Master Capstone Project

Increasing Awareness of Sensory Needs to Inform Teaching Practices

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Abstract

This professional development study examines the teaching practices of the researcher and how sensory-based strategies can be integrated with classroom instruction to support all learners. Instructional practices of the researcher were considered, with a focus on integration of sensory strategies to support learners during instruction. A reflective inquiry process was used following a cycle of observation, reflection, refinement, and implementation based on the application of specific strategies. Findings suggest that sensory-based strategies may be an effective way to support learners in maintaining engagement and demonstrating ready to learn behaviors during both whole group and independent learning experiences. Further study might include an action research study to examine the effects of a student-implemented menu of sensory-based strategies and the impact on self-regulation and ready-to learn behaviors.

Introduction

This paper explores the idea of sensory regulation in a classroom setting. The focal point changed over the course of the study due to placement challenges and the identified needs of the researcher and students which necessitated the shift to a study of self-awareness and professional practices. The study took place over the course of several settings, and in an environment where teachers were not familiar with sensory-integration theory or the impacts that sensory needs could have on their student's learning. A global health crisis resulted in the unexpected closure of bricks and mortar school settings, which subsequently reduced the ability to further process and reflect on the culminated findings with mentors.

Problem Statement

During practicum experiences, I noticed that students who demonstrate behaviors that disrupt learning are sometimes identified as having a behavior problem. Based on my observations, I identified that these challenges are often reflective of behaviors seen in individuals who struggle with an identified sensory regulation disorder. Sensory-based learning strategies are not a focus within some programs - particularly general education settings in which students are expected to attend to large group instruction for extended periods of time. My perception during these observations was that some (although not all) disruptive behaviors such as fidgeting, talking out, difficulty in maintaining personal space etc. may have been related to seeking sensory input.

During my work with past students, I found that proactively integrating opportunities for proprioceptive[1] and vestibular[2] input throughout the day helped to lessen the severity of challenging behaviors and allowed them to participate more successfully in daily routines and structured activities. This was particularly true if implemented immediately before a transition or activity that was particularly challenging for the child. Not all of these students had a diagnosed sensory processing disorder, or an attention related disability; however, even typically developing children benefited from the integration of opportunities for sensory regulation and showed improvement in their ability to attend to activities and maintain self-regulation.

I wonder about the impacts of integrating sensory-based movement routines and materials or sensory "breaks" more consistently within instruction for a *general education* classroom at the K-3 level. I question if such practices may support learning for students in a positive manner, or if the potential for distraction may take away from effective teaching for the group as a whole.

Rationale

Today more than ever students are expected to maintain focus on academic tasks for increasingly long periods of time, while simultaneously reducing the amount of free-time and opportunities for movement. The need for movement and sensory-based regulation strategies has been well documented for specific groups, for instance students identified with a sensory-

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[1] *Proprioceptive input* refers to information from the joints muscles and connective tissues that relate to body awareness.

[2] *Vestibular input* refers to sensation of movement related to speed, direction, and orientation of the body

integration disorder, Attention Deficit Disorder (both with and without hyperactivity) or students with a diagnosis of Autism Spectrum Disorder. These needs are sometimes addressed through implementation of sensory integration therapies or intentional routines designed to provide the student with specific types of sensory input to re-focus and regulate the sensory system. These plans are often implemented through occupational therapy interventions, or strategies designed by Special Educators. All students have unique sensory needs that may impact important components of learning such as focus, self-regulation, and ability to attend to instruction for extended periods of time yet, in my experiences within K-12 classroom settings, these types of strategies implemented on a broader basis within the context of a general education setting.

As outlined in the Elementary Education Endorsement Standard *2.b.3*, my role as an educator is to identify the necessary resources, strategies and supports that address the unique learning needs of students in my care(State of Washington Professional Educator Standards Board, 2014) – which includes promoting self-regulation and balancing the individual sensory needs of each student. In addition, the standard *3.c* also indicates the importance of building students' confidence, as well as their ability to advocate for their needs and take-ownership of their own learning (State of Washington Professional Educator Standards Board, 2014).

Addressing the sensory needs of *all* students aims to achieve both of these goals; by accessing resources such as occupational therapists and special education professionals to develop strategies for integrating sensory regulation practices with instruction. The goal for this integration is focused on designing instructional experiences in a way that makes learning accessible to a more diverse population of learners.

Literature Review

The purpose of this review is to complete an examination and analysis of the literature related to sensory-processing and the use of sensory-based strategies as a component of instruction to increase accessibility for all learners. This review includes a summary of the literature describing the neural coefficients that influence sensory system processes as well as dysfunctions that may be identified within these parameters. Further discussion will examine research surrounding the impacts that the sensory system may have on student learning at both the individual student and classroom level. To address the need identified through these discussions, the final topic of this review will examine research-based strategies for modulating and regulating behaviors using sensory-based teaching practices, classroom accommodations, and sensory motor-based routines

