Using Lesson Study to Help Teachers Design Lessons with Purposeful Planned Movement and Build Efficacy

by

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ABSTRACT

Due to the push down of academics, today's elementary students are being asked to learn more concepts and sit for longer periods of time. Sitting slows thinking, whereas movement wakes up the brain. Using movement to learn is embodied cognition, or learning through both the body and the brain. Movement should be part of instruction for young students; however teachers are often not sure how to incorporate movement in their lesson plans. The Japanese practice of lesson study may help because it embeds teachers' new learning in their classrooms while intimately connecting it to the learning of their students, and it links with the cyclical, constructed theory of learning provided by Vygotsky Space. If teachers incorporate movement in their lessons, children have the potential to become more engaged and learn.

This action research study was designed to understand if two first grade, two second grade, and one third grade teacher at a Title One elementary school in the Southwestern United States could learn how to use movement more during instruction through lesson study. This innovation took place for 14-weeks during which 12 lessons using movement were developed and taught.

Data were collected prior to the study and during each portion of the cyclical process including, while teachers learned, during lessons using movement, and when lessons were discussed and changed. The data sources were pre and post teacher surveys, student surveys, observation protocols, lesson plans, transcripts of lesson study meetings, and researcher notes. To reduce bias a triangulated mixed methods design was used.

Results indicate that through lesson study teachers were able to learn about movement, try it, observe the results, and adjust it to fit their teaching style and their students' needs. Data showed increased student engagement in lessons that incorporated movement as evidenced in the students' words, bodies, and learning. After participating in the study, the teachers realized they personally use movement to learn, and teachers' efficacy regarding their ability to plan movement in their lessons increased. Additionally, they started purposefully planning movement across their curriculum. Based on the results, further cycles of action research are suggested.

DEDICATION

This dissertation is dedicated to my incredible family! God truly blessed me by surrounding me with these people!

Chris, you are a remarkable man and the perfect husband for me. Without you, I never would have embarked on this journey, and without you, I never would have made it through. The sacrifices you made were endless, and I can never thank you enough. You have earned this doctorate as much as I have. Thank you for insisting that I follow my dream! I love you!

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Chapter 1

Introduction

The launching of Sputnik by the Soviet Union and the report, *A Nation at Risk*, were impetuses that caused the United States Department of Education to take note that our schools would need to make some changes if we were to remain academically on top (Sax, 2001). These factors ultimately led to the link between funding and academic assessments of the No Child Left Behind Act (NCLB) of 2001 and focus on standards and testing. The desire to remain on top has caused education to change at all grade levels. The disappearance of factory jobs and the increase in technology worldwide began to push curricula down, requiring kindergarten students to do first grade work and first grade students to do second grade work and so on (Ginsburg, 2007; Sax, 2001). While this curriculum change seems to be a logical reaction to increasing overall academic performance, young children are "not developmentally ready for the academic emphasis" (Hatch, 2002, p. 457). The push down of curriculum has caused students to spend more and more time in their seats (Sprung, Froschl, & Gropper, 2010; Wohlwend, 2009) and resulted in preschool learning focused on pencil and paper tasks (Marcon, 2002; Sprung et al., 2010). As Reinoso (2002) states, "we find ourselves clinging to rigid time frames and ineffective lessons for the sake of covering everything in the curriculum" (p. 70).

Research shows that this increased academic emphasis is not working for a lot of children, and according to Marcon (2002), the pushing down of curriculum has been counterproductive. She says this because in an initial study

conducted with 295 preschool children attending different urban preschools. She found these schools falling into three instructional models. One was considered a "child-initiated" model in which the teachers encouraged children to inquire about and experience new learning. Another was "academically directed" where more direct instruction took place and children sat in their seats and listened. The final was what he termed a "middle-of-the-road" model because instructional techniques from the other two were combined (Marcon, 1992, p. 520). Six years later, Dr. Marcon reported how these children were doing in school. She stated:

> Children's later school success appears to have been enhanced by more active, child-initiated learning experiences. Their long-term progress may be slowed by overly academic preschool experiences that introduce formalized learning experiences too early for most children's developmental status. Pushing children too soon may actually backfire when children move into the later elementary school grades and are required to think more independently and take on greater responsibility for their own learning process. (p. 375)

In this statement, Dr. Marcon reveals the importance of more active, kinesthetic, child-initiated instruction versus more formalized, teacher directed, academic instruction in preschools.

This change in curriculum becomes further complicated when brain development is considered (Arends & Kilcher, 2010; Restak, 2003; Willis, 2006; Zull, 2004). The advancement of technology and new imaging tools like computerized axail tomography (CAT) scans, functional magnetic resonance

imaging (*f*MRI), and positron emission tomography (PET) scans are allowing neuroscientists to observe the brain in vivo, as it learns or performs a task (Arends & Kilcher, 2010; Restak, 2003; Willis, 2006). In doing so, scientists now understand the brain's plasticity, or capacity for change (Ratey & Hagerman, 2008; Restak, 2003). Plasticity means that human brains are constantly responding and shaping themselves in response to the world around them (Ratey & Hagerman, 2008; Restak, 2003). According to Restak (2003), "Technology seems to be spurring the current alteration. One consequence of this change is that we face constant challenges to our ability to focus our attention" (p. 38-39). Given that the brains of young children are just forming, it may be important for educators to consider this when planning instruction and consider using multiple modalities, such as kinesthetic activities to capture and sustain students' attention. Research indicates that using a variety of senses stimulates brain connections and these connections influence what and how a child learns (Arends & Kilcher, 2010; Medina, 2008; Ratey & Hagerman, 2008; Willis, 2006).

Attention is not enough because the depth of processing also matters. Craik and Lockhart (1972) considered levels of processing as it relates to memory; they stated, "only deeper processing will lead to an improvement in memory" (p. 681). Research has shown a deeper level of processing when kinesthetic activities are connected with learning (Aubusson, Fogwill, Barr, & Perkovic, 1997; Block, Parris, & Whiteley, 2008; Cabrera & Colosi, 2010).

To successfully educate students in the post-Sputnik era, it is important to consider instruction that is developmentally appropriate, including kinesthetic

activities such as movement or gestures, that contemplates brain plasticity, and that encourages curiosity. Although he may not have known about brain plasticity, Friedrich Froebel, the father of kindergarten, understood the importance of developmentally appropriate, kinesthetic learning when he opened his first school for children in 1837 (Cabrera & Colosi, 2010; Sax, 2001). Froebel believed "that integrating play into educational settings would engage children and foster a long-term interest in learning" (Cabrera & Colosi, 2010, p. 38).

Another individual who understood the value of children being actively involved in learning was Jean Piaget, a well-known psychologist, who helped educators understand developmental stages of learning and how children learn about their world through sensory motor experiences, touch, and exploration (Cabrera & Colosi, 2010; Flavell, 1996; Piaget, 1965; Siegler & Ellis, 1996). Piaget's ideas still influence education and child development today (Bodrova & Leong, 2003; Garner, 2007; Minogue & Jones, 2006; Pellegrini& Bohn, 2005; Scarlett, Naudeau, Salonius-Pasternak, & Ponte, 2005; Zambo & Brozo, 2009). "On the 100th anniversary of his birth, Piaget's ideas remain central to current understanding of development during childhood" (Siegler & Ellis, 1996, p. 211).

Building on the work of Froebel and Piaget, researchers today are discovering that children of all ages benefit from kinesthetic learning. Children build conceptual knowledge through movement and gestures, learn with hands-on activities, or learn by doing projects that get them out of their seats (Cabrera & Colosi, 2010; Goldin-Meadow, 2010; Hall, 2007; Kagan & Kagan, 2009; Mears, 2003; Medina, 2008; Willis, 2009: Zull, 2004). According to Medina (2008),

"when touch is combined with visual information, recognition learning leaps forward by almost 30 percent" (p. 208). Students who are engaged in kinesthetic learning have better retention (Kelley & Clausen-Grace, 2009; Lan et al., 2009; Lee & Shute, 2010). While the importance of kinesthetic learning is known, it is being set aside due to the *pressure* of meeting the requirements of the standards based movement caused by the academic push down (Hall, 2007; Mears, 2003; Reinoso, 2002; Wohlwend, 2009).

I see this pressure at my school. Since my school is a Response to Intervention (RtI) school, data is systematically kept on all the students so teachers can provide them with the instruction they need. At our school, this means using assessments to set individual goals for each student who is not at grade level. The teachers monitor each student's progress weekly through data collection. Monthly grade level meetings are held to look at the progress and to readjust or write new goals as necessary. I believe the intent of this is laudable and beneficial, because children are not allowed to fall through the cracks. However, the requirement to collect weekly data takes copious amounts of time. This, coupled with the amount of academic material teachers must cover due to the way the curriculum is designed, causes a lot of in seat time for students and a unique type of tension for teachers. As teachers and I strive to cover all of the academic material and keep up on assessments, appropriate activities like building concepts through movement can be pushed aside.

As a special education teacher, I believe in using movement to learn and have been using what I call purposeful planned movement in my classroom. I

define purposeful planned movement as a range of strategies from short activity breaks to wake up the brain and body, gestures to create mental imagery, and total physical response such as simulation role play. Purposeful planned movement incorporates a range of strategies to use in the classroom in connection with learning to enhance cognitive connections. My conception of this can be found in Figure 1.

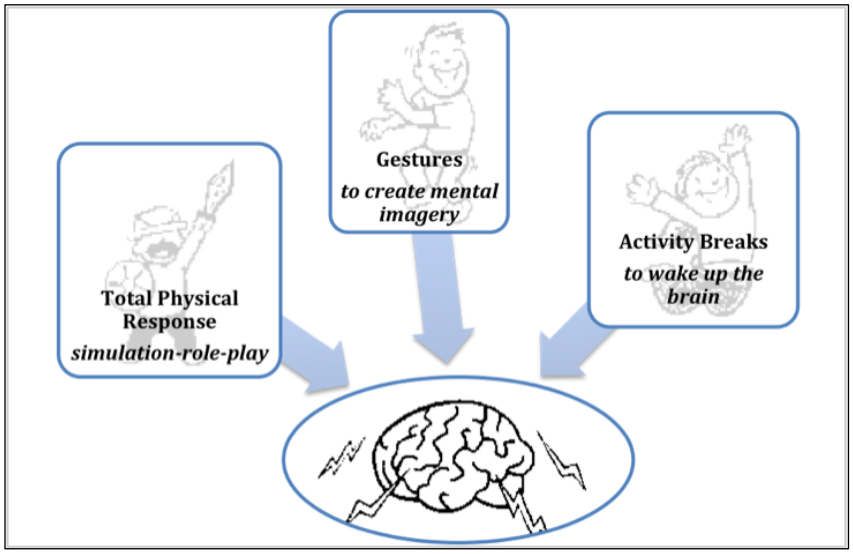


Figure 1. Illustration of purposeful planned movement strategies

As an example of this, I often start a lesson with an activity that causes the students to get out of their seats. For example, I may have each student find a plastic egg which will have a vocabulary word hidden in it. Then, they become the "expert" for that word by decoding and defining it. Later, they may use a gesture to recall the sound for a diphthong in their word. Another time they may use total physical response to identify the time on an analog clock or learn a new

decoding strategy. I see the children's enjoyment and witness the connections when they are asked to recall the information at a later date. The students often ask, "Can we hunt for eggs today?" Or, "Can I be the vowel this time?" Unfortunately, even though I am using these strategies and research is showing that children need more purposeful planned movement included during instruction, I do not see the teachers at my school using much of it in their general education classrooms. In casual conversations, general education teachers have confirmed what I have noticed regarding their lack of use of purposeful planned movement learning strategies in their classrooms. They say they know that using planned movement while teaching is beneficial for their students, but they state they are not doing it very often. These teachers offer four primary reasons that they are not using many purposeful planned movement learning strategies in their classroom. They say that they either forget about it because they are so overwhelmed with all they have to cover, perceive that it takes too much time, believe the students get too carried away (which also takes from instructional time), or cannot figure out how to incorporate it with an entire class of students. To help understand how an entire class might use purposeful planned movement throughout the day, I have created a vignette (see Appendix A).

In my position as a special education teacher and as a graduate level university instructor, I consult with teachers from my school and other schools around the state regarding specific strategies to help all students stay engaged. During consultation, teachers frequently have expressed that the pressure to cover large amounts of academic material in one school year not only causes them to set

aside purposeful planned movement learning practices, but also limits their time to reflect on their teaching practice. In my opinion, if teachers do not reflect on their teaching practice, they may not internalize the impact of minimizing purposeful planned movement instruction in their classrooms.

Another part of my role as a special education teacher is to work in general education classrooms and assist teachers in identifying strategies that will help students with learning challenges succeed. Through these interactions, the teachers have seen how I incorporate my idea of purposeful planned movement in my instruction. At times, when I am in the general education classroom, I am responsible for the primary instruction for the entire class. When this happens, the teacher sees how I use movement, gestures, hands-on activities, and projects that encourage students to get out of their seats with their entire class. The teachers have told me that they are surprised and excited to see how this instruction has not only helped students understand academic information, but how it also improved engagement and retention. They have made comments such as "it came up in our guided reading several times today, and the kids remembered the motion and it helped them remember the sound so they could figure out the word" or "I saw the students using the movement when they were working today." These are strategies that I have found to be effective with my special education students, and I agree with the research by Jordan and Stanovich (2004) that says "effective teaching skills are effective for all students, both with and without special education needs" (p. 535).

However, my role on campus is not limited to the classroom, I am also a member of the Campus Improvement Team (CIT). This team is responsible for setting goals for the school and planning appropriate strategies to reach those goals. In order to do this, we were asked to determine the root cause of weak academic areas as identified by Arizona's Instrument to Measure Standards (AIMS) testing. Recently, this discussion led to more conversations about active learning versus direct instruction. To gain further insight about how purposeful planned movement was being used in the classrooms, I decided to ask the teachers at my school to fill out an anonymous questionnaire regarding their use of movement in their classroom. One hundred percent of those who responded indicated that they would like to learn more about how to incorporate more planned movement in their classroom.

The questionnaire confirmed my beliefs that teachers recognize the need for movement as a way to enhance learning, motivation, and engagement. They stated they want to incorporate it into their lessons but would like further instruction on effective ways to do it. Even though a few teachers had lessons that include some movement, they were not working on improving these lessons systematically, collaboratively, or in a research-based manner. For these reasons, I wanted to pilot a professional development strategy called *lesson study.*

Lesson study "is a method of professional development that encourages teachers to reflect on their teaching practice through a cyclical process of collaborative lesson planning, lesson observation, and examination of student learning" (Lenski & Caskey, 2010, p. 44). Lesson study is based on the situated

learning theory (Lave & Wegner, 1991), "which advances the premise that learning is situated in the specific activity and is embedded within a particular context and culture" (Lenskie & Caskey, 2010, p. 442), and it affords many critical elements of effective professional development (Schmoker, 2004; Stewart & Brendefur, 2005).

My idea was to work together to incorporate my idea of purposeful planned movement strategies that are backed by research into specific lessons. At least two teachers from our team would observe the students in the classroom and look for engagement in the form of on task attention and positive emotion while listening to the students' voices during the lesson. The implementation of the strategy would be paramount as research indicates that academic engagement is significantly related to academic achievement (Fincham, Hokoda, & Sanders, 1989; Gregory & Cahill, 2010; Jordan, Schwartz, & McGhie-Richmond, 2009; Kelley & Clausen-Grace, 2009). The information from the observation would be shared with the team, reflected on, and then used in planning for the next lesson. This study would take place over a 12-week period.

From this work, I will attempt to answer these questions:

How and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement?

To what extent will these lessons with purposeful planned movement foster student engagement and learning as reflected in their bodies, their words and their assignments?

To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy?

How will I evolve as a result of leading this innovation?

Chapter 2

Literature Review

The world is changing. We are living in a time when information is increasing exponentially (Barzilai & Zohar, 2008). This combined with the shift of academic expectations for children (Hatch, 2005; Sprung et al., 2010; Wohlwend, 2009) and the changes that children are experiencing outside of school (Garner, 2007; Hatch, 2005), means that we, as educators, need to reflect on how our instruction aligns with these changes and focuses on the developmental, physiological, and social needs of children. Over 90 years ago, Dewey (1916) wrote, "as societies become more complex in structure and resources, the need of formal or intentional teaching and learning increases" (p. 9). Considering all of this, the question becomes, what is the best way to intentionally teach our students? The literature review that follows will outline the elements that seem to be most important when planning lessons to teach primary and intermediate children. These elements are how movement impacts children's learning, how teachers learn, the benefits of lesson study and what can be learned from the voices of teachers and students about their efficacy and learning. It also reviews the theoretical frameworks of social learning and Vygotsky Space to understand how the teachers make sense of the new learning as well as embodied cognition to understand the connection between body movement and cognition.

How Movement Impacts Children's Learning

Research is helping educators and others understand how interacting with the world changes our brains, and how learning occurs (Cabrera & Colosi, 2010; Goldin-Meadow, 2010; Jensen, 2004; Marcon, 2002; Medina, 2008; Zull, 2004). "As we interact with the world, the world becomes internalized, or mapped, in our brain" (Zull, 2004, p. 68). When applied to education,

> There has been a lot of talk about what is broken in the U.S. education system and why American students lag behind Europeans and Asians…It turns out that touch, movement and gestures are critical to learning. And why not? From our beginnings as toe-nibbling infants, we experience the world through our bodies as well as our brains, and the more integration between the two the better. (Cabrera & Colosi, 2010, p.36)

These ideas coupled with Piaget's (1954) beliefs concerning the developmental stages of children provide insight into how children learn. Piaget believes "that children are naturally curious about the world and actively seek out information to help them understand and make sense of it. They continually experiment with the objects they encounter, manipulating them and observing the effects of their actions" (Ormrod, 2008, p. 29). He also claims children do not collect isolated pieces of information, but instead connect new information to prior knowledge. These connections become the cognitive structures or schemes that children use to understand the world. Schemes provide the background for children to assimilate new information into an existing scheme or modify an existing scheme to accommodate the new information. Piaget's theory is that

children progress from stages of concrete to abstract thought. These stages happen as children interact with their world. At one time, typical childhood interactions included playing with water or sand to develop the concept of conservation. Conservation is the "realization that if nothing is added or taken away, amount stays the same regardless of alterations in shape or arrangement" (p. 32).

However, Garner (2007) found that today,

> Students spend more and more of their free time passively watching others do things on TV or engaging in 'virtual' play via computers...as a result, many do not get the physical, sensory input needed to develop a basic cognitive structure [schemes] like conservation of constancy (p. 48). All students-young ones especially-need 'real,' tangible experience with manipulatives. (p. 49)

This developmental skill of conservation transfers to academics. For example when reading, students with conservation look at the words *enter, reenter*, and *entering* and understand that the base word, *enter* remains the same, but affixes have been added. When students are provided with the opportunity to manipulate objects and interact with their world, not just watch their teacher do it, they develop cognitive structures like conservation. Physically acquiring this understanding helps students transfer this notion to more abstract concepts like volume and area.

Biological influences of movement on learning and engagement.

Touch, movement, and gestures can also impact students biologically and make a

difference in classroom engagement, acquisition, and retention of knowledge. It has been shown that movement creates activity in the brain that helps students pay attention. When students take activity breaks and get up and move, their concentration and attention span improve (Ayan, 2010; Jensen, 2004; Mahar, Murphy, Rowe, Golden, Shields, & Raedeke, 2006; Medina, 2008). Sitting still and listening puts the body in a resting state, because their heart rate and blood circulation slows down (Jensen, 2004) causing students to become listless or daydream. Research shows that movement, on the other hand, helps wake the brain up. Mahar (2006) and his colleagues designed lessons for 243 third and fourth grade students that integrated 10 – 20 minute activity breaks. Student engagement was measured by trained raters prior to the start of the study, during the study, and after the study was complete. The results indicated that students who were involved in activity breaks were, on average, eight percent more engaged and focused on academic instruction. Highly distractible students showed an even greater increase of engagement and focus; it was closer to 20 percent.

Movement also fosters an emotional connection. Aubusson et al. (1997) found this to be true when they used role-play in their science classes. When one teacher discussed the activity with his students after the role-play, they said, "it's fun…we liked it…Science is boring; this is better" (p. 569). When students enjoy what they are learning, it is not only a strong attention-getter (Jensen, 2004; Sprenger, 1999; Wolfe, 2001), but learning becomes more memorable (Jensen, 2004). When learning feels good, student motivation improves and creative

problem solving is facilitated (Jensen, 2004; Medina, 2008; Willis, 2006; Zull, 2004). In addition, retention is increased (Block et al., 2008; Cabrera & Colosi, 2010; Goldin-Meadow, 2010; Jensen, 2004; Medina, 2008; Willis, 2006).

Impact of movement and gestures on acquiring and retaining knowledge. When more avenues are used for students to learn new information, retention of that information increases (Block et al., 2008; Cabrera & Colosi, 2010; Goldin-Meadow, 2010; Jensen, 2004; Medina, 2008; Willis, 2006). Medina (2008) explains that, "the extra cognitive processing of information…helps the learner to integrate the new materials with prior information" (p. 209). Researchers have found that when one of the additional senses is kinesthetic, it helps students create a mental image for an abstract concept and strengthens the way that they think about the concept (Aubusson et al., 1997; Block et al., 2008; Goldin-Meadow, 2010; Willis, 2006). "If the students can actively do something with the new information, they can ultimately own it and store it in permanent memory" (Willis, 2006, p. 23).

