implementation. The study was easily done within the examiner's own classroom with a student receiving special education services. This research demonstrated that the implementation of this multi-sensory intervention for spelling could easily be applied in any classroom setting where that students are struggling with spelling.

Another benefit demonstrated by the Murphey and McLaughlin (1990) study was that the student who was receiving the multi-sensory intervention method (tactile and dictation approach) showed significant improvement in spelling scores. The student's retention was better when dictation was paired with the tactile component. By tracing the word before it was written, the student's handwriting showed improvement not only in letter formation, but in the ease of cursive writing as well. Additionally, by using both intervention methods, the examiner was able to achieve results that could be easily compared to see which one worked the best.

Despite the benefits of this study, there are several concerns that need to be examined. First, the study was implemented with a single student. With only one student it is difficult to generalize that this particular multi-sensory intervention method would show the same benefits with a larger population. In addition, the author could have used a different, more complex, research design to show how these two intervention methods could improve the spelling, handwriting, and reading skills of a larger population of students. Also, the student continued to take the Friday spelling test in the regular classroom throughout the twenty-eight week long study. By allowing the student to stay among his/her peers, the reader questions the validity of the study. It could be possible that the student may have copied the spelling words from a classmate sitting next to him/her.

The VAKT spelling intervention method is an excellent way to help students who struggle to spell. However, the VAKT intervention method can also be used to not only improve students' spelling, their word accuracy while reading, as well as their on-task behaviors in the classroom setting.

Word Accuracy and On-Task Behaviors

Thorpe and Borden (1985) examined the effects of multi-sensory instruction on not only students' word reading accuracy, but on-task behaviors as well. The study was conducted using students with learning disabilities (LD) whose ages ranged from seven to nine. The students participated in a single subject reversal design that contained a series of four experiments over the course of one year.

The implementation took place in an integrated classroom for students with LD and a LD specialist facilitating all four phases of the study. Two different groups were used for the experiments. The VAKT intervention method was used with the participants for one half hour daily after school. During the first phase of the study, visual and auditory instruction accompanied by praise, was provided. For the second phase, the visual and auditory interventions were again implemented, without any praise. During the third and fourth phases, the facilitator utilized the VAKT instruction methods. The third phase allowed participants to be praised while the fourth and final phase was implemented both with and without praise due to a ceiling effect that occurred during the previous phase. A ceiling effect occurs when participants have reached the maximum score possible.

Each day, the participants were provided with a pre-test before the instruction began as well as a post-test at the end of each lesson. This allowed the instructor to determine the number of words each student learned. Praise was only given to the students during the phases that required it. The words taught were randomly assigned to four different word lists. On-task behavior was used as the dependent variable and was tracked by an observer that recorded the on-task behavior during one of every six

sessions to obtain a sample for the overall study. The results revealed that students' on-task behavior and reading of sight words increased when the VAKT instructional method was implemented when compared to the visual and auditory procedure. However, when the visual and auditory procedure was implemented with positive praise, learning of sight words was higher than VAKT, even when it was paired with positive praise.

This study showed that both praise and the tactile/kinesthetic component improved student on-task behaviors. The visual and auditory instruction helped to increase the accuracy of the sight words read by the students, while the VAKT method helped to strengthen the students' short-term learning. Thorpe and Borden (1985), concluded that, "multi-sensory instruction succeeds because it increases student attention to task" (p. 286). Their data supports the idea that multi-sensory instructional approaches are one effective way for educators to increase student learning.

Thorpe and Borden (1985) provided the reader with a step-by-step process for both the VA and VAKT procedures and provided data charts for all four of the experiments to assist the reader in interpreting the results. An area for concern is that the study began during the spring and fall of 1982 and the winter and spring of 1983. The same students participated in the study; however there was no mention of any regression from what had previously been learned in the previous months. It would have been interesting to know if the students retained what they learned during the first and second phase of the study. Additionally, the third experiment showed a ceiling effect when scores of 100% were recorded for both on-task behaviors and sight words read correctly. As a result, the fourth phase was implemented with and without praise using the same participants as in experiment three. The only variable that changed was that the word

count increased. The results of the fourth experiment were similar to experiment three, which makes the reader question if the students were becoming accustomed to the pre-tests that were administered before each lesson. It may be possible that the students were seeing the same words over and over again to the point that they had not only learned them, but retained them as well.

The VA and VAKT are both excellent methods that incorporate all of the learning styles to help students to learn. In addition, there are several other methods to help students learn to read and spell. One of those methods that is favorable to the kinesthetic/tactile learner is sign language.