Sensory Processing: Overview and Explanations

The sensory system is generally defined as a combination of neurological functions that process information through the senses (Berkey, 2009; Morris, 2014). This includes not only the five functions traditionally identified as senses-- taste, touch, sight, hearing, and smell, but also two additional senses defined as proprioceptive and vestibular systems (Berkey, 2009; Morris, 2014; Polatajko, Kaplan, & Wilson, 1992). Proprioception refers to the body's ability to relay information from the joints to the brain and process the amount of pressure and force required to carry out a specific movement or activity. Vestibular input relates to the body's processing of motion-related input such as speed, direction, and orientation for instance sideways or upside down (Berkey, 2009; Morris, 2014). In an effort to maintain balance of input from these systems, individuals with dysfunction of the sensory system may develop

maladaptive behaviors such as chewing or fidgeting as well as an inability to focus or maintain an appropriate level of arousal. This dysregulation and maladaptive behavior pattern in turn impacts an individual's ability to participate effectively in daily routines and activities (Berkey, 2009; Morris, 2014; Spencer, 2015).

Neuroscientist and Occupational Therapist Ayres pioneered research in the field of sensory regulation and developed an intervention referred to today as Sensory Integration Therapy (SIT) (Morris, 2014). Her early research sought to identify a link between an individual's maladaptive behaviors and sensory processing dysfunction. She asserted that many challenging behaviors exhibited in daily occupations and classroom settings are linked to one of three categories of sensory dysregulation disorders: Modulation, Movement and Discrimination (Morris, 2014,). Morris reinforces this belief in her statement "Maladaptive motor, behavioral and emotional responses [are] due to inefficient processing of sensory inputs" (2014, p. 24).

Ayres's research has been the focus of much scrutiny since its inception in the early 1970's. Ottenbacker's 1982 paper titled *Sensory Integration Theory: Affect of Effect* aimed to evaluate the efficacy of Ayres's intervention practices as a valid treatment approach for increasing academic achievement in students with learning disabilities (1982). This review of the research examined the outcomes from a range of studies over the course of a decade. The resulting data implied that although there was convincing evidence to suggest plausibility, there was not enough conclusive data to validate the practice of Sensory Integration Therapy (SIT) as highly effective. As a result, Ottenbacher concluded that further research was warranted (Ottenbacher, 1982).

While Ottenbacher's study indicated that SIT might show promise as a strategy for supporting students with learning disabilities, a counter study from Polatajko reexamined the data ten years later and returned contrasting results. This review of the data examined the findings from a series of randomized control trials and compared the outcomes of SIT to the outcomes of perceptual motor therapy asserting that the latter was a more effective treatment model (Polatajko et al., 1992).

Sensory Processing Differences

Introductory explanations of the sensory system and potential dysfunctions varied widely. Sources such as Berkey and Thompson were written from the perspective of occupational therapy professionals, and were intended to educate classroom teachers on how the sensory system works and how it can influence student learning in the classroom setting (Berkey, 2009; Thompson Noddings, 2012). In-depth descriptions of brain function were presented by Berkey to illustrate how neural circuits within the brain govern an individual's ability to process and synthesize sensory input as it is experienced in real-time (2009). Thompson, like other sources such as Morris and Howe, offered a much less technical explanation of the neuroscience behind sensory processing. His work focused more on the basic sensory processes and their function in daily occupations (Howe, Brittain, & McCathren, 2004; Morris, 2014; Thompson Noddings, 2012). Thompson also focused on the perspectives of experienced occupational therapists regarding sensory processing differences and the implementation of sensory-based strategies in the classroom. Additional sources suggested that a blend of strategies pulled from both SIT as well as sensory-motor and multi-sensory

based interventions may be effective strategies for treating dysregulation in school aged children (Berkey, 2009; Bodison & Parham, 2018; Morris, 2014; Spence, 2015).

Impacts on Learning

The connection between self-regulation and the sensory system were identified in many studies and articles targeting occupational therapy (OT) professionals and educators. Morris stated, "Maladaptive motor, behavioral, and emotional responses [are] due to inefficient processing of sensory input" (Morris, 2014, p. 2). Similarly, Spencer theorized that maladaptive behaviors such as hyperactivity, inattentiveness, and poor attention in the classroom setting might be the result of dysfunction of the sensory system- particularly a condition referred to as sensory modulation disorder (Spence, 2015). Berkey echoed these sentiments, citing the connection between cognitive and learning functions in her statement "movement [is] a powerful organizer of sensation for functional use and a mediator of the higher integrative functions of cognition and learning" (Berkey, 2009, p. 25).

In her book, Berkey also asserted the link between movement and learning in her statement "Without the movement of the body therefore, the cerebellum and its neural circuit would not be effectively stimulated and the brain would simply not be alert enough to learn" (2009, p. 28). She then went on to support this statement with data from neuroscience outlining the interconnectedness of movement and learning (Berkey, 2009). Her description of this complex relationship indicated that the cerebellum was previously recognized for its role in motor control functions such as balance and movement. She went on to explain recent findings that show that the cerebellum is also a key link in the neural circuit responsible for high function cognitive skills such as information processing, mental tasks and sensory perception

and recognition. Additional, and integral, functions also include motivation and emotion as well as recall of learned behaviors and routines (Berkey, 2009).

