Sensory Strategies and Literacy Learning

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Abstract

This research explores the effects of sensory integration on literacy engagement. The purpose of this study is to observe different sensory strategies during literacy activities to see if specific strategies promote student engagement. Through my data collection I explored if literacy engagement increased when sensory strategies were implemented. This qualitative study was conducted with 14 first grade students over a six week period. The majority of research in this field addresses ways sensory integration helps children with disabilities and challenging behaviors. Limited research has been done on the impact of literacy engagement when literacy skills are combined with sensory integration. I collected data through student interviews, observational notes, a reflection journal, and student work samples to discover if sensory integration can help all students achieve literacy success.

Keywords: sensory integration, sensory strategies, literacy engagement
Table of Contents

Abstract ............................................................................................................................................. 2

Table of Contents .......................................................................................................................... 3

Introduction ...................................................................................................................................... 5

Research Problem .......................................................................................................................... 6

Rationale .......................................................................................................................................... 10

Purpose ........................................................................................................................................... 11

Research Questions ......................................................................................................................... 11

Literature Review ............................................................................................................................ 12

Introduction ...................................................................................................................................... 12

Sensory Integration and Children with Disabilities ......................................................................... 12

Sensory Integration and Engagement ............................................................................................. 15

Sensory Strategies and Unique Approaches .................................................................................... 16

Summary .......................................................................................................................................... 17

Methods ........................................................................................................................................... 18

Participants ...................................................................................................................................... 18

Setting ............................................................................................................................................ 18

My Positionality as the Researcher .................................................................................................. 19

Data Collection ............................................................................................................................... 28

Trustworthiness ............................................................................................................................... 30
Data Analysis .......................................................................................................................... 30
Findings.................................................................................................................................. 32
Discussion................................................................................................................................. 42
References................................................................................................................................. 49
Introduction

Upon first observation, the first grade classroom seems silent. All the students appear to be engaged in various literacy activities. While a small group of students meet with the teacher for a reading group, the remaining students work independently. The students working independently are doing Daily Five activities: Read-to-Self, Read-to-Someone, Listen to Reading, Working on Writing, or Word Work. Although the students are quiet, not all of them are engaged with their independent activities. During Read-to-Self, only one student is actually reading his book. The other students are quickly flipping through the pages, only looking at the pictures or fidgeting in their seats. One student is building a structure out of the books in his book box. What benefits are the students getting out of this independent literacy activity? At least the students at Work-on-Writing are on task, right? The students’ papers only include a couple of written words which suggests that full engagement is not taking place at this activity either. However, there are students that are engaged in literacy activities. The students that are doing Listen-to-Reading on the Learn-Pad tablets do not even look up when the co-teacher walks in the door. The five students doing Listen-to-Reading are sitting on rocking chairs, pillows, web chairs or standing. In a similar fashion, the students doing Word Work are spread out around the room using various materials including shaving cream, play-dough, sand, magnets, and letter Lego blocks. The only noise they make is groaning when they are told to clean up their Listen-to-Reading or Word Work materials. All the students at Listen-to-Reading and Word Work are truly engaged and motivated by the hands-on multisensory activity they are doing. Why is there a difference in the students’ literacy engagement? How can I, as the teacher, help to increase literacy engagement for all the students? What will happen if sensory integration is combined with literacy activities?
Research Problem

The problem that is illustrated in the snapshot above is that not all students are fully engaged in literacy activities. Students may not be getting their sensory needs met during certain literacy activities which might cause a lack in engagement. A lack of engagement may lead to other problems such as less instruction time for a teacher and less learning for students.

The scenario above is a look at my first grade classroom during Daily 5/Guided Reading. Daily Five is a program born out of the research done by two sisters, Gail Boushey and Joan Moser. Daily Five is a structure for organizing the literacy block in a classroom. The goal of Daily Five is to give the students five independent literacy activity choices to engage in while the teacher meets with reading groups for Guided Reading. The five choices include, Read-to-Self, Read-to-Someone, Listen-to-Reading, Work-on-Writing and Word Work (Boushey, 2012). The teacher aims to conduct Guided Reading groups while the other students are engaged in independent activities. The problem is many students are not on-task and engaged in the literacy activity they are working on. This can cause a teacher to have to give attention to the independent students instead of being able to fully focus on the Guided Reading group being conducted. During Daily Five, students gravitate towards the more multisensory activities like Listen-to-Reading and Word Work. During these choices students demonstrate more engagement than they do while doing Read-to-Self, Read-to-Someone or Work-on-Writing.

Engagement involves a number of components including students’ interest, motivation, and stamina while engaging in the activity. A student can engage either positively or negatively to these characteristics (Hui and Cheung, 2014). If students report being engaged in a certain literacy activity, that activity may be thought of as high quality in terms of “effective educational practice” (Hui and Cheung, 2014, p.561). “It is better for students to be engaged than
unengaged” and it is the obligation of “teachers and administrators to create and sustain high levels of student engagement in order to enhance their learning and development” (Hui & Cheung, 2014, p. 561).

Engagement is so important because, according to Klem and Connell (2004): Research links higher levels of engagement in school with improved performance. Researchers have found student engagement a robust predictor of student achievement and behavior in school, regardless of socioeconomic status. Students engaged in school are more likely to earn higher grades and test scores, and have lower drop-out rates. In contrast, students with low levels of engagement are at risk for a variety of long-term adverse consequences, including disruptive behavior in class, absenteeism, and dropping out of school. (p. 262)

When I compare the different Daily Five activities I notice some activities, such as Word Work and Listen-to-Reading, are sensory stimulating for the students. Activities that are sensory stimulating incorporate two or more of a child’s senses at once. Word Work and Listening-to-Reading engage a child’s senses by incorporating a combination of touch, smell, taste (oral stimulation), sight, and hearing (audio stimulation) (He, Petrus, Gammon & Lee, 2012). Work-on-Writing, Read-to-Self and Read-to-Someone may not involve two or more of a child’s senses like other activities do.

Some students may have Sensory Processing Disorder (SPD). “A sensory processing disorder (SPD), also referred to as dysfunction in sensory integration, is a complex disorder of the brain that affects children and adults. People with SPD misinterpret everyday sensory information such as touch, sound, and movement. They may feel bombarded by information, seek out intense sensory experiences, or have other symptoms” (Murray, Baker, Slutsky & Paris,
According to Murray, Baker, Slutsky and Paris (2009, p. 2), children with SPD can be sensory seeking, under responders, or over responders.