Research confirms this. Goldin-Meadow (2010) reported on a study that she conducted in 2008 with Susan Wagner Cook and Zachary Mitchell. In their study, they used varying conditions to teach 84 third and fourth grade students how to solve mathematical equivalence problems. The children were divided into three different groups. One group was taught using a combination of words and gestures, one was taught using words only, and the third group only used gestures. Immediately following the instruction, all of the students correctly solved the same number of problems. A month after the instruction, it was found that

gestures mattered. Only the students who had been taught using gestures solved the problems correctly. The researchers concluded:

> All that mattered was that children gesture: the kids who only gestured remembered as much as those who used both speech and gesture, suggesting that teaching children gestures tailored to a lesson - in this case, pantomiming a correct problem-solving strategy – can make learning last. Using the body to convey an idea appears to cement that idea in the child's repertoire. (p. 53)

In fact, it appears that "gesturing is innate: people who have been blind since birth gesture even though they have never seen anyone else do it…[suggesting]…that we do not always gesture for our listeners…we also gesture for ourselves" (p.50). The researchers also found that the students who gestured could explain the mathematical concepts they had learned (Goldin-Meadow, 2010).

Block et al. (2008) found similar results when they used kinesthetic movements to aid in reading comprehension. In an attempt to "enhance understanding of how comprehension processes work" and "overcome limitations in current instruction" (p. 460), Block et al. created several Comprehension Process Motions (CPMs). The purpose of the study was to see if the use of CPMs increased students' comprehension and metacognition. The study was conducted in kindergarten through fifth grade. It included 19 control groups as well as 19 experimental groups. The teachers and students were randomly assigned to groups, which met outside of the regular classroom for 45 minutes each day for twelve weeks. The teachers rotated so that every student received instruction

from every teacher. The experimental and treatment groups used the same stories to build comprehension and metacognition, but the experimental groups were also taught CPMs. For example, the students in this group were taught to bring the forefinger and middle finger of the right hand above their eye when they were making a prediction indicating that they were in their words, "look[ing] beyond the obstacle, which is the information you have not yet read…to see what is likely to occur" (p. 462). Then the student brought their hand down and over the left hand "facing toward the future" (p. 462). At the end of 12-weeks, the experimental and control groups took a standardized SAT-9, the Texas Primary Reading Inventory criterion-referenced test (CRT), as well as a basal reader CRT to assess reading comprehension. The results showed a positive, significant difference in the areas of both explicit and implicit reading comprehension as well as increases in vocabulary for the students who learned using the CPMs especially for students in kindergarten through second grade. Not only was comprehension increased, but the researchers concluded, "the possibility that providing concrete images in the form of hand movements will enhance young children's learning of other abstract concepts" (p. 469).

This is consistent with what Aubusson et al. (1997) reported in their study when their students used their entire bodies to learn about science. Their use of role-play to get students out of their seats and engaged in their science lessons developed from their concern that students were "reciting" (p. 565) knowledge, but were not able to explain abstract concepts in their "own words" (p. 565). An example of a role-plays was Barr's class enacting the gas exchange of the human

lung. The students were asked to create a circulatory system with parts of the body including red blood cells, plasma, and body cells. They used blue balloons to depict oxygen and yellow balloons to show carbon dioxide. To show the exchange of these elements, students traveled through the circulatory system and exchanged balloons. Using props and their bodies, students were able to represent the exchange of oxygen and carbon dioxide in the human body.

Many observations were made during the role-play:

1. The students enjoyed the activity.
2. All of the students participated willingly.
3. The students discussed specifics of their roles with each other.
4. The students who had prior trouble staying engaged "were actively on task and seemed to understand the science concepts being taught" (p. 569).
5. Students assumed leadership roles.

Also, during the discussion after the role-play, "the students were able to describe the function of the lungs using their own words" (p. 569). The ability to explain the process was a result found in each vignette described in the study.

Teacher concerns with using movement. Within the rich literature concerning the advantages of incorporating *kinesthetic learning* into the classroom, are concerns on implementation like having time and knowing how to do it well. In the study by Aubusson et al. (1997), their "teachers were concerned that role plays took a lot of time to prepare, perform, review, evaluate, and re-perform" (p. 576). The teachers in the study by Block et al. (2008) participated in

two days of professional development prior to the start of the study and were provided with scripts to use as necessary during the study. Gaus and Simpson (2009) report "some…teachers naturally add kinesthetic activities to classroom instruction, while others have a difficult time make a strong connection between teaching academic subjects while incorporating locomotor skills" (p. 89). Therefore, successful implementation of *kinesthetic learning* in the classroom requires a close inspection of how teachers learn and how this affects the lessons they plan.

How Teachers Learn

Current research provides information regarding valuable criteria that strengthens teacher learning and classroom application of new learning (Chew & Andrews, 2010; Guskey, 2002; Joyce & Showers, 1995; Knight, 2009; Kruse, 2008; Schmoker, 2004; Taylor, Pearson, Peterson, & Rodriguez, 2005; Valli & Hawley, 2002). Research indicates that aligning the district's educational goals and the teachers' interests in the new strategy is critical in effective professional development (Taylor et al., 2005; Valli & Hawley, 2002). It is also important to involve the teachers in the planning of the professional development. Joyce and Showers (1995) affirm this collaborative effort and encourage "communities of teacher researchers" (p. 35) to pursue focused cycles of practicing the new strategies, using assessments to determine effectiveness and adjusting accordingly. "The most productive combinations of thought and action occur in team-based, short-term experimental cycles" (Schmoker, 2004, p. 427). For these reasons, many schools are looking to models of professional development that

encourage a cyclical process that includes practical application of new learning, where the teachers are involved and reflecting on their teaching, and are working with a team to meet the ultimate goal of improving student learning (Guskey, 2002; Knight, 2009; Schmoker, 2004; VanTassel-Baska, et al., 2008). Lesson study is a model that meets these needs (Lenskie & Caskey, 2010; Lewis, Perry, & Murata, 2006; Stewart & Brendefur, 2005; Stigler & Hiebert, 1999; Wiburg & Brown, 2007).

Lesson study, situated learning, and professional development. In the book *The Teaching Gap.* Stigler and Hiebert (1999) suggest that math scores in Japan are higher than the United States (U.S.) because of the different teaching and professional development method they use, called lesson study (Lenski & Caskey, 2009). Originating in Japan (Wiburg & Brown, 2007), lesson study was initially used in the U.S. to improve mathematics scores; however, it is now expanding to other subject areas. The value of lesson study is not in the content area for which it is used, but in the strength of the cycle (Lewis et al., 2006; Stewart & Brendefur, 2005; Wiburg & Brown, 2007).

Lesson study is "a collaborative process in which teachers devise a research lesson, teach and observe the lesson, and then revise and research the lesson in an iterative cycle of professional learning" (Wiburg & Brown, 2007, p.1, 2). According to Lewis (2002), Japanese teachers focus most of their preparation activities on planning *collaborative* lessons and then watching and discussing each other's classroom lessons, while the teachers in the U.S. spend minimal time

on these aspects. Too often, teachers in the U.S. plan and teach their lessons in isolation.

The lesson study cycle begins with a close look at aligning curriculums and standards as well as long-term educational goals for the students (Lewis et al, 2006). This happens in the U.S. also, but the variation comes in what follows the examination of curriculum, standards, and goals. Instead of each teacher then planning a lesson for her individual classroom, in lesson study, the teachers come together and evaluate problems that are getting in the way of achieving their goals. They then work together as a team to devise a research lesson targeting the problems while working toward addressing their goals. Together, the group decides what student behaviors or outcomes will help them determine the success of the lesson. Following the group development of a research lesson, one teacher teaches the lesson while the other teachers observe the students looking for the targeted behaviors and/or collect artifacts (Lenski & Caskey, 2010; Lewis et al., 2006; Stewart & Brendefur, 2005; Stigler & Hiebert, 1999; Wiburg & Brown, 2007). After the lesson, the teachers get back together to evaluate the effectiveness of the lesson. They review the data that were collected by the observing teachers as well as artifacts such as student work and discuss what worked and what did not work keeping the focus on their goals for the students (Lenski & Caskey, 2009; Lewis et al., 2006; Stewart & Brendefur, 2005; Stigler & Hiebert, 1999; Wiburg & Brown, 2007). Adherence to the complete cycle is essential.

Stewart and Brendefur (2005) reported on a teacher who brought a lesson on the Renaissance to her lesson study team. The lesson was developed, taught, and observed. The team felt it was a strong lesson, and the students displayed appropriate engagement behaviors during the lesson, but when the students' work came in, it was "quite drab" (p. 685). The team then reworked the lesson to include elements to help the students understand the life of individuals during the Renaissance. The teachers talked about how using lesson study improved their instruction:

> There is power in collaborative planning. There is value in observing colleagues teach. My thought processes were stimulated, and it helped to organize my thoughts about teaching a lesson. My focus on instruction has been brought to a higher level. This process is less teacher directed and more student centered in lesson planning. There is more focus on your desired result. (Stewart & Brendefur, 2005, p. 686)

Lesson study embeds the teachers' new learning in their classrooms while intimately connecting it to the learning of their students. The lesson study format allows teachers to closely evaluate their concerns in a safe environment. However, it is imperative to keep in mind that the implementation of lesson study has some challenges as well.

Lesson study challenges. Time and trust are two challenges to the implementation of lesson study. Lesson study takes time (Lenski & Caskey, 2009; Stewart & Brendefur, 2005; Wiburg & Brown, 2007). Allowing for time to plan, observe, and reflect on lessons in order to improve the lessons is essential.

While time for collaboration, observation, and reflection is built into the school day in Japan, this is not always the case in the United States (Lenski & Caskey, 2009; Stigler & Hiebert, 1999; Stewart & Brendefur, 2005; Wiburg & Brown, 2007). One lesson study group that was studied by Stewart and Brendefur (2005) found that "it was not the number of lesson plans that were covered by the group but the depth and quality of the coverage that influenced their teaching the most" (p. 687). This leads to another crucial element of successful implementation of lesson study, trust.

Since lesson study is built on the value of the observation of the research lesson in order to determine the effectiveness of the lesson, the teachers in this group need to trust the members of their team. Yet, many teachers are uncomfortable with having their peers in their classroom (Lenski & Caskey, 2009; Stewart & Brendefur, 2005; Wiburg & Brown, 2007). The success of lesson study lies in the willingness of the teachers to openly share their thoughts and take chances. As Burney (2004) explains,

> Transforming thinking and practice requires people to take risks…they can develop their expertise only if they are willing to experiment, make mistakes, and analyze those mistakes – with everyone else and in front of everyone else. There is no other way for new knowledge to infuse the system and create stronger instructional practice. (p. 529)

Leadership is key to unlocking the motivation to take those risks. Stewart and Brendefur (2005) found that the leadership should be "perceived as caring and kind…but a professional focus on the task at hand" (p.686) was also critical.

They also found that when the combination of trust and risk taking were united, the learning was strengthened. As one teacher said,

> We bring lessons to be scrutinized by our colleagues without the fear of being ridiculed. I felt I was being mentored in the truest sense of the word. As we spent time together, we learned to value each other's opinions. (p. 686)

In *The Five Dysfunctions of a Team* (2002), Patrick Lencioni says, "by acknowledging the imperfections of their humanity, members of functional teams overcome the natural tendencies that make trust, conflict, commitment, accountability, and a focus on results so elusive" (p. 220).

Leadership in lesson study and change. Trust and openness will allow for the free flow of ideas, however, it is critical that any group employing lesson study focus on the teachers. As Hargreaves (2009) states, "no theory-in-action of sustainable educational change can ignore or by pass the teacher. It must involve teachers not just in delivering pedagogical details, but also in determining the basic purpose of their work" (p. 28). Lesson study is designed around this understanding. It is embedded in the classroom, designed to "benefit the students directly, especially in the areas of academic results where results are tangible and more satisfying" (Chew & Andrews, 2009, p. 67). This can raise teacher confidence and efficacy and ties in with Barth's (2001) findings that "having a goal" and "persisting" (p. 447) were two of three factors related to teacher leader success. Identifying goals that are important to the teachers and then working

through the details will help create change. This process takes time and needs to be reevaluated throughout the lesson study (Reinoso, 2002).

Reflection is another essential element of lesson study (Lenskie & Caskey, 2010; Lewis et al., 2006; Steward & Brendefur, 2005; Stigler & Hiebert, 1999; Wiburg & Brown, 2007). Reflection meshes well with Reinoso's (2002) statement that, "mistakes help propel us to the next step with more experience and expertise. If a lesson flops, it flops. Extract the positive aspects…move on to the next lesson" (p. 72). The elements of reflection and time are quantified in the third factor mentioned by Barth (2001) by suggesting defining "success as effecting an incremental change in the desirable direction" (p. 447). Lesson study takes into consideration this concern by using a cycle of teaching, reflecting, and reteaching (Lenskie & Caskey, 2010; Lewis et al., 2006; Stewart & Brendefur, 2005; Stigler & Hiebert, 1999; Wiburg & Brown, 2007).

A great deal can be learned about how the process of lesson study affects teachers from what they say about their learning. The question that then arises is, can teacher discourse provide a window into teacher efficacy as well?

Discourse of Teacher Efficacy

Teacher efficacy, student achievement, and teacher willingness to implement innovative practices are intricately intertwined (Bandura, 1993; Yost, 2002). Teacher efficacy is generally believed to be "a teacher's belief or conviction that he or she can influence how well students learn, even those who may be difficult or unmotivated" (Guskey, 1987, p. 41). Efficacy has been found to have a direct link to student learning (Bandura, 1993; Dembo & Gibson, 1985;

Guskey, 1987; Hoy & Woolfolk, 1990; Palardy & Rumberger, 2008; Yost, 2002). This may be because "efficacy beliefs influence how people feel, think, motivate themselves, and behave" (Bandura, 1993, p. 118). When teachers feel better about their teaching ability, they spend more time planning, and working with students.

Bandura (1977) found the "experience of mastery arising from effective performance" (p. 191) to cause the most significant changes in efficacy especially when the successes were repeated. Bandura also found modeling aids individuals in strengthening efficacy particularly when the observer perceives the model to possess similar characteristics. Watching someone else succeed in a situation that may initially be viewed as threatening provides "vicarious experience" (p. 197) leading the observer to believe that if he or she imitates the behavior, he or she will also be successful. This increased efficacy from modeling was also evident with individuals who were already self-efficacious. Bruce, Esmonde, Ross, Dookie and Beatty (2010) found that when teachers were engaged in an ongoing form of professional introspection and development, the correlation between student learning and efficacy were stronger. Teachers with high efficacy are also more willing to learn and try new ideas in their classrooms (Bandura, 1993; Emmer & Hickman, 1991;Yost, 2002; Zambo & Zambo, 2008).

In a study to find the effects of professional development on instructional efficacy, Zambo and Zambo (2008) found that as teachers learn and apply new ideas and strategies, their discourse reflects the connections they are making. After a two-week, professional development seminar, a first grade teacher said,

"every class I take, I get one new idea that kind of gets me enthused again…it gives me a chance to see other approaches that hopefully I can use to catch some kids that aren't getting it" (p. 165). At the same seminar, a sixth grade teacher commented that she attended workshops like these "for my benefit so I can learn more information to improve my teaching" (p. 165). Similar remarks from other studies help clarify how teachers with high efficacy talk about their learning. They exude excitement about new learning with statements like, "YAY! I actually did it" (Bruce et al., 2010, p. 1606), and "don't rest on what you know" (Bruce et al., 2010, p. 1606) reflecting their desire to continue to learn. However, Guskey (1984) found that this is not always the case. After experiencing a positive change in the learning outcomes for their students, the teachers in his study experienced "more positive attitudes toward teaching…[but, they also] expressed decreased confidence in their teaching abilities" (p. 252). He hypothesized this decrease in confidence was related to the high self-efficacy that the teachers had prior to the study. He explained that the teachers entered "feeling fairly confident of their abilities…then…some of these teachers find that…their instruction can become more effective" (p.254).

Looking at how teachers' self-efficacy is developed and how it affects instruction and student learning and how teachers talk about it provides insight regarding the use of lesson study to help teachers engage students physically and cognitively. Is there usefulness in listening to the voices of the students?

Student Engagement and Voice

Academic standards are changing causing children to experience curriculum that is a grade level or more higher than their peers experienced 15 years ago (Tyre, 2008). This increase in academic expectations is resulting in more direct instruction, and research has shown that young children whose classrooms focus on direct instruction experience more stress and the students are "less creative and less enthusiastic about learning" (p. 74). Therefore,

> As the pressure to emphasize academic standards increases, it is all the more essential to reflect on the most effective practices for ensuring that children are actually learning what is being taught. Some factors related to children's achievement are not in teachers' control, but creating a climate of engagement in the classroom is. (Jablon & Wilkinson, 2006, p. 2)

When students are engaged in what they are learning, they demonstrate higher levels of achievement; conversely, when they are not engaged, learning is difficult (Kelley & Clausen-Grace, 2009). Yet, engagement is not clearly understood but Schlechty, (2001) offers some insight.

> Engagement is active. It requires that students be attentive as well as in attendance; it requires the student to be committed to the task and find some inherent value in what he or she is being asked to do. The engaged student not only does the task assigned but also does it with enthusiasm and diligence. (p. 64)

O'Donnell, Reeve, and Smith (2009) have developed a model to help teachers gain a better understanding of what to look for in student engagement. The model includes four main categories of engagement: behavior, positive emotion, cognition and voice.

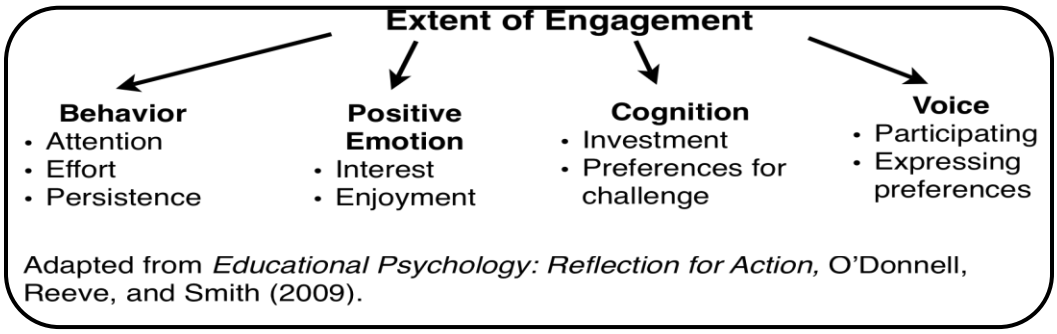


Figure 2. Model of extent of student engagement

Understanding that engagement is key to student achievement (Kelley & Clausen-Grace, 2009), and realizing the connection between the elements of engagement and motivation, researchers have studied different teaching environments to assess their impact on student learning and motivation (Marcon, 2002; Stipek, Feiler, Daniels, & Milburn, 1995). Yet even with a focus on teaching environments, student voices are often ignored (Daniels, Kalkman, & McCombs, 2001). Lincoln (1995) suggests, "we can no longer ignore research, such as that of Piaget, that has demonstrated that healthy humans from infancy on are active participants in learning about, and constructing views of, the social world they encounter" (p. 89). This supports John Nicholl's (1992) finding that by second grade, children's beliefs about education shape their enthusiasm to learn. We need to listen to what students have to say.

Daniels et al. (2001) conducted a study to investigate children's perceptions of their teachers and their learning. "The major purpose of the…study was to investigate young children's perspectives on teaching practices and learning in…different classroom contexts" (p. 256). The study's sample included sixty-six students in kindergarten, first, and second grade from seven classrooms. The students were interviewed and asked to complete rating scales. In addition to two open-ended questions, the interviewers used comic-like drawings and child friendly rating scales that used stars, faces, and towers to elicit information from the students. The findings illuminated the insightfulness of the children, as their descriptions of the type of instruction were in agreement with the researcher's knowledge of the instructional styles of the teachers. Overall, the children described a good teacher to be one who cares, helps, and stimulates them. In describing a good teacher, one kindergartner said, "[a good teacher] would be nice, and teach kids what they didn't learn in preschool" (p. 270). Voices not only reveal perspectives but can also strengthen an entire classroom.

When a high school in a suburb of San Francisco invited students to work together with their teachers to address "instructional practices, particularly for English language learners" (Mitra, 2008, p.22), the voices of the students strengthened the school environment in multiple ways. The students were assigned to diverse focus groups and then interviewed. From the interviews, the teachers learned about the misunderstandings that existed between the teachers and the students revealing the critical need for strong student-teacher relationships. Some students also participated in a professional development with

the teachers and learned about different instructional methods. The training was designed in a way that enabled the students to "share with teachers their positive and negative classroom learning experiences" (p. 22). The students who participated helped the other students understand the teachers' teaching methods, and they also helped the teachers understand the students' learning needs and styles. The researchers in this study found that:

> …the new views on instruction and assessment that students' involvement brought show how including student voice in reform efforts can strengthen schools. Students' invaluable perspectives help identify the issues most in need of improvement and focus faculty on what students truly experience and what kinds of support they need. (Mitra, 2008, p. 24)

This also aligns with Hargreaves comments in *Change Wars* (2009) referring to "students as partners in change" (p. 26).

Listening to the voices of students, both in elementary school and in high school, affords us a glimpse into their world. This glimpse may help strengthen teaching, create life-long learners, and ultimately reverse negative effects like dropping out.

> As we have learned more about young children's awareness of classroom practices and attitudes towards learning, it becomes even more important to find ways to hear their voices and address those practices that can nurture their natural motivation and love of learning. (Daniels et al., 2001, p. 270)

By helping the students physically connect "intellectually…and emotionally," the learning can sustain itself (Hargreaves & Fink, 2004, p. 9).

Theoretical Framework

The purpose of my study was to evaluate if lesson study helps the teachers I work with create research based lessons that engage their students cognitively and physically. My innovation involves supporting teachers in the process of internalizing and making sense of new learning, making that learning public, and then making it their own. There were stages of learning and digression and the acquisition, application, and sharing of new learning was not a linear progression. To understand these developments and processes, I used the theoretical frameworks of social learning, Vygotsky Space, and embodied cognition.

