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THE EFFECTS OF WHOLE BRAIN TEACHING STRATEGIES IN THE GENERAL
EDUCATION CLASSROOM

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ABSTRACT

As a kindergarten intern for the Professional Development School at The Pennsylvania State University, I observed my students and their behavioral needs. Many of my students demonstrated the urge to move and talk during whole group instruction. For most students, school is the first time they are expected to exhibit on-task behaviors for an allotted time period. Through the implementation of Whole Brain Teaching (WBT) strategies, I considered how I could improve the students' recall of information and on-task behavior while letting them move and talk, two significant behaviors that had been leading them to be off-task. WBT is an education reform approach with a goal of creating instruction that is full of fun, on-task learning experiences, while students' whole brains are activated as they see, hear, say, feel, and do. The purpose of this research study is to investigate the effects of WBT strategies on teachers and students in the general education classroom, specifically regarding on-task behavior during whole-group instruction and recall of information after the lesson. Through systematic data collection and interviews, I describe on-task behavior and student learning when students perform WBT gestures during whole group instruction as a classroom management strategy and as a method of teaching concepts. Research has been done on the effects of WBT strategies, but it is unclear which variation of the approach most positively impacts the students' on-task behavior and learning. More specifically, I examined the difference between gestures that the teacher introduced and those that students generated and how this contributed to on-task behavior and recall of information.

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Chapter 1

Introduction to the Problem

As a Professional Development School (PDS)¹ intern during the 2013-2014 school year, I work with Kindergarteners at Gray's Woods Elementary School in the State College Area School District (SCASD)². PDS is a yearlong student teaching internship. I was chosen as one of 48 Pennsylvania State Elementary Education majors to participate in this collaborative experience arranged between The Pennsylvania State University and the SCASD. By the end of the school year, I will have spent 185 full days in the classroom. Although my student teaching placement is in a self-contained kindergarten classroom, I also frequent my partner classroom, a third grade class, about once a week in order to gain experience observing and teaching older students. My extensive coursework and internship experience in the SCASD have provided me with the foundation I need to begin my professional career as an educator. Through the internship, I have learned how to take an inquiry-based approach to instruction, which provides teachers with opportunities for self-discovery. Inquiry is driven by the intrinsic desire to make something better within the classroom and is a state of mind that guides teaching practices. Through an inquiry investigation of my own, I have been passionate and committed to exploring ways to improve my students learning experience by increasing their on-task behavior and recall of

¹ Professional Development School will be referred to as "PDS" for the duration of the paper.

² State College Area School District will be referred to as "SCASD" for the duration of the paper.

information. My focus of my inquiry was inspired by the teaching style of my partner classroom teacher. I begin with a description of the setting in which my study took place.

Description of the Teaching Context

There are nineteen students in my Kindergarten classroom, 11 of which are girls and 8 are boys. The academic abilities of the students are varied with a wide range of talents. This is not surprising because students enter kindergarten at varying levels. Many factors could possibly affect students' readiness when entering kindergarten, such as whether or not the students attended pre-school and what the students were exposed to in their home life. For the subjects of reading, writing, and math, students mostly work in centers so that they can be surrounded by classmates that are at the same ability level. This helps the students learn because they are surrounded by peers that understand concepts to a similar extent as they do. Also, when in ability groups, students are not intimidated by a peer that may have a skill mastered already, while they are just beginning to learn it. Likewise, students that have mastered concepts can extend their learning and not be bored by content they already comprehend. The teacher considers two main factors when forming groups. The first is the screening the students took during the summer before school started, and the second is the observations the teacher has made about the students to determine where they best fit. The ability groups are named by colors so students don't feel like they are in a 'high' or 'low' group.

The reading abilities of the students vary. One student is reading significantly above the kindergarten benchmark, six students are above the benchmark, eight students are at the kindergarten benchmark, and four students are below kindergarten benchmark.

For writing, students are divided into four groups based on how independent they are at writing. The most independent writers can scribe a story with a few sentences without teacher

assistance. The next group of students can also scribe a story without teacher assistance, but the stories are shorter and less detailed. In these first two groups, the students sound out the words to the best of their ability. Then, there is a group of students that can attempt to produce writing independently, however, they are able to write more words accurately when they receive help from an adult to write the story. The adult “stretches” the words so that the student can identify more sounds and corresponding letters than they would have been able to when working independently. Lastly, there is a group of students that knows a minimal amount of sounds and needs help from an adult.

For math, students learn a lesson as a whole class and then work in small groups or partners for activities. When students work in small groups, they are separated into three groups based on their pace when working through mathematical concepts. The groups are distinguished by how quickly the students can acquire a new skill. For partners, students sometimes work with a peer that moves at a similar pace so that the students can be challenged in a suitable manner. Other times, they work with a peer that moves at a different pace so that the students can learn from one another. The teacher differentiates instruction by individually giving extensions for a lesson or providing support when needed. In addition, the grouping of students is flexible and changes as a result of their performance.

In general, the students get along with each other. Some of the students knew each other before kindergarten because they went to preschool together or are neighbors. These students developed stronger friendships with the students they already knew by playing together during appropriate times throughout the day. However, students have been open to including others in play and have been surprising the teachers by not always playing with their typical ‘buddies.’

Some students seem to stick out from the rest in different ways for an array of behavioral reasons. One student is naturally louder when speaking and hangs on the teacher often, which presents a behavioral challenge. Two male students need strong emotional support. One of these

students exhibits behavior that is challenging to address, like having trouble keeping his hands to himself. After the New Year, this student switched to a modified day, which means that the student attends kindergarten for only the first half of the day. His parents felt he was over-stimulated by a full day; he will be repeating kindergarten next school year. The other student that needs strong emotional support has speech that is difficult to understand, and he runs away to cry and scream when things don't go his way or is presented with a challenging task. The remaining students do not stick out as much and can mostly be grouped by similar qualities. Two male students that did not attend preschool get along but have trouble getting work done because they have trouble staying focused. Five of the girls are quiet and play together often. Three girls are louder and can always be heard from across the classroom. One boy is a social leader in the classroom that influences others by always striving to follow the rules as directed. Two boys also follow directions, but are quiet. One student is talented and a high reader but also quiet and is seen working and reading independently at most times. The remaining two girls interact with many students in the classroom. The classroom has a mixture of students that creates the community and contributes to a special and unique learning environment.

Rationale for the Study

Classroom management is essential to a smoothly functioning environment. When students are fully engaged and focused during lessons, they will get the most out of them. The students' and teachers' energy and attention during instructional time can then be spent more on content than on redirecting off-task behavior. There are several approaches to tackling the daunting task of managing behavior of a whole class of students, but one approach caught my interest from the first time I visited the classroom at the beginning of the school year.

I have observed my partner classroom teacher in third grade use Whole Brain Teaching (WBT)³ strategies with her students. During whole group lessons, the students' used repeated gestures with corresponding words. The actions seemed to be fun because students are encouraged to really exaggerate the movements with their bodies. They were all smiling and laughing as they simultaneously performed the movements and said the words. Despite the giggles and movement, the students were still focused and engaged. Since students were so concentrated on what they were doing that related to the lesson, her students were on-task and were recalling the content that was associated with the gestures. From what I have read about WBT strategies, there is little mental capacity left to engage in off-task behaviors when students' whole brains are activated during lessons as they see, hear, say, feel, and do.

When I observed my kindergarten classroom on the carpet during whole group instruction, I had some concerns about how much non-directed movement was occurring. The students were supposed to sit on their assigned carpet spot in crisscross applesauce position with their spoons (hands) in their bowl (lap) and eyes on the teacher. However, students did not always demonstrate these behaviors. The teacher would constantly have to give verbal or non-verbal reminders. Although I knew that children ranging in age from five to seven years old cannot be expected to sit still and be focused for extended periods of time, longer than 15-20 minutes, I did expect them to fulfill the expectations for that allotment of time. Throughout the school day, the kindergarten's schedule was purposely and thoughtfully designed in a way that children were not expected to sustain working on an activity which required them to sit still for longer than 20 minutes. When it is reaching the 15-20 minute mark, the teacher would know because the students would begin to lose focus. Their observable behavior no longer appeared to

³ Whole Brain Teaching will be referred to as "WBT" through the duration of the paper.

be engaged in the lesson. However, I have observed my students meet this expectation of sitting still and appearing focused for 15-20 minutes time period. For example, I have seen all my students engaged in read alouds by keeping their eyes on the book and bodies still, asking questions, and participating in discussions. They seemed to love hearing stories because they have asked several times if the teacher could “Read it again!” Therefore, I believe my expectations were reasonable, but the students struggle with them in settings other than during read alouds. I will provide the literature that supports this later in Chapter 2, under the section ‘Developmentally Appropriate Expectations for Kindergarten Students’. When I have the opportunity to lead the class, my concern had to do with on-task behavior. Are the active students really paying attention to the lesson when they aren’t sitting still and appear to be attentive? How can I use their urge to move in a way that helps the students stay on-task?

These observations of the contrast between student behavior in the classroom using WBT strategies and of my own classroom are what led me to my inquiry question. My wondering had developed from leaving school at the end of the day often pondering how I might get my students to remain on-task during instruction. I found myself constantly redirecting students to get focused, which made me frustrated that I had to continuously remind students to ‘get ready.’ This led me to wonder what I could do to limit the number of off-task behaviors during whole group instruction time. As I gradually took on more teaching responsibility, I became more invested in channeling my students’ energy. As I did so, I wanted to be able to channel my students’ energy and attention more on learning, so that I could focus more on what I am teaching to my students and how I deliver lessons and less on behavior management..

I have read about WBT and discovered several approaches that I could use to incorporate WBT strategies into my daily teaching in order to better manage behavior, while students are also recalling lesson content. The techniques are flexible and are meant to be modified by the teacher

in order to meet the unique needs of the students. I was interested in observing how WBT gestures impacted on-task behavior and student learning when my students performed them during whole group instruction as a classroom management strategy and as a method of teaching concepts. Research has been done on the effects of WBT strategies, but it is unclear which approach most positively impacts the students' on-task behavior and learning. I decided to further examine the difference between gestures that the teacher introduces and those that students generate, as well as how this contributes to on-task behavior and recall. I was anticipating and hoping that once gestures were incorporated into my lessons, students' on-task behavior and recall would increase. However, I was not sure what to expect in terms of the type of gesture used, either student or teacher generated. I decided to explore this topic because I wanted to find a way to improve the students' recall of information and on-task behavior while letting them move and talk, two significant behaviors that had been leading them to be off task.

Main Question

As a result of much of my time being spent on managing student behavior, I decided to focus my inquiry on ways to improve time on-task. "Time on-task, also known as engaged time, is the amount of time actually spent learning" (Martinez, 2009). Off-task behaviors vary with the kind of learning activity. This means that what appears to be off-task during one activity may be on-task in another. Some of the off-task behaviors for sitting on the carpet and listening would include, but are not limited to: having eyes not be on the speaker, laying down, being out of a seat, playing with something, talking to a friend, and performing unnecessary movements. My students are full of energy and demonstrate this through their mobile bodies and chattiness. I wanted to see if incorporating movements during instruction would help to increase their on-task time.

How do WBT gestures performed by students during whole group instruction impact students' on-task behavior?

Sub-Questions

- In what ways do gestures performed by students during whole group instruction impact students' recall of lesson content?
- Are gestures more effective if the students make them up or if the teacher tells them the gestures?
- What are students' feelings about the gestures?

The Intervention

In order to see if gestures performed by students during whole group instruction would help my students improve their on-task behavior and recall of lesson content, I implemented an intervention. My intervention involved using gestures informed by WBT during whole group instruction during reading. These gestures were first teacher generated, meaning that the teacher demonstrated the gesture that the students performed. Then, these gestures were student generated. For these, the class brainstormed student-generated gestures and then together we reached a consensus as to what gesture we would use.