**Sensory Seekers**

Children that are sensory seekers seek out intense sensory input in an attempt to calm their bodies and make sense of their environment. This presents as children who cannot sit at their seat, constantly touch their surroundings, demonstrate unsafe behavior and have poor body awareness (Murray, Baker, Slutsky & Paris, 2009).

**Under Responders**

Children that are under responders are sometimes children that stare into space, need a lot of wait time to answer questions, have trouble remaining upright, and do not respond to loud noises (Murray, Baker, Slutsky & Paris, 2009). This occurs because children that are under responders do not react to sensory input the same as their peers, which results in these students needing more sensory input in order to meet their optimal state of arousal for active engagement in the classroom (Murray, Baker, Slutsky & Paris, 2009). However, a child can look under responsive, but actually be in sensory shut down because of overstimulation (Murray, Baker, Slutsky & Paris, 2009).

**Over Responders**

Children that are over responders are considered to be sensitive to sensory input (Murray, Baker, Slutsky & Paris, 2009). These children respond well to calming activities and a structured learning environment. Too much sensory input can overstimulate these children (Murray, Baker, Slutsky & Paris, 2009).
For most people, responding to touch, sound, and movement is an automatic process. When individuals are lightly touched on the arm, they respond to that touch by calmly acknowledging that they were touched. However, a child with SPD does not respond in the same manner. If a child is an over responder he or she may react to that light touch as if it were painful. An under responder may not realize that he or she was touched and therefore not respond at all. People with atypical sensory processing have especially high or low thresholds to sensory stimulation (Murray, Baker, Slutsky & Paris, 2009). A threshold refers to how much sensory input a student needs to reach their ideal sensory level. Individuals with atypical sensory processing need either an increase or decrease in sensory input compared to others. Therefore, a child’s ability to attend and focus is affected when they are either under responding or over responding to sensory input or environmental stimuli (Murray, Baker, Slutsky & Paris, 2009).

The type of sensory-based learner the student is determines what type of sensory interventions will best benefit them. No matter what type of sensory-based learner a child may be, if they are not presented with sensory integration it may “deprive the learner of important learning opportunities” (Murray, Baker, Slutsky & Paris, 2009, p. 3). Furthermore, all students, not just those who have sensory processing disorder, have sensory needs (Thompson & Raisor, 2013). The only way to determine a child’s sensory needs is by “observing children’s responses to the environment” (Thompson & Raisor, 2013, p. 34). Then “teachers can determine each child’s processing profile and then implement various strategies to help all children succeed” in literacy (Thompson & Raisor, 2013, p. 34).
Rationale

Student engagement is the most important factor in student achievement (Hui & Cheung, 2015). This study is important because teachers want to help their children be as engaged in literacy activities as possible. Reflecting upon what my students achieve during English Language Arts (ELA) activities, it appears that they are not performing to their highest potential due to their lack of engagement. I wonder if during ELA these students are not engaged because they are not receiving enough sensory input, or stimulation from a sensory activity. This idea is also supported by Thompson & Raisor (2011, p.1). Even if the activity is developmentally appropriate, it needs to be engaging to promote learning (Hui & Cheung, 2015).

Student engagement is important because it may lead to desired academic, social, and emotional learning outcomes (Christenson, Reschly, Wylie & Springer, 2012). In order for students to be engaged in literacy activities teachers need to provide them with learning opportunities that are motivating and effective at teaching literacy skills (Christenson, Reschly, Wylie & Springer, 2012). Sensory integration during literacy activities may influence the engagement of students in a positive way. Many of my students are below grade level when coming into first grade. I wonder, are these students not getting their sensory needs met? If not, could that be a reason why they are having trouble learning the same literacy skills as their peers? Buica-Belciu (2014) reminds us that, “The human brain is multisensory and so are the learning processes” (p.106). When the classroom setting does not incorporate sensory integration students may not be getting what they need to succeed academically.

In review of research on related topics, I have found that many sensory integration strategies focus solely on the sensory side of the child and they don’t take into account the academic side of the child. I am interested in researching what happens when you combine
sensory strategies with teaching techniques. I have also found that many suggested sensory strategies would not necessarily work in a classroom setting for various reasons. Many of the research studies done on sensory integration are written from an Occupational Therapist’s viewpoint. These studies offer information regarding how to give sensory input, or sensory activities, to children but, once again, do not address how to do this in combination with teaching literacy. There is a need for research that focuses on sensory needs and literacy. Sensory integration is a strategy that teachers and school staff can use to help children with Sensory Processing Disorder control their behaviors. However, I am interested in how all students respond to sensory integration in relation to literacy engagement.

**Purpose**

The purpose of this study is to explore different sensory strategies during literacy activities to see if any strategies are effective in promoting student engagement. My goal is to find sensory integration activities that support the students’ sensory needs while also helping them focus so they can be fully engaged during literacy activities.

**Research Questions**

I am interested in researching how to help all students achieve literacy success through sensory integration. Thus, I am exploring the following: What happens when we incorporate sensory activities into literacy instruction? Do students learn literacy skills better when sensory strategies are implemented into ELA instruction? If so, what specific sensory integration strategies are most beneficial and effective for students? How does the inclusion of sensory activities into literacy instruction impact literacy learning? I aim to answer these questions through my research and be a teacher that can meet the needs of all of my students.
Literature Review

Introduction

All children are unique individuals that learn differently. Just as children have different learning styles, children also have different sensory needs and different activities that they find engaging. All children process information in different ways and their sensory needs have an impact on their academic performance. When a child’s sensory needs are not met it impedes their ability to learn appropriately and be engaged in an activity (Worthen, 2010). This study is an exploration of what happens when sensory integration takes place during literacy instruction.

Many researchers have explored sensory integration and its effects on children. There are three main well-researched components to sensory integration: children with disabilities (Devlin, Healy, Leader & Hughes, 2011), engagement (Christenson, Reschly & Wylie, 2012), and unique approaches (Katai, 2011).