Researchers Anderson (2016), Spence (2015), and Stoffers (2011) examined the impact of sensory differences in a variety of functions and capacities as well as the effectiveness of sensory-based strategies for use in a classroom-wide intervention. Both Anderson and Stoffers designed their research surrounding a classroom of mixed-need students including those with identified sensory needs and typical peers. Anderson's study examined the impact of movement-based routines on academic function and on-task behaviors (Anderson, 2016) whereas Stoffers sought to explore the impact of multisensory learning activities and their implications for classroom community with second grade students (Stoffers, 2011).

Spence's study echoed some of the foundational concepts from Anderson's exploration of specifically designed movement routines; however, rather than focusing on a blend of typical and atypically developing students, Spence targeted specific students who demonstrated signs of sensory dysregulation in the classroom setting (Spence, 2015). Spence also asserted that dysregulated behaviors such as hyperactivity, inattentiveness, and difficulty in attending to required tasks may be the result of undiagnosed sensory processing disorders. This is consistent with the undertones of both Anderson and Stoffers (Anderson, 2016; Spence, 2015; Stoffers, 2011) and aligned with research presented in earlier discussed sources such as Bodison, Berkey, Morris and Polatajko. Findings from all three studies indicated a positive correlation between sensory-based strategies or interventions and student learning, engagement, and community, which reinforced the foundation of this researcher's professional development exploration.

Classroom Strategies

Sensory integration strategies are traditionally implemented by occupational therapists in a clinic setting due to the accessibility of specialized equipment (Morris, 2014). The use of sensory-based strategies is becoming increasingly popular in classroom settings as the prevalence of students with special needs continues to rise alongside the increasing academic expectations placed on young students (Anderson, 2016; Berkey, 2009; Morris, 2014). Berkey (2009) identified a clear correlation between increased academic demands in early childhood settings and increased signs of dysregulation and anxiety among students. Her book included strategies for meeting the fundamental movement needs of students in Kindergarten through third grade in addition to environmental considerations such as lighting, flexible seating options and auditory cues (Berkey, 2009).

Prestia echoed many of the same strategies as part of her 2004 article in the *Intervention in School and Clinic* journal. She asserted that implementation of classroom wide strategies would allow students with sensory integration needs to receive the support they require, without being singled out. In addition, she suggested that allowing students to self-select their own sensory-based strategies teaches them self-advocacy and a sense of agency, which in turn encourages them to take ownership of their own needs and modify the environment as those needs change (Prestia, 2004). Thompson Noddings, a postgraduate research student, conducted a review of occupational therapists' perceptions of sensory integration strategies and their efficacy when implemented by a classroom teacher (2012). Findings from her interviews and research revealed that simple strategies founded in Sensory Integration theory, for example movement routines, are viewed by both classroom teachers

and therapists as viable intervention strategies when the routines are designed and overseen by a licensed OT who is well versed and formally trained in the technique (Thompson Noddings, 2012).

Bodison and Parham's review of current literature related to sensory techniques and environmental modifications examined the most promising interventions for meeting the needs of students with sensory integration differences (2018). Many of the strategies and modifications cited in their document were consistent across complementary sources such as Berkey, Anderson, Thompson Noddings and Howe. Bodison and Parham focused solely on individualized treatment rather than an integrative approach, which aimed to meet the global movement and self-regulatory needs of young students in the classroom setting (Bodison & Parham, 2018).

Conclusion

This review of literature was intended to identify patterns and overall themes within the research pertaining to sensory-based interventions within a classroom setting. The initial sources explored an overall look at the sensory system, as well as implications of dysfunction of this system in relevance to classroom learning. Deeper analysis narrowed the focus towards specific ways in which sensory dysregulation may affect a student's ability to engage and participate in learning activities effectively. Finally, intervention strategies and theories were compared and contrasted based on both past and present research within the field- particularly Ayres' Sensory Integration Theory and its validity in treating students with deficits in academic domains. Through review of this literature, a baseline of information has been considered in order to develop a clear focus and sense of direction for a professional development study

focused on recognizing the sensory needs of my students, and modifying my own teaching practices to increase the effectiveness of my instruction for all learners.

Question

How can I incorporate sensory based strategies into my teaching to effectively meet the needs of all learners in my classroom?

Purpose

I will reflect on alignment between current instructional practices and student needs as identified through observational data, and identify effective sensory-based strategies which can be incorporated during instruction without compromising the integrity of mandated curriculums: (1) by observing student behaviors related to readiness to learn, engagement and self-regulation (2) by reflecting on potential sensory-related factors that may contribute sensory needs during core instruction 3) designing and integrating strategies based in sensory integration theory to increase effectiveness of whole-group instruction and accessibility for all learners

Methodology

Design

This study was initially designed as an action research study, which would examine the impact of introducing students to the *concept* of self-regulation and how they could *self-initiate* sensory-based strategies to manage their own regulation to positively impact learning. Through my early stages of observation in the resource classroom, and discussion with my mentoring teacher(s) however, it became clear that, as a newcomer to the demands of elementary level classrooms – particularly general education, I lacked the depth of knowledge, familiarity with

curriculum, and experience with older students to take on an action research study of such magnitude.