For this research study, it is significant to define the terms in which I will focus, time on-task and student recall. As stated previously, "Time on-task, also known as engaged time, is the amount of time actually spent learning" (Martinez, 2009). According to engagement expert Phillip Schlechty (2011), "The engaged student is attentive, committed, persistent, and 'finds meaning and value in the tasks that make up the work'" (p.14) (as cited in Dana, 2013, p. 6). The amount of time teachers allocate for learning in a school day exceeds the amount of time students

are actually engaged in learning. Of the amount of hours in a school day, students only spend about 42% of their time engaged in learning (Martinez, 2009). It is significant to note that engaged time is more than a behavioral concept. Engaged time encompasses the emotional commitment to academics as well. In order to obtain accurate on-task behavior data, the observations have to be discrete and conducted in such a manner that does not alter the natural environment of the learners and the observed behavior needs to be concrete and measurable (Martinez, 2009). Students can demonstrate behavioral engagement through observable, measurable behaviors, such as participating in learning tasks, but they need to be emotionally involved as well, which means that the students are invested in what they are learning because they find it interesting (Martinez, 2009). Due to emotional involvement being difficult to measure, I focused on the behavioral aspect of time on-task. Observing engagement is always an inference because I can't measure engagement directly. I used observable behaviors to infer whether the students mind is engaged or not. However, students may exhibit off-task behaviors (e.g., such as not having their eyes on the teacher), but proves to be engaged when the student successfully answers a question from the teacher about the content. Therefore, aspects of time on-task may not be visible, but students can still be emotionally invested in the lesson. In addition, when teachers put too much stress on academic engagement, the large emphasis can adversely affect the learning outcomes.

An overemphasis on engagement as a teaching strategy can create an environment of mock participation, within which students pretend to be on-task but are not engaged in learning. While mock participation may achieve one's desire for students to stay on task behaviorally, it can negatively impact academic achievement as it lowers students' rate of emotional engagement (Slavin, 2003) (as cited in Martinez, 2009).

Some researchers conclude that engaged time is the most important influence on academic achievement (Martinez, 2009). It has been found that students will not be able to

respond to academic opportunities or manage subject matter tasks rapidly and accurately when they are engaged in off-task behaviors to a high degree (Martinez, 2009). Therefore, through my intervention, my goal was to increase the behavioral aspect of time on-task and thus hopefully the students would be able to more accurately and rapidly respond to academic questions after the lesson. Once students were able to recall information, they would be able to apply it in order to show their understanding of the content.

In addition, I must clarify the difference between "recall" of information and developing understanding of concepts or ideas. The human memory operates on two different levels, short-term memory and long-term memory. Beginning with short-term memory, this includes what is focused on in a given moment; it is what holds a person's attention. Most people can hold about seven items of information in their short-term memory at any given moment, such as a telephone number (Keeley, 2011). The information in short term memory has to be transferred to long-term memory, if people learned information with the goal of being able to retain and recall it. Long-term memory hosts all the information that a person knows and can recall. The information becomes a part of the person and once the information is stored in long-term memory, the person will have access to it for a long time (Keeley, 2011). In order to transfer short-term memory to long-term memory, people can do so through two methods, rote learning and learning through understanding. Rote learning is learning through repetition. This kind of learning is mechanical and requires little understanding of content, such as recalling multiplication and division facts. On the other hand, learning through understanding involves learning and remembering by comprehending the relationships that connect information together, such as remembering the main ideas and supporting details from a lecture because the person understands the concept that was taught and develops relationships between the ideas (Keeley, 2009). Rote learning and learning through understanding are both useful. Often times, these two types of learning are used together, such as when a person memorizes a date in history by rote learning and then relates this

fact to understand a concept, which was remembered by comprehending the content. It is important to consider that facts will be forgotten without review because they will be lost from memory (Keeley, 2011). By asking my students what they learned from a lesson, they may first just be producing rote information that the gesture helped them to recall, but when they relate this fact and gesture to its context, the students may push past the rote learning and move into learning through understanding. When I asked students questions after the lesson, I would first see if the students could recall the information. Then I questioned if they could prove their understanding of the rote information by having them apply it to a situation.

My study focused on the effects of WBT gestures and I questioned how the gestures would impact my students' on-task behavior and learning, regarding students' recall of lesson content. In Chapter 2, I describe the literature associated with WBT as well as the compare and contrast kinesthetic teaching and WBT. Further, I provide the literature that explains how others support the use of activating students' whole brains while they are learning, even though their practices are not WBT. Finally, I address the observable developmentally appropriate expectations of kindergarten students.

Chapter 2

Literature Review

In order to understand WBT in its fullest potential, one must understand whom, how, and why WBT developed. I will discuss the literature associated with WBT, the similarities and differences between kinesthetic teaching and WBT, the beliefs of others that encourage the activation of whole brains when learning, and the developmentally appropriate expectations of kindergarten-aged students.

Whole Brain Teaching

Origin of Whole Brain Teaching

Chris Biffle (2013) describes the origin of WBT as, “25 years of failure and then bingo...the light goes on!” (p. 4). Biffle was a teacher in a barrio community college and was giving lectures to his philosophy students when he had his first breakthrough. After asking a student, whom he believed to be a good student, to repeat what he had just said and she couldn’t, he wondered what little hope there would be when this student took the midterm three weeks later. Ultimately, Biffle (2013) realized that, “...it doesn’t matter if the students are in college or kindergarten...the First Great Law of Whole Brain Teaching: The longer we talk, the more students we lose” (p. 6).

Since Biffle (2013) noticed that his lectures were unfortunately ineffective, he next pondered his discussions to ultimately, and unfortunately, realize that only about a fifth of his students participated in the conversations (p.6). As a result, Biffle (2013) started to experiment with new teaching strategies that he came up with, but much to his dismay, most failed. A few

strategies, however, were successful. During these trials, the class was loud enough that neighboring teachers would pound on the walls out of anger due to the noise Biffle's students were producing. However, Biffle (2013) didn't believe that the students were creating noise; it was his students' excitement of what they were learning (p.6).

Then, Biffle (2013) had another breakthrough when he was coaching a middle school basketball team and tried the same techniques with these girls that were successful with his philosophy students (p.6). He was amazed that the same techniques were working no matter what he was teaching.

Next, Biffle (2013) contacted two of his former students, Chris Rekstad, a fourth grade teacher, and Jay Vanderfin, a kindergarten teacher, to ask them to try some of his strategies (p. 7). Rekstad and Vanderfin changed the techniques in creative ways that suited their classrooms and, as a result, the system worked for them as well. The three men, Biffle (2013), Rekstad, and Vanderfin, came to the conclusion that they discovered a classroom learning system that was successful with kindergarten through 14th grade (p.7).

In 1999, Biffle (2013), Rekstad, and Vanderfin met around 80 times in Yucaipa, a small town in Southern California, throughout the course of the year to create the core of a program that now exists today and is used by tens of thousands of instructors (p.7). They spent the year creating the new teaching system centered on three basic principles: the system should be brain based, fun, and free of charge (Pedersen, 2014). In 2000, they had a meeting in Biffle's home with 30 desperate Yucaipa teachers who were enthusiastic about the new system the three men had designed (Pedersen, 2014).

From 2001-2006, the three designers hosted monthly Power Teachers conferences at Crafton Hills College in Yucaipa that focused on classroom management, reading, and state standards. The attendance at these free seminars ranged from 20 to 40 people each. During these years, Biffle, Rekstad, and Vanderfin wondered how they could spread the word to other teachers

about “the music of task focused laughter” (Pedersen, 2014). They wanted to discover the “Golden Key,” which would be the focus that would allow them to reach more teachers so that they could spread their excitement of their realization. In 2007, they discovered the Golden Key: “Focus on teaching challenging students!” (Pedersen, 2014). Next, a seminar entitled “Teaching Challenging K-12 Students (and the rest of your class, too!)” was created causing seminar attendance to drastically increase from 40 to 400 and more in order to share the exciting news with “desperate, fun loving teachers” (Pedersen, 2014).

In 2008, the three men posted videos to YouTube and TeacherTube, resulting in 500,000 hits in 14 months (Pedersen, 2014). Teachers across the country and in 20 foreign countries studied the short movies and thousands of pages of the free materials were downloaded from an assortment of websites. By the end of 2008, Jason Pedersen, a programmer, assisted in the creation of a single website, which housed all of the resources, videos, testimonials, message boards, calendar, and free downloads, in one location (Pedersen, 2014). In 2009, the three men established their next goal, “to become one of America’s leaders in brain based education” (Pedersen, 2014). As a result, the system took on a new name with a new vision while remaining free of charge. Formerly known as Power Teaching, the system became Whole Brain Teaching, LLC, a limited liability corporation (Pedersen, 2014).

As of February 2010, the three men led a free conference in Hemet California in which more than 900 educators registered, making their seminar one of the largest in the world (Biffle, 2013, p. 7). In April 2010, international audiences were reached via webcasts and in August 2010, YouTube and TeacherTube videos exceed 1,000,000 views (Pedersen, 2014). WBT conferences are continuing to set attendance records (Pedersen, 2014), and as of 2010, the WBT website (WholeBrainTeaching.com) became one of the largest, free, privately financed, education websites in the world (Biffle, 2013, p.192). All the WBT seminars and downloads are free because WBT is not a business; WBT is a movement (Biffle, 2014).

Trying to answer his question of why instructors at every grade level had found success with WBT, Biffle (2013) did some brain research and “...discovered that the system that had been pounded out semester by semester during a decade of trial and error *worked because it was brain friendly*” (p. 7). The three men found:

...students were completely engaged in class when they were emotionally involved in lessons that required seeing, saying, hearing and physically moving...In a remarkable number of cases, our challenging kids couldn’t be challenging because their entire brains were too busy learning. (Biffle, 2013, p. 8)

What is Whole Brain Teaching?

WBT is classroom management and a method of teaching concepts combined together (Nutini, 2012, p. 24). “Whole Brain Teaching is meant for the uniqueness of every teacher and classroom” (Nutini, 2012, p. 24). Teachers are encouraged to take the techniques and adjust them to make them their own. WBT has the flexibility to allow teachers to put their own spin on techniques to meet each classroom’s needs (Biffle, 2013, p. 60).

As Biffle (2014a) states on the WBT website:

Whole Brain Teaching rests upon the principle that teachers at every level share the same difficulties: students lack discipline, background knowledge and fundamental problem solving skills. From kindergarten to college, teachers face students who have difficulty with reading and writing. Nonetheless, our students respond to challenges, enjoy well-designed learning games, and can make, in the proper setting, astonishing educational progress.

The first and primary research goal of Biffle (2013), Rekstad, and Vanderfin was to devise a system that teachers would be able to willingly adopt the approach to meet their particular students’ needs (p.25). Each of the WBT strategies have been rigorously classroom

tested, several of which have been researched for over 10 years. The three men use the feedback they receive via email, conferences, and from the WBT website from hundreds of teachers from locations all over the country to refine the techniques (Biffle, 2013, p. 25, 190). Therefore, the WBT system is ever-evolving.

Since students seem to learn best and the most when they are having fun, the goal of WBT is to create classroom environments that are full of orderly fun (Biffle, 2014a). Therefore, WBT is comprised of “a large amount of highly structured, educational tomfoolery” (Biffle, 2014a). In WBT classrooms, one would see and hear task-focused laughter as teachers incorporate games and humor. These two aspects beautifully combine to increase students’ repetition of fundamental information and rehearsing basic skills. Also, students of WBT classrooms are disciplined and organized. The students enjoy following the rules of the games more than they enjoy ignoring them (Biffle, 2014a).

According to Biffle and Vanderfin (2009):

A significant quantity of modern brain research demonstrates that we learn best by seeing, saying, hearing and doing. When we see information, we employ the visual cortex near the rear of the brain; when we say and hear information, the language centers, Broca’s area and Wernicke’s area in the brain’s left hemisphere are active. When we engage in a physical learning activity we employ the motor cortex, our most reliable memory storage area, located in a band across the top, center of the brain (as cited in Nutini, 2012, p. 24).

During WBT classroom activity, the whole brain is being stimulated because everything in the classroom is mirrored. This means that each action has a gesture, a visual, and verbal attachment to it; so therefore, the whole brain is stimulated (Nutini, 2012, p. 24). “If classroom instruction entertainingly engages the whole brain, students

don't have any mental area left over to create challenging behavior" (Biffle, 2014b).