Sensory Integration and Children with Disabilities

The Individuals with Disabilities Education Act (IDEA) requires “free appropriate public education for all school children with disabilities” (Howard, 2004, p. 167). As a result of IDEA children need to be educated in the Least Restrictive Environment (LRE) (Howard, 2004). LRE mandates that children with disabilities should “be educated with children who are not disabled to the maximum extent appropriate” (Howard, 2004, p. 167). This changes the demographics of classrooms by making children with disabilities more apt to be educated in a general education classroom (Howard, 2004). In order for all children to succeed academically they need to have tools and strategies in place to best benefit them. Sensory integration helps children with disabilities be able to succeed academically in a general education classroom by helping them control disruptive behaviors. Sensory integration can keep children with disabilities in a general
Sensory integration has been a strategy used by professionals to help children with autism control their “challenging behavior (including self-injurious behavior)” so that the students can be engaged in the instructional program (Devlin, Healy, Leader & Hughes, 2011, p. 1). Delvin, Healy, Leader and Hughes (2011) also looked at a behavioral intervention plan to explore if this approach helps children with autism with their challenging behaviors and engagement. A behavior intervention plan describes the problem behavior and says what intervention strategies need to be put into place to help the student (Devlin, Healy, Leader & Hughes, 2011). The behavior intervention plan is based off of “operant conditioning principles” in which positive rewards are used to influence a desired behavior (Devlin, Healy, Leader & Hughes, 2011, p. 1303). After comparing the two approaches, the results of this study showed that the “behavioral intervention was more effective than the sensory integration therapy in the treatment of challenging behavior” (p. 1). Although, this study found a behavior intervention plan to overall be more effective at controlling challenging behaviors compared to a sensory integration approach, benefits of the sensory integration approach were noted. The “frequency of SIB (self-injury behavior) decreased during [sensory] therapy sessions (p. 1305).” If behaviors are controlled then students can focus more on academics and learning. If teachers do not have to worry about a student’s behaviors, they can focus more on their instruction. More learning may take place when distracting behaviors are decreased.

Fernández-Andrés, Pastor-Cerezuela, Sanz-Cervera, and Tárraga-Mínguez (2015) also look at how sensory integration affects children with autism. This study notes that a classroom education classroom (Fernández-Andrés, Pastor-Cerezuela, Sanz-Cervera, & Tárraga-Mínguez, 2015). In my classroom I have children with various disabilities and I explore if sensory integration enables these children to learn literacy skills in a general education setting.
setting can be difficult for children, especially those with autism, because of the unpredictable factors in a classroom. Children with autism also can have a harder time socially at school than at home and this could be because “the school environment is a highly social environment where there are different people who are less known and trusted people by the child” (Andrés, Cerezuela, Cervera & Mínguez, 2015, p. 210). Sensory strategies can help students deal with the unpredictable factors that occur in the school setting (Andrés, Cerezuela, Cervera & Mínguez, 2015). If students can find ways to avoid being bothered by the unpredictable factors of school, then they can focus their attention on learning literacy skills.

Sensory integration is also used for children with “sensory integration dysfunction, and motor planning challenges” (Granke, 2007, p.231). Granke states that it is important for sensory integration to be used for these particular children because if they do not have their sensory needs met, they may have trouble with their body movement and have difficulty responding appropriately to various educational activities (Granke, 2007). To help children get their sensory needs met, Granke (2007) has found the hand, mouth, mind (HMM) strategy to be effective. Granke suggests that teacher’s should incorporate a student’s hands, mouth and mind to best support his or her learning (Granke, 2007). When a student is doing an educational activity with his hands, he should also have the opportunity to use his verbal skills to express his learning. Literacy activities, such as building words with Legos and reading them to a partner, are examples of using HMM to incorporate sensory input into literacy activities (Granke, 2007).

Leong, Stephenson and Carter (2014) look at how children with disabilities respond to sensory integration. According to Leong, Stephenson and Carter (2014) there is a lack of evidence supporting sensory integration, but it continues to be used in classrooms to help children have less disturbing behaviors and be more engaged (Leong, Stephenson & Carter,
The researchers state that many teachers perceive benefits from sensory integration, but do not have evidence to support the benefits (Leong, Stephenson & Carter, 2014). “Successful integration of the sensory systems is thought to be indicated by the student’s response to the therapy, called an adaptive response” (p. 10). It is important that teachers document any adaptive responses that they observe (Leong, Stephenson & Carter, 2014). This will provide teachers with evidence that suggests the positive benefits of sensory integration (Leong, Stephenson & Carter, 2014). In my research I use observational notes, collection sheets, interviews and student work to document any “adaptive responses” (Leong, Stephenson & Carter, 2014).

**Sensory Integration and Engagement**

In order for students to learn literacy skills, they need to be engaged in literacy activities. This study will explore if sensory integration can help improve student engagement with literacy activities. Researchers, such as Christenson, Reschly and Wylie (2012), consider student engagement as one of the most crucial factors in predicting student success. According to Klem and Connell (2004), “engaged students do more than attend or perform academically; they also put forth effort, persist, self-regulate their behavior toward goals, challenge themselves to exceed, and enjoy challenges and learning” (p. 262). Student engagement is also “generally associated positively with desired academic, social, and emotional learning outcomes” (Klem & Connell, 2004, p. 262). Bryson and Hand (2007) suggest that engagement, the learning environment and the learning process “cannot be treated as if they exist separately from each other” (p. 4). Engagement is not just active participation, but “emphasizes the relationship between the perception and experience of the student…and their engagement with education” (Klem & Connell, p. 5). Researchers agree that engagement promotes learning. If sensory integration leads to engagement then sensory integration will also promote learning.
Worthen (2010) claims that sensory integration can improve behavior, and engagement in the classroom which will improve learning literacy skills. According to Worthen (2010), sensory integration can also improve a student’s academic performance due to the increase in engagement. A student’s reading and writing may improve because they are engaged and motivated by sensory integration. Murray, Baker, Murray-Slutsky and Paris (2009) claim that “prevention of behavioral problems in school settings is essential” (p. 1). This work suggests that if a student’s sensory needs are not being met, they could be off-task and need redirection from a teacher (Murray, Baker, Murray-Slutsky & Paris, 2009). Therefore, it is crucial for teachers to have various approaches to support sensory-based learners. This research supports the idea of children needing their sensory needs met in order to control behaviors that may be disruptive in the classroom (Murray, Baker, Murray-Slutsky & Paris, 2009). Less disruptive behaviors will lead to the students being engaged in learning for longer periods of time.