As I transitioned from the special education classroom, to a general education classroom, the study focus narrowed from the impact of specific interventions and curricula, to a more introverted study of my own practices as an educator. This final revision of my research model laid the framework for a professional development study, which focused on increasing my awareness of student's sensory needs (both those with *and* without an identified sensory dysregulation disorder) and seeks to answer the question *How can I incorporate sensory- based strategies into my teaching to effectively meet the needs of all learners in my classroom?*.

Context

[redacted] School is one of 16 elementary schools in the [redacted] School District and shares a campus with both [redacted] High School and [redacted] Middle school. The district has experienced significant growth in recent years, with enrollment at [redacted] increasing from 578 students in 2018-2019, (Office of the Superintendent of Public Instruction [OSPI], 2018), to 725 students in early 2019-2020 (Office of the Superintendent of Public Instruction [OSPI], 2019). This dramatic increase in enrollment has caused strain on the school's facilities and staffing resulting in a need for creative utilization of available space to accommodate the number of general education classrooms needed. Specialists, when possible, have become mobile- moving from one classroom to the next to provide instruction. Larger spaces such as the library shared space with general music classes, while intermediate music programs (band, orchestra etc.) utilize the cafeteria for practice space.

Specific demographic info for [redacted] indicates 36% of students enrolled identified as low-income, 6.8% of students were identified as ELL, while 11% of students were identified as

having a disability (OSPI, 2019). To accommodate recent population growth within the district boundaries, a 2019 Bond was passed to fund the construction of three additional elementary schools; however, an additional 3,000 housing units are under construction within the school zoning boundaries, meaning that high enrollment will likely continue to be an area of challenge in the upcoming school year.

This professional development study was conducted during the fall and winter of 2019-2020 school year and within two contexts. The first setting was a K-5 resource classroom which served 59 students, and included three paraprofessionals, and special educator in addition to myself. Each student in this setting had a diagnosed learning disability and came to the classroom daily for specialized instruction based on their Individualized Education Plan (IEP) goals.

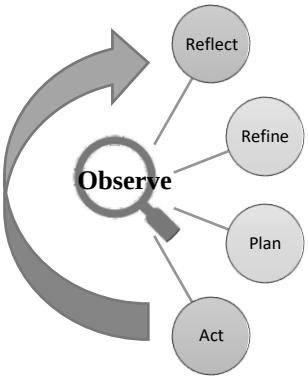
The second setting for this study was a general education 2nd grade classroom with 26 students, 15 boys, and 11 girls. Two students in this classroom were diagnosed with Autism Spectrum Disorder (ASD); both of whom had an active IEP indicating the provision of specialized instruction in all academic areas, social-emotional skills, and one or more related therapies. A third student had an active IEP and received specialized instruction in social-emotional skills as well as two related therapies, and leveled intervention for math and reading. An additional five students were identified as ELL, and another four received LAP services.

The second-grade team utilized a “walk to read” program, which was implemented during RTI time for reading. Each day, from 11:10 to 11:55 all 121 second graders participated in leveled reading interventions, with each classroom teacher targeting a specific area of need (phonics, fluency, comprehension, enrichment). My mentoring teacher and I taught three small

groups using the Phonics for Reading curriculum (book C-E) as well as the Read Naturally curriculum.

Methods

In order to answer the research question, *how can I incorporate sensory based strategies into my teaching to effectively meet the needs of all learners in my classroom?* A reflective inquiry cycle was developed using the following sequence of steps:



1. **Reflect** (*What do I notice?)*
2. **Refine** (*What specifically am I hoping to change?)*
3. **Plan** (*What will I do?)*
4. **Act** (*Put it into action*!)

The inquiry process was initiated by observing students as they engaged within their daily routines or small groups under the lead of the mentoring teacher. This provided a context for what behavior is typical for the particular age and grade level. These observations were documented in a field journal, and included anecdotal notes related to specific behaviors and trends observed (i.e. students begin to get "squirrely" between 7-10 minutes after instruction begins; students always struggle to focus when seated in a particular spot at the front carpet; students are getting up and down and leaving their designated area during seat work etc.). The observation journal also documented which strategies and the mentoring teacher already used, as well as any questions that came up during the observation period.

Reflect. For subsequent inquiry cycles, the reflection process was used as an opportunity to step back and consider the day's success in a narrative form. This was accomplished primarily with daily journal entries, and collaborative discussion with the mentoring teacher from both classroom settings. Ongoing feedback was also gleaned from occupational therapist

colleagues who have background in sensory dysregulation and experience in an elementary school setting. During the reflection process, potential sensory influences were considered such as specific tone of voice (auditory), movement sequences (vestibular), proprioceptive input, or environmental factors that may have impacted the learning of students –particularly related to behaviors and engagement.

Refine. The refinement stage focused on narrowing or shifting the focus of my practices to identify what specifically would be targeted for improvement based on the trends identified in the reflection process. This meant honing in on specific behaviors or trends and focusing through the lens of sensory regulation to identify potential underlying factors. These were then compared to sensory integration theory to identify specific strategies such as inclusion of proprioceptive or vestibular input opportunities throughout instruction.