Vygotsky Space. Drawing on Wenger (1998), I believe learning and practice are performed, "in a historical and social context that gives structure and meaning to what we do" (p. 47). Inherent in learning and practice is the social negotiation of meaning. Additionally, working, learning, and innovation take place in an organizational structure. As teachers develop their lessons, they are constrained or aided by the institutions and contexts in which they work. Ideas about social practice are pertinent to my work because they will focus my analysis on learning as it occurs in the context of the teachers' work as they learn, plan, and transform new ideas with each other in everyday practice (Gallucci, Van Lare, Yoon, & Boatright, 2010).

I draw on Vygotsky Space because it allows me to focus on the teachers' development, see their learning and change as they internalized the process of

lesson study and transformed cultural tools to their advantage and created artifacts of their learning. Vygotsky Space provides me with a cyclical view of the process of acquiring and internalizing the new learning I provided and the importance of sharing that learning with others (Gallucci, 2007; Gallucci et al., 2010). This cycle also revealed the back and forth movement teachers go through within the cycle and the potential for leadership and higher efficacy (see figure 3).

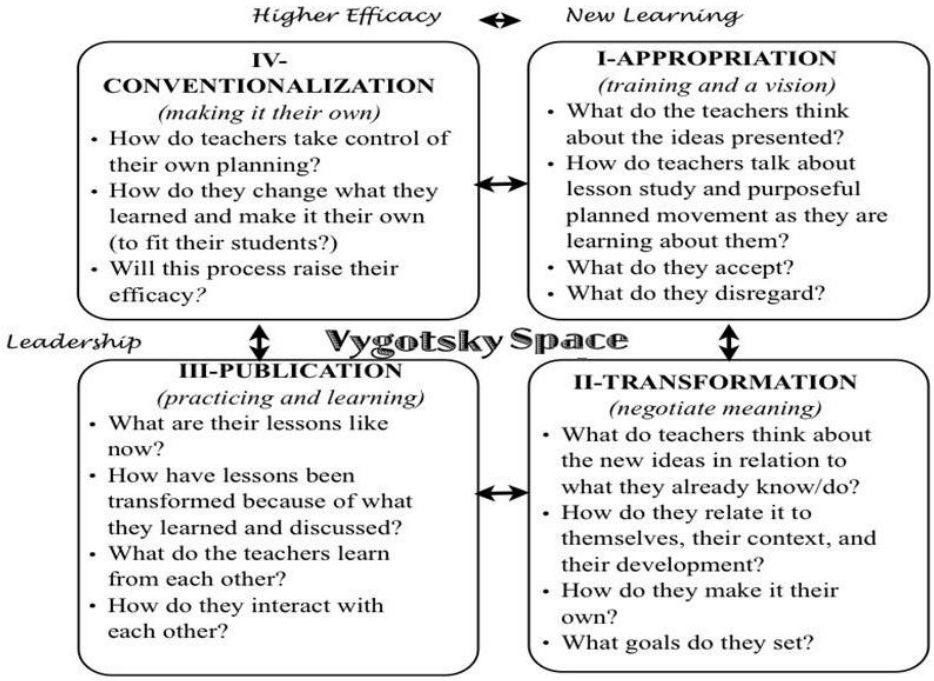


Figure 3. Model for Vygotsky Space

In Quadrant 1, learning for the teachers began with the public introduction of new knowledge, which in this study focused on: 1) the learning cycle (Zull, 2009) as a rationale for purposeful planned movement, 2) engagement strategies, 3) lesson study as a means to enact what has been learned. I also provided

research-based information on ways to incorporate purposeful planned movement in the classroom. I engaged in a conversation with the team of teachers concerning the potential effects these strategies can have on students' engagement and retention of information. Teacher discourse was used because in discussions what teachers accept and disregard can be found.

This discussion led to Quadrant II, the collaborative development of a specific, research lesson using purposeful planned movement. Here, I observed how the teachers took what they already knew and integrated it with the new knowledge. The conversations during this time provided insight regarding how each teacher makes the plan her own. During this time, I also shared research on student engagement with the teachers. The lesson study team evaluated the protocol and determined specific behaviors that will demonstrate engagement for this *transformed* lesson.

In Quadrant III, individual teachers experienced *publication* as they personally taught a research lesson. As the cycle continued, it became more evident as to whether the teachers incorporated more purposeful planned movement throughout their school day. Although only one teacher taught the lesson, the others watched and used the observation protocol to provide a lens regarding student engagement. Since the research lesson was taught while the rest of the team observed, the individual application of the learning became public.

Then, in Quadrant IV, the results of the research lesson may have caused the lesson study team to either try the new learning in their classroom

(*conventionalization*), or reevaluate and return to Quadrant I for different new learning. This model was "developed to characterize how individual development is achieved through participation in social processes" (Gallucci, 2007, p. 7); however, it is also "useful for clarifying the complex processes of collective learning we are observing in improving school districts" (Gallucci, 2007, p. 7). As the teachers in this innovation navigated research strategies to engage students physically and cognitively, Vygotsky Space gave perspective to the process.

Embodied cognition. Since this study also looked at the use of purposeful planned movement, also known as the use of activity breaks, total physical response and gestures, as they relate to learning, it is valuable to consider *embodied cognition*. Hostetter and Alibali (2008) claim "since people use their bodies…to express knowledge, it is argued, the knowledge itself must be deeply tied to the body" (p. 495). In their examination of research, they took a close look at the connections between embodied cognition and gestures. The studies they evaluated showed that the use of gestures increased efficiency in response time because "expressing spatial information in gesture is less resource-intensive than holding it in working memory" (p. 501). Furthermore, they found that gestures aided in comprehending more abstract concepts including metaphors. This may be due to the fact that gestures can "synthesize several meanings into single symbols [and are] global" (p. 501). The research also indicated that speakers tend to increase the use of gestures when it was difficult to verbally explain a concept. Embodied cognition claims the "tight coupling of motor and perceptual processes that is so important for physical interaction with the world may also be important

for mental representation of the world" (p. 497). As the teachers in this study used purposeful planned movement in their classrooms, the students' learning was also considered through the lens of embodied cognition.

In the beginning of Chapter 2, I provided a review of the literature concerning children's learning, the impact of movement, teacher learning, lesson study and the theoretical frame that I will use to understand my data. Next, I will explain the methodology, the details of the innovation, and the data sources used.

Chapter 3

Research Design

This chapter is organized in four sections. First, I explain about action research and the design of this study (mixed methods). This is followed by a description of the setting including the site and participants. Next, the action plan for the innovation is explained in detail. Finally, the specifics of the data collection tools are outlined.

Methodology

Stringer (2007) describes action research as "the means by which people in schools, business and community organizations, teachers, and health and human services may increase the effectiveness of the work in which they are engaged" (p. 1). Mills (2007) specifically defines action research as "systematic inquiry conducted by teacher researchers…to gather information about…how well their students learn" (p.5). As a special education teacher, I regularly progress monitor my students' skills and adjust my instruction to maximize their progress, and many of my peers do this as well. Stringer goes on to explain "professional practitioners, as research facilitators, engage their communities of interest in careful and systematic explorations that provide them with knowledge and understanding that, in very direct ways, improve the quality of their lives" (p. 6). For these reasons, I conducted an action research study to understand if, and to what extent, lesson study could help the teachers at my school design lessons that used purposeful planned movement. Specifically investigated was, to what extent, and in what ways, lesson study increased the teacher's ability to write

effective purposeful planned movement lessons, understand if purposeful planned movement lessons fostered student engagement and perceptions of learning, and understand if the process of lesson study and lessons that incorporated purposeful planned movement raised teacher perceived efficacy.

I used a triangulated mixed methods design with concurrent collection, analysis, and interpretation of the data (Creswell & Plano Clark, 2007; Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004). I did this because a mixed methods design relies on both quantitative and qualitative procedures to collect, analyze, and mix both in order to find answers to research questions. I believe the strengths of both of these help answer questions in a more complete way.

Triangulation "refers to the designed use of multiple methods…in investigations of the same phenomenon in order to strengthen the validity of inquiry results" (Greene, et al., 1989, p. 256). More specifically, I used the Triangulation Design: Convergence Model (Creswell & Plano Clark, 2007). In this model (see Figure 4 below), the researcher "collects and analyzes quantitative and qualitative data separately on the same phenomenon and then the different results are converged (by comparing and contrasting the different results) during the interpretation" (p. 64). My quantitative and qualitative data sources were a survey with open and closed-ended items administered pre/post to the teachers, the teachers' lesson plans, student surveys collected after a movement lesson and after a lesson that did not incorporate movement, observation protocols including

open and closed items, audiotapes of lesson study discussions, and researcher field notes.

Based on the triangulation convergence model, the quantitative data and the qualitative data were collected and analyzed independent of each other. During the interpretation stage, the results were converged to strengthen and enrich the conclusions. "Researchers use this model when they want to compare results or validate, confirm, or corroborate quantitative results with qualitative findings" (Creswell & Plano Clark, 2007, p. 65).

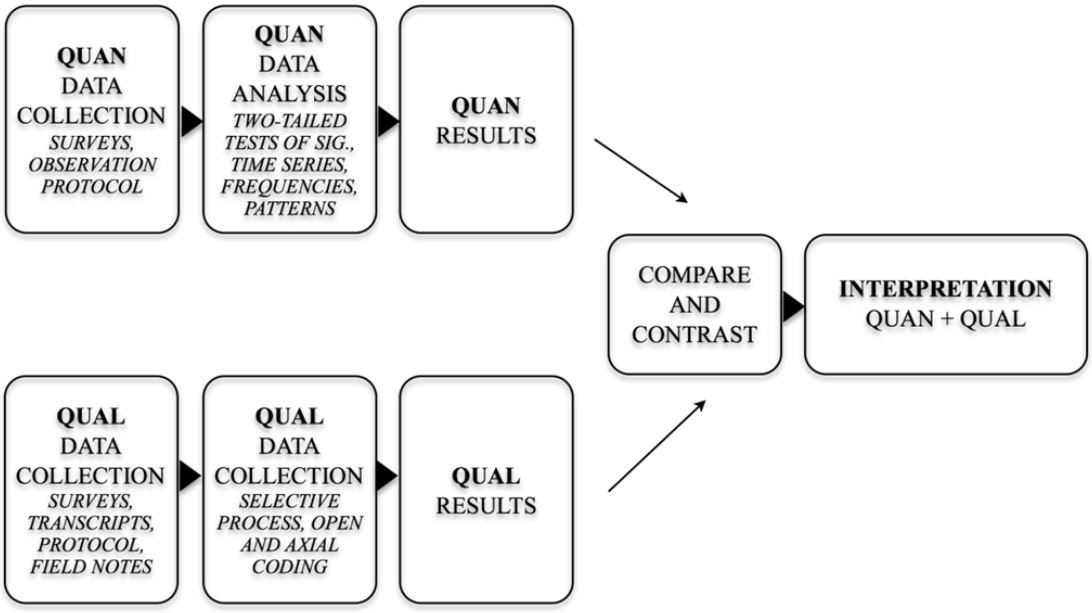


Figure 4. Triangulation convergence model. A model illustrating the timing of data collection, analysis, and interpretation. Adapted from *Designing and Conducting Mixed Methods Research* by J. W. Creswell and V. L. Plano Clark, 2007.

Setting

My study took place in a school in the Phoenix metropolitan area. The school is one of the 37 schools in its unified (K-12) school district. The district's

population is approximately 35,500, of whom 4% are Asian, 3% are African-American, 17% are Hispanic, 1% are American Indian, and 74% are Caucasian. Of these students, 29% qualify for free and reduced lunch. Students in the district qualify for additional services in the following ways: 3% receive English language services, 9% receive special education services, and 4% receive gifted services. Of the 37 schools, 16 are kindergarten through sixth grade elementary schools, 13 are kindergarten through eighth grade schools, three are middle schools, and five are high schools.

My study took place in a school that is a kindergarten through sixth grade, Title One, elementary school. The school has a total of 470 students of whom 2% are Asian/Pacific Islander, 5% are African-American, 19% are Hispanic, 3% are American Indian, and 71% are Caucasian. At this school, 55% qualify for the free and reduced lunch program. Students at this school qualify for additional services in the following ways: 4% receive English language services, 13% receive special education services, and 5% receive gifted services.

The teachers at this school have one common planning period. Most of the teachers use this time to review their progress in the curriculum, and sometimes they share materials and ideas. They also discuss and complete administrative tasks such as weekly newsletters and other paperwork. They spend very little time together developing specific lesson plans. Most lesson planning is done in isolation. Prior to the study, I asked the teaching staff at our school to complete an online survey on Survey Monkey. Eleven of the twenty classroom teachers completed the survey. On this survey, the teachers reported that they do

not think about including purposeful planned movement type of activities in their lesson plans; however, they did report thinking about the need for those activities throughout the day.

Participants

My role as researcher. I approached this study as a way to inquire with the teachers at my school how to develop and use purposeful planned movement strategies in the classroom to increase student engagement, retention, and learning. Together, we used lesson study as a vehicle for learning how to plan and personally implement the new strategies the classroom. As a teacher at the school working with other teachers, I was a practitioner researcher (Stringer, 2007).

> …the role of the researcher is not that of an expert who does research but that of a resource person. He or she becomes a facilitator or consultant who acts as a catalyst to assist stakeholders in defining their problems clearly and to support them as they work toward effective solutions to the issues that concern them. (p. 24)

I did an initial training with the teachers on lesson study and various ways to incorporate movement in their classrooms. I led the lesson study meetings, worked collaboratively with the teachers to develop the lessons, and asked some clarifying questions. The teachers taught the lessons in their classrooms. I observed the lessons with the other teachers, but to help avoid bias, I did not fill out the observation protocol for the lessons. To minimize my bias in coding my qualitative data, I had another researcher code also.

Teacher participants. To solicit the teacher participants, a presentation was made at a faculty meeting, which was followed up by an email asking for teacher participants. The study included 2 first grade teachers, 2 second grade teachers, and 1 third grade teacher who responded to the invitation. The experience of the participating teachers ranged from eight years to twenty-two years. The participants' age ranged from 31years old to 51years old. All of the respondents were female. Since they volunteered and are within my sphere of influence, they represent a convenience, volunteer sample (Teddlie & Yu, 2007); however, they are representative of the faculty at the school who teach in the general education classrooms.

Student participants. The students in the study were in the participants' classrooms. There were approximately 127 students in the five classrooms. Since all of the teachers in the first grade participated in the study, the students in that grade were a representative sample of the students in the school in regards to their economic status, ethnicity, race, first language, ability levels, and family structure. One of the second grade teachers and the third grade teacher have all of the students who are in the special education program in their classrooms so the students in those rooms are not a representative sample of the school population.

Innovation

Securing confidentiality and providing ethical protection for each participant and the site location was paramount to the study. As such, a request to conduct the study was submitted to the Institutional Review Board (IRB) for the Protection of Human Subjects in Research at the University (Appendix B) and the

school district in which the school is located (Appendix C). Approval was received from both institutions. Each participant signed and retained a copy of an informed consent and/or assent form describing the parameters of the study, participant involvement, measure of protections, including the right to withdraw at any time, and the intended use of the data (Appendix D). The researcher used pseudonyms for all participants, the program, and the location. In no case was any staff or student identified by the researcher of in the research.

Teachers were solicited, as previously described, in the spring of 2011 and those who volunteered became the lesson study team. The five teachers completed the pre-survey in August. Since the research lessons are based on a reflective, iterative cycle (see Figure 5 below) with the ultimate goal of improving student learning using purposeful planned movement, the intervention began with a training prior to the start of the new school year. Before using lesson study to incorporate purposeful planned movement in their lessons, the teachers needed to understand the lesson study cycle and the value of purposeful planned movement as well as the critical need for behavior management. This first training took place in August prior to the start of the school year. At that time, I worked with the teachers to help them deepen their understanding of purposeful planned movement. During the training, I used purposeful planned movement strategies to teach the teachers about lesson study and purposeful planned movement. The dialogue of the teachers during the professional development provided insight concerning what was accepted and what is disregarded (Gallucci, 2007).

During the first training session, the teachers and I discussed the lessons on which they wanted to focus. We looked at research and considered how it applied to their curriculum, their standards, and their students. A portion of the session was dedicated to training on the use of the student engagement observation tool. We also discussed the best time to send home the students' permission slips, and we decided to wait until classroom schedules were solidified before creating an official schedule for the research lessons. A decision was made to divide the team into two lesson study groups. One group was comprised of the two, second grade teachers and the third grade teacher. All of the teachers in this group were involved in the complete lesson study cycle. The second group consisted of the two, first grade teachers and one of the second grade teachers. In this group, the first grade teachers were involved the complete lesson study cycle, but since the second grade teacher was in both groups, she was only involved in the planning, observation, and reflection of the lessons for this group. A typical lesson contained three segments; it started with direct instructions, then the teacher and the students practiced together, and finally, the students practiced the skill independently. Each lesson study group planned, taught, and reflected on six purposeful planned movement research lessons. These lessons will be referred to as research lessons for the remainder of the paper.

The teachers met as lesson study groups to collaborate and develop new lessons based on their new learning concerning research on purposeful planned movement, the standards, the curriculum, and lesson study. During this time, the teachers began the process of transformation as they related the new learning to

themselves, their curriculum, and their students. With discussion, they negotiated the new learning and created lessons based on research that included purposeful planned movement. The second and third grade team decided to focus on Science and Reading vocabulary. The first grade team created their movement lessons for math.

Once the lesson study team developed a lesson, one teacher taught the research lesson while the rest of the team evaluated the students' engagement during the lesson using the Student Observation Protocol (Appendix E). After school on the day that the lesson was taught, we met as a team again to evaluate what worked well in the lesson and what should be discarded. A new lesson was developed from this information, and a different team member taught the new lesson to her class. The lesson study meetings were recorded to see how the teacher's interactions and perceptions changed. Figure 5 illustrates the lesson study cycle.

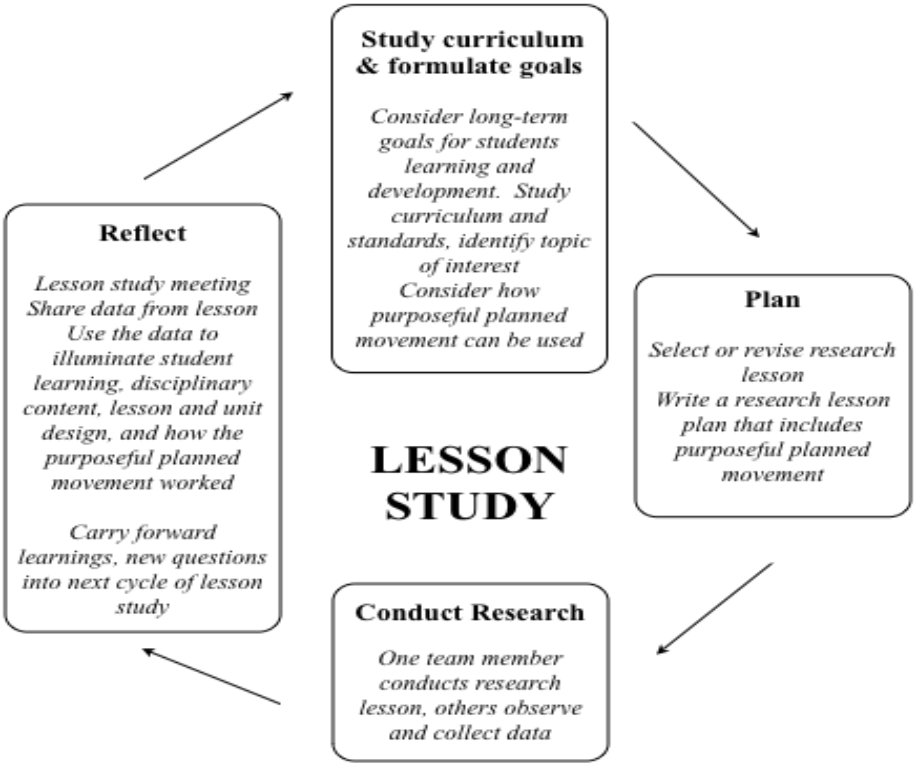


Figure 5. The lesson study cycle

At the end of the 14-week study, I used observations of the teachers, transcripts from the lesson study team meetings, lesson plans, and survey results to see how the teachers made the new learning their own.

Data Collection Tools

Teacher survey. All five of the teachers who participated in the study completed a survey prior to the start of the intervention and again after the intervention ended. The survey helped provide perspectives to these questions: How and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement? To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their

bodies, their words, and their assignments? and To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy? The teachers completed the instrument online through Survey Gizmo prior to the beginning of the study in August of 2011 and again at the end of the study in November of 2011. The entire survey can be found in Appendix F.

Design and pilot. I created and piloted the survey in the spring of 2011. The piloted survey consisted of the five constructs: instructional self-efficacy, teacher beliefs about instruction and student learning, lesson study reflection, lesson study peer observation, and purposeful planned movement. Questions in the instructional self-efficacy construct were adapted from Bandura's Teacher Efficacy Scale (Bandura, 1997). The questions in the teacher beliefs construct were adapted from Teacher's Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001). The open-ended questions and the questions regarding lesson study and purposeful planned movement were based on literature and written by me. After I piloted the survey, I ran a Cronbach Alpha on the close-ended questions. The Cronbach Alpha was used to determine the internal consistency of the items on the survey; a coefficient of 0.700 or higher is considered acceptable (Cronbach, 1951; George & Mallery, 2003). The Cronbach Alpha was calculated for each of the five constructs as well as the entire survey. The construct alphas for the pilot were: lesson study reflection (0.925), instructional self-efficacy (0.915), purposeful movement (0.913), lesson study peer observation (0.828), and teacher beliefs (0.515). The overall Cronbach alpha

was (0.926). All coefficients were above 0.700, except for the one for teacher beliefs so I made adjustments.

Changes. Two close-ended questions from the subscale concerning teacher beliefs about instruction and student learning were omitted from the original survey to increase reliability of that construct. Removing those questions changed the Cronbach alpha from a coefficient of 0.515 to a coefficient of 0.815.