**Sensory Strategies and Unique Approaches**

There are many different ways to integrate sensory activities in a classroom. “Sensory stimulation is typically provided in activities such as rocking, jumping on a trampoline, swinging, rolling and riding on scooter boards” (Devlin, Healy, Leader & Hughes, 2011, p. 1304). Other traditional methods of sensory integration “involve the delivery of deep pressure, joint compression, and body brushing” (Devlin, Healy, Leader & Hughes, 2011, p. 1304). Using “weighted vests, oral motor exercises and body massages” are other ways to “alter and improve arousal states” (Devlin, Healy, Leader & Hughes, 2011, p. 1304). Besides these traditional approaches, there are also unique approaches to sensory integration through the use of technology and nature.
Technology

Katai (2011) researches the effectiveness of traditional face-to-face teaching and on-line teaching. Katai suggested that “e-learning needs to be multisensory” in order for it to be effective (p. 234). Katai states that using technology can be a different method in giving children sensory integration because it has “several audio-visual elements” (p. 234). Technology can be incorporated into literacy activities to give students sensory integration while learning to read and write. Students in my classroom use Learn-Pad tablets to learn various literacy skills.

Nature

Another approach to sensory integration is to incorporate nature into a child’s learning. Cosco and Moore (2009) suggests that “exposure to the natural environment is linked to positive behavioral outcome” (p. 168). The claim is made that a child’s sensory needs can be met by using the natural environment (Cosco & Moore, 2009). The natural environment consists of trees, grass, flowers, and other greenery (Cosco & Moore, 2009). Cosco and Moore (2009) say that when children are exposed to sensory activities through the natural environment they get many benefits. The article suggests that children will increase their attentiveness to activities, increase cognitive development, have higher self-esteem, increase their academic performance, and have higher motor development when exposed to nature throughout their school day (Cosco & Moore, 2009). Incorporating nature into the classroom is another way to join sensory integration and literacy activities.

Summary

I discovered three themes in the research: sensory integration and children with disabilities, sensory integration and engagement, and sensory integration and unique approaches. There is limited research on sensory integration during literacy instruction. There is also limited
research that focuses on sensory integration and student engagement. Due to the gap in the research, I believe more research studies should be done in classrooms to determine if sensory integration can improve literacy engagement for students.

**Methods**

**Participants**

The participants in this study are the students in my first grade classroom. There are 17 students in my classroom. Five of the students have individualized education programs, IEPs. An IEP is a written plan, designed specifically for a child that has a disability, stating how he will be educated so he can reach academic success. One student has a 504 plan, which is a plan on how to educate children that need accommodations to ensure their academic success, but who do not have a classified disability. Three students receive academic intervention services, AIS, which provide them with the supports needed in order to help them reach the same standards as their classmates (Geltner & Teresa, 2008). My students range in interests and abilities. The sensory strategies are implemented in my literacy block so all of the students get a chance to experience them.

**Setting**

The context of the study is a first grade inclusion classroom in a small, rural school. The classroom has one general education teacher, one special education teacher for 30 minutes during ELA, a classroom aide, and a one-on-one aide. According to the Institute of Education Services (2014), the elementary building has about 516 students PreK-sixth. Out of those 516 students, 468 are white, 21 are Hispanic, nine are Black, and seven are Asian. 121 students receive free lunches and 39 receive reduced lunches.
The first grade inclusion classroom has 3 tables where the 17 students sit. There are two horseshoe tables that are used for small group instruction. The students each have a book box that contains literacy materials for them such as books that they picked out, a notebook, a high frequency word list and headphones for Listening-to-Reading. Other materials that are used for literacy instruction are found around the room. In the classroom library, known as the Book Nook, there are butterfly chairs and pillows for the students to use. At their seats, some children have bicycle bands around their chair to help them if they feel the need to fidget. Some students also have stress balls or attachments at the ends of their pencils to give them a way to move while still focusing on literacy activities.

**My Positionality as the Researcher**

I am a graduate student attending the College at Brockport where I am pursuing a Master’s degree in Literacy Education B-12. I completed my undergraduate studies at Roberts Wesleyan College in Childhood Education and Special Education. I am certified by the state of New York to teach grades Pre-K-8. The 2015-2016 school year is my third year teaching at a rural elementary school and my third year teaching first grade. Being a first grade teacher has given me the opportunity to help young children develop academically, emotionally, and socially.

I am a very passionate teacher that wants to help my students be engaged and nurtured. My goal is for my students to grow up to be active members of their community. I believe an essential part of students being successful in life is being successful with literacy. Literacy skills play a crucial role in a child’s academic success and also their success outside of school. The literacy goal of first grade is for students to become more fluent with their reading, comprehend what they are reading, self-monitor themselves, and use reading strategies independently. My personal struggle learning to read in elementary school has motivated me to find ways to best
meet the needs of all of my students. I remember the frustration that occurred while I struggled to get through books my peers read with ease. To best support all learners, I want to understand what impact sensory strategies integrated into literacy instruction has on students. In the future, I want to use this data and share it with my colleagues in hopes of helping our students meet the literacy standards in first grade. In this study I am the classroom teacher and I take on the role of a participant observer.

**Procedures of Study**

I collected the data on 14 students for six weeks between February, 2016 and March, 2016. The sensory strategies that were used during the literacy instruction were the same strategies that had been employed in my classroom all year. Therefore, the sensory strategies did not take time away from my students’ literacy instruction. Various sensory strategies were used in the classroom and students were given the choice of what sensory strategy they used. Some of the sensory strategies used in the classroom are shown below.

**Ball Chairs**

The students had the option of doing their literacy activities on ball chairs. “These chairs consist of a therapy ball or exercise ball stabilized in a ring or with feet at the bottom to keep it stable” (Bagatell, Mirigliani, Patterson, Reyes & Test, 2010, p. 895). Ball chairs allowed students to move while still maintaining their “postural control” and “balance” (Bagatell, Mirigliani, Patterson, Reyes & Test, 2010, p. 895). Bagatell, Mirigliani, Patterson, Reyes and Test (2010) also suggests that ball chairs could help children “focus” on literacy tasks (p. 895).
Figure 1. A ball chair. A ball chair allows students to have movement while still in a seated position.

**Web Chairs**

Web Chairs were another seat option that allowed children to bounce while in a seated position.

Figure 2. A web chair. A web chair also creates movement for the student while they are in a seated position.
Saucer Chairs

Saucer chairs were a comfortable option for students who wanted more cushion while they were working.