The Brain Behind Whole Brain Teaching

WBT was named because the strategies use students' whole brains. Understanding WBT and how it benefits challenging students with helping them learn, one should grasp the basic concepts of the functions of the brain. As described in Biffle's (2013) book, it is easy to comprehend how the brain works when comparing it to a model of lacing one's hands together in front of one's chest (p.18). The shape that two hands form is approximately the size of one's brain. The brain is a complex organ, weighing about 3 pounds, and it contains around 100 billion neurons, which are brain cells that transmit information. The overall length of one brain's nerve fibers exceeds 94,000 miles (Biffle, 2013, p.18).

When one views the hands laced together, the left hand represents the left hemisphere of the brain and the right hand represents the right hemisphere. When one wiggles the two pinky fingers, they represent the prefrontal cortex. The prefrontal cortex is the area that controls reasoning, planning, and decision-making. This region can be thought of as the brain's boss (Biffle, 2013, p. 18). It does not fully mature until one's early 20s, explaining why people younger than this can act irrationally more often than their elders. When people grow up, there is a struggle between unequal forces because the prefrontal cortex is only partially developed and it is trying to guide a fully mature limbic system, which is explained later as one's emotions (Biffle, 2013, p. 18).

Next, when one wiggles the middle fingers, they represent the motor cortex. This region is the brain's most reliable memory area. For example, one remembers how to ride a bike after years of being out of practice because the information on how to do this complex activity is stored in the motor cortex (Biffle, 2013, p. 18).

Then, when one wiggles the thumbs, they represent the visual cortex at the rear of one's brain. Like how one's thumbs are larger compared to the other fingers, the visual cortex of the brain occupies a large portion of the brain, so much so that scientists refer to the brain as the "seeing brain" (Biffle, 2013, p. 19). This region is one of the brain's most trustworthy memory areas, with the motor cortex being the most reliable. The function of the visual cortex explains why people recall faces better than names since information about people's looks is stored in the substantial visual cortex area of the brain.

The back of one's left hand represents the outside of the left hemisphere of the brain. Broca's area would be located toward the front of one's left hand and is essential for speaking. Wernicke's area would be situated toward the back of one's left hand and is necessary in hearing and understanding language (Biffle, 2013, p. 19).

To understand how these five areas of the brain can work together, if one was reading this paragraph aloud, information would pass from one's visual cortex (thumbs), to Wernicke's area (language understanding; back of left hand), to Broca's area (speaking; front of left hand), and lastly to the motor cortex (middle fingers) to trigger one's lips, tongue, and vocal cords in order to produce speech. Then if one chose to stop reading and have a cup of tea, one would activate the prefrontal cortex (pinky fingers) because a decision was made (Biffle, 2013, p. 19).

Further, when one separates the hands, the base of the palms represents the limbic system, which is responsible for emotions. When one does something irrationally, it is because the limbic system, one's emotions, had power over the prefrontal cortex, one's reason (Biffle, 2013, p. 19). In addition, there are more connections from the limbic system to the prefrontal cortex than vice versa. This is important for teachers to understand because one's emotions are capable of controlling their reason more easily than the reverse, which explains why people act irrationally at times (Biffle, 2013, p. 20).

To understand how one learns, another analogy would be helpful to comprehend the science of the brain. The brain is comprised of 100 billion neurons, which are nerve fibers that process information. Dendrites are attached to each neuron, similar to how branches are attached to a tree trunk. When one learns something, one grows dendrites. The more that one has knowledge of a subject, the more one has repeated experiences associated with the subject, and the more interconnected one's neuronal dendrites become. Therefore, "repetition equals dendrite growth equals learning" (Biffle, 2013, p. 19).

Moving on, in the limbic system, there is a region called the hippocampus, and it processes memories before sending that information back to the region from which it was initiated. The brain does not have one single area devoted solely for memory. Thus, "The more brain areas involved, the more dendrites are grown, the deeper and more lasting your learning" (Biffle, 2013, p. 20). There are two types of memory, short term and long term, which brain scientists differentiate. Short-term memory is limited in capacity from three to seven items and limited in duration, some believe it to only be two seconds and others believe the memory to be lost in 15 to 18 seconds. Long-term memory is unlimited in capacity because storing new information into long-term memory does not force other information out. When information is repeated frequently enough, it will be stored forever (Biffle, 2013, p. 20). Although rote information, like the alphabet or math facts, may be stored forever through repetition, it is application of this content that will prove learning for understanding.

Another important part of the brain is mirror neurons, which are scattered throughout the brain and explain why people will mirror others, or do what they are doing. This occurs in classrooms as students mirror their teacher's actions and/or words and students mirror each other's behavior (Biffle, 2013, p. 21).

Lastly, according to Biffle (2013), habituation seems to be one of the most important concepts in education. "Habituation occurs when an individual's response to a stimulus decreases

after repeated stimulation” (Biffle, 2013, p. 22). People will react to stimuli until they get used to it and don’t even notice it anymore, like living on a busy street and hearing cars pass the first few days living there, but not noticing it after that. For reference to the classroom setting, an approach that works with students at the beginning of the year may not be successful a few months later.

The Big Seven

There are seven teaching techniques that lay the foundation of a WBT classroom. With these techniques, eight areas of the brain may be activated. When students are involved with a call and response, the prefrontal cortex is stimulated. They are using their Broca’s area when they are speaking. Listening utilizes the Wernicke’s area, and emotions awaken the limbic system. Memory formation uses the hippocampus, pleasure and pain triggers to amygdala, and seeing registers the visual cortex. Anytime gestures are involved, the brain’s motor cortex is triggered (Biffle, 2013). Based on the literature associated with the seven teaching techniques, I will now explain each of them, including what parts of the brain the technique activates.

1. Class-Yes

Class-Yes is the main attention-getting strategy used in WBT classrooms. When the teacher says, “Class!” the students reply with, “Yes!” This call and response is used countless times throughout the school day, so in order to prevent habituation, the decrease in response to repeated stimuli (Biffle, 2013, p.23), from occurring, the teacher can vary this consistent technique (Biffle, 2013, p.80). Students need consistency because it provides a clear structure for students to follow, but at the same time, students need variety in order to remain engaged (Biffle, 2013, p. 30). Therefore, teachers can mix up this technique by changing how they say class, like ‘Classity, Class Class!’, and with what tone, such as silly or robotic. For extra variety, a teacher can add gestures. With the Class-Yes strategy, students will mimic the teacher because the mirror

neurons, one of the primary learning mechanisms in the brain, are triggered – people learn by imitating others (Biffle, 2013, p. 80). The attention getter seems to act as a switch that turns on the prefrontal cortex, the reasoning center of the brain or the brain’s boss. This area needs to be activated in order for the rest of the brain to process information. Class-Yes immediately prepares students for instruction when they stimulate their prefrontal cortex because it controls decision-making, planning, and focus of attention. Students aren’t fully ready to learn until the prefrontal cortex is engaged (Biffle, 2013, p. 22).

2. Five Classroom Rules

The five classroom rules provide organization to the WBT classroom. The first three rules describe exactly what the students are to do; they are behavior specific. The rules are stated as follows:

Rule 1: Follow directions quickly;

Rule 2: Raise your hand for permission to speak;

and Rule 3: Raise your hand for permission to leave your seat (Biffle, 2013, p.80).

The fourth and fifth rules cover a wide range of situations and act as general principles.

These rules are as follows:

Rule 4: Make smart choices;

and Rule 5: Keep your dear teacher happy!” (Biffle, 2013 p. 81).

A memory gesture is assigned to each rule. This activates the brain’s most powerful area for creating and retaining memories, the motor cortex. Gestures also engage the limbic system because they are entertaining and fun to do, especially when the students use a different tone of voice than normal (Biffle, 2013, p. 37). Students rehearse the rules several times throughout the day, which shows that the teacher takes the rules seriously and ensures that that the rules are at the forefront of students’ minds during the school day (Biffle, 2007, p. 61). As Biffle (2013) describes, “By rehearsing the rules several times a day, with gestures, you will engage whole

brains in hearing, seeing, saying, doing, and feeling the principles that create an orderly classroom” (p. 81). In addition, the mirror neurons are involved while the rules are rehearsed (Biffle, 2013, p. 23).

3. Teach-Okay

Teach-Okay technique is the most powerful learning activity in a WBT classroom because it activates the hippocampus of the brain in order to form long-term memories. Students learn the most when they are involved in teaching their classmates, according to brain and learning research (Biffle, 2013, p. 22). In addition, Barbara Gross Davis, Assistant Vice Provost for Undergraduate Education at the University of California at Berkley states, “Students learn best when they are actively involved in the process” (as cited in Biffle, 2013, p.45). With the Teach-Okay technique, the teacher speaks in small chunks for about 30 seconds and then says, “Teach!” and the students respond, “Okay!” The students then teach each other what the teacher just said while using speaking and listening gestures until the teacher gets their attention with the Class-Yes technique. Teachers must speak in short amounts of time with small amounts of information because the short-term memory has limited capacity of three to seven items of information. The longer the teacher talks, the more students are not engaged (Biffle, 2013, p.46). On the flip side, the more the students repeat the lessons to their classmates, the more the students are engaged, especially since most kids love to talk and be active (Biffle, 2013, p. 81). The lessons are established in long-term memory as the students use their energy to promote the learning of themselves and their fellow classmates. This technique develops students’ language skills and allows students to practice speaking to explain concepts to each other in an atmosphere free of embarrassment or public failure. Students are thinking clearly when they have the opportunity to be the teacher (Biffle, 2013, p. 46). Those students that are the typical talkers get the chance to be listeners, and vice versa. With this technique, the prefrontal cortex (call and response), visual cortex (seeing gestures), motor cortex (making gestures), Broca’s area (speaking

to classmate), Wernicke's area (listening to classmate), and limbic system (finding emotional content to lesson) are involved (Biffle, 2013, p. 22-23).

4. The Scoreboard

The Scoreboard is the motivator in the classroom with the goal of unifying students behind the teacher's leadership. The scoreboard has different levels, similar to a video game, as to avoid habituation. The beginning levels help to unify most of the class behind the teacher's leadership and the higher levels feed off of the unity in order to encourage the rebellious students to participate (Biffle, 2013, p.24). The scoreboard has two competing sides that vary to suit the needs of the students, but the scoreboard tally is used less as the school year progresses because students need fewer reminders as the students settle into the classroom. Individual students may be recognized for points for positive behavior on the scoreboard, but never for negative because the teacher will turn the class against him/her if one student causes the whole class to be penalized (Biffle, 2013, p. 82). This technique triggers the limbic system as students' emotions are involved in the competition between sides. Also, the amygdala is activated as students recognize pleasure and pain when rewards and penalties are distributed and students give "mighty oh yeah" for positive marks and a "mighty groan" for negative. The class would receive a "mighty groan" for the behavior of more than one person, but never receive penalties as a result of the actions of one individual, as to avoid the class turning against the student.

5. Hands and Eyes

Hands and Eyes intensely focuses students on the teacher when he/she is making an important point. As the classroom instantly becomes silent and free from all learning distractions, the prefrontal cortex takes control of the brain activity by focuses all mental powers on seeing, utilizing the visual cortex, and hearing, employing the Wernicke's area, the teacher (Biffle, 2013, p.24). The teacher says, "Hands and eyes" and the students repeat these words while simultaneously using a memory gesture to bring hands together.

6. Switch

Switch is used with more difficult lessons. For this technique, students take turns being the teacher or listener in the Teach-Okay technique. Students have a partner and switch between assuming the role of a teacher to teach their partner and then a listener while their partner assumes the teaching role. The teacher says, “Switch!” and the student repeat this word and switch roles between teacher and listener. The ‘Brocaians,’ or speakers, and the ‘Wernikites,’ or listeners, have the opportunity to swap to develop both speaking and listening skills (Biffle, 2013, p. 24). Repetition of explaining and listening to information helps to grow new dendrites. As Judith Horstman, award-winning journalist in *The Scientific American Day in the Life of Your Brain*, states, “The more you repeat something – an action or a thought – the more brain space is dedicated to it” (as cited in Biffe, 2013, p. 82).

7. Mirror

Mirror is one of WBT’s simplest and most powerful techniques to engage students and is known as the class-unifier. When the teacher says, “Mirror,” the students respond, “Mirror,” and then pick their hands up ready to mimic the teacher’s gestures (Biffle, 2013, p. 77). According the Biffle (2013), “As students imitate the motions you use to teach a lesson, their motor cortex, the brain’s most reliable memory area, is automatically engaged...used mirror...anytime she wanted her class locked into what she was saying” (p. 77).