In addition to deleting two questions, one question was added to the purposeful planned movement construct to determine if the teacher uses purposeful planned movement in her own learning.

The scale on the pilot was also modified in two ways. The original scale was a 9-point Likert scale that went from low to high. This was changed to a 4-point Likert scale, and the ratings were inverted. This put the highest choice, 4, first and the lowest choice, 1, last.

Table 1 (below) shows the final Cronbach alpha for each construct in the survey as well as for the entire survey. The scores on the individual constructs as well as the entire survey indicate a reliable instrument.

Table 1

Internal Reliability for Constructs and Instrument

Constructs	Internal Reliability (Cronbach's Alpha)
Lesson Study Reflection	0.92
Instructional Self-Efficacy	0.92
Purposeful Movement	0.91
Lesson Study Peer Observation	0.83
Teacher Beliefs	0.82
Overall	0.93

Final draft. The final draft of the survey contained five constructs: instructional self-efficacy, teacher beliefs about instruction and student learning, lesson study reflection, lesson study peer observation, and purposeful planned movement. It consisted of twenty-five close-ended items and seven open ended items. The Likert scale for the close items ranged from 4 "a great deal" to 1 "not at all." There was one open-ended question at the end of each section to offer each respondent the opportunity to provide his/her perspective. This information was triangulated with other sources for a deeper insight. The fifth open ended question asked for specification of the type of movement that was currently being used in the classroom if the teacher responded positively to the question asking if she currently used movement in her classroom. The sixth question asked if the teacher believes student engagement is different when movement is used in the lesson.

The last open ended question asked each respondent to look back at the previous week's lesson plans and highlight the lessons that included purposeful planned movement. On the post survey it read, *As you look back at your plans and think about your teaching day, do you use movement more than last year, about the same as last year, or less than last year? If you use it more or less than last year, can you elaborate on why it has changed?*

The survey was anonymous, but to allow for pre and post comparison, the teachers created a code using their two-digit birth month and the first two letters of their middle name.

Weekly lesson plans. To understand if the action of including purposeful planned movement was being used in lesson plans, weekly lesson plans were collected prior to the start of the study and four other times during the study. The teachers write their lesson plans in lesson plan books. At four different times, the teachers were asked to make a copy of their lesson plans for the week. Then, they were asked to highlight the lessons during that week where they had purposefully planned movement. *Purposefully planned movement* was movement that was planned ahead of time. The teachers were specifically told not to highlight times when they decided to add movement mid lesson or mid-day. The lesson plans were anonymous, but the teachers used the same code as they used on the survey so that the results could be recorded on a time series graph.

Student survey. As part of the research lesson, the teachers surveyed their students. The student survey was used to determine if the use of purposeful planned movement increased students' perceived emotional connection to

learning to help answer the question, To what extent will these lessons with purposeful planned movement foster student engagement, enjoyment, and learning as reflected in their bodies, their words and their assignments? The students completed the pencil and paper survey during class at the end of the first lesson that incorporated purposeful planned movement. Two classes also completed a survey at the end of a lesson without purposeful planned movement. The survey contained three questions asking the students how they felt when their teacher was teaching, when they we practicing with their teacher, and when they were doing their work alone. It also includes a question regarding how they feel about moving during a lesson or using gestures to remember things. The first five questions were the same on the surveys for all age groups, but the method of response varied slightly to adjust for age appropriateness. The first and second grade students responded by circling a *happy face* ☺, *a straight face* 😐, or a *sad face* ☹, and the third grade students circled the words, *interested*, *a little interested*, or *not too interested*, to indicate how they felt during the different parts of the lesson and how they feel about using movement or gestures. Both surveys had a question that asked if the student liked it when their teacher had them get up and move. The third grade survey asked the student to further explain why or why not. The third graders were asked to explain how they used their body or gestures, and the first and second grade students were asked what movement or gesture was used. The final question asked the student to indicate if their answers could be included in the study. The student surveys can be found in Appendices G and H.

Changes. After the initial survey was completed, the survey was modified for clarification for the first and second grade students. The revised survey for the second grade students did not include the closed ended question, "Did you use your body or gestures later to help you remember?" Since everything happened in one lesson, this question did not make sense to the students. That question was also eliminated from the first grade student survey as was the question, When we move our bodies or use gestures to remember things, I feel… There were three open ended questions on the third grade survey and one on the first and second grade survey. The first grader students and some of the second grader students drew pictures to answer the question, What movement or gesture did your teacher use today?

Observer protocol. The teachers who observed the research lesson, recorded field notes on the observation protocol (see Appendix E). These notes were gathered to answer the questions, To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their bodies, their words, and their assignments? and, How and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement? The observation protocol was created based on the *Extent of Engagement During a Learning Activity* model by O'Donnell et al. (2009) captured in Figure 2. The teachers recorded their observations of three aspects of student engagement during the beginning of these three segments of the lesson as well as few minutes into each of these segments. They looked for student behavior, emotion, and voice. Behavior was observed and recorded for on task

attention, effort, and enduring persistence. Emotion was recorded as good, ok, or poor. The teachers wrote some of the things that students said in the section for student voice. Notes were recorded on the protocol each time a research lesson was taught. Each teacher who was observing completed her own protocol. The protocol was collected after the reflective discussion during the lesson study meeting.

Lesson study meeting transcripts. After the research lesson was taught, the lesson study group met and discussed what went well and what needed to be changed. The group collectively reflected on the observation protocols, the student surveys, as well as student work from that lesson to help them determine the effectiveness of the lesson. After this reflective discussion, the team created another research lesson. The meetings were taped using a digital recording device and later transcribed into text. The transcripts helped provide perspectives to these questions, How, and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement? To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their bodies, their words, and their assignments? and To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy?

Researcher field notes. As the researcher, I also took field notes to help answer the questions: To what extent do lessons with purposeful planned progress developed in lesson study raise teachers' perceived efficacy? How and to what extent will lesson study change the teacher's thoughts about lesson planning with

purposeful planned movement? How and to what extent will these lessons with purposeful planned movement foster student engagement, enjoyment, and learning as reflected in their bodies, their words and their assignments? and How will I evolve as a result of leading this innovation? My field notes (see Appendix E) included descriptive and reflective notes regarding personal observations of the teachers as they participated in the study. I looked to see whether the teachers accepted or rejected lesson study and purposeful planned movement, if they connected ideas to what they already knew, how they talked and interacted, and if they learned from each other (Coburn, 2001; Gallucci, 2007). Part of the reflection included how I was developing as a leader and researcher along the way. These notes also include transcripts of short conversations that I had with four first grade students and two third grade students after a research lesson.

The relationship between the data sources and the research questions is illustrated in Table 2 below.

Table 2

Relationship between the Data and Questions

	Data Collection Tools							
Research Questions	Weekly Lesson Plans Quantitative	Teacher Survey Quantitative	Teacher Survey Qualitative	Student Survey Quantitative	Observer Protocol Quantitative	Observer Protocol Qualitative	Lesson Study Transcripts Qualitative	Researcher Field Notes Qualitative
How and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement?	X	X	X		X	X	X	X
To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their bodies, their words and their assignments?		X	X	X	X	X	X	X
To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy?	X	X	X				X	X
How will I evolve as a result of leading this innovation?							X	X

Validation of Qualitative Data Analysis

In this study, qualitative data from teacher and student surveys, lesson study transcripts, observation protocols, and field notes were used to determine

the extent to which lesson study helped teachers plan lessons with purposeful planned movement, increased their efficacy in using and planning movement, and to what extent the use of purposeful planned movement fostered student engagement, enjoyment, and learning. To ensure descriptive validity, or the factual accuracy of the account, I recorded the lesson study meetings, transcribed them word for word, and reviewed them for accuracy. I did this because "qualitative researchers must ensure that they are not distorting anything" (Gay, Mills, & Airasian, 2009, p. 375). I read the entire data set multiple times to make sure that no instances were misconstrued or omitted. When statements were used from the transcripts, surveys, protocols, or field notes, they were checked against the original data source. To make sure the "meaning[s] attributed to the behaviors or words of the participants" (p. 375) were accurate and that my preliminary hunches were the same as theirs I asked the teachers questions along the way. At the end of the study, I conducted member checks to "test the overall report with the study participants before sharing it in final form" (p. 376).

An additional way I ensured credibility and trustworthiness was to bring both quantitative and qualitative data together (triangulation) so the strength of both forms of data could be compared and used to offer true perspectives (Creswell & Plano Clark, 2007; Greene, 2007; Greene et al., 1989). The triangulation of the data from multiple sources was used to "obtain a more complete picture of what [was] being studied and to cross-check information" (Gay et al., 2009, p. 377).

Chapter 4

Analysis and Results

In the previous chapter, I explained action research and mixed methods, described the setting, explained the innovation in detail, and outlined the data collection tools. In this chapter, data analysis results from this study are organized into three main sections. First, an inventory of the data sources is provided detailing how and when the data were collected. Then, the statistical analysis used to analyze the quantitative data and the reasoning and the steps taken to code the qualitative data are explained. Finally, the results of the quantitative and qualitative data are listed for each data source.

Data Inventory

Teacher survey. The five teachers who volunteered to participate in the study were sent an email prior to the initial training in early August 2011, with a link to the teacher survey on Survey Gizmo. Two reminder emails were sent, and two weeks after the initial email, everyone had completed the survey. The last week in November, the teachers were sent another email with a link to the survey on Survey Gizmo. Everyone completed the post survey within one week. The survey took an average of 25 minutes to complete.

Weekly lesson plans. Prior to the start of the research lessons, the five teachers submitted a copy of their lessons for one week. On the copy, they highlighted any lessons in which they purposefully planned movement in advance of the lesson. These weekly lesson plans were collected four more times during

the study. The lessons where they had purposefully planned movement ahead of time were highlighted on these plans also.

Student survey. All of the teachers had their students complete the student survey after the first lesson they taught using purposeful planned movement. Even though the survey was read to the students, they had a difficult time understanding the questions and it took longer than planned. For this reason, it was decided that only two classes would complete the survey a second time for a lesson that did not involve movement. The student surveys were also coded so that pre and post means and standard deviations could be reported for those two classes.

In September, 19 third graders completed the survey after the first movement lesson. It took the students five minutes to complete the survey. Of those 19, one student circled no for the question that asked if the answers could be included in the study. Of the remaining 18, 13 of them completed the survey for the non-movement lesson and agreed to have their answers included in the study. Twenty-five second grade students in the first class completed the survey. Two of those students did not want to have their answers included in the study. Of those 23, 19 of them completed the survey for the non-movement lesson and agreed to have their answers included in the study. The first three questions on the survey related specifically to the lesson that was taught. For this reason, the pre and post analyses were conducted on those three questions for these two groups of students.

A total of 32 first grade students, 41 second grade students, and 19 third grade students completed the survey after a movement lesson. These surveys were used for further analyses.

Observation protocol. The observation protocol was used for every purposeful planned movement research lesson. The lessons ranged from 35 minutes to 45 minutes in length. The observing teachers recorded notes throughout the entire lesson. A total of 39 observation protocols were completed for the 12 research lessons conducted.

Lesson study transcripts. A total of 17 lesson study meetings were recorded and transcribed: One meeting for training and eight meetings for each of the lesson study groups. The initial training took 3 hours. The subsequent lesson study meetings ranged from 10 minutes to 30 minutes. Planning for a new lesson involved studying the standards and curriculum and developing ways to purposefully plan movement in the research lesson; these meetings took between 25 minutes to 30 minutes. The subsequent meetings where the team reflected on the data and revised the research lesson for another teacher to teach took between 10 minutes and 15 minutes. Refer to figure 5 for the lesson study cycle.

Researcher field notes. As a researcher, I kept notes on how the teachers responded to the use of lesson study and using movement in their classrooms, on the problems that the teachers and I ran into, and on how the students responded including the comments they made. Field notes totaled 13 typed pages. They were gathered from August 9, 2011 through December 14, 2011.

Methods and Reasoning

Quantitative data analysis.

Teacher survey. The answers for the pre and post teacher survey were entered into the Statistical Package for the Social Sciences (SPSS). They were analyzed for the Cronbach alpha coefficient (Cronbach, 1951). The questions were analyzed for the descriptive statistics of mean and standard deviation (Gay et. al, 2009). The mean describes the arithmetic average for the responses, and the standard deviation (SD) indicates how much variance exists between the responses. The pre and post surveys were compared using a two-tailed test of significance to determine the significance level, or *p* value.

Weekly lesson plans. A time series graph (StatSoft, 2011) was created to chart the average number of times that the teachers include purposeful planned movement in their lesson plans each day as shown in highlighted weekly lesson plans. The number of times they included movement during the week was divided by the number of days in that school week to determine an average number of times per day.

Student survey. The survey was given after a typical lesson and after a lesson that incorporated purposeful planned movement. The first three questions on the survey referred specifically to the lesson that was taught. The answers for these questions were entered into SPSS. The Cronbach alpha coefficient (Cronbach, 1951) was determined, and the descriptive statistics of pre/post means and SDs were calculated (Gay et. al, 2009). The results for the other two close ended questions on the survey for the second and third grade students were

graphed. The one other closed ended question for the first grade students was also graphed.

Observation protocol. The teachers recorded the number of students in the categories of *good, ok,* and *poor* for both behavior and emotion six different times during the lesson. As mentioned earlier, there were two lesson study groups. Each lesson study group presented six lessons. The total of the number of responses for each category for behavior and for emotion were calculated for each lesson study group. These results were put into a pie graph to show the overall percentage of good, ok, and poor behavior and good, ok, and poor emotion for the lessons.

Reasoning behind qualitative analysis. I developed codes and did open and axial coding for the lesson study meeting transcripts and the research journal notes. First, the data were analyzed using the seven *a priori codes* (Johnson & Christensen, 2012) that I developed in relation to the research questions. These codes were: student engagement in movement lessons, student learning from movement lessons, teacher perceived efficacy before, teacher perceived efficacy related to movement lessons, teacher shared thinking-lesson study collaboration, teacher thinking about lesson study, and teacher thinking about movement lessons. See Appendix J for a list of codes and the relationship to the research questions. Then, the data were examined for instances of the four a priori codes related to my theoretical framework, Vygotsky Space (refer to Figure 3 in Chapter 2). Those codes were: appropriation – training and vision, transformation – negotiate learning, publication – practicing and learning, and conventionalization

– making it their own. This was followed by the processes of *open* and *axial coding* (Glaser & Strauss, 1967) to look for unexpected categories or relationships. Through this process I created 18 open codes (see below). As the researcher, I was, "explicitly mindful of the purposes of [my] study and of the conceptual lenses [I] am training on it – while allowing [myself] to be open to and reeducated by things [I] didn't know about or expect to find" (Miles & Huberman, 1994).

A priori coding. A priori codes are "codes…developed before examining the current data…Researchers may…establish some a priori codes before data collection based on their relevance to the research questions" (Johnson & Christensen, 2012, pp. 525-526). I developed 11 a priori codes prior to my initial analysis.

From there, I used a grounded theory approach to analyze this qualitative data (Glaser & Strauss, 1967) further. At that time, open and axial coding (Glaser & Strauss, 1967) were used to gain insight into data and construct themes. The qualitative data from the teacher survey, student survey, and observation protocol was not analyzed using a priori codes; it was only analyzed using grounded theory.

Open coding. Open coding is a method of analyzing qualitative data (Corbin & Strauss, 2008; Glaser & Strauss, 1967). As the name suggests, the text is opened up and examined with an open mind to "expose the thoughts, ideas, and meanings contained therein" (Glaser & Strauss, 1967, p. 102). This can be done line by line, paragraph by paragraph, or through a general appraisal of the entire

document. I did this line by line and came up with the following codes for the lesson study transcripts and the researcher's journal: creation of gestures, generalization across subjects, instructional piece, real life issues, peer observation, retention, non-movement but still learning, student enjoyment, student perception of learning, student use of gestures later, multiple strategies, teachers using elsewhere, engagement of unique students, instructional leader, real world, surprises, talking too much, and teacher comments. Open coding starts the analysis process and lays the groundwork for axial coding.

Axial coding. The process of "relating categories to their subcategories is termed axial coding because coding occurs around the axis of a category" (Glaser & Strauss, 1967, p. 123). This unique way of looking at the text enables the researcher to add depth to the analysis. Memos can also be used to help tie the various data together and help the researcher start to construct theories (Miles & Huberman, 1994; Glaser & Strauss, 1967). Glaser (1978) defines a memo as "the theorizing write-up of ideas about codes and their relationships as they strike the analyst while coding…it can be a sentence, a paragraph, or a few pages…it exhausts the analyst's momentary ideation based on the data with perhaps a little conceptual elaboration" (pp.83-84). I wrote four pages of memos as I read through the data to record the connections that I saw. This analysis continued until a point of saturation was reached (Glaser & Strauss, 1967).

Results for Data Sources

Teacher survey. To determine the internal consistency of the instrument, I ran a Cronbach's Alpha on the close-ended questions. A coefficient of 0.70 or

higher is considered acceptable (Cronbach, 1951; George & Mallery, 2003). The overall Cronbach's Alpha score of .88, as shown on Table 3 (below), indicates a reliable instrument.

For an overall look at the quantitative results, Table 3 below illustrates the means and standard deviations for each construct. It reports the results for the teachers as well as the entire group. Scores from 4.00-3.50 were interpreted to mean *a great deal,* 3.49-2.50 *some,* 2.49-1.50 *very little,* and below 1.49 *not at all.*

Table 3

Within Group Means and Standard Deviations of All Constructs For Individual and Collective, Pre and Post

Construct		N	Pre (SD)	Post (SD)
Instructional Self-Efficacy	Teacher 1	1	3.40	4.00
	Teacher 2	1	4.00	4.00
	Teacher 3	1	3.60	3.60
	Teacher 4	1	4.00	4.00
	Teacher 5	1	4.00	4.00
	Group	5	3.80 (0.28)	3.92 (0.18)
Teacher Beliefs	Teacher 1	1	3.75	4.00
	Teacher 2	1	3.75	4.00
	Teacher 3	1	3.50	3.75
	Teacher 4	1	4.00	3.75
	Teacher 5	1	4.00	4.00
	Group	5	3.80 (0.21)	3.90 (0.14)
Lesson Study Peers	Teacher 1	1	3.40	4.00
	Teacher 2	1	3.60	3.80
	Teacher 3	1	3.80	4.00
	Teacher 4	1	3.60	3.60
	Teacher 5	1	4.00	4.00
	Group	5	3.68 (0.23)	3.88 (0.18)
Lesson Study Reflection	Teacher 1	1	4.00	4.00
	Teacher 2	1	3.75	3.50
	Teacher 3	1	3.50	3.50
	Teacher 4	1	3.00	3.00
	Teacher 5	1	4.00	4.00
	Group	5	3.65 (0.42)	3.60 (0.42)
Purposeful Movement	Teacher 1	1	3.57	4.00
	Teacher 2	1	2.86	4.00
	Teacher 3	1	3.14	3.29
	Teacher 4	1	3.14	3.43
	Teacher 5	1	3.71	3.86
	Group	5	3.29 (0.35)	3.71 (0.34)

Statistical significance. Next, I used SPSS to run the two-tailed significance test on construct means to determine if there were any significant

changes. If a change is statistically significant, it means that the "results are unlikely to have occurred by chance" (Gay et al., 2009, p. 607). A *p* value of less than or equal to 0.05 means that there is less than a 5% chance that the results occurred by chance, and in educational research $p \leq 0.05$ is generally considered statistically significant. The *p* values for the five constructs were: movement, 0.08, lesson study peers, 0.14, instructional self-efficacy, 0.38, teacher beliefs, 0.38, and lesson study reflection, 0.38 (table 4 below). None of the constructs were statistically significant.

Effect size. Even though the change was not statistically significant by the typical educational standards, I wanted to find out if the change was practically significant for this study (Johnson & Christensen, 2012) so I calculated the effect size. "It is important to mention that an effect size estimate can be computed regardless of whether 'significance' is obtained…[because] readers may conclude that a nonsignificant finding has an effect size of 0; this demonstrates faulty logic" (McCartney & Rosenthal, 2000, p. 175). Effect size is a "numerical way of expressing the strength or magnitude of a reported relation" (Gay et al., 2009, p. 96). The effect size helps "cue the researcher regarding the noteworthiness of…anomalous results" (Thompson, 1996, p. 28) that can occur with a small sample size (Coe, 2002). Cohen (1992) defines a medium effect to be "visible to the naked eye of a careful observer" (p. 156). To interpret the resulting number, I used this guide developed by Cohen (1992) and Ellis (2010):

< 0.2 = trivial effect
0.2 - 0.5 = small effect
0.5 – 0.8 = medium effect
> 0.8 = large effect

The effect size of 1.09 for movement indicates a large effect. Lesson study peers has a medium effect size at 0.79. The effect sizes of the remaining three constructs, instructional self-efficacy, 0.47, teacher beliefs, 0.46, and lesson study reflection, 0.45 indicates a small effect (see table 4 below).

Table 4

Two Tailed Significance Test and Effect Size Results

Construct	Sig. (2-tailed) *P* value	Effect Size Cohen's *d*
Purposeful Movement	0.08	1.09
Lesson Study - Peers	0.14	0.79
Instructional Self-Efficacy	0.38	0.47
Teacher Beliefs	0.38	0.46
Lesson Study - Reflection	0.38	0.45

More detailed results from the teacher survey are reported by construct below. First there is an explanation of the quantitative results. This is followed by the results of the qualitative analysis. Table 10, at the end of the teacher survey section illustrates all of the themes developed from the qualitative data on the teacher survey. The constructs are listed in order from the greatest post mean to the least post mean.

Instructional self-efficacy quantitative results. The construct Instructional Self-Efficacy contained five closed-ended questions. The post mean

for the entire construct rose from 3.80 (0.28) to 3.92 (0.18) indicating that the teachers believed they had *a great deal* of self-efficacy. They thought they could promote learning, keep students on task, increase memory, get through to difficult students and motivate students. Table 5 (below) shows the survey questions in descending order by the post mean score. The mean and SD are listed for each question and for the entire construct.