Plan. The planning stage identified which solutions and strategies to implement based on the insight gathered through the reflect and refine stages of the cycle as well as input from colleagues and other professionals. The identified changes were aligned with the curriculum to determine how and when the planned sensory strategies would be integrated. The goal was to interweave these strategies in a way that would not disrupt the integrity of the established curriculum, while still addressing the needs of my students.

Act. During the act portion of the cycle, my planned strategies would be implemented within instruction. During the lesson, brief notes would be recorded on a sticky note for later reflection during the day's reflective journal entry

Data Gathering Instruments/Assessments

Due to the shift from action research to a professional development study, there were no formal mechanisms developed for the purpose of collecting and triangulating raw data. The data

used for this study was gathered through observational and reflective journaling practices and processed through discussion and coaching from professionals in the fields of special education and occupational therapy. These post-reflective discussions served as an avenue to ensure the veracity of strategies implemented, problem solve challenges as they arose, and ensure that the integrity of classroom curricula remained consistent.

Results

Sensory processing has been an area of professional interest for several years. I was first made aware of the academic and behavioral impacts of sensory dysregulation during my tenure as a Head Start teacher. Our agency's mental health team led a training on sensory-based strategies such as reducing auditory/visual input, providing deep pressure, and using tactile tools to help preschoolers calm themselves when they were frustrated or overwhelmed. These strategies were particularly targeted towards children whom had experienced significant trauma or had a high score on the Adverse Childhood Experiences (ACE) screening. I quickly learned to adapt these same strategies to help my students stay focused and engaged during structured parts of our day such as circle time, centers, and transitions.

My interest in sensory processing was piqued further when I entered the field of Early Intervention and began working with developmentally delayed toddlers and their families. Through guidance and collaboration with our home-based therapy teams, I learned the full range of impact that the brain's processing of sensory information could have on daily functioning. I began to experience the impacts of a dysregulated sensory system and the ways that addressing these sensory needs could improve quality of life and ease challenging behaviors in a significant way. As my understanding of the sensory system developed, I began to notice opportunities within my own home in which recognizing my children's physical cues led to the use of a

sensory-based strategy or intervention that allowed our day to run more smoothly and effectively. The transformations I witnessed in early childhood and early intervention as well as with my own children led me to question how sensory processing differences might impact student learning in the elementary classroom in a similar way. I further questioned if there were universal strategies such as proprioceptive and vestibular input that might be able to alleviate some of the challenges elementary teachers face in their classrooms and improve outcomes for student engagement and learning.

During the initial planning stages of this study, I envisioned an in-depth examination of sensory integration routines and their impact on student behaviors, engagement, and learning. Ayres theory of sensory integration suggested a correlation between student outcomes and sensory regulation (Morris, 2014), while researchers such as Anderson and Spence documented the positive impacts of sensory-movement and perceptual-motor routines on student engagement in a classroom setting. With this information in hand, and the guidance of a supportive occupational therapist from my early intervention team I began developing a series of sensory-movement routines that could be taught periodically throughout the day to help my students maintain a consistent state of arousal and focus.

Unexpected changes with my hosting school district caused a delay in the procurement of my classroom placement for this study and as a result, the proposed intervention plan was by necessity vague and highly generalized in nature. To this point, I had designed my study based on either a developmental preschool classroom, or a K-3 Autism classroom; however, until the week school started, I was unsure of what grade level I would be working with and if the classroom would be a general education or special education setting. This presented some challenges to the planning process – particularly related to timelines and study design.

Once placement information was finalized, it quickly became apparent that I would need to rethink my initial plan for the study. The integration of sensory-movement routines throughout the day became largely irrelevant due to the constantly changing age, grade level, and group size that existed within the resource classroom where I would be student teaching. This change initiated the first cycle of the *reflect, refine, plan,* and *act* process that I elected to use as the structure for my research. I found that verbally processing through these challenges with other professionals was invaluable as I began the process of re-formulating my research question and interventions. I relied heavily on guidance and support from my OT colleague from the early-intervention program. Her suggestion was to scale back the trajectory and pacing of my study and take some time to observe the students in my new setting. She pointed out that the vast majority of my knowledge base in sensory processing had been gained through early childhood settings—most heavily in birth to three, and home-based settings. Having limited experience in working with students over the age of six, and in a structured small group setting such as a resource classroom would require some reflection and observation before I would be able to identify the needs of my students and target specific interventions.

As I gained familiarity with the special education team in the resource classroom, I was able to pose questions and observe the integrated strategies that they were already using with students. I was then able to reflect the impact that these strategies or interventions might have (or not have) on their success during small groups. As I began to take on small groups and gain the rapport of the paraprofessionals and students in the classroom, I documented my observations in a field journal to reflect on and process through with the team. My mentoring teacher in this setting was incredibly supportive of the concept behind my planned research. She fielded many questions in the moment related to challenges that I encountered during groups and took the time

to help me process through which behaviors might be related to sensory needs, and those which were more likely behavioral or related to group management. We discussed why one strategy such as adding a thera-band to the bottom of a chair might have been more effective for a student than a wiggle seat or tactile tool such as a stress ball or fidget.