![Saucer Chair](image1)

*Figure 3. A Saucer Chair. A Saucer Chair is more cushioned than a regular classroom chair.*

Chair and Bike Band

A chair with a bike band on the bottom allowed students to sit in a regular chair, but be able to create resistance and movement by pushing on the band with their feet.

![Chair with Bike Band](image2)
Figure 4. A chair with a bike band attached to the bottom. The bike band allows students to fidget and move while still sitting in a regular classroom chair.

**Pillows and Carpet Squares**

Various pillow and carpet square options were available to students so that they could pick what would work best for them.

*Figure 5. Pillows and carpet squares. Pillows and carpet squares can be used on the floor or at a chair to add extra cushioning.*
Standing

Students could also stand up to complete their literacy activities. Aminian, Hinckson and Stewart (2015) state, “prolonged bouts of sitting in the classroom result in back pain in children” (p. 632). This pain “can be reduced by replacing sitting with standing” (Aminian, Hinckson and Stewart, 2015, p. 632). By offering students the chance to stand they could do what was comfortable for them so that they could focus on learning literacy skills.

![Image of a student standing while writing her high frequency words on an easel. Some students chose to stand instead of sit during various literacy activities.](image)

**Figure 6.** A student standing while writing her high frequency words on an easel. Some students chose to stand instead of sit during various literacy activities.

Fidget Toys

To help children meet their sensory needs, children received sensory input during literacy instruction by using fidget toys such as pencil toppers and stress balls to provide them with “extra stimulation” (Thompson & Raisor, 2013, pg. 1).
Figure 7. A pencil topper that attaches to any number two pencil. The pencil topper allows students to fidget while working.

![Image of a pencil topper](image1.jpg)

Figure 8. A student uses a stress ball. A stress ball can help students focus by letting them move their hand.

**Shaving Cream**

To practice their spelling words, high frequency words and phonics skills students could write words and sentence in shaving cream.

![Image of shaving cream](image2.jpg)

Figure 9. A student writes their high frequency words in shaving cream. The shaving cream can go directly on a table or on a tray.
Play-dough

Students could work with play-dough to spell words. They could roll the play-dough to form letters or use alphabet cookie cutters to make letters.

Figure 10. Play-dough letters to spell a word. This student rolled their play-dough to form their word.

Puzzles

Puzzles are used to teach a variety of skills such as spelling words and rhyming.

Figure 11. A rhyming puzzle. This puzzles reinforcing the concept of rhyming.
GoNoodle

GoNoodle is a free website that has various brain break activities to help children get in movement throughout their day. GoNoodle has “hundreds of movement games and videos that get kids dancing, running, jumping, stretching, deep breathing, and more” (GoNoodle, n.d). GoNoodle’s goal is to help kids be able to “focus on learning” (GoNoodle, n.d).

Figure 12. A yoga activity found on GoNoodle. Maximo is just one of the many characters that take children through movement activities on GoNoodle.

Implementation

All strategies that I implemented were done during either skills/phonics, Daily Five, or guided reading groups. Many of the strategies, such as different seating choices, were modeled to the students, but then the students were in charge of choosing a seat and using it correctly. Word work choices that merged different senses, such as using shaving cream and play-dough to write and build their high frequency words, were also first modeled to the students. Then the students had the choice of what activity to do. Some sensory strategies, such as Go Noodle, were done in a whole group setting and I was the facilitator. Whether the students were independent
with the sensory strategy or involved in the activity under direct supervision, depended on the type of activity they were partaking in.

If a student, group of students, or the whole class responded positively to a sensory strategy I looked for similar sensory strategies. I followed the students’ leads and responded to their needs while deciding what type of sensory strategies to implement.

**Data Collection**

I collected my data through interviews, observational notes, a reflection journal, Daily Five tracker and a collection of student work. My purpose for using these instruments of study was to gather the most informative data possible to answer my research questions.

**Interviews**

From interviewing the students one-on-one, I learned my students’ views on sensory strategies and literacy activities. According to Shagoury and Power (2012), asking questions through interviews is a way “to bring out the information we couldn’t learn without getting inside our students’ minds” (p. 100). My open-ended interview questions asked about the students’ preferences as well as their dislikes. We interacted in conversations that gave me insights on what helps each student learn literacy skills best.

**Observational Notes**

In addition to interviewing the students, observational notes were used to keep track of the engagement and enthusiasm from the students during various literacy activities. “Taking notes is one of the main tools in teacher-researchers’ repertoire” (Shagoury & Power, 2012, p. 92). On the observational notes, I recorded any comments from the students that displayed their reactions to the activities. Daily notes on the students’ behaviors during ELA and on the students’ progress allowed me to record what happened when I integrated sensory activities in literacy
activities. I kept notes of conversations or comments I heard from my classroom aide, co-teacher, and other staff members working with my students on how they responded to the ELA activities.

**Reflection Journal**

A reflection journal was a way for me to reflect on my observations of individual students and the class as a whole.

**Student Work**

A collection of student work helped me to see the work the students were doing during the literacy block.

**Daily Five Tracker**

A note sheet helped me keep track of what Daily Five choices the students were picking each day and each round. This tracker helped me to make sure that students were working on various skills throughout the week. It also assured that the students would do at least three different skills each day. The tracker allowed me to see what the most popular choices were so that I could plan similar activities to engage my students.
Figure 13. A Daily Five tracker sheet. The tracker sheet is used daily to record each student’s Daily Five choices and to make sure they choose a different choice each round.

Trustworthiness

Strategies outlined by Clark and Creswell (2014), were used to ensure the trustworthiness of the research study findings. To verify the credibility of the research study, I triangulated information from multiple data sources, including individual interviews, observational notes, a reflection journal, and the collection of student artifacts. Other strategies consisting of transferability, dependability, and confirmability all validate the quality of the findings. This study provides detailed descriptions of participants, research process, and the data so other researchers can analyze this study or conduct a similar study.