The highest mean scores captured are questions 2, 3, and 4 which all have a post mean of 4.00 indicating that they all had the same perceptions; that they now believe that they can do *a great deal* to promote learning, keep students on task, and increase students' memory. There was a drop from 4.00 to 3.80 in the mean concerning their ability to get through to the most difficult students although it still points to a belief that they can do *a great deal*. The teachers' beliefs regarding their ability to motivate students remained at a pre/post mean of 3.80.

Table 5

Means and Standard Deviations for Survey Items Instructional Self-Efficacy

Survey Item Number	Survey Question	Pre *M*	Pre *SD*	Post *M*	Post *SD*
2	How much can you do to promote learning when there is a lack of support from home?	3.80	0.45	4.00	0.00
3	How much can you do to keep students on task during difficult assignments?	3.80	0.45	4.00	0.00
4	How much can you do to increase student's memory of what they have been taught in previous lessons?	3.60	0.55	4.00	0.00
1	How much can you do to get through to the most difficult students?	4.00	0.00	3.80	0.45
5	How much can you do to motivate students who show low interest in schoolwork?	3.80	0.45	3.80	0.45
	Instructional Self-Efficacy Construct	3.80	0.28	3.92	0.18

Note. The questions were rated on a 4-point Likert scale: 4 represented *a great deal*, 3 represented *some*, 2 represented *very little*, and 1 represented *not at all*.

Instructional self-efficacy qualitative results. To gain a better understanding, of the teachers' views on instructional self-efficacy I analyzed their responses to the open-ended question: Do you have any additional comments regarding instructional self-efficacy? On the pre-survey, four of the teachers answered no to this question. The fifth teacher said, "I know there is a

great deal I can do in all of these areas…I would [like] some more ideas though. Many of mine don't always work. This year I think it will [be] particularly important to find new methods." On the post-survey, one teacher responded no. The analysis of the responses of the other four teachers created two themes. The overriding theme was that *teachers stated that they now believed they could do something to improve instruction in difficult situations*. Some of the statements that supported this theme were "I think my current opinion now differs from my previous answer…how much can I do? It's all about my attitude and approach," "I know I can do so much to help all children," and "There is a lot I can do to motivate and encourage students regardless of outside factors." The second theme expressed the *teacher's perceived need for multiple strategies* when they said, "It's all about…my ability to keep trying with every child…differentiating to make each child successful," "teachers need to have multiple strategies available in order to reach all students," and "it is often difficult to find that special something to reach certain children. I do believe that the movement lessons are very effective."

Teacher beliefs quantitative results. The construct Teacher Beliefs about Instruction and Student Learning contained four closed-ended questions. The post mean for the entire construct rose from 3.80 (0.21) to 3.90 (0.14) indicating that the teachers believed they could do a *great deal* about instruction and student learning. They believed they could gauge student comprehension, adjust instruction, provide alternate explanations or examples and implement alternative strategies. Table 6 (below) illustrates the survey questions in descending order by

the post mean score. The mean and SD are listed for each question and for the entire construct.

The teachers' responses regarding their ability to gauge student comprehension remained the same at, *a great deal*, with the pre/post mean of 4.00. The mean increased on question eight from 3.80 to 4.00 indicating that all of the teachers now believe that they can do *a great deal* to adjust their lessons to the proper level for individual students. The responses for question nine remained the same with pre/post means of 3.80 (0.45) pointing to the belief that they can do *a great deal* to provide different explanations or examples. Question ten captures an increase in means from 3.60 (0.55) to 3.80 (0.45) indicating that teachers believe they are better able to use alternate strategies.

Table 6

Means and Standard Deviations for Questions in Teacher Beliefs

Survey Item Number	Survey Question	Pre *M*	Pre *SD*	Post *M*	Post *SD*
7	How much can you gauge student comprehension of what you have taught?	4.00	0.00	4.00	0.00
8	How much can you do to adjust your lessons to the proper level for individual students?	3.80	0.45	4.00	0.00
9	To what extent can you provide an alternative explanation or example when students are confused?	3.80	0.45	3.80	0.45
10	How well can you implement alternative strategies in your classroom?	3.60	0.55	3.80	0.45
	Teacher Beliefs about Instruction and Student Learning Construct	3.80	0.21	3.90	0.14

Note. The questions were rated on a 4-point Likert scale: 4 represented *a great deal*, 3 represented *some* or *some extent*, 2 represented *very little*, and 1 represented *not at all*.

Teacher beliefs qualitative results. To gain a better understanding of the teachers' views on their beliefs regarding instruction and student learning, I analyzed their responses to the open-ended question: Do you have any additional comments concerning your beliefs about instruction and student learning? No comments were made regarding this question on the pre survey. Three teachers

responded on the post survey. The analysis of their responses fell into two themes. The responses, "I know I can help every child" and "a classroom teacher has the 'power' to change or assist how each child finds success in the classroom," point to the theme that *teachers believe they can help all students learn*. The second theme specified *how they could accomplish this goal*. Statements like "instruction must be differentiated to meet individual needs," the "teacher…assist[s] how each child finds success…with strategies," and "using movement is a great way for all children to learn."

Lesson study quantitative. The questions on lesson study were divided into two constructs. One asked questions regarding the aspect of lesson study that involved peers, and the questions on the other focused on the reflection piece of lesson study. There was one open-ended question for lesson study that covered both constructs. Therefore, the quantitative data will be reported separately and it will be follow by the qualitative results.

Lesson study-peers quantitative. The construct concerning peers had five closed-ended questions. The post mean for the entire construct rose from 3.68 (0.23) to 3.88 (0.18) indicating that the teachers believed that working with their peers through lesson study had a *great deal* of impact on their teaching and planning. They valued watching their peers, believed they helped them develop better lessons, felt supported by them, and changed plans based on their feedback. Table 7 (below) captures the survey questions in descending order by the post mean score. The mean and SD are listed for each question and for the entire construct.

The pre/post means for question 14 remained the same at 4.00 (0.00) indicating that the teachers valued watching their peers teach a *great deal*. There was a decrease in the mean for question 12 from 4.00 (0.00) to 3.80 (0.45), but the mean still points to the teachers believing there is a *great deal* of value of working with their peers to develop lessons. The mean for question 13 increased from 3.40 (0.55) to 3.80 (0.45) pointing to a change from believing there is *some* value in the support and guidance from their peers to a *great deal* of value. Question 18 had the largest increase in the means from 3.20 (0.84) to 3.80 (0.45) indicating that teachers' changes to their lessons based on peer feedback increased from *some* to *a great deal*. The pre/post means for question 20 remained at 3.40 (0.55) signifying that the teachers have *some* comfort having their peers in their classroom.

Table 7

Means and Standard Deviations for Survey Items in Lesson Study Peers

Survey Item Number	Survey Question	Pre *M*	Pre *SD*	Post *M*	Post *SD*
14	To what extent do you value observing your peers teach?	4.00	0.00	4.00	0.00
12	To what extent do you believe working with your peers will help you develop better lessons?	4.00	0.00	3.80	0.45
13	To what extent do you look to your peers for support and guidance when trying to implement new instructional strategies?	3.40	0.55	3.80	0.45
18	To what extent do you change your lessons based on peer feedback?	3.20	0.84	3.80	0.45
20	To what extent are you comfortable having your peers in the classroom during instructional time?	3.40	0.55	3.40	0.55
	Lesson Study - Peers Construct	3.68	0.23	3.88	0.18

Note. The questions were rated on a 4-point Likert scale: 4 represented *a great deal*, 3 represented *some*, 2 represented *very little*, and 1 represented *not at all*.

Lesson study-reflection quantitative. The construct regarding reflection consisted of four closed-ended questions. The post mean for the entire construct decreased from 3.65 (0.42) to 3.60 (0.42) still representing *a great deal* of value in planning good lessons and reflecting on them. They believe that good lesson

planning impacts teaching, and they reflect on their lessons and make changes based on student retention, student work, and student engagement. Table 8 (below) shows the survey questions in descending order by the post mean score. The mean and SD are listed for each question and for the entire construct.

Question 19 is the only item where the mean increased. It increased from 3.80 (0.45) to 4.00 (0.00) demonstrating that all of the teachers now believe that good lesson planning impacts their teaching *a great deal*. The teachers' pre/post means for question 15 remained at 3.80 (0.45) indicating that the teachers reflect on their lessons and make changes *a great deal* of the time based on student retention. There was a decrease in the pre/post means for question 16 from 3.80 (0.45) to 3.60 (0.55); however the post mean still represents *a great deal* of changes based on reflection on student work. Finally, the pre/post mean of 3.60 (0.55) on question 17 signify that the teachers also make *a great deal* of changes in their lessons based on student engagement.

Table 8

Means and Standard Deviations for Questions in Lesson Study - Reflection

Survey Item Number	Survey Question	Pre *M*	Pre *SD*	Post *M*	Post *SD*
19	To what extent do you believe good lesson planning impacts your teaching?	3.80	0.45	4.00	0.00
15	To what extent do you reflect on your lessons and make changes based on student retention from a previous lesson?	3.80	0.45	3.80	0.45
16	To what extent do you reflect on your lessons and make changes based on student work?	3.80	0.45	3.60	0.55
17	To what extent do you reflect on your lessons and make changes based on student engagement?	3.60	0.55	3.60	0.55
	Lesson Study -Reflection Construct	3.65	0.42	3.60	0.42

Note. The questions were rated on a 4-point Likert scale: 4 represented *a great deal*, 3 represented *some*, 2 represented *very little*, and 1 represented *not at all*.

Lesson study qualitative. To better understand how the teachers' perception of lesson study might have changed, I analyzed their answers to the open-ended question: Based on your current understanding, what are your thoughts regarding lesson study? The answers on the pre survey pointed to two themes. First of all, the *teachers looked forward to the feedback.* The statements,

"it will offer great feedback" and "I am looking forward to getting the feedback," illustrate this theme. At the same time, *they were a little nervous*. This was confirmed by the comments, "I think it seems like a good thing, as long as the conversations/comments remain positive and helpful," and "I'm excited, but a little nervous." The responses on the post survey continued these themes with more specificity and strength. Overall, *they found lesson study to be a positive experience* shown in the words "beneficial," "valuable," "helpful," and "a very powerful tool to help teachers improve their instruction." Two teachers specifically commented about the value of observing their peers and three mentioned the value of the feedback on the student behaviors while they taught. The theme regarding *nervousness continued in a positive light.* They made remarks such as "although it was rather a frightening thought before we did it….well, I would actually like to do it again," and "at first, I didn't think I would like doing lesson study. However, after doing it…I enjoy lesson study."

Purposeful movement quantitative. The construct Purposeful Movement contained seven close-ended questions. The post mean for the entire construct increased from 3.29 (0.35) to 3.71 (0.34). This signifies that the teachers' beliefs concerning the value of purposefully planning movement in their lessons changed from *some* value to *a great deal* of value. They believe that movement increases an emotional connection to learning, increases retention of knowledge, increases engagement of highly distractible students, increases a student's ability to explain concepts in his/her own words, helps students understand abstract concepts, and they realize that they use movement when they learn, and they are using it more

frequently in their classroom. Table 9 (below) illustrates the survey questions in descending order by the post mean score. The mean and standard deviation are listed for each question and for the entire construct.

The highest post mean in this construct was question 23 where the mean changed from 3.60 (0.55) to 4.00 (0.00). This signifies that all of the teachers believe that purposeful movement increased an emotional connection to learning *a great deal*. Questions 24 and 25 both increased their means from 3.60 (0.55) to 3.80 (0.45) pointing to an increase in the belief that purposeful movement helps *a great deal* to increase retention of knowledge and engagement of highly distractible students. The increase in means from 3.20 (0.84) to 3.80 (0.45) on question 26 indicates that the teachers' belief that purposeful movement helps students explain concepts in their own words changed from helping *some* to helping *a great deal*. Question 27's change in means from 3.40 (0.55) to 3.60 (0.55) also indicated a change in perception that purposeful movement can help *some* to helping *a great deal* in increasing a student's understanding of abstract concepts. The greatest change in the mean occurred in question 28 that asked the teachers if they personally use movement to learn; the mean for this question increased from 2.80 (0.45) to 3.60 (0.55). This change in means is indicative of a change from the teachers believing that they use movement to *some* extent to learn new to concept to using movement *a great deal* to personally learn new things. The teachers also indicated an increase in using purposeful movement in their classroom with a mean increase from 2.80 (0.45) to 3.40 (0.55) on question 22.

Table 9

Means and Standard Deviations for Questions in Purposeful Movement

Survey Item Number	Survey Question	Pre *M*	Pre *SD*	Post *M*	Post *SD*
23	To what extent do you believe purposeful movement increases as emotional connection to learning?	3.60	0.55	4.00	0.00
24	To what extent do you believe purposeful movement increases retention of knowledge?	3.60	0.54	3.80	0.45
25	To what extent do you believe purposeful movement increases engagement of highly distractible students?	3.60	0.55	3.80	0.45
26	To what extent do you believe purposeful movement increases student's ability to explain concepts in their own words?	3.20	0.84	3.80	0.45
27	To what extent do you believe purposeful movement helps students understand abstract concepts?	3.40	0.55	3.60	0.55
28	To what extent do you use movement to help yourself learn a new concept?	2.80	0.45	3.60	0.55
22	In the past month, how frequently have you purposefully planned movement strategies ahead of time in your classroom?	2.80	0.45	3.40	0.55
	Purposeful Movement Construct	3.29	0.35	3.71	0.34

Note. On this survey, purposeful movement was defined as "strategies that use movement gestures, acting it out, learning with hands on activities, or doing work that gets students out of their seats." The questions were rated on a 4-point Likert scale: 4 represented *a great deal*, 3 represented *some* or *some influence*, 2 represented *very little*, and 1 represented *not at all*.

To gain a more complete understanding of the teachers' thoughts about purposeful movement, I analyzed their responses to these two open ended questions: Based on your current knowledge, what are your thoughts about using purposeful planned movement in your classroom? And, Do you notice a difference in student engagement when you use movement in your instruction? Explain your answer. On the pre survey, three themes arose. First of all, all of the teachers felt that *movement was a good thing*. They showed this with the words, "it is great," "I would like to do it more often," "It will be helpful to student learning," "[it] offers a new way," and "I feel movement is beneficial in any and all classrooms." The words also indicated that *they believed it increased student engagement* when they said, "they are using their bodies so I know they are with me," "I do notice that they seem…more involved," "it helps get resistant students involved," "they are more alert," and "I do notice a difference." At the same time, the theme of *possible obstacles* was expressed with these words, "I do not have enough strategies to incorporate more [movement] in my class," "[I am] little concerned about some students getting out of control," and "sometimes the children lose control of themselves."

On the post survey, the teachers' *still believed it was effective, but their words were stronger and specific*. In speaking about purposeful movement they said, it is "very powerful in keeping students engaged and increasing their interest and comprehension," "very effective," "highly effective," and that "I now use movements for every subject area. The kids use the movements and I have noticed better student achievement on vocabulary in reading, math, and science."

In regards to *engagement* again the *words were stronger and more specific*. On the post survey they remarked that the students "are definitely more engaged…they are thinking about making the movements and why they are moving." "more alert and highly interested," "are up an paying attention and participating in the activity. I also notice more student participation in wanting to give responses," and that "the feedback I received from my peers proved that it is an effective method for the group that I have." There were not any remarks mentioning the concerns expressed on the post survey. The final open ended question that was only on the post survey was: As you look back at your plans and think about your teaching day, do use movement more than last year, about the same as last year, or less than last year? If you use it more or less than last year, can you elaborate on why it has changed? All five of the teachers stated that they are using movement more this year. In looking at their explanations, two themes arose. First the teachers felt that *learning about it with their peers helped them use it more*. They said, "I have learned more about it." "Doing lesson study with others…helped me become comfortable with [movement]." and "It was also easier to implement when working with my peers to plan." The second theme involves the *comfort and ease of using movement*. Some of the statements that revealed this theme were: "Now it comes natural to me." "I am naturally adding movements to explain concepts throughout the day." "I am taking the time (risk) and including movements on a weekly basis [because] I find it helps students recall information when there is a movement or a gesture

attached to it." and "even if I don't plan a movement in my lesson, sometimes I think of them in the middle of my lesson and incorporate them at that time."

Table 10

Themes From Open-Ended Survey Items by Construct and Final Question

Construct/ Question	Pre-Survey Themes	Post Survey Themes
Instructional Self-Efficacy	none	• Teachers now believe they can do something to improve instruction in difficult situations • Teachers perceive a need for multiple strategies
Teacher Beliefs	none	• Teachers believe they can help all students learn • Teachers specified how they could accomplish this goal
Lesson Study	• Teachers look forward to feedback • Teachers were a little nervous	• Teachers found lesson study to be a positive experience • Nervousness continued in a positive light
Movement	• Believed movement was a good thing • Believed it would increase student engagement • Concerned about possible obstacles	• Still believed it was effective, but their words were stronger and more specific • Still believed it increased student engagement, but words were stronger and more specific • *No concern regarding obstacles was mentioned*
As you look back at your plans and think about your teaching day, do use movement more than last year…why it has changed? *(All of the teachers said they use it more.)*	• N/A • *This question was not on the pre survey*	• Learning about movement with their peers helped them use it more • Comfort and ease of using movement

Weekly lesson plans. The time series graph below shows the progression of teachers purposefully incorporating movement in the planning of their weekly lessons. These plans only represent times when movement was planned prior to the start of the lesson. Figure 6 illustrates the average change for all of the teachers.

The graph shows that prior to the study, the teachers purposefully planned movement in their lessons an average of 1.0 times a day. At the end of the study, they averaged 2.4 times per day. There was a peak for the first collection at 2.3 and then it decreased to 1.9 with a steady incline for the next two collections, 2.2 and 2.4.

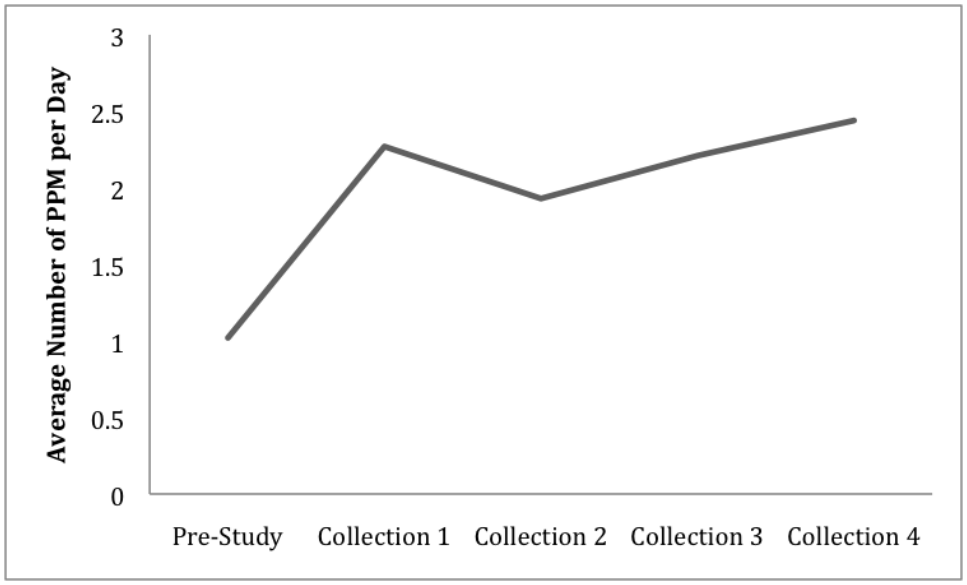


Figure 6. Overall time series graph

Note. PPM represents lessons where the teacher purposefully planned movement ahead of time.

Figure 7 shows the individual changes for each teacher. The graph illustrates that all of the teachers did some planning of movement in their lessons

prior to the beginning of the study. All the teachers' lesson plans indicated an upward trend in purposefully planning movement in their lessons. Teacher 1 (T1) increased from 0.6 times a day to 2.8 times a day, teacher 2 (T2) from 1.6 times a day to 2.5 times per day, teacher 3 (T3) increased from 2.0 to 3.1, teacher 4 (T4) from 0.4 to 1.3, and teacher 5 (T5) increased from 0.4 to 2.6 times per day. T1 and T5 both showed an increase of 2.2 more times a day. T2 and T3 both increased 1.1 times a day, but their initial time was higher leaving an ending average that is similar to T1 and T5. Teacher 4 had the smallest increase at 0.8, but she still shows a steady increase.

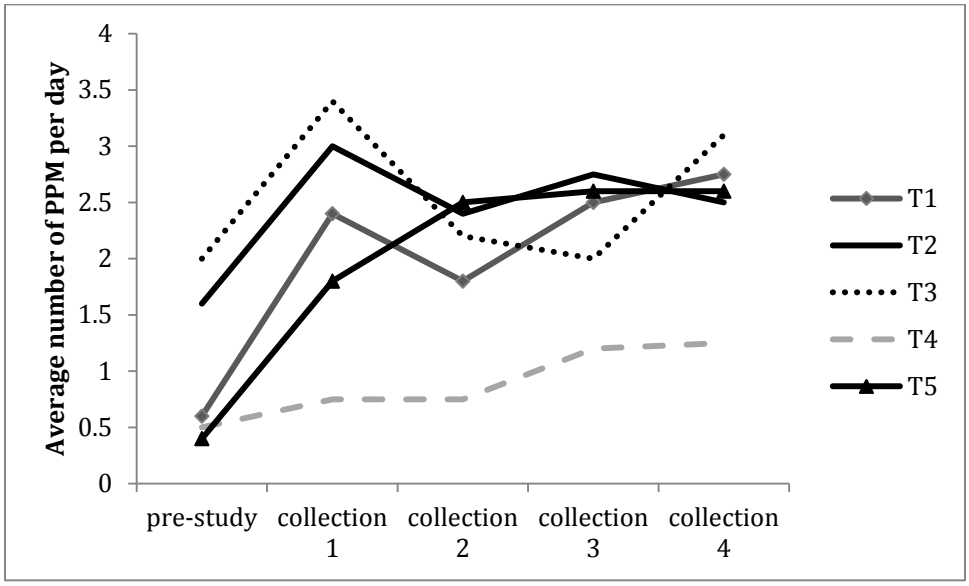


Figure 7. Time series graph for individual teachers

Note. PPM represents lessons where the teacher purposefully planned movement ahead of time. T represents teacher.