There are three different kinds of gestures to use while teaching. The first are casual gestures, which are hand motions that teachers naturally use while teaching. The second are graphic gestures, which are gestures that match exactly to what the teacher is saying. For example, if one wanted to explain a hard problem, one could scratch one’s head. The third gesture is called memory. These gestures are linked to core concepts or state standards. Each one of these memory gestures is unique. For example, for a period ending a sentence, one could push one’s hand out as if giving a “stop” signal to represent the period (Biffle, 2013, p. 78).

In order to create additional student engagement with mirror, teachers are encouraged to add silliness and exaggeration elements to gestures, such as “mirror words.” This is when the teacher says “mirror words” and the students respond “mirror words.” Next, the teacher speaks in a silly manner, like slowly or robotically, while matching arm movements to what she is saying. When this occurs, the students repeat the teacher’s words and mimic the gestures (Biffle, 2013, p. 79). Now, with the use of the “mirror words” strategy, “Five brain activities are now involved: seeing (motor cortex), saying (Broca’s area), hearing (Wernicke’s area), doing (motor cortex) and feeling (limbic system). Another name for this quintuple learning is “Teacher Heaven” (Biffle, 2013, p. 79).

Benefits of Whole Brain Teaching

Benefits for Teachers

Teachers have many benefits of using WBT strategies, but three main benefits are positive behavior reinforcement, memory retention, and student engagement (Biffle, 2013, p.181). “These benefits work to reinforce one another as well; as students are surrounded by positive behavior, they can learn better and students will inevitably behave better when they feel more confident in their learning” (Biffle, 2013, p.181).

First, positive behavior is reinforced in a WBT classroom because the feedback and corrections that students receive is always planned by the teacher and presented positively. It has been found that in terms of the verbal stimuli teachers use in the classroom, punishment seems to create a lesson of lower quality. However, Karaduz (2010) found that stimuli for feedback and correction have the most power to affect students’ attitudes with regard to a lesson (as cited in Biffle, 2013, p. 181). In WBT classrooms, there is no punishment for verbal stimuli because students are encouraged to make efforts regardless of the outcome. For example, a positive atmosphere is created because students respond to incorrect answers with “It’s cool!” forming a classroom support system in which students aren’t afraid to have incorrect answers since

participation is valued and rewarded. When students generate a correct response, they are rewarded and celebrated with a “ten-finger woo” (Biffle, 2013, 181).

Next, memory retention is benefitted through WBT because, according to Martinez (2010), short-term memory can hold more complex information when the process of recalling old information and learning new is completed in small chunks at a time. Memory can be stored in images, experiences, and language (as cited in Biffle, 2013, p.183). WBT miniature lectures use visual learning when the class creates gestures and images for key concepts and, through this, have an experience utilizing their bodies alongside their teacher and classmates to learn.

Third and lastly, student engagement is a benefit for teachers. Pang (2010) found that passive learners, students who sit quietly and aren’t noticed because they “fly under radar” or “fall between the cracks,” aren’t aware of activity based learning because they have been taught to be passive learners (Biffle, 2013, p. 184). When students are engaged with activity-based learning, Pang explains that application of metacognitive learning occurs. Participation is expected in WBT classrooms. In addition, as explained by Snowman and Biehler (2003), observing model behavior and identifying with success are two major factors of self-efficacy (Biffle, 2013, p. 184). In WBT classrooms, students experience these two factors when they observe and model their teacher and are rewarded for their accomplishments through praise and recognition. Snowman and Biehler (2003) also said that the students with higher-efficacy tend to be the ones with higher-level thought processes and solve complex problems (as cited in Biffle, 2013, p. 184). Teachers allow for better self-efficacy when they create a classroom community environment in which students aren’t afraid to participate and are reward for positive behavior (Biffle, 2013, p. 184). The three major factors of positive behavior reinforcement, memory retention, and student engagement can produce students’ better self-efficacy when they begin to feel success with their academics.

Benefits for Students

Students seem to benefit from WBT strategies in many ways, but the three major benefits are motivation, student-centered learning, and application of learning. Those students who can identify with success are the ones who are more likely to have higher self-efficacy, which is noted as a major motivation factor by Snowman and Biehler (2003) (as cited in Biffle, 2013, p.186). In WBT classrooms, students have many opportunities to experience success through utilizing gestures and following classroom rules. Since students have many chances to experience success, which leads to higher self-efficacy, motivation is a big benefit for them.

Next, student-centered learning is a benefit for students because WBT lessons move at the pace that students show they need. Students have to practice new skills as many as 24 times before mastery can be achieved, as explained Marzano, Pickering, and Pollock (2001) (as cited in Biffle, 2013, p. 186). WBT teachers have to plan this so that chunks of information are repeated a few times and then as students demonstrate comprehension, the teacher can add on the factors of speed and complexity. During the lesson, the teacher provides review as needed, which creates a classroom-learning environment for the students in which practice is the focus, as opposed to performance or assessment. Students are only assessed after they have had multiple chances to practice as individuals and in cooperative groups.

Third and lastly, students benefit from application of higher-level thinking. Since WBT lessons follow a recurring format in which students begin with memory gestures and then summarize concepts with gestures, teachers can utilize higher-level thinking tools once the basic understanding of concepts is met (Biffle, 2013, p. 187).

Feedback

Since 2008, Biffle (2013), Rekstad, and Vanderfin have been asking instructors just one question at the completion of the seminars:

“Compared to other teaching systems that you are familiar with, Whole Brain Teaching is:

- a. much better
- b. better
- c. about the same
- d. worse
- e. much worse” (p.25).

As a result, seventy percent of teachers rated the WBT system as “much better” and twenty-eight percent rated it as “better.” Thus, based on the participants that were asked to complete the survey, “ninety-eight percent of educators believe WBT is superior to every other teaching system they are familiar with” (Biffle, 2013, p. 26). Biffle (2013), Rekstad and Vanderfin strongly believe that no other instructional strategy can compare with these amazing results, which “polled over 2,000 K-12 educators in California, Arizona, Texas, Montana, Louisiana, Minnesota, Missouri, Georgia, Utah, Florida, Pennsylvania, Arkansas, Tennessee, Michigan, Virginia, Vermont, New Jersey, Oregon, North Carolina, New York, and Alabama” (p. 25). Also, they have found that “there is a direct correlation between the effectiveness of a classroom management system and an instructor’s enthusiastic implementation of the system” (Biffle, 2013, p. 25, 190).

“Individual WBT instructors across the country report their state test scores exceed those of traditional teachers by 20-30%” (Biffle, 2013, p.191). In a two year period, three schools in Hemet, CA have reported a decrease in office referrals and suspensions by as great as 50% after implementing WBT strategies (Biffle, 2013, p.191).

“Whole Brain Teaching is one of the fastest growing education reform movements in the United States” (Biffle, 2014a). The statistics prove how WBT is expanding due to three main

reasons – WBT is fun, free, and the techniques powerfully engage challenging students (Biffle, 2014b). Over the past 10 years, the three men have delivered seminars to greater than 6,000 educators, which represents more than 300,000 students (Biffle, 2013, p. 192). Educators are taking advantage of the available resources so that they can incorporate WBT in their classrooms. For example, there have been 3,000,000 views of the free WBT videos on YouTube and TeacherTube, and 10,000,000 pages of free materials have been downloaded from the WBT website, which has been registered by 80,000,000 (Biffle, 2013, p. 192).

Others have studied the effects of WBT strategies. Students, Burton, Crist, & Daltoso (2013), from George Fox University in the Master of the Arts Teaching Program completed a study to evaluate whether incorporating active learning strategies for all students will increase academic achievement and decrease behavioral problems that were found in the classroom (p.3). The students studied this in kindergarten, third, and fourth grade classrooms and compared which classroom management strategy, whole brain learning, cooperative learning, or building relationships, would most help to reduce the behavioral and disruptive issues and increase learning opportunities. As a result, the students found: “Students seemed to be more engaged and more interested in lesson based on feedback during whole brain teaching strategies. Data also suggests that whole brain learning strategies were more successful for on-task behaviors at 80% compared to a baseline of 75%” (p. 6).

The other two classroom management strategies did not receive as high of results as WBT, with cooperative learning resulting below baseline averages at 70% on-task behaviors and building relationships only slightly above baseline averages at 78% (Burton et al, 2013, p. 35).

Kinesthetic Teaching vs. Whole Brain Teaching

From the description of WBT, specifically regarding student gestures, the movements being performed by students sound very similar to that of kinesthetic teaching. WBT and kinesthetic teaching sound similar because they are comparable. However, WBT targets the whole brain and consists of more than just kinesthetic movement, which is what sets it apart. Kinesthetic teaching primarily focuses on activating the motor cortex area of the brain. Kinesthetic teaching is “the use of creative movement in the classroom to teach across the curriculum” (Griss, 2013). Through kinesthetic teaching techniques, students are prompted to get out of their seat, which increases oxygen to their brains, and physically engage with what they are learning. Teachers encourage students to experience new levels of self-discovery and self-expression when they are asked to respond nonverbally to material and experience the lesson through the movement of their bodies (Griss, 2013). Kinesthetic learners, also known as “hands-on learners” or “doers,” are ones that learn best when they activate their large and small muscles because they learn best when they move their bodies. These people concentrate better and, therefore, are able to learn easier when movement is incorporated (Cox, 2006b). If kinesthetic learners use their hands and bodies while they are learning, their attention will be focused on the learning at hand. Conversely, if these learners must sit still, pay attention, and listen, their results may not be successful since the more they are expected to sit still, the less they are able to focus and learn (“Kinesthetic and Tactile Learners,” 2009).

Others Support Movement during Instruction

Using movement during instruction is a technique that others support besides those that incorporate WBT, but WBT extends this notion by incorporating other techniques of learning besides just movement. Numerous authors and educators assert that students' *whole brains* should be used during instruction. However, the methods that are used are not WBT strategies. Several sources promote the use of kinesthetic movement, which is primarily incorporated in mirror, one of the many WBT techniques. Recall that during mirror, students automatically engage the brain's most reliable memory area, their motor cortex, as they perform the gestures used to teach a lesson (Biffle, 2013, p. 77).

According to the Programs Manager of Miami Children's Museum, Logan Block, he and his staff are always looking for ways to turn experiences at the museum from passive to active ones. They discovered that "movement and learning simply go hand in hand..." because "... movement helps to engage brains and focus minds on the task at hand" (Block, 2013).

Next, according to a reading and phonics program called Ring Around The Phonics, conventional methods of teaching, such as workbooks, flashcards, and lectures, unintentionally shut down the right side of the brain. Since the conventional methods deliver information in serial order through verbal media through print or speech, an increasing number of students do not learn with the conventional methods due to this scientific reason of only half of the brain being activated (Cox, 2006a). To engage the other half of the brain as well, body movements make information flow from the left to the right and back again at lightening velocities. Thus, teaching to the whole brain, also known as Total Physical Response, has been found to be far more effective than conventional methods (Cox, 2006b). "Studies show that with whole brain teaching, children learn faster, retain more, drop out rates decrease by 90%, stress (a major cause of learning disabilities) is reduced, and the health of the brain improves" (Cox, 2006a).

Further, Child 1st, a source designed to help provide multi-sensory teaching materials that are created to make the challenging task of teaching to the whole brain easier for teachers and parents, recognized that in traditional classrooms, students can be expected to sit quietly in their seats, listen, and learn based on what they are hearing. With this method, apart from writing with a pencil and paper, there are not many opportunities for students to experience the learning with their bodies and hands. Teachers will be able to accommodate the various learning styles of all their students and be successful in reaching all the learners needs at one time if they develop a teaching style that synthesizes methods which together target the whole brain (“Kinesthetic and Tactile Learners,” 2009).