Data Analysis

Introduction

I collected data over a six week period from February, 2016 to March, 2016. I took observational notes, field notes, reflected in a journal, and collected artifacts. The data were collected during my literacy block of the day, which goes from 9 am-11:30 am. After my data collection, I spent a lot of time reviewing and analyzing the data. I analyzed the data using the constant comparison method, which “involves deriving categories from data over time, and then using the categories to develop a theory” (Hubbard & Power, 1999, p. 120). When I coded my data I was looking for “the major ideas and perspectives in the data” (Clark & Creswell, 2014, p. 354). Before I started my data collection and analysis I had preconceived ideas of what my findings would be. Even with my preconceived ideas, I stayed open to any possibilities including contradicting what I thought I would find (Clark & Creswell, 2014). I recognized that there were
different types of sensory learners, children liked to have choices, self-awareness was an important skill and children benefited from working with adults.

**Coding**

After I went through all of my instruments of study, I highlighted and coded the interviews, notes, student work samples and Daily Five tracker into three categories: engaged (E), somewhat engaged (SE), and not engaged (NE). I used open coding in order to stay unbiased to all themes that may have emerged in my data. I based my students’ engagement off of the students’ interest, motivation, and stamina while performing the activity (Hui and Cheung, 2014). For my observational notes, I made a chart to see what the students were doing when I noted their level of engagement. For example, a student who was reading a book was stopping at the end of each page and writing down their thoughts on a post-it. I classified that action as engaged because the child was taking a skill learned during guided reading and applying it to their independent work time.

I followed the same coding process with the student interviews, the student work samples and the Daily Five tracker. In the interviews, I noted what students said they found engaging and what helped them focus. I took many pictures throughout my data collection. I took pictures of students doing various literacy activities and then would note in my journal if the students were engaged, somewhat engaged, or not engaged at the time the picture was taken. I also took pictures of the students’ work to see the quality of work they were doing throughout the activity. On the Daily Five tracker, I tallied up the choices and figured out what choice was the most popular as well as what choices kept each student the most engaged.

After using the coding system for the observational notes, interviews and student work samples, I looked to see what themes were emerging. I found similar themes between the notes,
the interviews, student work samples, and the Daily Five tracker. Finding similar themes between my instruments of study made my findings more accurate, since my different types of data collection yielded similar themes.

**Recognizing Biases**

I used my reflection journal as a way to recognize my own biases as the teacher. I wrote about what activities I thought were the most engaging and wrote my reactions throughout my time collecting data. The reflection journal allowed me to comment on themes I thought were emerging, but also to triangulate my data.

**Findings**

**Finding One: Different Types of Sensory Learners**

First, I recognized that there are three different types of sensory learners. Students can either be sensory seeking, under responders, or over responders (Murray, Baker, Slutsky & Paris, 2009). Some students fell into these categories. However, there were some students who did not fall into any of these categories. These were students that adapted and had multiple types of literacy activities that were beneficial for them. I determined what type of sensory learner a student was based on interviews, observations, and my reflections on articles I have read about sensory learners.

While viewing different literacy activities, I noticed that different students responded differently to certain activities. This could be because all students respond to sensory input differently. Different literacy activities touch upon different senses and children will respond differently to them depending on what type of sensory learner they are.
Over Responders

For example, I noted in my observational notes that one student who had over responding behavior yelled out while writing his sights words in sand that he “hates sand” because it was getting in his nails. He wrote 3 words, “they”, “then” and “able” in the 15 minutes he was allotted for the activity.

Figure 14. A student writing their high frequency and spelling words in sand. Writing in sand was not a popular choice for children that have over responding behaviors.

In an interview, the same student said he liked “paper and pencil” activities better than other choices. When asked what he would do if he was a teacher, he responded with “worksheets”. I also noted several times where this student had trouble working with materials that had certain textures. To build sentences, children can use small squishy letters. This student began using the letters, but then asked the classroom aide if he could use the “hard letters” instead. The aide helped the student switch the letters he was using. The student was then engaged with the “hard letters” and built nine sentences with the letters and then wrote them on paper. Over the six weeks, I used a Daily Five tracker to document what choices students chose. I documented 23 Daily Five choices. Out of those 23 times there were 11 times when a worksheet
option was made available. The student chose the worksheet option first 11 out of 11 times. Since this student is an over responder, it is important for him, and other students who may be over responders, to have materials and activities available to them that they are comfortable doing.

**Sensory Seekers**

Many sensory seekers crave high input activities. Some of my students showed sensory seeker behaviors by consistently gravitating towards activities that offered them high input. I have two students that were not able to sit in their seats safely while reading and engaging in other literacy activities. The Occupational Therapist at my school recommended putting bike bands on the bottom of their chairs. This allowed the students the chance to get sensory input by pushing and pulling their feet on the band, which causes resistance, while still sitting in a chair. When I interviewed these two students and asked them where they liked to work best in the classroom, they both made a reference to the bands on their chairs. One of the students said that the band “helps me get my work done”. The other student said, “it helps me not get in trouble”. While observing the students, I noticed that while they were doing literacy activities at their seats, they had their feet on the bands and were pushing and pulling the bands while working. I noted that these students were engaged in various activities while working at their seats. I also reflected on the change I noticed in the students’ engagement during literacy activities since I put the band on their chairs. These two students, as well as other students, gravitated towards choices that use two or more of their senses.
Figure 15. A student pushing on the bike band. Students who sat in chairs with bike bands consistently pushed and pulled on the band while doing literacy activities.

I had nine students comment about enjoying writing sentences and high frequency words on the smart board. While writing on the smart board, students can either stand up or sit in my teacher swivel chair. When I asked why they liked the smart board, six of the nine students mentioned liking the chair they got to sit in while writing on the smart board. One student said, “it’s cool because I don’t just get to write on the smart board like a teacher, but I also get to sit in the teacher chair, and it spins. So guess what? I spin as I write and I write a lot of words. Do you see all the words? Don’t I write a lot?” This student was engaged while writing on the smart board. During 15 minutes the student wrote five sentences and 32 high frequency words and was able to read them all to the classroom aide.
Figure 16. A student sits in the teacher swivel chair while writing high frequency words on the Smart Board. The student spins as she writes her words.

Activities on the Learn-Pad tablets are also a popular choice. Out of the 23 times students got to choose their literacy activities, 11 out of the 14 students chose some type of Learn-Pad activity every day. Nine students called the Learn-Pads “fun” while being interviewed. The Learn-Pads combine multiple senses through sight, sound, and touch. Six students commented on how getting to listen to music and sounds helped them “block out others”. By having choices that engage two or more of the senses, the students can choose the amount of sensory input they receive.

Figure 17. A student using a Learn-Pad to listening to books. While listening to reading student also use their headphones.