Student survey. As described in chapter three, 13 third grade students and 19 second grade students completed both the pre/post survey. To look at the internal reliability, the Cronbach Alpha was run on both of these groups with the

understanding that the number of questions and scale size can influence the reliability (Schmitt, 1996). A coefficient of 0.70 or higher is considered acceptable (Cronbach, 1951; George & Mallery, 2003). Table 11 below shows the overall Cronbach's Alpha score for the second grade group was 0.89 (reliable), and the third grade group was 0.40 (not reliable).

Table 11

Cronbach's Alpha for the Student Reflection Survey

Cronbach's Alpha		N of Items	Internally Reliable
Second grade students	0.89	3	yes
Third grade students	0.40	3	no

For an overall look at the quantitative results for the first three questions, Table 12 below illustrates the means and standard deviations for each question for each group of students. The students took the pre-survey after a lesson that did not include movement and the post-survey after a lesson that included movement. To enable a comparison of the same students, only the students who took both surveys were included in this analysis. The third grade students' survey used words (interested, a little interested, not too interested) and the second grade students' survey used pictures (☺, 😐, ☹). For ease of description, the pictures were matched to the words and interpreted as follow: scores from 3.00-2.50 were

interpreted to mean *interested* ☺, 2.49-1.50 *a little interested* 😐, and below 1.49 *not too interested* ☹.

The third grade students' pre/post means indicate a change in how they felt when the teacher was giving instruction, when they were practicing with their teacher, and while they were working at their seats from feeling *a little interested* to *interested.* The second grade students' pre/post means also increased during all three parts of the lesson, but the means started higher indicating that the students felt *interested* (☺) on both the pre/post survey.

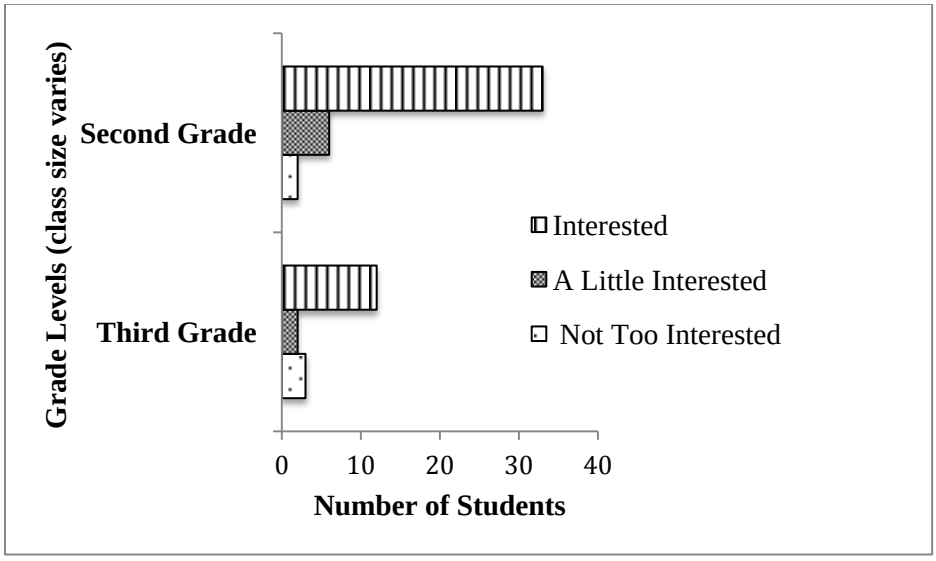
Table 12

Group Means and Standard Deviations of Each Question for Non-Movement Lesson and Movement Lesson

Grade	Question	N	Non-movement lesson (SD)	Movement lesson (SD)
Third Grade	When my teacher was teaching I felt…	13	2.00 (0.91)	2.69 (0.63)
	When I was practicing with my teacher, I felt…	13	2.08 (0.76)	2.46 (0.52)
	When I was doing my work at my seat, I felt…	13	2.38 (0.87)	2.54 (0.78)
Second Grade	When my teacher was teaching, I felt…	19	2.53 (0.84)	2.74 (0.65)
	When I was practicing with my teacher. I felt…	19	2.68 (0.67)	2.74 (0.56)
	When I was doing my work at my seat, I felt…	19	2.63 (0.68)	2.79 (0.54)

Note. The questions were rated on a 3-point Likert scale: 3 represented *interested* or ☺, 2 represented *a little interested* or 😐, and 1 represented *not too interested* or ☹.

The results from the remaining questions used all 32 responses from the first grade students, 41 responses from the second grade students, and 19 responses from the third grade students. The responses were captured on graphs. Figure 8 illustrates the second and third grade students' responses to the question *When we move our bodies or use gestures to remember things, I feel…* Forty-one second students responded to this question of which 33 responded ☺ or *interested,* 6 😐 or *a little interested,* and 2 responded ☹ or *not too interested.* Of the 17 third grade students who responded to this question, 12 responded *interested,* 2 *a little interested,* and 3 *not too interested*.



…

Figure 8. Item responses: When we move our bodies or use gestures to remember things, I feel…

Note. Forty-one second grade and 17 third grade students responded.

The next item graphed (figure 9) was on the first and second grade survey and it asked if the students liked getting up and moving. Of the 32 first grade

students who responded to this question, 25 of them marked ☺-*yes* and the remaining 7 students marked ☹-*no*. Forty second grade students answered this question and 34 of them said ☺ -*yes* and 6 of them said ☹-*no.*

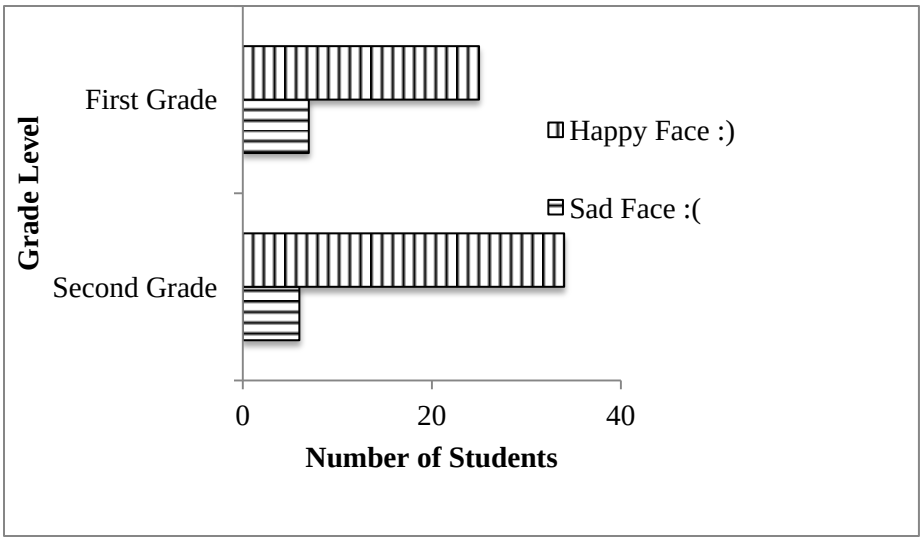


Figure 9. Item responses: Do you like it when your teacher has you get up and move?
Note. Thirty-two first grade and 40 second grade students responded.

The third graph (figure 10) represents a similar question asked on the third grade survey *Do you like it when your teacher has you get up and do exercises to wake up your brain?* Sixteen third graders answered this question and 15 responded that *yes* they do like it and 1 responded *not really*.

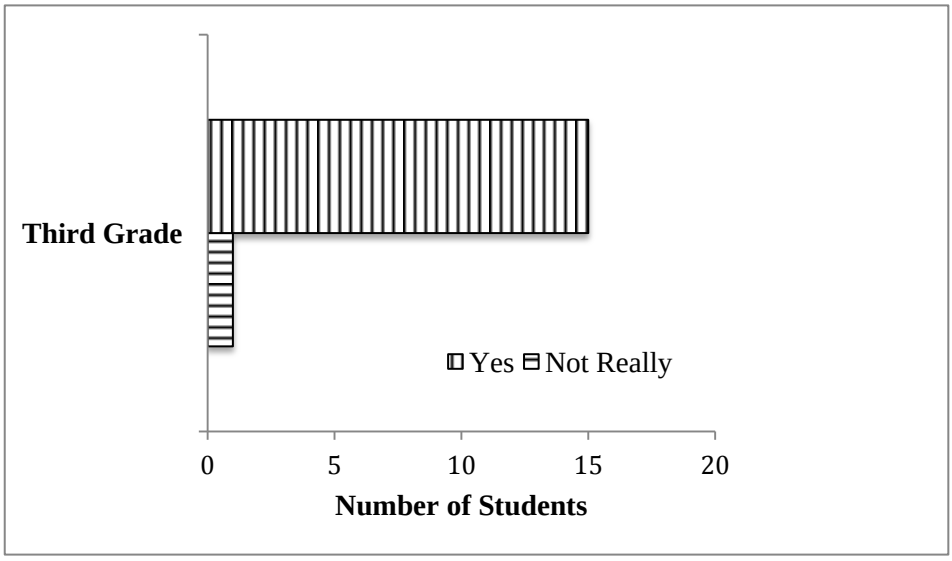


Figure 10. Item responses: Do you like it when your teacher has you get up and do exercises to wake up your brain?
Note. Sixteen third grade students responded to this question.

Student survey qualitative. To learn more about how the students felt about the use of movement, I looked at their responses to *Why or why not* they like it when their teacher has them get up and do exercises to wake up their brain. The overall theme was *enjoyment.* Eleven students wrote that they like to get up "because it's fun." The other students said things like, "because it makes me smart," "because it wakes up my brain," "because I can stretch," and "because I don't like to stay in one spot. I have to move. If I do [have to stay in one spot] I will scream." The one student who responded *not really* to the question regarding getting up and exercising said, "I don't like to exercise."

Observation protocol quantitative. The quantitative results for the observation protocol are illustrated using pie graphs. First the behavioral results from the lesson study groups are presented. Then the emotional results are

presented. The results are reported by each lesson study group. One graph indicates the results from the first grade group and the other illustrates the results from the second and third grade group. The results reflect average student engagement during the entire 35 - 45 minutes of the lesson. The results are broken into behavioral engagement and emotional engagement.

Behavioral engagement quantitative. Behavioral engagement is defined on this protocol as on-task attention, strong effort, and enduring persistence. Figure 11 captures 1,927 tally marks regarding behavior over the six research lessons for the first grade group. These marks were recorded at six different times throughout the lesson. Of those marks, 1,722 (89%) of them were marked *good*, 151 (8%) of them were marked *ok*, and the remaining 54 (3%) were *poor*. This indicates an average throughout the entire lesson of 97% of the students behaving in the *good* or *ok* range.

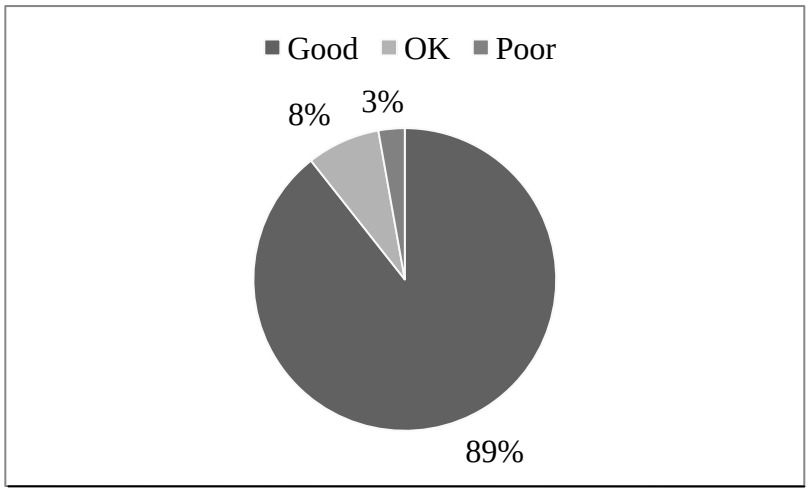


Figure 11. First grade student behavior during research lessons
Note. The percentage is based on 1722 tally marks.

Figure 12 illustrates the 2,893 tally marks that recorded the behavior of the second and third grade students six different times during each of the six research lessons. Of those marks, 2,665 (91%) of them were recorded as *good*, 123 (5%) of them as *ok*, and 105 (4%) of them as *poor*. This points to an average throughout the entire lesson of 96% of the students behaving in the *good* or *ok* range.

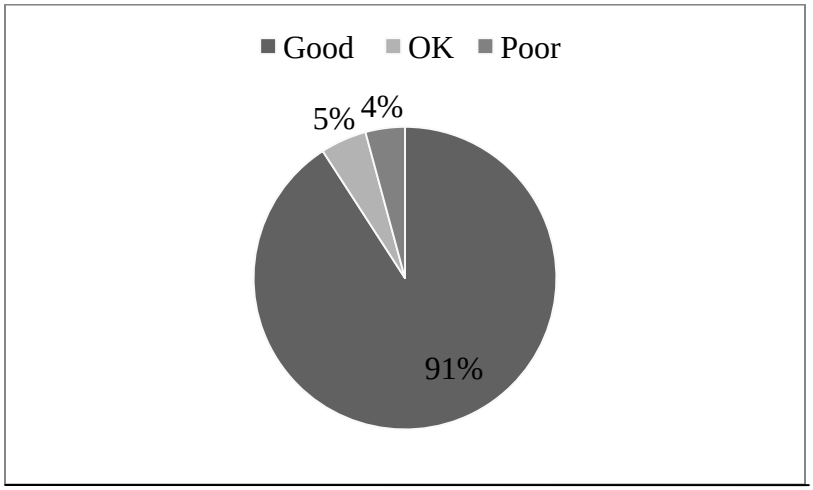


Figure 12. Second and third grade student behavior during research lessons
Note. The percentage is based on 2893 tally marks.

Emotional engagement quantitative. On this protocol, emotional engagement is defined as positive emotion such as interest and enjoyment. Figure 13 illustrates the 1,781 tally marks that were made to record student behavior during the first grade research lessons. These marks were recorded six different times throughout the lesson. One thousand seven hundred ten (96%) of those marks indicated *good* emotion, 46 (3%) *ok*, and 25 (1%) *poor*. This points to an average throughout the entire lesson of 99% of the students' emotional engagement in the *good* or *ok* range.

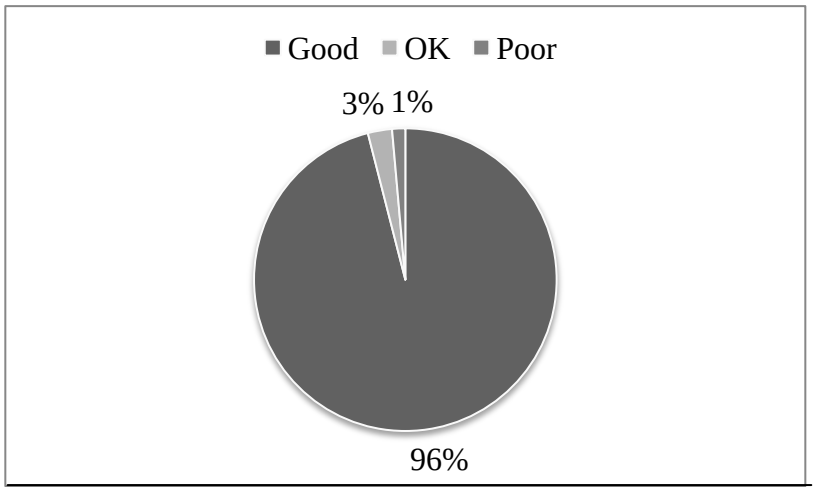


Figure 13. First grade student emotion during research lessons
Note. Percentage is based on 1781 tally marks.

Figure 14 captures the 2,898 tally marks made to record student emotion throughout the research lessons for the second and third grade students. Of those marks, 2,637 (91%) were recorded as *good* emotion, 193 (7%) *ok,* and 68 (2%) *poor.* This points to an overall average of 98% of the students displaying *good* or *ok* emotions during the research lessons.

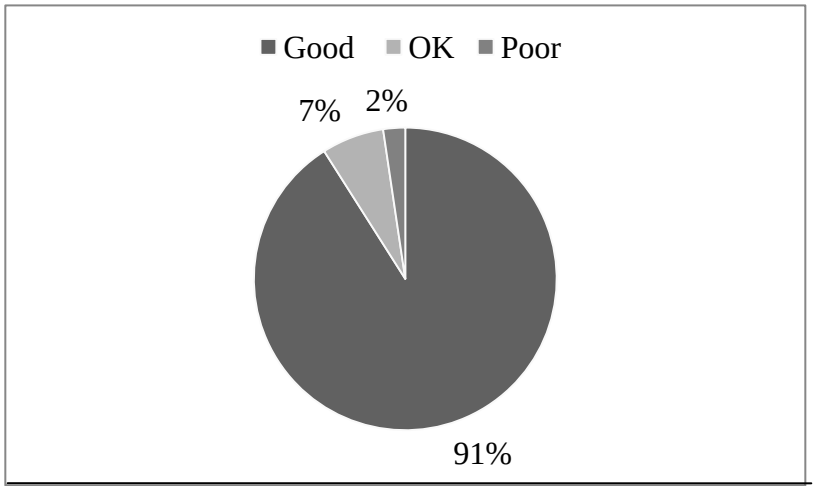


Figure 14. Second and third grade student emotion during research lessons
Note. The percentage is based on 2898 tally marks.

Observation protocol qualitative. To get a better idea concerning what the teachers saw and heard as they observed the students during the research lessons, I looked at the remarks that they wrote on the protocol. Some of the comments like, "good smartboard pictures," "[need] individual handouts," and "question and results seemed similar" were related to the presentation and would be used during the reflection and revision discussion, but I did not include them in this analysis. These remarks were coded using open coding, no a priori codes were developed. I also noted whether the comments were made during the initial part of the lesson when the teacher was teaching, during the part where the teacher and students practiced together, and/or whether it happened during the time that the students worked in pairs or independently. Next, I grouped those codes into themes.

In analyzing the comments, I created the seven codes of *enjoyment, expressions, participation, physical, changes, voices,* and *student learning.* During the analysis, I also noted whether the comments were referring to the beginning of the lesson when the teacher was teaching, the middle when the teacher and students were practicing together, or the end where the students worked in pairs or independently. Next, I developed three themes from those codes. All three themes were noted in all three parts of the lesson. The theme that generated the most comments was *participation*. It was supported by more than 28 comments starting with, "heads were down…by the end, heads were up," "students seemed disinterested as the lesson began but were at full attention once the movements were introduced," "their interests increased" to "all participating,"

"lots of hands," "I noticed full participation and engagement as well," "students were engaged with the motions," and "kids were really into the lesson." The second theme captured another aspect of the participation, *enjoyment.* Some of the over 18 comments that showed enjoyment were: "Whoa!" "What's next?" "laughter," "lots of smiles," "giggles," "excitement," "good positive interaction," and "really enjoyed every part." The third theme I noted was *student learning*. There were over 16 comments like, "some students 'tutored' their partner," "when students were not sure of answers, the movements helped them remember," "doing the motions during the review," "as the students began to do the movement more, [the] students became focused on the topic," "students were able to say what each symbol did," and "even those who didn't seem to be paying attention were able to show [the] motions to [their] partners." Table 13 below captures the initial codes, the part of the lesson, and the resulting themes.

Table 13

Themes From the Open Ended Remarks on the Observation Protocol

Codes	Part of Lesson *Direct Instruction, Guided Practice, Independent Practice*	Themes Created
Participation Changes Physical	All Parts of the Lesson	Student Participation
Enjoyment Expressions Physical	All Parts of the Lesson	Student Enjoyment
Learning Expressions Physical Voices	All Parts of the Lesson	Student Learning

Lesson study transcripts. The 17 lesson study meetings were recorded for a total time of eight hours and 50 minutes. The tapes were transcribed. To insure accuracy, I listened to the tapes a second time while reading the transcription. Then, the text was entered into Hyper Research along with the researcher's notes to capture the data related to each code and to record the frequency. As mentioned earlier, the transcripts and notes were initially analyzed using the 11 a priori codes that were developed based on the research questions and the theoretical framework. This analysis was done line by line over a period of several weeks. Next, the data were opened up to look for other concepts. Eighteen more codes were developed during this analysis. From these codes, I created a 133 page report on Hyper Research that categorized the codes and provided the related text. After combining codes around the axis of a category, 17 codes remained from the initial 29. From these 17 codes, six themes (see Table 14 below) were created that related to both the lesson study transcripts and the researcher's notes (one more theme specifically related to the notes will be discussed below in the researcher's notes). Further analysis of the themes revealed this loose sequence:

- Training and vision
- Efficacy and negotiation of learning
- Shared thoughts and learning
- Student engagement and enjoyment
- Student learning
- Making it their own

The themes will be reported in the order listed above. First, the number of times the theme was coded in the text will be presented. Then the rationalization for the combination of the codes will be explained, and finally each theme will be supported by text from the transcripts.