Sign Language

Felzer (1998), a California special education teacher, demonstrated how utilizing sign language as a multi-sensory instructional approach helped kindergarten students in general education learn to read. The idea of using sign language came after Felzer encountered a class of children in the 1970's who were then termed 'trainable mentally retarded'. These students were able to learn forty words in just six lessons. She then developed a plan to see if a multi-sensory approach to reading instruction using sign language as a tactile means could help students to learn.

Felzer (1998) partnered with kindergarten teacher Ruth Nishida who taught general education students. Together, they planned lessons where they would co-teach one day of the week while all other lessons would be implemented independently by the classroom teacher. The overall goal of the program was to get all kindergarten students reading at a beginning first grade level by the end of the school year. They followed steps for implementation that were laid out by Felzer in her *Multisensory Reading*

Program booklet. Their program began with the introduction of basic sight words and progressed into simple sentences and stories. Phonics was introduced when the students had learned forty sight words. Finally, spelling would be introduced. Felzer believed that by allowing students to learn basic sight words before introducing the phonics component of the program enabled students to realize the letters and sounds were associated with words they already knew.

At the beginning of the analysis, none of the twenty-five students in Nishida's kindergarten class could identify the letters of the alphabet, letter sounds, or even basic sight words (Felzer, 1998). By following the steps that were carefully laid out by Felzer, they developed lessons that included reading flashcards, signing the words, matching the words to objects, reading simple stories such as P. D. Eastman's, *Go Dog Go!* and putting simple scrambled sentences back into correct word order. The students were required to read the simple stories repeatedly to help reinforce reading fluency and accuracy.

By the end of the school year, twenty-one of the kindergarten students were reading at a first grade level. Seven of the students were reading at a mid-first grade level or higher. The author believed that a multi-sensory reading program showed great potential and should be studied further. All of the students taught using the sign language method developed a love of reading. Felzer concluded by stating that work would be done to improve the reading program and cooperation would continue with any teacher interested in the program.

While the approach to reading instruction was interesting, there are several areas of concern. First, Felzer was using sign language to teach students to read, however,

Felzer was not formally trained in sign language. She referred to a sign language handbook that is used throughout the study to help teach the students signs for the sight words. Second, by making the students reread the same text over and over again for fluency and word accuracy, it is possible the student may have memorized the simple text rather than become truly fluent. Also, it would be helpful to have some evidence of the students' progress throughout the rest of the school year. Rather than simply reporting that students ended the school year reading on a first grade level, she should report readers' progression throughout the entire school year. It also would be interesting to see if the same results would occur for students with learning disabilities.

Despite these areas of concern, the article provided clear step-by-step procedures for implementation. The program appears to require very little cost or training. It is easy to see how sign language could be utilized to help struggling readers learn to read more quickly, especially if the struggling reader is a tactile/kinesthetic learner.

For many students, reading continues to be a struggle. Struggling students not only have difficulty with reading basic sight words, but often are poor spellers lacking phonemic awareness. Many times, these students have weak auditory or visual skills. For these reasons, a multi-sensory approach to reading and spelling instruction may be beneficial for them. However, for a multi-sensory approach to work for students, educators need to be able to give up their own routines and rituals. Educators need to be flexible in their teaching and truly recognize that not all students learn in the same manner.

The literature reviewed shows two different approaches to implementing a multi-sensory program in the classroom. Each approach has its own strengths and has shown

benefits for those that participated in the studies reviewed. Each approach would cost little to the classroom teacher and would require minimal or no training. However, the study utilizing the VAKT instructional approach provided data supporting its validity as compared to the sign language only approach.

This brief look into multi-sensory instructional approaches to reading and spelling instruction has provided some useful information that can be utilized in a special education classroom. An area of concern is that there seems to be very few studies that have examined the effects that multi-sensory instruction can have on reading and spelling development in young students. Additionally, many of the journal articles that were found were not current.

Potential Causes for Reading Difficulties

Current research proposes that there may be several probable causes as to why some students struggle to read and decode text. These probable causes can be broken down into two main areas: cognitive causes, and causes related to the learning environment.