**Under Responders**

Students in my class who may be under responders have different sensory needs depending on the day. Therefore, choice was important for these students so that they still got their needs met daily. Sometimes under responders can be overstimulated and then choose an activity that gives them less sensory input. I recorded in my notes and journal that I have three
students who only chose Read-to-Self, a more calming activity, after we had some sort of change in our routine in the morning. For example, my one student who said, “I never ever want to read to myself” because “it’s so boring” chose reading to himself after we returned from a loud assembly.

![Student reading](image)

*Figure 18. A student choosing to read to herself. This student rocks in the rocking chair while reading.*

In my classroom, there were all different type of sensory learners. The best way to meet their needs was to provide them with different literacy activities that would fit a wide range of learners. If my students did not have a choice between activities then they would not have been able to pick an activity that best met their sensory needs and helped them learn literacy skills.

**Finding Two: Choices**

When asked what students liked best about Daily Five, 12 out of 14 students responded that they liked to be able to choose. One student said, “I like not having to do the same exact thing every day”. On the other hand, another student said, “I like it because I get to pick Raz-Kids and smart board all the time.” Throughout the interview and informal class discussions students indicated enjoying being able to pick how they learned literacy skills. They also liked to
choose different things like where they sat. For example, one student said, “I don’t like reading, but I like getting to use a pillow so that’s why I do reading.” Another student said her favorite part of Daily Five was “the rocking chair”. In the interview I asked the students how they would teach reading, writing and high frequency words if they were the teacher. Five students said an answer that had to do with letting the students choose.

![Pie chart](image)

**Figure 19.** What students like best about Daily Five. This pie chart illustrates that most students liked Daily Five best because of the choices they got to make during Daily Five.
Figure 20. Students choosing the Read-to-Someone choice. These students also chose to use pillows while reading to each other.

Finding Three: Student Self-Awareness

Self-awareness has many definitions. Flavian (2016) defines self-awareness as “one’s ability to think about, talk about, and define feelings, thoughts, and/or actions” (Flavian, p. 89). Since “self-awareness develops along a continuum” not all children will develop self-awareness at the same time (Flavian, 2016, p. 89). I observed that children in my classroom varied in their abilities to be self-aware.

Through my data collection I noticed that some students consistently made choices that they knew would lead them to engagement. Other students chose what they enjoyed, but it did not always lead to engagement. One of my students said that Learn-Pads helped him focus because “I learn through the games and I do it all right”. He also liked that “the headphones block talking”. However, my observational notes indicated that this student was only somewhat engaged/not engaged while using the Learn-Pad. While using the Learn-Pad, the student was flipping through a book as fast as he could and laughing at the sound it made. He then put his headphones on the peer next to them and had them listen to the noise as he flipped through the pages. Another time the student was on a math game instead of a literacy activity. The student was asked twice by the aide to go to the correct activity. After the aide saw that the student did not change the activity, the student was asked to put away the Learn-Pad. In this case, letting the student choose their choice did not promote engagement. The difference in my observational notes and the interview answer indicates that this student was not self-aware about what helped him learn literacy skills best.
However, some of my observations on what helped the students be engaged matched what the students said in their interviews. One of my students never picked Read-to-Someone. I assumed it was because she didn’t like it. While interviewing her she opened up that “Read-to-Someone is fun, but I was bad at it”. When I asked her why she was “bad at it” she said, “I always talked to my partner instead of doing the right thing and reading.” I documented when she did do read-to-someone that she was not engaged because she was talking about her dog instead of reading. Since this student was aware of what was not helping her she avoided that choice. Choice is helpful for students when they have the self-awareness to make choices that benefit them.

**Finding Four: Teacher Guided Versus Independent**

When asked “what helps you learn best?” nine out of 14 students responded that working with an adult was what helped them learn the best. When asked, “what helps you stay on task during Daily Five and Guided Reading?” 11 out of 14 students responded that working with a teacher was the best way for them not to get distracted. My observational notes indicated that most students were engaged all or most of the time when working with an adult. I had 4 students who were consistently not engaged when doing any independent task. However, when they were working with a teacher, parent volunteer, or a classroom aide they were engaged in the literacy activity.
Figure 21. Helping the students learn best. This pie graph illustrates that the majority of students think they learn best when they are working with an adult.

Figure 22. Staying on task during Daily Five and guided reading. This pie chart indicates that students feel they stay on task better when they are working with a teacher.
Figure 23. Students working with an adult during Daily Five. Students indicated that they benefit from working with a teacher. This picture shows a small group of students working with a teacher aid to review a skill previously taught.

Discussion

Summary of Findings

Through my exploration of sensory integration during literacy activities, I noticed that there are different types of sensory learners and each type of learner needs different activities to promote engagement. According to Murray, Baker, Slutsky and Paris (2009), children can fall into three categories of sensory learning: sensory seeking, over responding and under responding. While collecting and analyzing my data I was able to find what type of sensory learner some of the students were. The type of activities a student gravitated towards were based on their sensory needs (Murray, Baker, Slutsky & Paris, 2009). The sensory needs a child had guided their decision when choosing a choice. As their teacher, I was also able to gear their activity choices to their sensory needs.

The ability to choose different activities and materials led the students to be more engaged in their literacy activities. Delisle (2012) states, “it takes a brave teacher to loosen the
reins from kids who just might gallop away at breakneck speed, but, in doing so, educators offer students the chance to shine” (Delisle, p. 66). By giving students choice we are trusting them with their learning, but as long as their choices are developmentally appropriate “the end result can be something too often lacking…relevance” (Delisle, p. 66). When students get to choose what literacy skills they need to work on they can pick skills that they find relevant to their lives. When students choose activities, they are often based on what they are interested in and interest leads to engagement (Delisle, 2012). In a study done by Mozgalina (2015), students who got to choose their literacy activities were more engaged which lead to them performing their literacy tasks with better quality compared to students who did not get to choose their literacy activity (Mozgalina, 2015, p. 127).

Students who were self-aware of their strengths and areas of need did a better job of choosing literacy activities that would engage them. Students who lacked self-awareness often chose literacy activities that did not keep them engaged. Students who were self-aware have the ability to decide what literacy skills will most benefit them. When children are self-aware it helps to “enhance their…internal motivation” (Flavian, 2016, p. 88). Being self-aware doesn’t just happen, it is a result of “learning processes in school” (Flavian, 2016, p. 90). “People increase their awareness of themselves and of their ability to become aware” through experiences (Flavian, 2016, p. 90). In classrooms some students will be able to choose productive literacy choices and some students will need to be taught how to make literacy choices that will lead to engagement.