Themes from lesson study transcripts. *Training and vision* was a theme that was coded 68 times throughout the transcripts and notes. This theme was strong when the study was initially introduced and just beginning, and it continued throughout the entire study. In addition to *instructional pieces* on using movement in lessons and lesson study, it was constructed from the codes on *real life, creation of gestures,* and *behavior management* because they all reflected a need for awareness in the training and vision of the study. Statements like, "I actually planned on thinking that through a little more had I not been trying to get [a troubled student] out…" "there are some students who fall on the floor, but they get back to it," and "they were all engaged which is why they were shouting out. Sometimes when they shout out, you feel like they're just being ornery but this was because they were interested," illustrate how real life and understanding behaviors need to be part of the *training and vision*. Along with that piece, comments such "we really could [have] the students help come up with the motions – it gives them ownership," "but when I did that in my room, they came up with something horrible," followed by, "the students will create a gesture with teacher direction or with teacher guidance," illustrate a continued theme of *training and vision*.

Efficacy and negotiation of learning was coded 131 times throughout the transcripts and notes. It was constructed from the codes *efficacy (before and during), negotiating meaning, practicing and learning,* and *thinking about movement* as these codes pointed to the manner in which the teachers' efficacy regarding using movement was changing, and how they were personally negotiating with the new learning. Some of the statements that showed *efficacy and negotiation of learning* were: "Hypothesis? And I go, seriously, I'm teaching hypothesis in about 20 minutes, so this better work!" "These are just hard words." to "Well, I thought hypothesis was hard, too, and look at that they got it!" "They were - Oh my gosh it was so much better this time!" "It went so smoothly, like I…sort of feel why would you mess with a good thing?" "I was surprised how many people were getting it right, I mean every single one!" "I think it shows that they were following what I was doing."

Shared thoughts and learning was a theme that was coded 92 times. It was constructed from the codes *lesson study thoughts, peer observation,* and *shared thinking* because they captured how the teachers discussed amongst each other regarding what they saw, experienced and thought. Here are some statements that illustrate the theme of *shared thoughts and learning*: "So should we maybe, instead of using the 100s carpet, what if we used that big thing we made? The big number line." "We don't want to get crazy. Maybe we could like hop bigger, or hop smaller. Or no?" "Except for the few who expectantly do that, your whole class was paying attention. 'Oh good – that's good to know because you know sometimes when you're teaching it's hard to tell.'"

Student engagement and enjoyment was coded 62 times in the transcripts and notes. The codes *student enjoyment, engagement of unique students,* and *student engagement in movement lessons* spoke to the students' physical and emotional connection through engagement and enjoyment. The following statements illustrate this theme. "You know, one of the things I wrote…is that in the very beginning, I saw …was a lot of kind of disinterested faces. But it changed very quickly once they were able to do the motions." "Actually, we noticed that the ones who were not engaged…were the ones who are students with autism…but they did more than I've seen them do in the past…like [student] was totally doing the…and I heard him…and you said 'What's the next vocabulary word?' and he said it!" "The motions seemed to wake them up a bit. You know, like, they come back from specials…eww… and then they get excited when they're going to get to do a movement." "They were smiling and giggling and having fun." "They were so excited…the kids were so excited to show…" "I also wrote…the kids really seemed to do it…there was laughter, but it wasn't inappropriate."

Student learning was coded 76 times in the transcripts and notes. It was constructed from the codes, *student use of gestures later, student perception of learning, non-movement and still learning,* and *student learning from movement lessons* because all of these codes captured times and ways the students showed their learning. Some of the remarks that support *student learning* were: "All the time, one little guy's shaking his head, but he still completely knew the whole song and activity later." "we introduce the word and definition…they give me a

movement, - this is trail – and then a kid will come up, do the movement, call on a friend, what word is it?...what's the definition?...who can use it in a sentence…I'm kind of out of it…except for introducing it." "I was impressed that they all got 100 on their vocabulary." "But I'll tell you as soon as I start talking about that they all do the motions…like instantly."

Making it their own was coded 51 times. The codes, *conventionalization – making it their own, generalization across subjects,* and *using elsewhere* illustrated the teachers' increasing comfort and use of movement. Some of the comments that captured the theme *making it their own* were: "I find myself using them all the time…anytime I'm thinking about something, I say to myself, I'm curious and I do the motion…and the kids, the kids do it right after me…and they say, 'you are curious.'" "And now we use movement for everything." "Ya, you know what else I tried one day…I was like oh my gosh…when you add ten you down – you put ten more on your paper. You're going down the hundreds chart…ten less you take them away – you go up…take them off the paper…put them on the paper." "It really showed me that doing the motions will keep students interested for one thing." "Because I used to just stand up and do arm circles for a minute…Instead of just saying we'll count to ten, we're going to do arm circles counting by fives…I feel like I'm throwing a little academics in there."

Table 14

Themes From the Lesson Study Transcripts and the Researcher Field Notes

Theme	Codes	Total Number of Phrases Coded
Training and vision	Instructional pieces Real life Creation of gestures	68
Efficacy and negotiation of learning	Efficacy (before and during) Negotiating meaning Thinking about movement	131
Shared thoughts and learning	Lesson study thoughts Peer observation Shared thinking	92
Student engagement and enjoyment	Student enjoyment Engagement of unique students Student engagement in movement lessons	62
Student learning	Student use of gestures later Non-movement and still learning Student learning from movement lessons	76
Making it their own	Generalization across subjects Using elsewhere	51

Researcher field notes. As a researcher, I kept personal notes beginning in August at the start of the study until December after the study had concluded. I entered the 13 pages of notes into Hyper Research to capture the data and analyze it for concepts. Initially, the notes were analyzed with the transcripts as described above. Then, I looked to answer the question, How will I evolve as a result of leading this innovation? I also opened it up looking for any additional concepts

that arose. A total of 59 sections of the text were coded for a total of 20 different codes. Thirteen of those codes matched codes used in analyzing the lesson study transcripts. The remaining 7 were, *instructional leader, talking too much, real world, student interest, student survey notes, surprises,* and *teacher comments.* These codes were used to construct the theme *Instructional Leader* because they represented areas that needed to be contemplated and addressed as the instructional leader of the innovation. Some of the statements that illustrate this theme were: "The students participated in the movements during the instruction and about 80% to 90% were engaged. However, when the students sat down to do their work, there were only two or three who used the motions. Most of the students used their fingers, thought they knew it, or used a number line. There were also about three or four that were totally off task." "I [now] understand the importance of matching the assessment with the teaching. The teachers often have fun ways to practice things, but the transference of the activities needs to match the teaching until they [the students] really learn the concept." "I realize that I need to…talk…about how to support the new learning in later lessons…many teachers will not do that unless they are given specific instructions to do so." "Food is always an attraction." "The teachers feel good about standing up and moving because academics are added. They talk about how the kids really like to move."

In Chapter Five, I will compare and contrast the quantitative and qualitative data results described in this chapter to mix and interpret the data.

From there, I will use the results to present assertions that respond to my four research questions.

Chapter 5

Findings

In the previous chapter, I described my data collection procedures, the process and reasoning behind my analyses, the reliability of the tools I used, and the results from each data source. In this chapter, I use the triangulation convergence model (Creswell & Plano Clark, 2007) to mix, analyze, and interpret my data for the purpose of presenting assertions in response to each of my research questions. A visual of the triangulation convergence model illustrating the timing of data collection, analysis, and interpretation can be found in Figure 4 in Chapter 3. In this chapter I converge my quantitative and qualitative data through a process of comparing, contrasting, and interpreting. This design of using "different methods…to measure the same phenomenon" (Greene, 2007, p. 100) is utilized to add confirmability and validity and reduce natural bias.

Part of the process of comparing, contrasting, and interpreting the data involved looking at the results through my theoretical lenses of Vygotsky Space and embodied cognition. These theories were explained in Chapter 2 and provided insight into the responses from teachers and students. From my results, I pose the following assertions:

1. The teachers in my study found purposefully planned movement to be an instructional strategy that could be used to increase student engagement, promote enjoyment, and improve student learning.
2. Lesson study supported the teachers in learning and practicing purposefully planned movement. They became comfortable enough in

using movement in their planning that they started purposefully planning movement across the curriculum.

3. The teachers moved through Vygotsky Space as they learned, negotiated meaning, practiced, and made the use of movement their own (see Figure 3 in Chapter 2).
4. Increased student engagement in lessons that incorporated movement was evidenced in the students' words, bodies, and learning. Embodied cognition (Hostetter & Alibali, 2008) was evident in the depth of understanding the students demonstrated both in their ability to create movements and do well in their class work. A clear example of embodied cognition is captured in these words from one student, "we do the movement, I'm like 'Oh!' It's this, so I remember."
5. Teachers' efficacy regarding their ability to use purposeful planned movement in their lessons became much stronger.

The comparing, contrasting, and interpreting that took place to construct these assertions is explained below. Each research question is listed and followed by a detailed description of the triangulation and evidence that led me to my final assertions.

Research Question One

How and to what extent will lesson study change the teacher's thoughts about lesson planning with purposeful planned movement? This question evolved from preliminary research conducted by myself to determine how general education classroom teachers would respond to a study involving incorporating

purposeful planned movement into their lesson plans. In the fall of 2010, I asked the teachers at my school to volunteer to fill out an anonymous survey regarding their use of movement in their classroom. One hundred percent of the teachers who responded indicated that they would like to learn more about how to incorporate more movement in their classroom. With this in mind, I looked for a professional development model, which took into consideration what research revealed concerning how teachers learn and what had been shown to be effective. As stated in my literature review, research indicates that it is important to align district educational goals with teachers' interests and involve teachers in the planning of their development. It is also important to use cycles to practice new strategies, assess, and adjust (Joyce & Showers, 1995; Schmoker, 2004; Taylor et al., 2005; Valli & Hawley, 2002). Lesson study was chosen because it fits these ideas.

My first question delved into the complexity of how the teachers at my school learned and processed the new information regarding purposefully planning movement in the framework of lesson study. To fully appreciate *how and to what extent*, it was critical to look at the teachers' beliefs and feelings before the innovation began. To do this, I collected and analyzed data and constructed themes. Data indicated that the teachers believed movement was a useful instructional strategy that would increase student engagement. However, data also indicated that they were hesitant because of perceived obstacles. A closer look at some of their statements on the survey revealed some hesitation. Hesitation was voiced in the statement, "I do notice that they [their students] *seem*

more involved." I interpret the word *seem* to express uncertainty or a form of hesitation. The hesitation becomes clearer when data sources were converged. Answers from the survey aligned with statements from the initial lesson study transcripts. For example, one teacher said, "…are we going to take into account the kind of kids we have in our class, the time of day…you know what I mean? Because that makes a huge difference" and another said, "I'm really good at making up movements for stuff like the story words…but result and conclusion are hard!" The overall pre-survey score on the movement construct of the survey provided further confirmation of uncertainty because means indicated the teachers believed that movement had *some influence* on student learning, engagement, and emotion. The pre-innovation times series graph of movement in lesson plans also provided a picture of where the teachers started. Before the study began, the group incorporated purposefully planning movements in their lesson plans about once a day with three of the five teachers planning movement less than once a day. The teachers approached the innovation with a hesitant but positive outlook. They were hesitant because their experiences were minimal and they were not sure how it was going to work. On the other hand, they were also positive and willing to give purposeful planned movement a try because they had seen me successfully use movement with students in the past.

Prior to the innovation, the teachers' feelings about lesson study also appeared to be a combination of excitement and nervousness. This was confirmed by the themes on the pre-survey, *teachers looked forward to feedback* and *were a little nervous*. Further confirmation is found in the questions listed

below that were on the pre-survey. The teachers' responses to, *To what extent do you look to your peers for support and guidance when trying to implement new instructional strategies? To what extent do you change your lessons based on peer feedback?* and *To what extent are you comfortable having your peers in the classroom during instructional time?* all indicated that *to some extent* they made changes based on their peers input. Triangulating the data from the teachers' pre-survey, the lesson study transcripts, and the time series graph, leads to the conclusion that although the teachers had some experience with purposeful planned movement, felt a bit of excitement, were interested and thought lesson study and movement might work, they possessed some initial concerns, felt nervous and had a great deal of uncertainty.

The word *how* in my first research question invited me to look at what happened to the teachers along the way. So to answer this I turned to lesson plans. When I compared initial lesson plans to lesson plans created after my innovation began, I saw a significant jump in incorporating movement from only once a day to an average of 2.3 times a day. Converging data from several sources showed this likely may have happened for several reasons. First the second and third grade teachers were excited about how the students responded in the first round of lessons. Data from the observation protocols confirmed the idea of student engagement because the protocols showed 96% of the students in the good or ok behavior range for the entire purposeful planned movement lesson and 98% had ok to good emotion for the same period of time. This positive engagement was reinforced by words on the protocol because after analysis, the

themes of *student participation* and *student enjoyment* were uncovered. The first grade students were also engaged and used the motions with the teacher in the first research lesson, but only a few used the motions for their independent work. The observation protocol still showed 97% of the behavioral engagement in the ok to good range and 99% of their emotional engagement in the ok to good range. So the teachers' concern was not engagement, but the fact they were not using the movements in their independent practice. The teachers discussed this phenomenon during one of the lesson study debriefing sessions. Their conversation went something like this: "Do you think they're not getting it because they haven't had enough practice or because of the theory?" "Oh, I think, just not enough practice." In my notes I captured that the teachers decided to press on and continue using the movement to see if their use increased. The lesson study transcripts showed that the teachers also discussed the fact that the students had other strategies and may not have used motions because they already had a method that worked. "Some of the kids already had a strategy that was tangible for them. It wasn't the first one they'd seen. So it's hard to break an old habit."

The other part of *how* involves the teachers' reaction to lesson study. The teachers' voices on the lesson study transcripts indicated that even though having peers in their classroom made them a little uncomfortable, they liked it because it provided insight into their teaching/lessons. To illustrate the mixed emotions teachers had about having their peers in their room one teacher said, "Because it really is hard to see…how it really goes…you're right…it was uncomfortable, but

it's nice too, like, have somebody else watching to see…" At the same time, statements like, "Oh…that's good to know because you know sometimes when you're teaching it's hard to tell," explain *how* they appreciate it. Teachers often work in isolation and lesson study became a means for them to collaborate.

As my innovation progressed, the teachers became more confident, gained a better understanding of how their students were responding, and took ownership of the new learning. This aligns with Quadrants III and IV of Vygotsky Space where after a lesson the learner practices the new learning and makes it their own. The observation protocol and words from the lesson study debriefing sessions showed that engagement of the students remained high and the teachers made new and exciting discoveries. The themes of *student engagement and enjoyment, student learning, shared thoughts and learning,* and *making it their own* came from the lesson study transcripts debriefing sessions along with themes of *student participation, student enjoyment,* and *student learning* from the observation protocols. These sources converged and indicated that the teachers gained a new level of learning and ownership of purposeful planned movement and began to incorporate it in their lesson plans after an initial dip. There was a steep rise, but that number went down from the first spike of 2.3 to 1.9 times a day. This drop in use purposeful planned movement on the lesson plans may be the result of what Michael Fullan, author of *Leading in a Culture of Change,* (2001) calls the implementation dip. Fullan explains that leaders need to "appreciate early difficulties of trying something new – what I call the implementation dip" (p. 5). After the dip, the number of times the teachers purposefully planned movement

gradually climbed to an average of 2.4 times a day by the end of the innovation. Data indicated movement was something teachers easily added because we had worked on it for 14 weeks. Even though the constructs of movement and lesson study peers on the teacher survey were not statistically significant, the effect size for movement was large and the effect size for lesson study peers was medium. Cohen (1992) described a medium effect to be "visible to the naked eye of a careful observer" (p. 156). As mentioned in Chapter 4, the effect size indicates whether the innovation had an effect on the participants in the study (Gay et al., 2009; Johnson & Christensen, 2004).

In summary, the triangulation of quantitative and qualitative results from the teacher survey and the observation protocol, and the quantitative results from the weekly lesson plans, along with the qualitative results from the lesson study transcripts, and the researcher's notes indicate that lesson study facilitated a change in the way teachers' thoughts and actions about using purposeful planned movement in their classrooms. They changed from using it a little to more than doubling its usage (on average). The teachers saw and experienced strong results with their students and I believe lesson study was why. Using lesson study as a means of professional development clearly enabled the teachers to plan together, observe each other, talk, and get feedback from each other, which facilitated the understanding they needed to make significant changes in their teaching style. In the end, they "love[ed] using movement.

Research Question Two

To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their bodies, their words, and their assignments? This question was asked in an attempt to look at student learning from different angles. Since the innovation was implemented in a short time period I could not look at how if affected statewide standardized testing. Given this, I decided to look at other ways in which learning is demonstrated such as the artifacts from the independent practice, student engagement, and enjoyment. To gain insight, I asked the students to talk about their learning and respond to questions. I did this because research indicates that the level and type of student participation and engagement including emotion directly correlates with student achievement (Daniels et al., 2001; Kelley & Clausen-Grace, 2009; Nicholls, 1992; Schlechty, 2001).

To understand *to what extent* the lessons fostered student learning, engagement and enjoyment, I triangulated the student survey completed after a lesson that did not include movement with my notes. Even though my notes indicated that some of the students marked all happy faces/interested or all sad faces/not too interested before knowing what the questions said, enough students completed the survey to provide some insight into their thoughts. The student survey given after a lesson with no purposeful planned movement indicated that all of the third grade students were *a little interested* during all parts of the non-movement lesson and the second grade students scores were slightly higher in the low end of the *happy face/interested* range. By triangulating this finding with

what was said in the teachers' debriefing session and the qualitative data on the observation protocol, a change in engagement/interest level was confirmed by statements regarding the behaviors of the students at the beginning of the movement lessons. A comment on the observation protocol said, "…students seemed disinterested as [the] lesson began but were at full attention once the movements were introduced" captured a change in student behavior due to the movements as does this remark from the lesson study transcripts, "…in the very beginning, I saw…a lot of kind of disinterested faces, but it changed very quickly once they were able to do the motions." The triangulation of the student survey, my notes, the observation protocol, and debriefing transcripts, point to a change in student engagement from low to high when movements are included.

In regards to student emotion, the written statements from the observation protocol and the teachers' comments during the lesson study debriefing sessions are consistent with the results of the student survey that was completed after a lesson using movement. The average of the responses from the students regarding how they felt during the different sections of the lesson were all in the *happy face/interested* range. The student responses for the remainder of the questions regarding how using movement or gestures made them feel placed 70% to 93% of the answers in the *happy face/interested* range. Realizing that some students "may give responses to shock" or to please (McDevitt & Ormrod, 2010, p. 40), triangulation was very important because it helped illuminate whether the 70% or 93% paints a more accurate picture. The data from the observation protocol showed the students responded with their bodies and their words, and it

revealed more to the story. Data showed 91% to 96% of the students in the *good* range for emotion during the entire lesson, and from the comments on the survey, I constructed the themes of *student engagement* and *student enjoyment* and these themes were present throughout the entire lesson. Looking more deeply into the data revealed that the theme of *enjoyment* was coded 62 times in the lesson study transcripts. On the student survey, the theme constructed from the student responses was *enjoyment*. My notes captured comments from students like, "I was like…well you know… the excitement," "it's fun," and "we giggle" which further support the idea of a positive emotional connection. So, the triangulation of the observation protocol, lesson study transcripts, my notes, and parts of the student survey creates a picture of the positive emotional connection made by the students during the lessons that involved movement.

The next part of this question asked *to what extent* the use of movement fostered learning. Comments on the observation protocol regarding the students' ability to explain the meaning of the vocabulary words, students tutoring each other, and the students remembering after they did the motions were coded in the theme *student learning*. Student learning was also coded 76 times on the lesson study transcripts. One teacher who used movements to teach vocabulary commented, "This year, these guys are accurate with their sentences…they have all used all their words appropriately!" My notes also captured this belief in a conversation with a student who said, "it helps me memorize the things and it actually…it makes it memorize in my head. So like whenever we do the movement, I'm like Oh! It's this so I remember." Also, all of the teachers'

responses to the questions on the teacher survey asking about movement and learning increased in the *great deal* range on the post survey. In triangulating the data concerning student learning from the teacher survey, the observation protocol, the lesson study transcripts, and the researcher notes, it was clear the students and teachers believed the movements fostered student learning.

By triangulating the teacher survey, the student survey, the observation protocol, the lesson study transcripts, and my notes, it became clearer lessons with movement fostered student engagement, enjoyment, and learning. It was evidenced in the visible changes in facial expressions and body movements as well as the conversations that were heard. This connection between movement, engagement, enjoyment, and learning exemplified embodied cognition. Hostetter and Alibali (2008) explain that "cognition is rooted in the body" (p. 497) and when purposeful movement such as gestures are connected to the learning, cognitive resources are freed up because "rather than being held in working memory, these spatial representations may have been off-loaded to gesture" (p. 501). This may also explain why teachers saw their students using the movements later to remember on tests, and one teacher specifically mentioned an increase in test scores.

Research Question Three

To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy? This question was asked to see if using this new strategy might strengthen the teachers' efficacy. Research shows a strong connection between teacher efficacy and student achievement

(Bandura, 1993; Dembo & Gibson, 1985; Guskey, 1987; Hoy & Woolfolk, 1990; Palardy & Rumberger, 2008; Yost, 2002). It is also important to note that research also shows that teachers with high efficacy are more willing to try new ideas in their classroom (Bandura, 1993; Yost, 2002; Zambo & Zambo, 2008).