In this study, the cognitive factors that can affect a child with learning disabilities' ability to read will be examined first. Students who have been identified as having a specific learning disability in reading often demonstrate cognitive deficits in phonological awareness, auditory processing, and visual perceptual skills. Researchers have traced aspects of the condition to things such as a deficit in "phonological awareness", or the ability to decode words into individual sound units to the level of the neuron and even to the gene (Roush, 1995). Researchers have begun to establish that poor readers possess structures and activity levels within areas of the brain that are believed to be related to

phonological processing. This essentially creates subtle irregularity which can make a disturbance in the neural system which helps to link the visual representations of the letters to the corresponding phonological framework. These irregularities in phonological processing may appear in more than 20% of the nation's school children (Roush, 1995).

A second factor that can affect a student's ability to read is their learning environment. One of the major issues related to the learning environment of a student who struggles to read is the general lack of reading practice they get outside of the school setting. In order to become proficient readers, students should be submersed in reading not only in the classroom setting, but also at home. By doing this, students will become more independent readers and gain a valuable skill that be with them for the rest of their lives. As they become better readers, they display more independent motivation to read simply for pleasure. Regrettably, this same cycle can operate in reverse, resulting in a negative consequence. If students do not read outside of the classroom setting they are less likely to improve as rapidly as a student who reads for at least twenty minutes at home with a parent.

Perhaps one of the greatest interventions that can be implemented with a student who is having difficulty reading would begin within the home. A study, implemented by the Early Childhood Longitudinal Study of a kindergarten class throughout the 1998-1999 school year, showed that children who were read to at least three times a week by a family member were twice as likely to score in the top 25% in reading than children who were read to less than three times per week. Only 46% of the parents who had students participating in the study read to the children on a daily basis (Denton, 2002). Literacy

should begin in the home when the child is an infant. In fact, parental involvement with literacy may be one of the primary missing links for students who struggle to read.

There are also implications for the classroom learning environment. Students who are behind in reading instruction benefit from a more intensive and defined reading program than the typical general reading curriculum that most school districts utilize. Reading instruction should not only include whole group general reading curriculum at the student's current grade level, but also mini-lessons that are more intensive and geared to the phonemic awareness and decoding skills the student seems to be lacking. These mini-lessons should occur in a small group setting for students at the same reading level.

In today's classrooms, getting small group lessons in with the rest of the general curriculum can be a daunting task for any educator. There are two general ways small group lessons can occur. One of the most common ways the educator can include small group lessons is to place all students in the classroom into four or five groups based on their reading level. Membership in a reading group should rotate throughout the school year as students improve. One reason for the evolving reading groups is that students learn at differing rates. One student may require minimal interventions and move on to the next higher group, while another student may require more intensive reading interventions. The teacher can provide the class with classroom centers that focus on independent and academically engaging literacy work. While the students rotate around the class, teachers work with an individual literacy group while the remaining groups continue to work on independent literacy activities.

In summary, the two main causes for weak reading and decoding skills revolve around cognitive and learning environmental issues. The cognitive involves a

disturbance in the neural system and the link to the visual representation of the letters to the phonological framework. Learning environment issues include a lack of practice of reading skills outside the classroom setting, and the actual structure of the classroom reading curriculum and grouping of students.

There are three different learning styles: visual, auditory, kinesthetic/tactile. One of the methods used to incorporate all of the learning styles into spelling is the VAKT intervention method. The VAKT intervention method can also be used to not only improve students spelling, but also their overall word accuracy while reading. By incorporating intervention methods that use all of the learning styles can also improve the student's on-task behaviors in the classroom. Finally, sign language is an excellent method to incorporate a tactile approach when teaching younger students to read.

Methods

Every student has his/her own personal learning style that they prefer more than the others. However, it is important to recognize that many of the students who struggle to read are usually tactile kinesthetic learners who benefit from hands-on approaches and interventions (Bear 2000). Since the number of students that have difficulty grasping basic reading and spelling skills continues to grow, it is important for educators to implement a literacy program that incorporates all of the learning styles. A multisensory learning approach may be more beneficial to students with learning disabilities who are struggling to read.

Participants

For the purposes of this study, the researcher utilized a sample of convenience. All students in the researcher's class were classified as having learning disabilities and

received special education services throughout the entire day. The researcher teaches in an elementary school that is located in an underprivileged neighborhood. The students were third graders that were functioning at a mid-kindergarten level. The curriculum was modified for them so that they would learn how to spell and read basic sight words from the first grade curriculum.

For this study, two second grade male students from the class were targeted to determine if their reading development would increase after the use of a multisensory reading intervention. As a result of the standardized tests provided by the school district, the students qualified to receive special education services and interventions in the language arts content area. Both students were identified in the spring of their kindergarten year. Both of the students seemed to learn best through the use of kinesthetic and tactile activities.