Students were more engaged with their literacy task when they were working with an adult than when they were working independently. “Student engagement is shaped by context” and when students are working with supportive adults the adults can give them “reaffirmations of
their developmental needs in learning contexts” which means the students “are more likely to remain actively engaged in school” (Wang & Degol, 2014, p. 138). Adults can redirect children and give them immediate feedback which will keep them engaged in the task. “Structural features” such as the size of groups are another factor in “creating an educational atmosphere that influences student engagement and achievement” (Wang & Degol, 2014, p. 138). When students are working in an adult facilitated small group or one-on-one with an adult it maximizes the engagement they will have (Wang & Degol, 2014).

Conclusions

**Sensory integration and literacy engagement are related.** My data indicated that students did learn literacy skills better when sensory integration was involved in their activity. All students have sensory needs that need to be met (Murray, Baker, Slutsky & Paris, 2009). However, each child requires that their needs be met in a different way (Murray, Baker, Slutsky & Paris, 2009). Due to every child having sensory needs, it is crucial that their sensory needs are met before the learning of literacy skills can take place (Granke, 2007). By incorporating sensory integration strategies, such as a bike band on a chair, my students could focus their attention on reading, writing and other literacy skills. My two students who were having trouble sitting in their chairs and completing activities were able to successfully be engaged in literacy tasks once the bike band helped give them sensory input.

Furthermore, various literacy activities that students could choose from, such as writing high frequency words in shaving cream, listening to books on Learn-Pads, and writing sentence on the smart board while spinning in a swivel chair, were sensory stimulating. Activities that are sensory stimulating incorporate two or more of a child’s senses at once (He, Petrus, Gammon & Lee, 2012). Word Work and Listening-to-Reading engage a child’s senses by incorporating a
combination of touch, smell, taste (oral stimulation), sight, and hearing (audio stimulation) (He, Petrus, Gammon & Lee, 2012) and these were the choices that most students gravitated towards. I believe that most students gravitated towards these literacy activities because these activities met their sensory needs, which allowed them to be as engaged as possible.

**Most effective sensory strategies to increase engagement depend on the student.** The type of sensory strategies that were most beneficial and effective in creating literacy engagement depended on the student. Students interpret sensory input in various ways (Murray, Baker, Slutsky & Paris, 2009). Therefore, the sensory strategy that benefitted a student depended on the way that they received sensory input. Children that are sensory seekers, under responders, or over responders will need different sensory integration tools to help them stay engaged. This is why choice of activity was important in increasing engagement. By giving students various choices they were able to choose the choice that met their sensory needs that day. My student who had sensory seeking behaviors was able to use shaving cream and the student who had over responding tendencies was able to choose paper and pencil activities to learn literacy skills. However, if students do not possess the self-awareness to choose an activity that leads to engagement, a teacher may need to intervene and help the student pick an engaging activity.

**Implications**

**Teachers need to know their students in order to meet sensory needs.** In order to meet students’ sensory needs, teachers need to first pinpoint what type of sensory learner a student is. Teachers need to be aware that some students may have sensory processing disorder (SPD), which will cause them to “misinterpret everyday sensory information such as touch, sound, and movement” (Murray, Baker, Slutsky & Paris, 2009, p. 2). Even if a student does not have SPD, they can still fall into one of the three categories of sensory learners: sensory seeking, under
responding and over responding (Murray, Baker, Slutsky & Paris, 2009, p. 2). Teachers need to be educated on what to look for in each sensory learner. Teachers also need to know what type of activities will best support each type of sensory learner. Then, teachers need to make sure they provide students with choices. Students will respond well to various choices ranging from where they sit, to what they sit on, to who they work with, and what they work on.

Teaching self-awareness can lead to engagement. Giving the students choices leads to them getting their sensory needs meet (Granke, 2007), which leads to more engagement with literacy activities (Delisle, 2012). However, if students are not capable of knowing what helps them learn, then they won’t be able to make a choice that will lead to engagement. Teaching students’ self-awareness will help them be able to make choices that lead to their sensory needs being met and engagement in literacy activities. In order to “plan how to develop students’ self-awareness through a variety of experiences”, teachers first need to “gain more knowledge and understanding of the domain of self-awareness” (Flavian, 2016, p. 90). Only then will teachers be able to properly create experiences that help the students develop their self-awareness (Flavian, 2016).

Limitations

My data were collected over a six week span, which limited the amount of data I was able to collect. I conducted research with one class and my sample size was 14 students. The students were all in the same grade level. My class also had to follow a literacy curriculum set by our school district, which limited the sensory activities I was able to implement in my classroom.

Recommendations for further research

Integrating sensory strategies into literacy activities has shown positive results for my students. I would be interested to see if sensory integration can be done successfully in all grade
levels. Using shaving cream, stress balls, and other sensory strategies may not work in a middle school or high school setting. I would like to see research done on what other sensory strategies would benefit older students, or even adults.

I was limited in what sensory strategies I could implement based on time and my school’s curriculum. Future research should be done on other sensory strategies that may increase engagement. It would also be helpful for future research to explore if sensory integration has other benefits for students, besides an increase in engagement.

Since self-awareness is an important life skill for students, future research should be done on specific ways to increase a student’s self-awareness through experiences. Also, specific benefits of a student being self-aware should be explored.

**Closing**

It is the obligation of “teachers and administrators to create and sustain high levels of student engagement in order to enhance their learning and development” (Hui & Cheung, 2014, p. 561). Creating an engaging atmosphere that encourages learning needs to be a priority of every school. In order for learning to take place, engagement needs to take place. Students come from all different backgrounds, but “researchers have found student engagement a robust predictor of student achievement and behavior in school, regardless of socioeconomic status” (Klem & Connell, 2004, p. 262). Therefore, whatever teachers can do to promote engagement needs to be taken seriously.

Sensory integration leads to engagement by meeting the sensory needs of every student. In order for students to learn, their sensory needs must be met (Murray, Baker, Slutsky & Paris, 2009). Sensory integration helps students control their senses so that they can be engaged in a
literacy activity. It is important that teachers implement sensory strategies into their literacy instruction so that all students can find literacy success.
References