Over the course of my time in this setting, I came to realize that the number of strategies that could be used to support students with sensory needs was as diverse as the students themselves. No two students seemed to respond to a tool in the same way, and some students responded to the same tool or strategy differently from day to day. One of my journal entries highlighted this stark realization after observing a particularly squirrely group of second graders during their math group. This group of students had developed a reputation within the resource classroom as well as the general education teams and had been challenging to work with during previous years. They were frequently up and out of their seats, grabbing materials impulsively, touching other students, and invading their space resulting in limited time devoted to instruction.

After discussion with my OT colleague, I approached the school-based OT, paraprofessional team and my mentoring teacher to problem solve. We questioned if visual-perceptual dysregulation might be a contributing factor to the behaviors – causing students to fidget and move in a subconscious attempt to regulate their vestibular system. We decided to try providing a visual barrier between seats with the intention of helping students to define where their body was (and should be) in space.

We used blue painters' tape to divide the horseshoe table into wedges, and then used the next day's group time to introduce the strategy to students. After the first week, we debriefed as a team and determined that defining the space seemed to be helpful for one of the students; however, it seemed that the novelty had worn off for several of the others and behaviors began to

escalate again. As a team, we continued to reflect on what we saw, refine the specific behaviors that needed addressing and planning new interventions to try. Tactile tools such as fidgets seemed to be effective for a few students but became a distraction for others. Tools which allowed for vestibular movement such as a wiggle stool, yoga ball, or inflated seat cushion were effective for some students, but success was inconsistent and varied widely. Similarly, proprioceptive based strategies such as the thera-bands, a compression glove, or weighted lap blanket seemed to help some students stay focused, while others became so distracted by the input that it made learning almost impossible for other students in the group.

As my rapport with the special education team and some of the general education teachers developed, I become a resource for strategies and a sounding board for problem solving. One paraprofessional in particular would talk with me frequently to process through challenges that came up in her groups. We would think through possible reasons behind the behaviors and brainstorm a strategy to try for the next few days. Sometimes we would co-teach the group as new strategies were introduced, utilizing a coaching model in which I would provide feedback and modeling in real-time.

I was approached by one of the general education teachers for support to help one of her special education students engage in learning with his peers rather than disrupting them by running around the classroom and pushing or touching them. She already utilized class-wide strategies such as flexible seating options and movement breaks within her classroom but found that often he was unable to regulate his body for more than a few moments. Together we brainstormed possible reasons behind his behaviors and identified some strategies which she could try to increase learning opportunities class wide. One strategy which she found to be particularly helpful was to offer students not only flexible seating options, but flexibility in

positioning during independent work. She found that this particular student, responded well to completing tasks upright (such as against a wall or easel) and either standing, or seated on a seat that allowed movement such as a yoga ball or wiggle stool.

As I later reflected on this success and talked with the special education team I noted that this small change had provided the student with multiple types of calming sensory input which were likely the reason he was able to remain more focused and on task, even if only for marginally longer periods of time. The standing or wiggle seat options allowed for the student to meet his vestibular movement needs, thus reducing his need to move around the classroom in a way that was disruptive to other peers. His preferred positioning was sitting on a wiggle stool working against the wall or white board. The amount of force required for him to hold his paper against the vertical surface provided proprioceptive input, as well as activation of core muscles which has a calming and focusing effect as well as reduces his need to impulsively seek out input through pushing and touching peers. By allowing her students this flexibility she was able to help him manage his own needs without causing disruption to learning for other students.

These observations and ongoing conversations helped to re-frame my study focus yet again. While the special education classroom served as my observation and conceptualization period, the general education second grade classroom would serve as ground zero for the meat of my research. I devised a new intervention sequence, which began with implementing the Zones of Regulation curriculum to teach students the concept of self-regulation. Phase 2 was to teach students a series of sensory strategies, which could be self-implemented such as flexible seating, movement breaks, tactile tools, or headphones. The students would have opportunities to practice and experiment with these strategies through support from their teacher and myself and then develop their own “menu” of sensory strategies to keep at their desk. The ultimate goal was

for students to be able to evaluate their zone of regulation in real time and reference strategies from their personal menu to stay in the green "ready to learn" zone. I talked almost daily with my OT friend, as well as the school-based occupational therapist to develop a collection of strategies which could be easily taught, and were relevant to the general education classroom setting without disrupting the established routines and classroom flow put into place at the beginning of the school year.

My first week in second grade was a dramatic reality check. I learned that I was not as comfortable in working with the older students as I had expected and that there was a dramatic difference in classroom management between working with 16 preschoolers and 26-second graders. I learned that the rigors of the district prescribed curriculum did not leave enough time to deviate from the pre-developed lessons and that as a general education classroom there was far less flexibility in how concepts were taught. My new mentoring teacher and I spent a large amount of time over the first few weeks processing the differences between my expectations and the reality of implementing an additional curriculum into the classroom. She shared that the school day is so structured that even as a seasoned educator she struggles to work in opportunities for students to move and get their movement needs met. She says that as a classroom teacher she must focus on teaching to the majority, rather than individualizing her teaching to meet specific needs. She also shared that the RTI math time is the only part of the day that has flexibility for self-designed instruction, and even that time is largely governed by activities that serve as busy-work for high-performing students so that she is able to focus on closing the gaps for unfinished learners.