The literacy history of these students showed an inability to decode unknown words in grade level text. Due to their inability to decode words, they also had great difficulty comprehending text read to them or read independently. Students at the end of their first grade year should typically be reading at a level 16 with at least 90% word recognition accuracy while reading 60-80 words per minute, however, these students were reading on a level 1. Consequently, these students also had great difficulty in their overall writing conventions and writing applications.

Instrument

Throughout the study, the students' progress was tracked through the use of running records, high frequency word checklists and phonemic awareness checklists.

The running records were taken from the PM Rigby Benchmark reading assessments and were used at the end of each grading period to determine the students' literacy growth. Running records were utilized for both the pre-test and post-tests. One running record was given at the beginning of the school year in August to assess the student's starting reading level. At the end of each grading period, a running record was administered to check the individual progress of each student, while one final running record was given at the end of the school year in May. During the times the running records were administered, the facilitator also assessed the students' high frequency word recognition progress.

By using running records, teachers are able to effectively monitor students' progress in reading throughout the school year. Through the use of such running records, teachers are able to monitor student's word accuracy, comprehension, and fluency rates by tracking how many words they read per minute.

The checklist assessing students' progress in high frequency word knowledge came from the Fry High Frequency word lists. These lists provide one hundred words the student should know by the end of each grade level beginning with first grade and ending with fifth grade.

Procedures

Data collection. In August of 2006, at the start of the school year, a running record from the Rigby PM Benchmark reading assessment kit that the school district utilizes was administered to both students to determine their current reading level, word accuracy recognition, comprehension of read text and reading fluency. At the same time, the students' knowledge of high frequency words was also tested. At each grade level,

the student is expected to memorize one hundred words from the Fry High Frequency word lists. The researcher not only tested the students' knowledge of the words they needed to learn for the second grade, but also the words from the previous school year. Throughout the course of the school year and the study, the students were tested with the same materials at the end of each of the four grading periods to assess their literacy growth during their second grade school year.

At the beginning of the 2006-2007 school year, both students' reading levels were analyzed using the designated running record format. Students entering the second grade are expected to read a minimum of a level 16, however, results indicated that both students' reading scores were significantly below grade level. Both students' reading scores were between level 1 and level 3, which is considered a pre-primer or pre-kindergarten level. Examination of the students' literacy folders with the district revealed both had been reading at the pre-primer level at the beginning of their first grade year as well. This indicated that these two students made virtually no literacy growth throughout the previous academic school year.

In order to track the students' literacy growth throughout the school year, running records from the Rigby PM Benchmark system were administered to the students every nine weeks. Again the running records assessed the students' word accuracy, reading fluency, and overall reading comprehension of not only literal questions, but also questions that required them to infer what they had read. During this time, the students were also assessed on the number of sight words they could accurately read from the Fry High Frequency word list for first and second grade.

Interventions. The multisensory interventions used with the two target students with learning disabilities utilized all three learning styles: visual, auditory, and kinesthetic/tactile. This was done partly to allow students the opportunity to apply their preferred learning style within the classroom. In addition, by incorporating all three learning styles into the interventions, it allowed students to reap the benefits all three learning styles had to offer. The first intervention implemented was changing the seating arrangements for both students within the regular education classroom.

A visual learner learns the best by having information presented to them in a visual manner. Since visual learners make up the majority of the population within a learning community, many classrooms present the learning material through illustrations, diagrams, and presentations. Student A seemed to learn best through visual methods. For this reason, his desk was moved to the front of the classroom so that he could be closer to where the majority of the teaching was occurring. By doing this, Student A was able to be up front where the teacher would be presenting lesson material and writing on the chalkboard.

An auditory learner learns through hearing material. Student B's greatest strength was in listening comprehension. Often, Student B could be observed looking at the person that was reading from a textbook, rather than following the text with his eyes as the reader spoke. Since auditory learners like to sit where they can hear the lesson material, the teacher worked with Student B to find a location where he could listen the most clearly with few distractions. After several trial periods, Student B's desk was relocated to the middle of the second row in the regular education classroom. This arrangement allowed him to listen to the lesson material being presented, and allowed

him to see the chalkboard more clearly. This seating arrangement permitted his two strongest senses (visual and auditory) to be combined.