In addition, it has been found that kinesthetic teaching is good for all learners, ranging from those that don’t talk enough to those that talk too much, because all students can find success. The shy, quiet students come alive when they are kinesthetically moving during lessons. These students feel less vulnerable moving with everyone simultaneously than they do when they are the only voice speaking in the class. The thoughts and feelings that may be challenging for them to put into words can be expressed through creative movements. After experiencing creative movement, these students often can then find the missing words they were searching for with having discovered a new sense confidence because they now know what they want to say (Griss, 2013). On the opposite end of the spectrum, some students find it difficult to contain their physical energy and are constantly seen out of their seats and find it challenging to concentrate. With kinesthetic teaching, these students are able to transform their “disruptive energy” into focused creative movement. The students are able to engage, find their focus, and show increased concentration and attention span with kinesthetic teaching (Griss, 2013). Kinesthetic teachers focus on an approach that has their students “show” them, instead of “tell” them. When students are asked to show their teacher an answer, all the students can respond; they are asked to make a commitment to an answer. All students are participating in the process of learning when their

learning is made visible (Griss, 2013). At times a shape or movement is satisfactory, while other times a word or phrase added to the physical response is needed. Just as hands move in the air when they are searching for a word to say, the “physicalization” helps the verbalization (Griss 2013). There are three main benefits to having students respond kinesthetically when they “show” their teacher because many levels of feedback are now accessible for the teacher and students. To start, the teacher is immediately aware of his/her clarity and effectiveness after seeing responses from students. Next, the teacher can give instant feedback to his/her students based on their responses. The teacher can use the formative assessment of their understanding to guide their next step of instruction. Lastly, students obtain immediate feedback by observing their peers because students can learn from their peers. This idea of students getting to think about their response in comparison with others and deciding whether or not to change it is a democratization of learning (Griss, 2013).

Developmentally Appropriate Expectations for Kindergarten Students

According to the U.S. Department of Education’s National Center for Education Statistics, one of the signs of readiness to start kindergarten is to pay attention and sit still. At five years old, attention spans vary, but when considering paying attention and sitting still as a readiness skill for starting kindergarten, children should be able to do so for about fifteen to twenty minutes at a time (Iannelli, 2007). Sitting still does not include playing video games or watching television. In addition, another source provided a described list of five things that kindergarten teachers wished parents knew on the first day of school. The things on the list are aspects of education that deal with expectations that have changed over time. Therefore, expectations of children now entering kindergarten are a lot different from what it used to be when the children’s parents went to school. This lack of knowledge from the parents of these

differences can make the kindergarten year stressful for teachers (Morin, 2014). Listed as number four were other skills, besides academic ones, that kindergarten students should have before entering. One of these skills is being able to sit still and pay attention for at least ten minutes (Morin, 2014).

In light of this information, the on-task behavior expectations I have for my students are developmentally appropriate because the longest amount of time I expect them to pay attention and sit still during a lesson is twenty minutes. However, when students appear to be disengaged for some reason, like having “the wiggles,” I always pause the lesson and allow students to move their bodies before continuing. Kindergarten students sometimes have difficulty being successful with my expectation to sit still and appear engaged for a maximum time of 20 minutes. This struggle caused me to pursue another approach, WBT, and seek to study it. Next, I provide information I gained by interviewing WBT teachers within SCASD and researching other WBT teachers use of techniques and reactions to the implementation WBT.

Chapter 3

Whole Brain Teaching Teachers

As a way to provide me with more information to address my research questions regarding students on-task behavior, recall of information, and feelings about the implementation of WBT gestures, I will now describe the results I gained from interviewing and researching WBT teachers.

State College Area School District Whole Brain Teaching Teachers

Before beginning my intervention, I interviewed four WBT teachers in the State College Area School District (SCASD) in order to gain insight on how they thought WBT strategies were impacting their classrooms in the areas that I was going to be investigating. They shared how they thought WBT strategies affected their students learning and on-task behaviors. In addition, I wanted to hear their opinions of WBT, like why they chose to use this teaching approach. Further, I asked for advice they would recommend to someone who was just about to begin using WBT strategies in a kindergarten classroom. Three of these teachers work at my school teaching in Response to Instructional Intervention (RtII), kindergarten, and third grade and the fourth teacher is from Mount Nittany Elementary teaching second grade (*see Appendix A for interview questions*).

Three of the four teachers chose to use WBT strategies in their classrooms because they wanted a way to manage their students' behaviors. One teacher wanted to engage students more and have them involved in the process by moving, almost in a musical kind of way, in which the teacher could give the directions and have the students move along with them (Teacher B,

personal communication, February 24, 2014). All the teachers agreed that when using WBT strategies in their classroom, they began with the classroom management piece with the Class-Yes strategy. When beginning to use WBT, the teachers started with the management aspect before using the strategies as a tool to teach. They did this because the students needed to get used to the idea of responding as a class, while also putting gestures to what they say during the class management techniques. This had to be established before focusing on connecting WBT to academics (Teacher E, personal communication, February 27, 2014). The strategies just worked with the students and helped the teachers to have some order in their classroom, while having the kids pay attention and have fun all at the same time (Teacher D, personal communication, February 19, 2014). As one teacher phrased her first reaction to implementing the strategies, she said, “It is just magical” (Teacher B, personal communication, February 24, 2014). Another positive reaction came from a teacher who stated:

I like it because it’s interactive and fun. It’s fun because the students really like the competition, especially with the scoreboard. It’s fun for me because I can see the information clicking in their heads. They’re able to recall information. With some of the questions that I ask, they are able to answer it. Instead of saying ‘Class-Class,’ I start asking a question, and then they have to answer in a complete sentence. So that practice went into their writing. It’s fun because it’s working and affecting all areas of their education (Teacher D, personal communication, February 19, 2014).

Another teacher described how she wanted a management system that she could use every day. She typically created the classroom rules with her students at the beginning of the year and the students signed that they agreed to follow the rules they helped to establish. However, she didn’t really refer to the rules very often after the class made them. Therefore, she was looking for something that she could use consistently, all day long (Teacher E, personal communication, February 27, 2014). The scoreboard holds the students accountable and makes

the game fun and competitive, while also building classroom community because the teacher doesn't have to single anyone out. The whole class is constantly reminded of the expectations because the students recite the rules frequently throughout the day (Teacher C, personal communication, February 21, 2014).

With regards to on-task behavior, all the teachers believed that their students were more on-task after starting WBT in their classrooms. Although they never formally collected data, the teachers felt that their students were paying attention more with the use of WBT strategies. For example, the students were no longer rolling around on the carpet, but they were sitting, listening, and participating in the lessons. The students seemed more on-task because it only took one or two words from the teacher to reiterate the expectations (Teacher E, personal communication, February 27, 2014). As stated by one teacher, "The classroom management I have now is so much more relaxed than what I had before. The thing I like is that it's not a 'you did this bad thing, I need to yell at you, you're going to miss recess.' There's specific POSITIVE ways to help the students to remember their good behavior. So since it's a more upfront, relaxed environment, they are able to sit back, relax, and learn and then recall the information" (Teacher D, personal communication, February 19, 2014). This leads into the teachers' responses of how WBT helped students learn lesson content and then recall it later.

The teachers who have used WBT strategies as a way to teach information incorporate gestures along with words or short phrases. One teacher admitted that, "Just because they are saying it doesn't mean they actually do know it. So that goes back to your teaching of the lesson and that you are double checking their understanding. If the students truly learned the information, the gestures should trigger what they learned during the lesson. The gestures serve as a cue or prompt. The students have asked me if we can make a motion out of that because the motions help me remember things" (Teacher E, personal communication, February 27, 2014).

This teacher proceeded to say that:

It's based on research and that's the amazing thing. It's based on how kids learn and the research of using your whole body-listening skills, emotional skills-all these things together that can help you recall information. Beyond the classroom management piece, there's a lot available for you to help the kids be responsible for their academics and hold high standards and make it sink in. WBT is about making it sink in. Also, it's about making it fun. We as teachers talk too much; we take the fun out of teaching when we're 'blah, blah, blahing' and it's not a lecture-teaching should not be a lecture. That's the whole brain part of it. Teachers take taking talking away from the students when we do that. It puts more responsibility on them with coming up with the motions and talking and teaching each other. They talk more and when they talk more, they are learning more" (Teacher E, personal communication, February 27, 2014).

In addition, another teacher spoke about the use of gestures and why she likes them and why she uses them. She stated that, "I really like the gestures because when I call on students and ask them a question and if it has a gesture, if they don't really know at first, I can start to make the gesture, something clicks in their brain-that's why it's called WBT- and they can remember and tell it then" (Teacher D, personal communication, February 19, 2014).

Each of the teachers responded by saying that they definitely thought that WBT is much better compared to other teaching systems that they are familiar with. All the teachers plan on continuing to use WBT in their classrooms because it works and it's fun for the kids and the teacher. Lastly, the teachers recommend that other teachers use WBT strategies, but suggest making it their own and taking it one step at a time. One teacher's advice is that, "You can make up your own. The key with WBT is that you say a specific sentence or a phrase and then have the motions with it. So make up your own or even have the kids make up the motions for things they need to know, like adding and subtracting" (Teacher D, personal communication, February 19, 2014). This teacher recommends that others use WBT and stated, "Yes, definitely because the

kids are engaged when you use WBT. They are seeing, hearing, and repeating things that you are saying so they are able to remember the information. And did I say that they are having fun?!” ”

(Teacher D, personal communication, February 19, 2014).

Other Whole Brain Teaching Teachers

Teachers outside of the SCASD have also reported positive reactions to using WBT in their classrooms. I will share two examples that are from the grades I have primarily worked with this year at Gray’s Woods through the PDS internship, kindergarten and third grade.

Jessie Fishel, a kindergarten teacher, performed a research study to observe how WBT strategies impacted her students’ mastery of vocabulary words. Her study can be found online on her professional portfolio. The teacher stumbled upon WBT from viewing Youtube videos (Fishel, 2011). She was searching for ideas as a way to brainstorm different routines she could add to her morning calendar time, and when she discovered WBT, she knew she had to try it out. For the intervention of the study, the students were shown a vocabulary word and corresponding picture. Together, the students and teacher practiced hand gestures to help them remember what the word meant or an example of the word in use. Her new method helped vocabulary retention for all five students she tested because each produced improvement with their results. When testing the students after the intervention was in place, the kindergarten teacher found it interesting that some of her students used the hand symbol to remember the word and others referenced the images from the mini poster of the word on the wall. Both techniques helped to trigger their memory of the vocabulary words meaning (Fishel, 2011). Fishel believed that adding the hand actions, along with the visual images, provided students with prompts for learning new vocabulary words and they gave new “life” to her circle time mini-lessons. Fishel reported that she was pleasantly surprised how well the WBT method helped to close the learning

gaps. In addition, she noticed that her students enjoyed the new teaching method, while she also liked them because the method was fun, easy to use, and more effective than other learning structures she had previously incorporated in her classroom (Fishel, 2011). As Fishel continued to reflect on the study, she stated, “Many of the other teachers I worked with also enjoyed the new strategies and their effectiveness and began using them with the rest of the kindergarten students. I would highly recommend these techniques to other teachers and I will continue to use them in the future” (Fishel, 2011).

A third grade teacher, Melissa, was looking for something new to spice up her teaching because she was tired of using the same strategies every year in order to gain her students’ attention. After viewing Chris Biffle’s videos, she was captivated by his work and was inspired to try WBT strategies in her classroom at the beginning of the school year of 2012. From the video, Melissa observed how the techniques could keep students engaged and motivated, especially for kinesthetic learners and students that have trouble focusing (Melissa, 2012). The teacher incorporated Biffle’s strategies and she loved them. With regards to gestures, she saw that they helped her students retain information from lessons. She was amazed to observe that the students remembered the gestures first and then came up with the words to accompany the gestures. The teacher enjoyed when the students helped her come up with the gestures because they had excellent ideas when asked for their input. As Melissa states, “So it was not just a lesson of me teaching them motions to imitate, but rather ALL of us working together as a TEAM!” (“Whole Brain Teaching,” 2012).

In terms of my study, I used the WBT teachers’ insight in order to guide my decisions when planning how I would implement my intervention of incorporating WBT strategies in my kindergarten classroom. Also, their testimonials provide evidence of how WBT has positively impacted students’ on-task behavior and recall of information and how the students have positive

feelings with regard to the use of WBT strategies. I will now move to discussing what data I collected data to answer my research questions and how I did so.