The reality of this new setting triggered another re-vamp of my research focus and necessitated a shift from targeting the response of my students, to the more introverted

examination of my own practices. I began to consider my interactions with students, and how my behaviors, attitudes, and instructional strategies might be able to support the learning of my students and make the prescribed curriculum that must be taught more accessible for a larger number of students. I re-examined the literature surrounding sensory-based strategies and processed through the shift with my OT colleague, the school-based OT, and the special education team. Together with my mentoring teacher, we brainstormed ways in which I could structure my teaching to meet the sensory needs of students through changes in my own behavior while still honoring the integrity of the curriculum.

Some of the strategies I started with were focused on movement integration and the concept of brain-body connections. Outside of sensory processing, the idea of movement breaks and bodily-kinesthetic learning is widely accepted in the educational community. What I sought to examine was how I could structure my lessons to incorporate movement with the focus on sensory-related needs. My mentoring teacher recommended that I start with splitting up the teaching periods by transitioning students more frequently. For instance, the established math routine when I joined the classroom consisted of three transitions. The students transitioned from lunch directly to their seats for the day's application problem and sprint exercise. From there they transitioned to the carpet for the instructional period. They then transitioned back to their seats for their workbook pages. For my mentoring teacher, this movement broke up learning and allowed students to move throughout what would otherwise be a 90-minute lesson; however, as a new-teacher to managing a classroom of this size, the transitions became overwhelming to manage and I spent more time managing the movement than I did teaching the lessons.

After reflecting on my experiences during the first few weeks of teaching math, I determined that I wanted to focus on giving my students more opportunities to move intentionally throughout the teaching rather than just transitioning from one place to another between activities. I wanted movement to be integrated seamlessly into learning so that it became a natural and steady source of vestibular input. I hypothesized that if I provided students with opportunities for vestibular movement throughout the lessons, then the transitions would go more smoothly because their vestibular system would be more regulated.

I found that the special education team and my OT support teams were supportive of the idea and they voiced agreement that this may be effective in managing behaviors and helping students to stay focused and ready to learn. I was met with some resistance from my mentoring teacher however, due to her concern that changing the way that I structured lessons might confuse students when my practicum ended and she took over teaching again. This slowed my implementation of the study, and I continued to focus on less intrusive and dramatic changes to my teaching such as modulating my tone of voice, classroom lighting and observing for student responses that might indicate a change was needed. I continued to reflect through daily journal entries and ongoing discussion with the special education team and OT colleagues. As I continued to work with my mentoring teacher to develop my classroom management and instructional practices, I continued to brainstorm opportunities that I could integrate more of my focus on sensory needs and self-reflection.

Over time, I came to realize that our daily social-emotional lessons could serve as a prime opportunity to introduce concepts related to self-regulation and sensory needs to students. One of the concepts we focused on for several weeks was ways to stop and calm down. The prescribed curriculum taught students to recognize signs that they might need to stop, name their

feeling, and use a strategy to calm down. As I began planning for this segment, I found that these concepts aligned with my focus on sensory regulation. With the support of my mentoring teacher and some resources gathered from the literature and my OT resources, I determined that I could help to meet the needs of my students facilitating their correlation between the feeling of dysregulation or feeling "out of control" and how they respond. The prescribed curriculum taught students to recognize physical signs that they needed to calm down such as feeling like their muscles are "tight," "butterflies" in their stomach, or feeling "hot" in the face. With this in mind, I used it as an opportunity to reflect on my own responses to stress and the ways in which I modulated my own sensory system to re-regulate and manage stressful situations in the classroom. I elected to use this curriculum as a platform to model strategies for my students, simultaneously drawing their attention to the concept of sensory-needs while normalizing the idea that everyone can feel as though they are "out of control" (dysregulated) and that there are ways to reregulate and calm down.

I introduced the students to the concept of proprioceptive input during one of our second step lessons, comparing it to ways that pressure can help us to calm down. For instance, we discussed the ways that sometimes a hug can help us to feel more calm if we are very sad or feeling upset and that sometimes we can give ourselves a hug, or "squeeze" to help calm down. Another concept that we discussed was the idea or movement and how this can help us to focus our attention and be better learners – for instance standing on our spot at the carpet and doing a full body stretch such as reach to the sky, and then down to touch our toes.

As I began to integrate some of these strategies within our classroom routines, I simultaneously became more intentional about openly narrating my observations and how we could change the why we were learning to focus attention. The Physical Education teacher had

taught the students a movement sequence she called pretzel arms, which provided proprioceptive input and motor skills such as crossing midline which requires both sides of the brain to work together. To accomplish this, students would reach their arms straight out in front of them with their thumbs facing down towards the floor, cross their arms at the wrists and fold their hands together. They would then rotate their folded hands downward at the elbows and up to their chest. This strategy was particularly useful during transitions and long-periods of instruction at the carpet when students seemed to be losing focus and was quickly renamed by several of my students as the "focus pretzel." My students were quite receptive to the idea of this particular change, and because of their buy-in it became a highly effective strategy for refocusing their attention. Once students were refocused, we could continue learning or transition from the classroom to other areas of the building such as specialist or out to the playground for recess.