One of the materials used for both students in this study was the EZC Readers. The EZC Readers are used like color overlays to help alleviate visual tracking problems that can occur while reading. Unlike color overlays which cover the entire page, EZC Readers are small portable bookmarks that have a strip of transparent colored plastic that covers a single line of text. They improve the students' tracking of text as they read, making it less likely for word error or discrepancy due to poor tracking. EZC Readers also helped improve both students' word accuracy and fluency rates.

Another intervention that was implemented was a rapid word recognition sheet. The rapid word recognition sheet is a grid or table that consists of high frequency sight words the students were required to learn. Only five to six high frequency words were presented on each grid. Each box on the grid contained one sight word the student had been having difficulty memorizing. As the grid progresses the high frequency words are rotated on each line. This system helps to prevent the student from utilizing rote memorization of the words and to become a more fluent reader. It forces the student to utilize one-to-one correspondence, touching and looking at each individual word while reading, ultimately increasing fluency. See Appendix for a sample grid.

Each week the students were required to read and comprehend one story from the school district's required reading textbook for their specific grade level. The two students were held accountable for all tests and assignments required of students in the regular education classroom. Allowable accommodations provided in their Individualized Education Plans were also permitted for the tests. Since one

accommodation was to receive lessons in a small group environment, both students were pulled out of the regular education classroom and received their daily lessons in the learning resource room. The daily lesson included not only the regular reading curriculum, but also mini lessons that focused on phonemic awareness components the students were lacking. Within the learning resource room there were fewer distractions due to the small group environment and the students were able to read at a slower pace. Pulling the students out into the learning resource room also allowed the instructor to provide them with more individualized instruction based on their needs.

One of the ways the instruction was individualized was that students were able to listen to the story three times throughout the week. This differed from the regular education classroom where the students only heard the story once and were required to read the story silently on another day. By allowing the target students to hear the story more than one time it allowed them to work on their listening comprehension, and helped them to develop better decoding skills. Student B is an auditory learner and it was vital that he was able to hear the story multiple times before completing any comprehension tests. During the introduction of the new story, the students were able to listen to the story being read aloud by either the instructor or through the use of compact disc. During this process, the students followed the text with their EZC readers.

On the second day working with the textbook story, the teacher read the story aloud to the students, stopping throughout to ask comprehension questions. By stopping and asking comprehension questions, the instructor was able to monitor students' understanding of the story. Literal questions were asked where students could look back within the text and locate the exact answer, as well as higher level questions that required

students to infer utilizing their background knowledge. On the third day, the student's partner read the story aloud. The students were paired based on reading level so that higher level students were paired with lower level students.

Graphic organizers were used to support students as they demonstrated their comprehension of the text after they read aloud and independent reading phases. Graphic organizers are an excellent way for the visual learner to help organize their thoughts and information about the text on paper. Rather than writing their thoughts in a reading journal, the graphic organizer provides visual learners with visual cues to help them remember the important parts of the story. Graphic organizers also helped to reinforce specific literary skills such as comparison and contrasting, main idea, supporting details, and plot. Many of the graphic organizers used at the primary level provided a picture as a cue to help students visualize, understand, and transfer the specific literary skill. One specific example of this was the graphic organizer that was used to demonstrate plot. See Appendix for a sample organizer.

The final intervention was based on the kinesthetic/tactile learning style. Kinesthetic/tactile learners make up about 10% of the population. These learners are often characterized as having "learning disabilities" mostly because schools do not teach to their preferred learning style (King, 1996). Kinesthetic/tactile learners need to be active and take frequent breaks. They often speak with their hands using hand gestures as they talk. When sitting, these learners tend to tinker or doodle when bored. If allowed to pick their own seat in a classroom setting, these students usually try to sit where they can easily exit a room. In addition, they often sit on the ends of rows.

Since both target students displayed signs of being kinesthetic/tactile learners, they were offered frequent breaks throughout the day. Many times during the course of the study, a short break was taken after each lesson. Another intervention used weekly was to allow the students to have more kinesthetic/tactile experiences such as *Making Words* (Cunningham, 1994) activities.

The *Making Words* activities requires students to manipulate individual letter tiles into words dictated by the teacher. The words begin small, requiring only two letters, with subsequent words building upon previous words. This process continues until the students are eventually building five and six letter words. Finally, the students are asked to use all of the letters provided to create or decipher a secret word. Through the *Making Words* activities, students are able to improve their phonemic awareness and identify and recognize smaller word chunks within the larger words. The activities also allow a child that has already acquired phonemic awareness to discover letter-sound correspondence and spelling patterns (Cunningham, 1994). It helps them to recognize word families, improving both reading and spelling skills.