Chapter 4

Methods

To answer my main question, I wanted to collect a range of qualitative and quantitative data from students, my mentor teacher, and other WBT elementary school teachers in the SCASD. To establish baseline data, I recorded the students' behavior by using time on-task charts and interviewed students, my mentor teacher, and other WBT teachers in the district. During the data collection, I continued to record the students' behavior by using time on-task charts as well as continuing to interview students. After the intervention, I interviewed my mentor teacher again.

My study was approved by PSU IRB (Human Participants Research) through a system called PRAMS: Protocol, Review, Approval and Management System(*see Appendix A*), before I was approved by the SCASD Board (*see Appendix B*).

Student Participants

Time On-Task Behavior Collection Chart

Since I was hoping to see an increase in my kindergarten class's on-task behavior, I needed to collect baseline data. In order to do so, I recorded student behavior using a time on-task chart. With this chart, I systematically scanned the room every minute to see which students were on-task and which students were off-task. By utilizing this chart, I could determine what observable behavior was causing student(s) to be off-task. Different symbols and letters represented the various behaviors. A check mark meant that a student was on-task, meaning that the student was sitting/standing as directed by the teacher, looking at the teacher, and not demonstrating any of the off-task behaviors I will now define. The off-task letters included: E:

eyes not on speaker, L: laying down, O: out of seat, P: playing with something, T: talking to a friend, U: unnecessary movements (ex: rocking), and X: other.

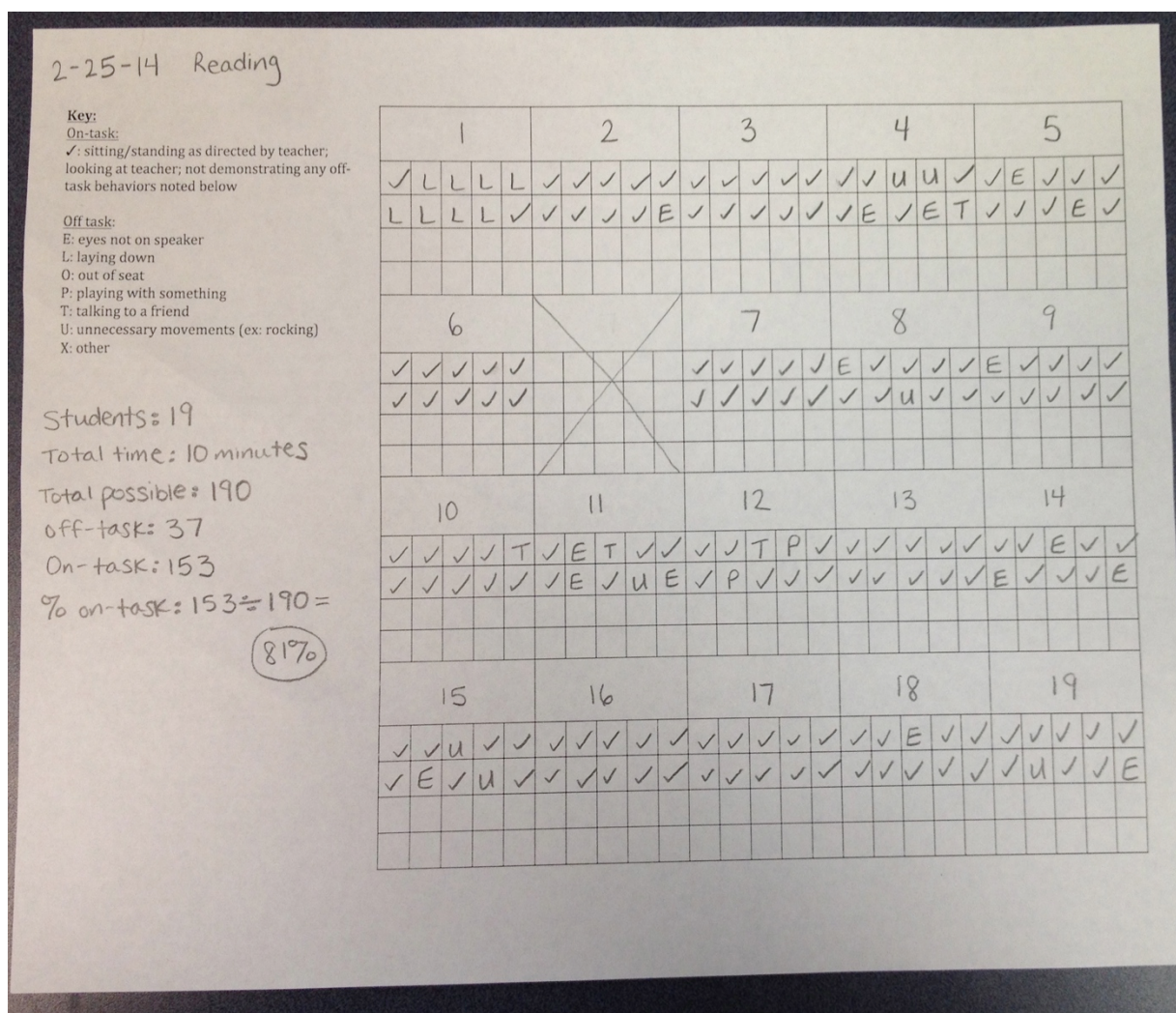


Figure 1 Time On-Task Behavior Collection Chart Before Intervention

I collected baseline data for four school days in February during three targeted academic subjects in kindergarten, which are writing, reading, and math. The length of the time observed ranged from 9 to 16 minutes. From this data, I determined which subject displayed, on average, the lowest on-task behavior. Once the subject area was determined, I collected baseline data on only this subject for four days during the last week of February with each observation lasting

between 10 to 16 minutes. These observations of the class were video recorded so that I could confirm my data collection and, also, personally reflect and analyze my teaching skills.

After my intervention was in place, I continued to use these charts to collect data on the class's time on-task behavior once gestures were implemented. However, I needed to add two new symbols to the chart since on-task and off-task behaviors appear different with the implementation of gestures. I added a check mark with a plus as another on-task behavior and a check mark with a minus as another off-task behavior. If a student was doing the gestures when directed by the teacher, s/he would earn a check plus. If the student was not participating in the movement of the gestures, this resulted in a check minus. When tallying the total, I counted check marks and check pluses as on-task behaviors, but check minuses as off-task behaviors. A student may exhibit the same observable behavior when receiving a check and a check minus. However, the difference is that with a check mark, the student was on-task when gestures weren't being used; just as they were credited for being on-task before the intervention began. The student would be mark off-task if they were exhibiting this same behavior, but were not participating in the gestures, thus exhibiting off-task behaviors since the student was not partaking in the lesson as directed by the teacher.

I collected data intervention data for four days each in the month of March. The length of the time observed ranged from 6 to 13 minutes for the implementation of teacher-generated gestures and 7 to 11 minutes for student-generated gestures. The length of time of the mini lessons varied to due to several factors, including the time available for instruction during the particular school days the observation were taking place.

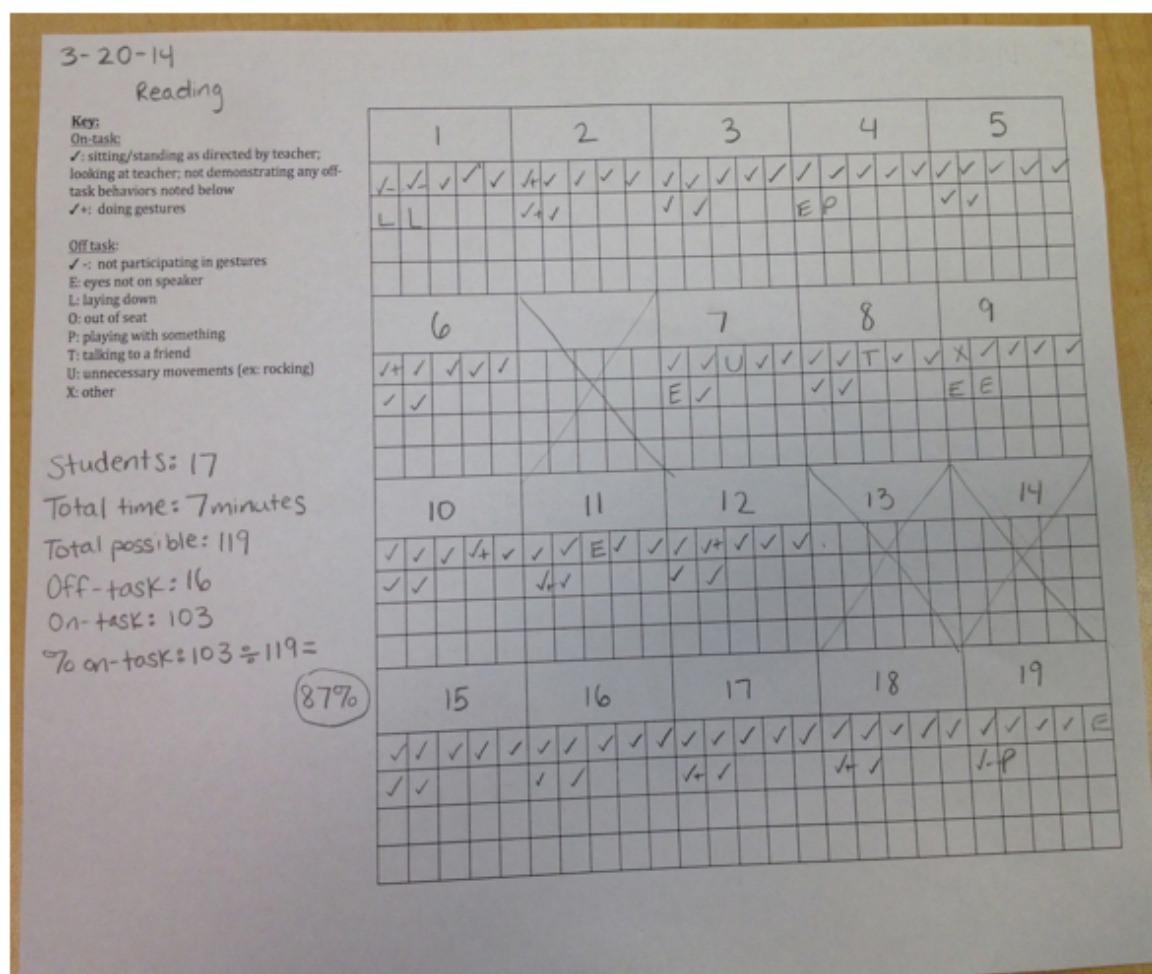


Figure 2 Time On Task Behavior Collection Chart After Intervention

Student Interviews

I collected more baseline data on a targeted subject because, in addition to calculating the class's time on-task behavior, I wanted to collect data on how the gestures impacted students' learning, regarding their ability to recall information. To do this, I interviewed six students, three girls and three boys. These students were chosen based on their behavior before the intervention. Of the students in the class, I selected three students that proved to be mostly on-task and three that demonstrated a high significance of off-task behaviors. I audio recorded the interviews that occurred during school hours within the school building about two hours after the lessons. I also asked questions of the students a few days after the content of a lesson was taught because I

wanted to be able to analyze their learning over time. The interviews were held outside of the classroom, in order to obtain a quieter environment. The questions during the interviews were asked to compare the responses before and after the intervention, to better gauge whether the WBT gestures were preferred over other classroom management techniques and methods of teaching, and to determine how the gestures helped students learn (*See Appendix D for questions*). The students were individually interviewed and asked questions during baseline collection and during the intervention, which was after a lesson that included gestures, that were either derived by teacher or the students. During the intervention, I started the interviews with the same questions I developed for the baseline collection. I did this because I could prompt for information about the gestures if it didn't come up. I was interested to see what the students would tell me about the lesson before I specifically asked about the gestures. The students were asked similar questions after the intervention began in order to compare the impact of gestures on students' learning. The questions checked their recall of the lesson content, but I also asked the student to apply the information as a way to check their understanding.

Teachers

Mentor Teacher Interviews

Another piece of information I wanted to find out was how my mentor teacher viewed the new classroom management strategy and method of teaching concepts. Therefore, in order to understand her opinion of different teaching approaches, I interviewed my mentor before and after the intervention (*See Appendix E for questions*).