I found that as I become more intentional about acknowledging and narrating my observations and strategies (i.e. "We seem to be losing focus, I think that we need to do a focus pretzel so we can get back on track") the students quickly adapted and we were able to refocus and quickly get back to the lesson. I also found that many students became more aware of their own needs and adapted these strategies on their own. On several occasions, I observed students to implement the pretzel arms strategy independently throughout independent learning time. With this new sense of awareness that I was building in myself, I found that I had simultaneously led some students to be more aware of their own needs as well.

With this observation in mind, I became increasingly intentional about how and when I used strategies to manage my personal levels of regulation throughout the day and narrated this for students as appropriate throughout the day. If I noticed that I was having difficulty focusing while teaching a lesson (for instance losing my place during a math lesson), I would note this to

students with a simple comment such as “Oh man I really seem to be sleepy and having a hard time focusing today don’t I?” I would then quickly describe how I was going to adjust my behaviors to address it “Maybe I need to stand up and move a little bit while we are working.”

This verbal modeling of my observations and subsequent changes became second nature, and I found that my students responded well to this normalization of behaviors and feelings of dysregulation. The shift and openness with students was unfortunately met with some continued hesitance from my mentoring teacher, which I suspect was due in part to teaching styles and variance in perspectives related to teacher-student relationships. My own philosophy in education is founded in the idea that students and teachers are engaged in a parallel state of perpetual learning. I feel that open and honest communication with students is imperative while still maintaining an appropriate level of management that allows the classroom to run smoothly. I want students to understand that I am a resource, and am there to help them learn and grow; however, sometimes things do not go as planned and that even as adults, we have to continue to be flexible, and learn how to grow and change as a result. This philosophy was quite different from that which existed in the classroom prior to my arrival and was sometimes met with guidance and feedback that was contradictory. This resulted in some inconsistency as we shared teaching responsibilities and made it challenging to truly pursue my research in more depth.

I feel that over the course of this research, I have learned that there is a broad spectrum of perspective that exists among educators which oftentimes influences that way that we interact with our students and shapes the way that we approach instruction and learning. Reflecting on my own practices and experiences through this experience has provided me with valuable insights related to how I would want to structure my own classroom when the time comes. I have learned that students are highly perceptive to adult dynamics and are quite resilient in their

willingness to try new things are able to quickly adapt to these changes and apply them independently. These experiences have helped me to recognize the disparity that sometimes exists within educational philosophies, and how important it is for myself as an educator to continually strive to better my educational philosophies and practices. This includes tuning in not only my students' needs, but my own as well and to narrate this reflection with students to normalize the process of self-betterment as a lifelong practice. Reflective teaching from the perspective of sensory processing needs became more a focus on the awareness of how my own practices, behaviors, and responses as an educator can impact the students that I work with. Being open and intentional about changes to my own behaviors and the strategies that I use provides valuable opportunities to model for students. This in turn communicates to students that it is acceptable, and even encouraged to tune in to their needs and take steps to meet these needs as they arise.

This may mean that as an educator I need to read the cues of my students, and recognize when more intentional teaching is warranted to increase their level of self-awareness and ability to navigate and meet their own learning needs. While the focus of this study changed dramatically several times, I feel that it perfectly encapsulates the very idea that I now realize I need to convey to my students – that everyone has their own unique set of needs and that by tuning in to those needs, we as learners (of all ages) are able to acknowledge and rectify these needs to improve our capacity to learn and grow. Recognizing and acknowledging our body's sensory responses to our environments and addressing these sensory needs can have substantial impact not only in our physical well-being and readiness to learn but also our self-awareness in general. This is a powerful concept to convey for students and encourages a level of self-

awareness that has potential to impact their learning far beyond the scope of their K-12 education.

Limitations

The focus of this research shifted dramatically over its course. The scope broadened and narrowed from the idea of highly structured sensory integration strategies, to more individualized student driven interventions and finally turned inward towards professional growth. The structure of classroom settings paired with time constraints and curriculum mandates necessarily limited the scope of research that I was able to pursue for this study. While a more targeted investigation with intentional teaching for students related to sensory regulation continues to be an area of need, the experienced in this setting made such an investigation impractical and unobtainable for the purposes of this professional development study.

Recommendations

For future study within the concepts of sensory-integration, a study would need to be restructured to occur within a classroom that is established and maintained in alignment with personal philosophies related to teaching and classroom management – particularly teacher student relationships. Future study should explore the application of a targeted curriculum related to self-regulation such as the Zones of Regulation curriculum noted earlier in this study. Intentionally teaching students to recognize and address their own needs in connection with sensory-based input would lay a solid foundation for the previously designed action research study examining the impacts of an individualized strategy menu for students to reference. Action research should be designed to further examine the ways in which this direct teaching impacts specific learning behaviors and outcomes such as engagement, academic growth, and self-regulation.

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