One of the most important interventions immediately put into practice was the use of nightly baggie books. It has been speculated that a missing link for students who struggle to read is a lack of parental involvement with literacy. A child who reads with an adult for a minimum of twenty minutes is more likely to make strong reading progress than a child who does not read outside of the classroom setting (Topping, 1996). In an effort to get parents more involved in the literacy development of the students, nightly baggie books were sent home. The book sent home was generally a book that had been read in small guided reading group sessions. These books contained many of the high

frequency words the students had been struggling to learn. Also part of the baggie book ritual were high frequency word flashcards. As the students became more fluent in read the words, additional flash cards were added. Each student had a reading log the parents had to sign to confirm the nightly reading had been completed. Baggie books were sent home four days a week. It is important to note they were not sent home on the weekends because the students frequently would forget to return them to the classroom.

Moving Student A's seat to the front of the classroom helped him to learn more because his close proximity to the teacher helped to keep him on-task. It also allowed him to be directly in front of where the core teaching was occurring. Student B's seat change to where he could listen the best helped to utilize his strong listening comprehension. The EZC Readers assisted both students with visual tracking problems that occurred while they were reading. They also helped with on-task behaviors when others were reading aloud. Rapid word recognition sheets improved both students high frequency word recognition and prevented the typical rote memorization of flashcards. While in the learning resource room, the students were able to hear the weekly story three different times through the use of read-alouds, partner readings, and silent reading. Graphic organizers were used to help the students improve their reading comprehension. Finally, *Making Words* activities were used to help students improve their decoding skills in a kinesthetic/ tactile manner. All of the above interventions helped the students improve not only their overall reading skills, but also their listening comprehension and spelling skills.

Results

By changing the students' seats, using EZC Readers, rapid word recognition sheets, nightly baggie books, *Making Words* activities, graphic organizers, and read alouds impressive results were attained. Both students reading at pre-primer levels at the start of the study improved an entire grade level.

Pre-intervention Results

Rapport was easily established with both students and each seemed eager to have the one-on-one time with the researcher. Running records from the Rigby PM Benchmark system were used for both the pre and post tests with both students. However, as both students read the selected text used in the pre-assessment, they failed to demonstrate any strategies that a typical second grader would display to decode unknown words. Rather than looking at chunks within the unknown words, both students seemed to guess words that began with the beginning letter of the unknown word. They failed to utilize the visual cues of the word structure, which in turn caused confusion with the meaning of not only the unknown words, but the entire text itself. As a result, the students' comprehension of the text was greatly affected. Many of the words that the students missed were considered high frequency words that should have been mastered in the first grade. As a result, both of the students failed to demonstrate comprehension of the reading passage.

Post-intervention Results

Both participants in the study showed significant growth in all aspects of their reading development. At the beginning of the study, both were reading significantly below grade level. In fact, both students were reading at pre-primer levels one and two at the beginning of second grade while their more typical peers were reading at text level

twelve or higher. See Figure 1. However, by the end of the study both students had greatly improved their word decoding skills to increase their reading text levels tremendously. See Figure 1. Student A began the study reading at a level two according to the Rigby PM Benchmark system. At the end of the study, Student A was reading at a level thirteen. Student B began the study reading at a pre-primer level one. By the end of the study, Student B had improved and was reading at a level twelve.