Whole Brain Teacher Interviews

Lastly, before my intervention, I interviewed four WBT teachers in the SCASD. I wanted to gain insight on how they thought WBT strategies were impacting their classrooms in the areas that I was going to be investigating. This information was reported in Chapter 3. Below is a table of the teachers I interviewed and their information.

Table 1 Teachers Interviewed

Teachers	Current Grade Teaching	School	Number of Years Teaching	Amount of Time Implementing WBT
A	Kindergarten (mentor teacher for placement)	Gray's Woods Elementary	5	N/A (will be soon with my intervention)
B	Response to Instructional Intervention (RtII)	Gray's Woods Elementary	38	5 months
C	Kindergarten	Gray's Woods Elementary	21	2 months
D	2 nd Grade	Mount Nittany Elementary	5	3 years
E	3 rd Grade (partner classroom)	Gray's Woods Elementary	14	5 years

Next, I will provide my data and analysis as well as the claims I developed to answer my research questions. There is evidence so support each of my claims.

Chapter 5

Data and Analysis

Before Intervention

The first step in analyzing my data required me to look at the on-task data charts I collected to calculate the percentage of time on-task before the intervention. In order to do this, I first calculated the number of total possible collection points by multiplying the number of students by the duration of the lesson in minutes. Then I counted the total number of on-task behavior marks and divided this by the total (See Appendix B and C for a sample charts). By doing this, I created a fraction, which allowed me to calculate the percentage of time on-task for the class.

This data averaged together to determine an average percentage of time on-task before the intervention. I collected data during the three-targeted academic areas in kindergarten, which are writing, reading, and math. As a result of this data, I wanted to choose the subject area with the lowest on-task behavior as the focus for my intervention. Although the data in Figure 1 below showed that writing had the lowest on task behavior at 78 percent, I decided to implement my intervention during reading, which had an average percentage of 81. I made this decision because during writing, five students leave the classroom to attend Response to Instructional Intervention (RtII), so the typical class size of nineteen students usually dropped down to fourteen students. Due to the potential benefits of the intervention, I wanted to implement my intervention in a subject that would include the most number of students. Then, I collected baseline data in the identified subject of reading and used this data from reading to compare it to the intervention data.

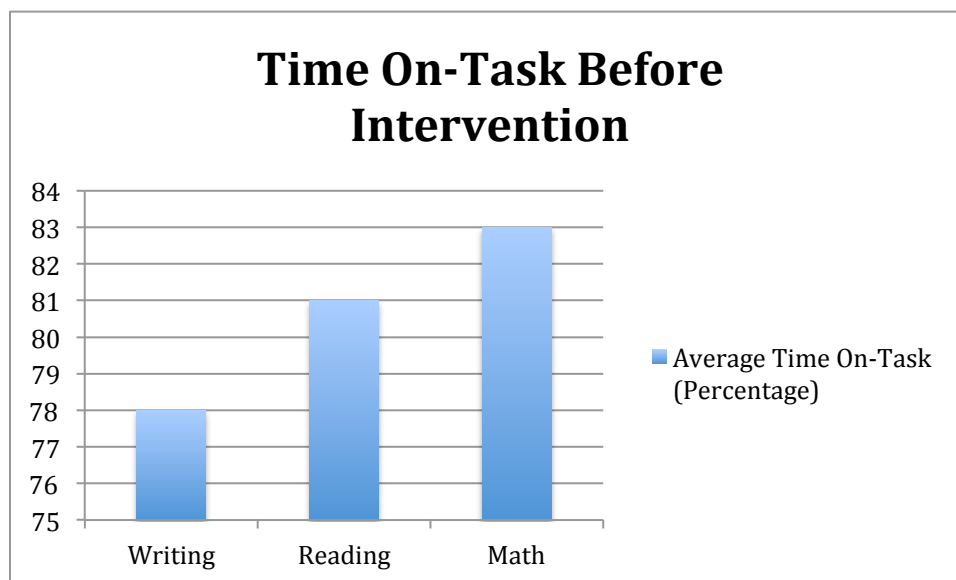


Figure 3 Time On-Task Before Intervention

The second step in analyzing my data was to review the responses that students and teachers gave before the intervention began.

After Intervention

Since I had calculated a percentage of time on-task before the intervention, I compared it to the average percentage of time on-task during the intervention. I repeated the same procedure as previously explained with the on-task data collection charts in order to determine the average percentage of time on-task after the intervention was in place. As described below there was a clear improvement in the amount of time on-task.

Next I analyzed the students' responses to the questions asked during the intervention and the teachers' responses after the intervention.

Explanation of Findings

After analyzing my data, I generated a few patterns and trends with the addition of gestures during whole-group reading instruction regarding my class's on-task behavior and the six selected students recall of information. Below I will restate my question before providing my claim. Then I provide evidence and reasoning that supports my claim.

Main Question: How do WBT gestures performed by students during whole group instruction impact students' on-task behavior?

Claim 1: Gestures performed by students during whole-group instruction increased the percentage of time students were on-task.

Before analyzing my data, I thought that the students' on-task behavior had increased because while teaching, it seemed that the students were more engaged in the lessons. They seemed to be participating more and I felt like I was giving fewer reminders to students to get focused again. After reviewing my data, I can strongly claim that the addition of gestures during whole-group instruction has increased the percentage of time my students were on-task. As seen in Figure 2, my students were on-task 80 percent of the time before we began using gestures. This data is based on systematic observation charts. After my intervention was in place, these same charts displayed that my students were now on-task 87 percent of the time for both teacher and student-generated gestures, which is an increase of seven percent.

In addition to systematic observation, I interviewed my mentor before and after my intervention. One question I asked before my intervention was, "What do you think about your students' on-task behavior during whole group instruction?" She thought it could be improved. She believed that although there were a handful of students that are wonderful on a consistent basis, there are, however, a handful of students who are consistently unable to sustain focus for as

long as a whole class lesson, lastly no longer than fifteen minutes (Teacher A, personal communication, February 27, 2014). After my intervention was in place, I asked this same question. My mentor responded by saying, “I think it is improving for many of them. I think it has something to do with the fact that they have something to do while they are sitting on the carpet during instruction. There are a couple that we’re still trying to draw in, but for the most part, the large majority is more activated and engaged in what we’re doing” (Teacher A, personal communication, March 21, 2014). In addition, when responding to the question, “What are the students/teacher doing when the students appear to be the most on-task?” she said, “The teacher is usually leading or requesting one of the new gestures that we’re using, and the kids are doing it back or answering a question with a gesture. We were doing the vowel activity and they were to close their eyes and just do the gesture for the vowel they thought it was, instead of one kid raising their hand and saying it’s the letter ‘a,’ everyone got the chance to participate in answering the question” (Teacher A, personal communication, March 21, 2014). This helped support my claim that the gestures helped my students increase their on-task behavior because an observer also confirmed that the on-task behavior had improved.

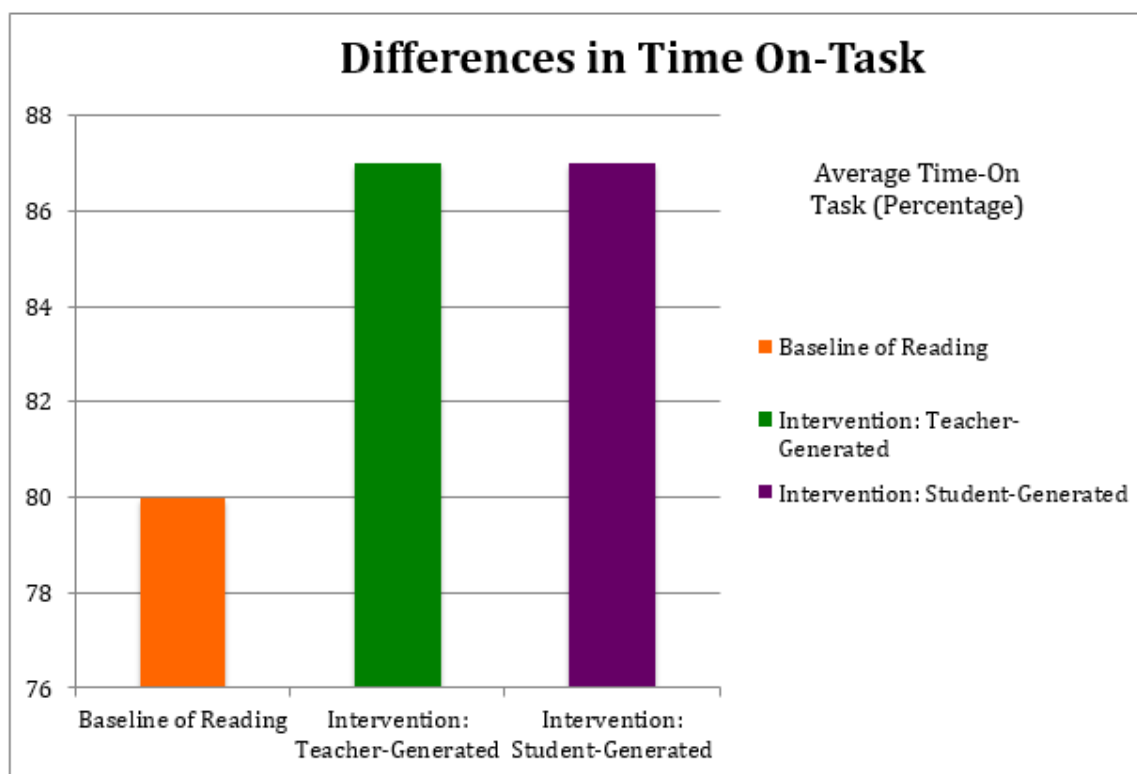


Figure 4 Differences in Time On-Task

Sub-Question: In what ways do gestures performed by students during whole group instruction impact students' recall of lesson content?

Claim 2: Gestures performed by students during whole-group instruction helped students recall lesson content.

One of my sub-questions was regarding how gestures performed by students during whole group instruction could impact students' recall of lesson content. Before interviewing students, I had to research the difference between recalling lesson content and understanding lesson content. I described the difference in Chapter 1 under in the section 'The Project.' When interviewing my students, I was asking them to recall the information from a lesson, which is referred to as rote learning. Rote learning is learned

through repetition and is one of two methods of transferring short-term memory to long-term memory. However, rote learning is often used together with learning through understanding. I did this by first asking my students what we were doing for reading, but then the student applied the information to a situation, which is having the student learning through understanding. The gestures helped the students with their rote learning, but they actually had to understand what they were saying and doing in order to apply the information to contexts. For example, the students were able to give me the rote response for the five important parts they would make sure they included when retelling a story, the characters, setting, beginning, middle, and end. There were teacher-generated gestures that accompanied each of these five parts. After the students identified the five parts, I had the students define what these five parts mean. For example, students said that the characters are who's in the story. Then, the students had to apply this knowledge to the read aloud they heard that day. The gestures helped them remember what parts to include in a story retell and then think about these parts while hearing the read aloud. As a result, they could apply the information to the context of the story by retelling a specific story, which included the five important parts through their story retell.

When interviewing my students before using the gestures, two students were not able to recall the information, but three were able to recall and define the information. One student was not applicable because this student was absent. After my intervention, all six students were able to recall the information and define it. Only one student was given the non-verbal cue of a gesture to help the student recall the information.

In addition, when I interviewed students after a few hours or a day after a lesson, the students had a mixture of responses when asked questions. All the students were able

to do the gestures and say the corresponding words when asked to do so. Sometimes the students would do the gestures on their own without being prompted to do so and other times if a student couldn't remember something, I would do the gesture and the student would automatically remember. When I asked the students why we do the gestures, they all replied with similar answers by saying that the gestures help them to remember, especially since the gestures look like what we're talking about, like the gesture for 'setting' looking like a house, which is an example of a setting.

Furthermore, I asked my mentor if she thought the students were able to recall information easier/better with the use of gestures. She thought that they had a better chance of recalling the information when the gestures are used. For example, she noticed the difference the gestures made when she was doing running record assessments for the latest data collection. If she just simply did the gesture, it was a quick and easy way to get them to recall information and then apply it to the test she was assessing. The gesture served as a non-verbal cue versus her having to give the students a verbal prompt (Teacher A, personal communication, March 21, 2014). This information from my mentor supported my claim because she had seen the impact that the gestures had on students' learning in terms of recalling information that the gesture helped to trigger and then applying this information to a situation.

Sub-Question: Are gestures more effective if the students make them up or if the teacher tells them the gestures?

Claim 3: Gestures have the same effectiveness regardless of whether they are teacher or student-generated.

Another sub-question I asked was questioning whether the gestures would be more effective if the students made them up or more effective if the teacher told them the gestures. This question was what was driving me to do my research study because there is evidence of the success of WBT strategies, but it is unclear what approach, teacher or student-generated gestures, most positively impacts the students' on-task behavior and recall of information. As seen in Figure 2, the students' on-task behavior was equal at 87 percent for both teacher and student-generated gestures. 87 percent represents the average of four days of data collection during reading. Therefore, regardless of who generated the gestures, the students' on-task behavior still increased equivalent amounts. In addition, the derivation of the gestures had the same impact on the students' recall of information as it had on their on-task behavior. Regardless of the gestures being teacher or student-generated, the students were able to recall information equally. The students would recall the information by doing the gestures without being prompted to do so or would recall the information without the use of the gestures, but they could do the gestures if asked to do so. Students who could not recall information without support were able to do so when they saw the non-verbal cue of the gesture.

My mentor teacher was not surprised by the results. Although she thought it best to begin the use of gestures with teacher-generated ones, as we did for my intervention, she believed that once the students understood the big idea behind gestures, what they are and why they are used, that it could switch back and forth between teacher and student-generated gestures (Teacher A, personal communication, March 21, 2014). Like other new concepts that students are learning, the teacher models before the students are able to try it out; this same idea occurs for the implementation of the gestures. Her opinion supports my claim because she thought the gestures

achieved the same result of having students on-task and recalling information, regardless of who generated the gestures.

In addition, when I interviewed my students, five of the six believed that the kids should make up the gestures because it's fun to make them up and then use them (Students A-C and E-F, personal communication, March 21, 2014). On the other hand, one student thought that the teacher should make them up because it's faster. Also, this student believed that sometimes she wouldn't know which gesture went with what the class was saying, so she liked when the teacher told the students what gesture to use (Student D, personal communication, March 21, 2014). This evidence supports my claim because the majority of the students thought that then when we continue using gestures in the future that the students should make them up because they thought it was fun to do so. Although, the students believed that doing gestures in general is fun, so whether they are teacher or student-generated, the students are having fun doing them. Therefore, they are on-task when they are having fun and are able to recall information since they were on-task.

Sub-question: What are students' feelings about the gestures?

Claim 4: Students enjoy doing the gestures during whole-group instruction.

My final sub-wondering focused on students' feelings about the gestures. I was interested in this because although the data may show how the students objectively respond to the gestures, I was interested in their opinions because they are the ones that are learning with the support of gestures. As a teacher, I want to ensure that my students

are enjoying the learning process. When they are, they will be able to be on-task and recall information since they are focused and engaged in enjoyable and engaging lessons.

When interviewing students, all six replied that they liked the gestures when asked what they think of them. Students responded that the gestures are fun because they like moving their body and that we should keep doing them when we're learning this year. One student said, "They're really fun. I like them instead of just sitting on your bottom. Well, you move your body and instead of just sitting on your bottom, you're moving instead of just staring at the teacher while they're talking. I like moving" (Student C, personal communication, March 21, 2014). When then asked if the kids or teacher should make up the gestures, the student said, "Well the teacher pretty much does everything so I want us – the kids – to do some. Pretty much the teacher teaches and pretty much does everything you have to do and the kids want a turn" (Student C, personal communication, March 21, 2014).

Chapter 6

Conclusion

When I began thinking about my project, I knew I wanted to focus my attention on how I could help my class improve their behavior while also addressing their learning. My students needed help remaining on-task since they easily became wiggly and talkative, which impacted their learning if they were not focused on the lesson's content. Although WBT has many different strategies, I focused my observations and attention specifically on student gestures, even though we incorporated other strategies into our daily routine, including Class-Yes, five classroom rules, and the scoreboard. I chose to focus on gestures because when students are moving their bodies and talking in accordance with lesson content, I predicted that their on-task behavior would improve since their bodies would be busy doing the gestures and the minds, *their whole brains*, would be invested in the lesson. Also, I thought that the students would be able to more easily recall lesson content when their attention was focused on the gestures that helped them to be more on-task were related to pertinent lesson content. I had seen WBT in action in my partner classroom successfully work and viewed videos via YouTube. Therefore, I was enthusiastic about implementing gestures during reading instruction in my kindergarten placement.

Even though my class is still working on improving their on-task behavior and recalling lesson content in an application manner and not just rote memorization, the class has improved significantly since February when the intervention began. I am extremely proud of my students for being able to improve their on-task behavior when the teacher or students generate the gestures. In addition, I found that teacher and student generated gestures were equally effective since they resulted in the same increased time on-task behavior and students were able to equally recall lesson content. Although most students said that they enjoyed when the kids get to make

up the gestures, we will continue to implement a mixture of both student and teacher-generated gestures. Since the gestures have a positive effect regardless of who generates them, a combination of student and teacher-generated gestures will continue to be used as a classroom management strategy and as a method of teaching concepts. We still have room for improvement, and I think we always will, but the students' ability to remain on-task and recall lesson content has had a noticeable improvement.

However, this study's findings are specific to this group of students' needs. Different schools and classes will have various needs that should be recognized and then addressed. WBT can successfully work at any grade level with any students; that's the beauty of this education reform movement. WBT was created to be altered and adapted to fit the needs of individual students within uniqueness of every classroom. The teacher's approach to selecting what strategies to implement will change accordingly.

Implication for Future Research

As I begin to think about having my own classroom one day, I know that no matter what grade I am teaching, I will always have students similar to this group. There will always be students that engage in off-task behavior, and I will always have students that have trouble recalling lesson content. Although some students may appear on-task and may be able to recall lesson content without the use of gestures, I think the whole class can benefit from implementing gestures while learning. They help everyone, students and teachers, activate their *whole brains* when they move their bodies and talk. Their attention can be focused, which leads to exhibiting on-task behavior and recalling the content that their minds were just focused on. Also, gestures are fun! The teacher and the students can enjoy learning with the use of gestures. I will

definitely continue to implement WBT strategies, especially gestures, with my current and future students based on the data I have collected.

There are still some questions that I did not have the opportunity to answer. I am still wondering, what other WBT strategies impact students' on-task behavior and learning? Can the students just be moving their bodies when learning or do the movements need to be specifically related to the lesson content in order for students to appear on-task and recall lesson content? Do WBT strategies have the same impact across different grade levels? How does the impact of WBT strategies compare/contrast across subject areas?

Overall, I am very pleased with not only my students' improvement regarding their on-task behavior and learning, but also with my growth as a teacher. I have learned a lot, but the most significant is that it takes time for new routines to settle into place and become more automatic. Before I began my intervention, I was used to observing a third grade teacher and her students use WBT strategies. With being more than half way through the school year, the third graders easily participate in the WBT gestures since they have had a lot of practice with them. However, based on my first day of implementing gestures, I was made aware that the students need lots of repetitions to practice the gestures and words. They need time to let the new additions to their daily routine sink in. Thankfully, the students did catch on to new gestures more easily after the first day because they understood what we're doing with the gestures and why. In addition, I have learned that inquiry is a never-ending process. I will continue to collect data and work on my current wondering. In addition, I will be sharing my information at the Professional Development School Inquiry Conference through my presentation entitled "Whole Brain Teaching: How gestures impact kindergarten students' on-task behavior and learning." WBT can happen in kindergarten, but to do so requires repetition, clear expectations from a strong, enthusiastic leader, and patience in order to find success from this classroom management strategy and way of teaching concepts.

Appendix A

IRB Approval

Date: February 08, 2014

From: The Office for Research Protections - FWA#: FWA00001534
Jodi L. Mathieu, Research Compliance Specialist

To: Hannah Nellis

Re: Determination of Exemption

IRB Protocol ID: 45024

Follow-up Date: February 7, 2019

Title of Protocol: Effects of students' on-task behavior when implementing Whole Brain Teaching strategies during whole group instruction

The Office for Research Protections (ORP) has received and reviewed the above referenced eSubmission application. It has been determined that your research is exempt from IRB initial and ongoing review, as currently described in the application. You may begin your research. The category within the federal regulations under which your research is exempt is:

45 CFR 46.101(b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Given that the IRB is not involved in the initial and ongoing review of this research, it is the investigator's responsibility to review [IRB Policy III "Exempt Review Process and Determination"](#) which outlines:

- What it means to be exempt and how determinations are made
- What changes to the research protocol are and are not required to be reported to the ORP
- Ongoing actions post-exemption determination including addressing problems and complaints, reporting closed research to the ORP and research audits
- What occurs at the time of follow-up

Please do not hesitate to contact the Office for Research Protections (ORP) if you have any questions or concerns. Thank you for your continued efforts in protecting human participants in research.

This correspondence should be maintained with your research records.

Appendix B**Approval Letter from SCASD**

STATE COLLEGE AREA
SCHOOL DISTRICT
Uniting Talent and Passion!

February 11, 2014

Ms. Hannah Nellis
316 South Allen Street, Apt 5
State College, PA 16801

Dear Hannah,

Please accept this letter as final approval for your research proposal, *"The Effects of Whole Brain Teaching Strategies in the General Education Classroom,"* which will be conducted at Gray's Woods Elementary School. You may begin your research at any time.

If you have any questions, please don't hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Michael S. Hardy". The signature is written in a cursive, flowing style.

Michael S. Hardy
Assistant Superintendent

c: Kris DeWitt

Appendix C

WBT Interview Questions

1. How long have you used WBT strategies in your classroom?
2. Why did you choose to use WBT strategies in your classroom?
3. How would you describe WBT in your classroom? If someone walked in, how would they know that your classroom is a WBT environment?
4. Would you recommend that other teachers use WBT? Why or why not? What advice would you give a teacher that wants to begin to use WBT?
5. Do you think you will ever not use WBT? Why or why not?
6. What do you like about WBT? What do you not like or find difficult about WBT?
Why?
7. Compared to your teaching methods before WBT, do you think WBT strategies have helped to increase on-task behavior of students? Why?
8. Compared to your teaching methods before WBT, do you think WBT strategies have helped students learn lesson content and recall it later?
9. This question was asked at the end of WBT seminars:
Compared to other teaching systems that you are familiar with, WBT is:
 - a. much better
 - b. better
 - c. about the same
 - d. worse
 - e. much worse

Appendix D
Student Interview Questions

Before Intervention:

1. What did you learn from the lesson today?
2. What helped you learn today?
3. What did you like about the lesson today?
4. What helped you stay focused? If you weren't focused, why?
5. Do you have any suggestions the class could try to help us focus better?

After Intervention:

1. Same questions as above, but ask questions below if student does not talk about the gesture(s) involved with the lesson.
2. What were the gestures/corresponding words used in today's lesson?
3. Did the gestures help you learn? Why or why not?
4. Do you like using the gestures? Why or why not?
5. Do the gestures help you focus better? Why or why not?
6. Do you have any suggestions the class could try to help us focus better?

Appendix E

Mentor Teacher Interview Questions

Before Intervention:

1. What do you think about your students' on-task behavior during whole group instruction?
2. What are students/teacher doing when students appear to be the most on-task?
3. What helps the students during a lesson for them to be able to best recall information after a lesson?
4. How would you describe your teaching approach in terms of keeping students on-task and able to recall lesson content?

After Intervention:

1. What do you think about your students' on-task behavior during whole group instruction?
 2. What are students/teacher doing when the students appear to be the most on-task?
 3. What do you think about the gestures in terms of a classroom management technique and a method of teaching?
 4. Do you think your students are more on-task when they use gestures during whole group instruction? Do you think students are able to recall information easier/better when they use gestures during whole group instruction? Why or why not?
3. This question was asked at the end of WBT seminars:
- Compared to other teaching systems that you are familiar with, WBT is:
- a. much better
 - b. better
 - c. about the same
 - d. worse
 - e. much worse

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ACADEMIC VITA

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Education

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- In progress of completing Schreyer Honors College thesis
 - Will be presented at The Professional Development School Inquiry Conference
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- Penn State Fitness Instructor
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- National Council of Social Studies Teachers

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