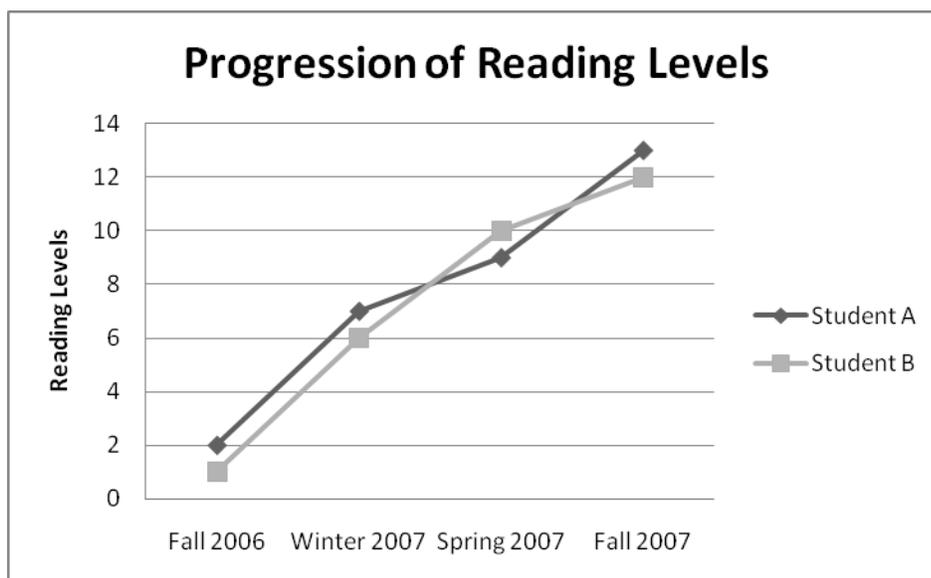


Figure 1. Progression of students' reading levels

Student A showed the greatest overall improvement in not only word accuracy, but also in overall reading comprehension and reading fluency. See Figure 2. At the beginning of the study, Student A's reading fluency was twenty words per minute. A typical student would have been reading seventy words per minute on average. By the end of the study, Student A had improved his reading fluency to eighty words per minute.

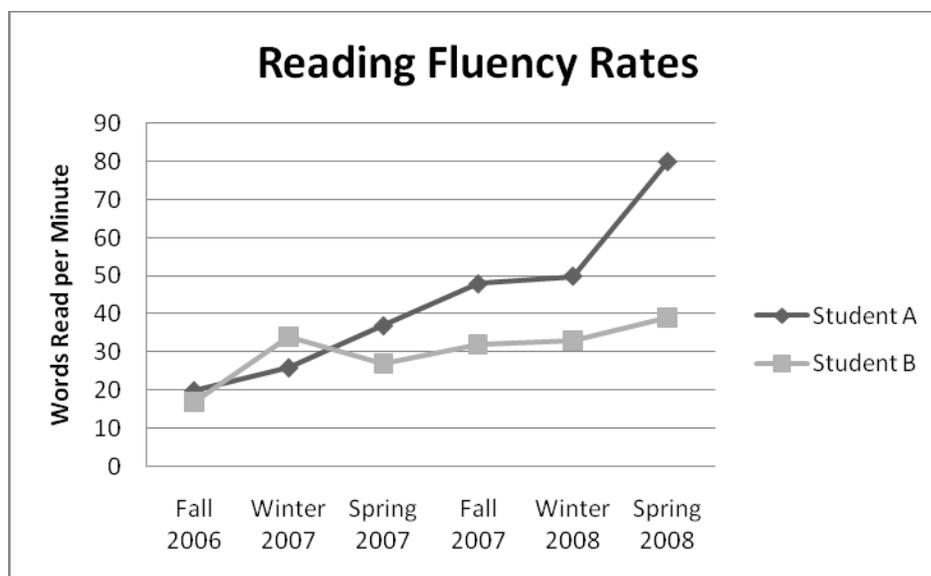


Figure 2. Progression of students' reading fluency (words per minute)

As evidenced in Figure 2, interventions such as changing the student's seating position within the classroom, reading aloud text, graphic organizers, and rapid word recognition drills were successful in improving both students' overall reading text levels as well as their reading fluency rates. It is the researcher's opinion that these interventions are successful in helping to improve students with learning disabilities overall reading ability and therefore these recommendations are highly recommended.

Recommendations and Conclusions

The debate over which interventions are best when teaching children to read continues throughout each and every school in America. Within schools there will continue to be a population of students identified with learning disabilities who will struggle to acquire the basic reading and spelling skills that come easily to their typically developing peers. During the elementary years, it is most crucial for students to master the basic reading and spelling skills necessary for their entire academic career. Reading

is a fundamental part of daily life making it a lifelong skill that each and every student needs in order to be successful as an adult functioning in the 21st century.

Visual learners make up sixty percent of the learning populations and auditory learners make up thirty percent (King 1996). This may explain why educators tend to teach their daily lessons in a manner that caters to visual and auditory learners. The remaining ten percent of learners tend to favor a more tactile/kinesthetic approach to learning that is more likely to take more time to teach. Teachers, due to the pressure to have students succeed on today's high stakes achievement tests, may not feel that they have enough time to incorporate reading lessons designed to reach all students adapted to a variety of learning styles. It is important, however, that an effort is made to reach all students so that every child is given a chance at a quality education.

Discussion

Based upon running records and high frequency word record lists, the two participants in this research study showed strong gains in their overall reading accuracy, comprehension, and fluency. They were provided reading interventions designed to enhance their favored learning style, combined with other learning styles the students utilized less often. Daily, the students were immersed in a classroom environment that provided engaging lessons and activities where they had to use their visual and auditory senses along with many hands-on opportunities designed to enhance phonics and reading strategies.

Recommendations

It is evident from the improvement in students' reading decoding skills, reading fluency, and overall comprehension that the participants should continue to receive multi-

sensory reading interventions to maintain and improve their literacy development. The interventions utilized during the study had previously not been part of the students' reading instruction. It is the researcher's opinion that one of the interventions producing a strong positive outcome was reading at home with a parent or other adult. Having the parents sign off on a daily reading log helped to ensure that the students were reading with their parents nightly. Parents were also able to provide feedback to the teacher as to difficulties they were seeing at home with the baggie books. The daily baggie books that were sent home focused on the students' decoding skills and high frequency words. Additionally, it encouraged parents to take a more active role in their child's education. It can be noted that perhaps one of the greatest interventions that can be done with a student who is struggling to read is to get the student to read more at home with a loved one.

The interventions utilized in this study should continue to be used with not only the two participants in the study, but also with any newly identified students needing special education services. Students who are academically at risk and are receiving interventions to determine if they have a disability could also benefit from a strong literacy program that incorporates all aspects of multi-sensory learning.

Future research might explore whether or not these multi-sensory reading interventions could be implemented at an earlier primary age such as kindergarten or first grade. Perhaps, with earlier interventions that focus on all multi-sensory areas, there could be much more successful readers and less students being referred for interventions to determine if they have a specific learning disability in reading.

It is important to note the interventions in this study can be implemented by a special education or a general education classroom teacher. These strategies could be incorporated into guided reading groups and reading centers during group time.

Conclusion

A teacher who implements a multi-sensory literacy program must be extremely organized and flexible. It can be very time consuming to develop interventions and utilize them on a daily basis, but the reward is having students that are much more engaged in the reading process and improved reading scores. One of the greatest gifts that can be given to a child is the gift of reading and life-long learning. As educators, it is our job to provide students with the knowledge and skills to become strong readers and learners and the methods outlined above are an excellent way to ensure that happens.

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Appendix A

Blank Sample of Running Record

Level 12					Level 12: Soccer at school				
Reading Record					Assessment Record				
Name: _____ Age: _____ Date: _____ Text: Soccer at school Level: 12 R. W: 122 Accuracy: _____ S.C. Rate: _____					Name: _____ Analysis of retelling (meaning, main ideas, coherence, vocabulary, reference to text)				
je	This story is about some children named Matt, James, and Andy who are playing soccer at school.	E	S.C.	Errors MSV	Self-corrections MSV	Questions to check for understanding (check if understanding acceptable)			
	Matt said to James, "Let's go and find a place where we can kick my soccer ball." The big children came to play on the grass, so James and Matt went over by the trees. "This is not a good place to kick the ball," said Matt. "Let's see if we can go on the grass." They went over to a big boy named Andy. "We want to play soccer on the grass," said Matt. "Can we play here with you?" "No, you can't," said Andy. "We always play here." Matt and James walked slowly back to the trees. Then they saw Andy kick the ball off the grass. It went all the way over to the school and hit the wall.					1. What game did Matt and James like to play? Response: <input type="checkbox"/>			
						2. Why couldn't Matt and James play soccer on the grass? Response: <input type="checkbox"/>			
						3. What happened when Andy kicked the ball off the grass? Response: <input type="checkbox"/>			
						4. What do you think might happen next? Response: <input type="checkbox"/>			
					Reading level Accuracy level: _____ = 1: _____ = % Self-correction rate: _____ = _____ = 1: Reading level (with understanding): Easy / Instructional / Hard				
					Analysis of reading behaviors (print concepts, meaning cues, structural cues, visual information, self-monitoring, self-correcting, fluency, expression)				
					Recommendations:				
					Teacher: _____ Date benchmark assessment completed: _____				
Total									

Appendix B

Rapid Word Recognition Sheet

Rapid Word Recognition				
over	new	sound	only	know
new	sound	only	know	place
sound	only	know	place	after
only	know	place	after	thing
know	place	after	thing	sentence
place	after	thing	sentence	great
after	thing	sentence	great	help
thing	sentence	great	help	through
sentence	great	help	through	much
great	help	through	much	before
help	through	much	before	over

Appendix C

Graphic Organizer

setting

place

time

Graphic Organizers: Reading • Scholastic Teaching Resources