Again, in looking at *to what extent* as it pertains to my innovation it is important to look at the teachers' perceptions of their efficacy in regards to teaching and in regards to using movement in teaching. There were five questions on the teachers' survey in *instructional self-efficacy* construct. These questions asked the teachers how much they could do to get through to difficult students, keep students on task, increase student memory, motivate students and promote learning when there is a lack of support from home. One of the teacher's answers revealed that she felt she could do *some* to help her students. The other four teachers believed they could do *a great deal* to help their students for an overall average of 3.80 indicating that as a group, the teachers believed that they could do *a great deal* to help their students. The second construct looked at how the teachers felt about their ability to teach - *teacher beliefs about instruction and student learning.* The questions specifically asked how much the teachers felt they could gauge student comprehension, adjust lessons to the proper level, provide alternative explanations, and provide alternative strategies. The responses to this construct were also strong with a mean of 3.80 indicating that the teachers believed they could do *a great deal* to adjust instruction. This strong agreement made it important to look closely at what the teachers had to say on the survey. In looking at the open-ended questions for self-efficacy and teacher beliefs, only one

comment was made. "I know there is a great deal I can do in all of these areas…I would [like] some more ideas though. Many of mine don't always work." When this statement is triangulated with the lesson study transcripts, more specific information that relates to movement is gained. The teachers' comments illustrated that even though they had strong efficacy in their ability to help students in their classroom, they did not have strong efficacy in using movement in their classroom. This conclusion comes from remarks like, "I'm thinking I can't do 27 [students], but if I had…groups," or "It's just hard to bring them back," and "that's hard!" in response to an increased instructional level that included analogies. This is also consistent with the teachers' responses of *some* to the question on the survey that asked how often they used movement in their classroom. So the triangulation of the teacher survey and lesson study debriefing transcripts painted a picture of teachers with high efficacy for teaching in general, but they did not necessarily have the same confidence in their ability to teach with movement.

The post survey helped understand *to what extent* because it showed that even though the teachers started with high efficacy, their efficacy continued to increase. By the end, their mean responses increased to 3.92 in self-efficacy and 3.90 in teacher beliefs placing them at a higher level of agreement that they could do *a great deal*. The one teacher whose pre-survey responses indicated she agreed she could do *some* to help students learn increased to *a great deal.* This increase is better understood when the themes are taken into consideration. The post themes in instructional self-efficacy were *teachers now believe they can do*

something to improve instruction in difficult situations and *teachers perceive a need for multiple strategies.* The post themes in the construct of teacher beliefs were *teachers believe they can help all students learn* and *teachers specified how they could accomplish this goal,* which included using movement. The theme of *efficacy and negotiation of learning* was the strongest theme constructed from the lesson study transcripts. It was coded 131 times from the codes of efficacy, negotiation of learning, and thinking about movements. The other theme in the lesson study transcripts that related to this question was *making it their own*. This theme was coded 51 times and constructed from the codes of generalization across subjects and using elsewhere. The number of times these themes were coded showed the teachers voiced strong beliefs that learning how and when to use movements were valued. At the same time, the time series graph on lesson plans showed a steady increase in purposefully planning movement in their lessons. This connects to another question that was on the post survey in the construct of movement. The teachers were asked if they used movement more or less than a year ago and why. In response to this question, all teachers said that they use it more and the theme that was constructed from their responses was *comfort and ease of using movement*. The teachers explained that "now it comes naturally to me," "I am naturally adding movements to explain concepts throughout the day" and "even it I don't plan a movement in my lesson, sometimes I think of them in the middle of my lesson." Triangulating this with the fact that the teachers themselves changed from thinking that they used movement *some* to learn new things to using it *a great deal* to learn new things

themselves. This is significant because research indicates that a teacher's comfort level in using movement is often reflected in their ability to connect it to their teaching (Gaus & Simpson, 2009).

The triangulation of the teacher survey, the lesson study transcripts, and the time series graph clearly show that as a result of my innovation, the teachers increased their comfort and confidence in using movement, and considered it an effective strategy. In the end, they took ownership of the new teaching technique as indicated by the fact that they generalized it across other subjects and realized that movement also helped them learn. This conventionalization of the new learning is consistent with Quadrant IV of Vygotsky Space. Through this cyclical process of acquiring and internalizing the new learning, the teachers were able to plan it on their own. Overall, incorporating purposeful planned movement into their lessons increased their efficacy because now they had yet another strategy to strengthen their teaching.

Research Question Four

How will I evolve as a result of leading this innovation? I learned a great deal about myself from leading this innovation, and this was captured in my notes. My experience leading teachers to change prior to this innovation had been minimal. I had experience teaching teachers at the graduate level and having them implement simple specific strategies in their classroom. Some teachers took these concepts and ran with them, others simply did the assignment. In my position, I was their instructor and they did what I asked because they wanted to get a good grade. I also did a short action research cycle at a previous school

where I provided strategies for teachers to use with expository text. In those situations I was an expert of sorts, but I felt this was different. I might have had a little more experience using movements in my classroom with six to eight students, but they were the experts in handling a classroom of 25 to 30 students. I might have had more experience using movement in reading instruction because that was my area of focus, but they were the experts in the range and depth of all the subjects taught at their grade level.

As I coded my researcher notes, I created one theme, and that was *instructional leadership*. That theme evolved from a realization that I needed to use the unexpected circumstances to guide my instruction. I realized that some strategies that were natural for me were not natural for others and specific instruction was needed. I also found it important to keep lessons simple so that the students could connect the movement to the independent practice. These were little steps along the way, but the biggest surprise was when the first grade students did not use the strategy to do their work. Personally, I thought first grade would be the easiest. Students this age should be easily influenced but in this case, they were not. This caused the teachers and me to look more closely at all aspects of the lesson. In doing this, we realized two things. First the students had prior knowledge of the concept that was being introduced and therefore they reverted to previously used strategies to solve the problems. We discussed this as a group and concluded that it was not necessary for the students to use the gestures if they already had a strategy that worked for them. We also realized that the independent practice that we had planned was different enough from the

instruction that the students may not have realized the connection, which would further explain the reason they fell back on previous strategies. In future lessons, we tried to use newer concepts and independent practice that more closely resembled the instruction, and I believe these lessons were stronger because we did this. I also became better at helping the teachers stay on topic so that we could do our planning and reflection in a timely manner. I learned to make sure my instructions were clear and that I was not making assumptions regarding follow through. I needed to remind myself not to lead, but to facilitate the expertise teachers bring with them. However because I was not an active participant in the teaching or filling out the observation protocol, I was able to look at the lesson with a global perspective. I was able to see the complexities and nuances that could make a difference. I learned how to be a better instructional leader.

Chapter 6

Conclusion

When I embarked on this innovation, I knew purposefully planned movement worked with small groups of students with special needs, but was uncertain as to how it would work with a classroom of 25-30 students. I understood that purposefully planned movement would involve more teaching time initially. However, I was hopeful that if teachers received good instruction, time to collaborate, practice, and feedback, the use of movement with their students would increase their retention, recall, and engagement which would ultimately decrease teaching time. By having the teachers use purposeful planned movement and seeing heightened engagement and emotions, overall, the innovation achieved the outcome I was looking for and more.

Discussion

I am making strong claims, but I make them with confidence because I created an audit trail, used a mixed-method convergence model, triangulated data, did reliability checks on my instruments, calculated effect size, and then verified my findings with member checks.

The tentative excitement that the teachers felt at the beginning of the innovation quickly changed when they saw how the students responded to the research lesson. The positive change they saw in the students created an understanding within the teachers of the value of purposefully planning movement in their lessons. The more they used movement, the more comfortable they felt using it, which encouraged them to use it across the curriculum. To this

day all of the teachers are using movement much more than they did before my innovation.

The use of movement consistently, positively changed student engagement beyond the teachers or my expectations. Student engagement was more sustained and intense than we anticipated. It was sustained throughout the entire purposeful planned movement lesson as indicated 96% to 99% percent of emotional and behavioral engagement in the ok to good range during the entire lesson. Words written by the teachers on the observation protocol reinforced the extent of engagement with phrases like, "all acting out," "all working," "all engaged," "all participating," and "full participation and engagement." A closer look also revealed that many of the 1% to 4% whose engagement was poor were the students with disabilities, and even though they did not seem to be engaged, they knew the movements later during independent practice. As documented in research, engagement enhanced learning. The teachers and I hoped to see learning, but it was much more prevalent than expected. This showed up when the teachers wrote things like, "understanding of the concepts," "students were able to say what each symbol did (after a lesson on maps)," and "students became focused on the topic." Using movement in instruction exemplifies embodied cognition. The act of using gestures lightens the load cognitively allowing students to remember more (Goldin-Meadow, Nusbaum, Kelly, & Wagner, 2001). The teachers saw this learning in the students' assignments as well. This happened in every classroom even when teaching styles were different.

The other valuable finding was that the teachers realized that they themselves used movement to learn more than they originally thought. After studying, creating, and planning movement for their classroom, they went from thinking that they used movement to *some extent* to help themselves learn to realizing they used movement *a great deal* in their own learning. They realized that they use embodied cognition to learn themselves. This was significant because "research supports the concept that most teachers teach the way they learn" (Stitt-Gohdes, 2001, p. 137). It appears that the innovation heightened teachers' awareness of the value of movement in their own learning, and since they had a deeper understanding of how movement helped them learn, it should motivate them to use movement more.

It is important to note that in the beginning there were many concerns about using movement but these concerns were overcome as the teachers personally witnessed the impact of the movement. Seeing its impact, the teachers became more efficacious in purposefully planning movement, but this could only have occurred because of the professional development model of lesson study. It was through lesson study's cyclical formulating of goals, planning, conducting research, reflecting, and re-planning that the teachers were able to make purposeful planned movement their own. This idea links with Vygotsky Space, which also provides a cyclical view of the process of acquiring and internalizing new learning. Specifically, lesson study allowed the teachers to learn about purposefully planning movement in a safe environment and plan collectively. When the research lesson was taught, the focus was on the students' responses,

and the teachers were able to personally see what was happening with the students without being concerned about presenting a lesson. Then, when they reflected, all aspects of the lesson could be addressed. The practice of planning together, watching the student behaviors, and adjusting accordingly helped the teachers see a more comprehensive view of the value of purposefully planning movement and the results. The process allowed them to learn, negotiate meaning, practice, and make it their own.

Unintended effects. Two of the teachers involved in the innovation had student teachers the semester that the research took place. One of the student teachers was very interested in purposefully planned movement. He saw the reactions of the students both in the research lessons he observed as well as the carry over in the classroom where he worked. He started using movement when he was teaching. As a special education teacher, I am in that room two times during the day, and one day, when I walked into the classroom the students started whispering, "She's here." Then, the class got up and showed me the series of movements they had created with their student teacher to remember how to round numbers. The student teacher told me that he could tell he was losing them so he had them get up and design the movements. I also had a student teacher that semester, and she purposefully planned movement in her instruction whenever she could.

Another unintended effect was that teachers used the time they spent with their peers to seek advice on other teaching methods and/or student behavior.

Lesson study offered valuable collaboration time for more than just learning how to incorporate purposefully plan movement in their lessons.

Implications for Practice

The implications for practice are significant and two-fold. First, purposefully planning movement in lessons increases student engagement and emotion, which connects to higher achievement. It also increases depth of understanding, and can actually reduce teaching time because recall and retention are facilitated. Hostetter and Alibali (2008) explain that this happens because "accumulating evidence indicates that much of cognition is rooted in the body" (p. 497) and the use of movements such as gestures frees up cognitive resources by reducing the load on the working memory.

This connection to the theory of embodied cognition is significant. With the shift of academic expectations due to the rapidly changing world in which we live, educators must react. Students are expected to learn more and teachers need to find a developmentally appropriate way to increase conceptual understanding and form memories to make cognitive connections. Purposefully planning movement could be one avenue to use. Goldin-Meadow, Nusbaum, Kelly, and Wagner (2001) found that using gestures frees up memory. Wilson and Gibbs (2007) found that comprehension of metaphors was increased when connected to movement, and Willis (2006) explains that when students "actively do something with new information, they can ultimately own it and store it in permanent memory" (p. 23). This innovation helped the teachers I was working with personally see these possibilities in their classrooms with their students.

Second, lesson study was an effective professional development model. Lesson study helped the teachers I worked with learn and become more comfortable using movement in their teaching. Since the ultimate goal of teaching is student achievement, using a professional development model that has the teacher try something new while others watch the response of the students was extremely effective. The cyclical process of lesson study also allowed the teachers to adjust and reteach lessons based on their students' responses. This afforded them the opportunity to perfect lessons and increase student engagement and ultimately achievement. Lesson study also addresses the four sources of efficacy expectations found in Bandura's model: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977) which could be another reason why the teachers felt good about using it. The teachers in my study enjoyed learning this way so much that they suggested lesson study to the principal as a method of professional development to be used throughout the school.

Educational Leader

I learned that as a leader, I needed to constantly be a student of the people I was leading, and that slowing down needed to be a part of the process. It was critical for me to balance waiting for some pressures to be relieved, and then to push when the teachers needed pushing. I learned to step back and listen to the concerns and complications that occurred as teachers engaged in lesson study and then offer support if needed after others had had a chance. I learned the value of

wait time with teachers and allowing them the opportunity to make their own connections.

I also learned to wait myself. I tend to get excited about new ideas and want to try them immediately; however, I now realize the value in taking the time to research and think them through completely. I learned to take time, go deeper, listen, and be ready to explain.

Implications for Future Research

Limitations. The results of this study were positive, but there were some limitations. These limitations included the small number of teachers who participated, the limited number of grade levels that were involved, and the limited time of the innovation. Another limitation for future research could be scheduling.

Participants. A total of five teachers participated in this study. A small N makes it difficult to generate a significant difference in quantitative data. Also, these teachers volunteered to be part of this innovation. They entered the study efficacious and were willing to take chances. In order to make generalizations regarding this innovation, it is important to have a larger number of participants and have participants who may be more uncomfortable taking chances. I would like to see if using lesson study helped them incorporate more movement in their classrooms and increased their efficacy as well.

Grade levels. This innovation involved three different grade levels all of which were in the primary grades. All of the first grade teachers were involved, but only two of the three second grade teachers and one of the three third grade

teachers were involved in the innovation. To increase the reliability and validity of the innovation, it would be important to include all of the teachers at all seven grade levels in the school. Since we found first grade a little more challenging than second and third, it would be interesting to see how kindergarten and sixth grade students responded to purposefully planned movement.

Limited time. This innovation took place over a 14-week period. It started with a training prior to the first week of school, and the first research lesson was conducted approximately three weeks later. This delay occurred because it was the beginning of the school year. I had planned for each lesson study group to conduct 12 research lessons. That meant the teachers in one group personally taught two lessons and the teachers in the other group personally taught three lessons. Even though the results were good, I believe that it would have been more effective if the teachers had had more opportunities to teach lessons with purposefully planned movement in more subject areas.

This was a good start, and it made a difference for this group of teachers, but these teachers started with high efficacy. Teachers with less confidence may need to be involved in more lessons to gain mastery. During the member checks, every teacher in this group told me she is using movement much more, but a couple of the teachers told me that they would like to continue to learn more. I would like to see these teachers continue to share ideas for using movement and periodically have "check-up" lessons.

Scheduling. While scheduling was not a limitation in my study, it could be a limitation in other studies. Lesson study requires that the teachers meet to

plan and reflect which can be done before and after school, but it also requires the observation of the teaching lesson. My principal worked with me and helped provide substitutes in classrooms so that the teachers could observe when necessary. The teachers also volunteered to give up lunches and preps to observe. This worked because it was a limited amount of time, but it could be challenging to sustain in an entire school for an extended period of time.

What is Next?

I would like to try this innovation school-wide. I believe that embodied cognition could be an answer to the increased curriculum load and students sitting in their seats for long periods of time. However, doing this would require a careful look at school schedules, but I believe that with advanced planning, preps could be arranged to allow teachers in the same grade level to observe each other one day during the week.

I would like to see how students in other grades respond to this type of teaching. The upper elementary grades have regular district assessments throughout the year. These assessments would provide another measure of learning. I would also like to measure the student engagement throughout the year as movement becomes more common. I have not seen a decrease in engagement in the classes that were involved in the innovation, but it would be important to watch.

I envision this school-wide innovation and data collection that would go along occurring over a three or four month period of time. Each grade level would choose the subject in which they wanted to incorporate purposeful planned

movement. The following data collection tools from the first cycle would be used again: teacher survey, observation protocol, and lesson study meeting transcripts. However, I would also use student achievement. I would have teachers use teacher made or district assessments as additional collection tools pre and post. If a grade level chose to create their own assessments instead of using district assessments, I would work with them to ensure the assessment tool captured what students were to learn through movement. To gather baseline data, I would have the teachers use the assessment tool two times prior to the start of the innovation. At the end of the innovation, I would analyze the quantitative data from the assessments, the teacher survey, and the observation protocol and the qualitative data from the teacher survey, the observation protocol, and the lesson study meeting transcripts separately before triangulating the data using the triangulation convergence model.

Closing Thoughts

I have been using movement to teach concepts to my students with special needs for years. I started using movement because I was trying to find another way to teach the same information and because I often had students who liked to move. Even though I saw the value in my classroom with my students, I did not fully understand the impact it could have on a classroom full of students. Actually, I was not quite sure how it would work. Like the teachers in my study, I started this innovation with tentative excitement, and like my teachers my tentativeness quickly changed when I saw how the students responded.

As I researched to support my innovative idea, I learned a great deal about why movement works, and I was also introduced to the theories of Vygotsky Space and embodied cognition. Theory has never been my strong point, but now I get it! Vygotsky Space provided a clear picture as to how people learn collectively and individually, and I watched it happen before my own eyes. This experience helped me grow as a leader. I am fascinated by the theory of embodied cognition. The more I learn, the more I want to learn. I am passionate about educating all students to be successful in today's world. Our world is changing; our students are changing, and we, as educators need to keep changing too.

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APPENDIX A

PURPOSEFUL PLANNED MOVEMENT VIGNETTE

The students walk into the classroom, put their homework in the bin, hang up their backpacks, and start on their "morning work" as the teacher takes attendance and deals with other morning concerns. After quietly working for a while, the morning work is reviewed. When it comes time to go over the corrected sentences, the teacher asks the students to stand. They proceed to act out the capitalization and punctuation as they read the sentences using *total physical response*. The students put their hands over their heads for the capital letters, create a comma with the swoop of their arm, and squish the period into the ground indicating the end of the sentence. In the next sentence, they also used their arm as if they were carrying something at their side to illustrate a possessive and this time, they end with their palms up to show a question mark.

Later in the day after several quiet rounds of reading centers, it is time for math, but the students are getting restless. The teacher decides to use an *activity break* so she has the students stand next to their desk. She uses the twos, fives, and tens from several decks of cards. The number on the card determines whether they are counting by twos to 20, or fives to 50 or tens to 100. The suit establishes the movement. Hearts are for jumping jacks, diamonds are knee lifts, spades are for straight jumps, and clubs are twists. A student picks a five of spades and the students count by fives to fifty while jumping for a total of ten jumps. Four more cards are picked, and four more activities take place. At the end of the break, the students are told to take a deep, quiet breath. They take one more deep, quiet breath before sitting down to start math.

They are working on multiplication. They use gestures as they read the multiplication problems. For the first one they say "four" while they hold up four fingers. Then, they cross their arms in front of their body as they say "groups of," and then they hold up four fingers again while saying "four." Next, they create an equal sign with their arms as they say, "equals 16." The movement continues for all of the problems.

Science is after lunch. Today the students are learning new vocabulary words. The teacher hands each student a card with a syllable from one of the vocabulary words written on it, and then the students move around the room trying to find the rest of their word. The words are written on the board so that the students know what is missing from their word. As the syllables are combined to create a word, those students become a team. The team becomes the experts on the word. It is their responsibility to learn what the word means, and create a movement or *gesture* to help the other students learn and remember the word. One word is *permeate*, and the students ask the teacher if they can spray a little bit of the room deodorizer so it will *permeate* through the room. They agree that in the future they will simply use a hand gesture to indicate spraying a bottle along with a noticeable nose whiff. The teams write down their ideas and get them approved by the teacher before heading home for the day. Tomorrow, they will teach their word to the class.

APPENDIX B

INSTITITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Debby Zambo 4701 West
From:	Mark Roosa, Chair Soc Beh IRB
Date:	06/27/2011
Committee Action:	**Exemption Granted**
IRB Action Date:	06/27/2011
IRB Protocol #:	1106006536
Study Title:	Using Lesson Study to Help Teachers Design Lessons with Purposeful Planned Movement and Build Efficacy

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(1) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX C

DEER VALLEY SCHOOL DISTRICT RESEARCH APPROVAL

Deer Valley
Unified School District

20402 N. 15th Ave.
Phoenix, AZ 85027
623-445-5000 Phone
623-445-5086 Fax
www.dvusd.org

September 9, 2011

To Whom It May Concern,

This letter serves as confirmation that Linnea Lyding has been given permission from the Deer Valley Unified School District to conduct her dissertation research at Mirage Elementary School. The scope of this research includes the following:

> The purpose of this study will be to use a professional development strategy called lesson study to help the 1st, 2nd, and 3rd grade teachers that I co-teach with at my school incorporate purposeful planned movement in their classroom. For the purpose of this study, I define purposeful planned movement as a range of strategies from short activity breaks to wake up the brain and body, gestures to create mental imagery, and total physical response such as simulation role-play. The lesson study group will work together to plan the lessons, and then one teacher will teach the planned lesson while the other teachers observe student response. The content associated with the movement activities will align with the school district's normal curriculum and the state standards for their grade level. The only difference will be the use of varied instructional strategies (e.g. short activity breaks, gestures, and total physical response).

Ms. Lyding's research is limited in scope to review student data only from students that she works with in the normal course of her job duties. The Deer Valley Unified School District does not permit access to student information/data to outside entities to ensure compliance with federal FERPA guidelines.

Should you have any questions, please feel free to contact Cherryl Paul at: 623-445-4906.

Sincerely,

Cherryl Paul, Director
Improvement Systems Division

APPENDIX D

PARTICIPANT CONSENT LETTERS

Using Lesson Study to Help Teachers Design Lessons with Purposeful Planned Movement and Build Efficacy

Date: June 6, 2011

Dear Potential Participant,

I am a doctoral candidate under the direction of Associate Professor Debby Zambo in the Mary Lou Fulton Teacher's College at Arizona State University.

I am conducting a research study to help teachers design lessons with planned movement. I am inviting your participation, which will involve participating in a professional development called lesson study where you will learn more about how to use movement in your classroom. You will meet with your group every other week for 12 weeks. You will work with your group to design a research lesson, and then one member of your group will teach the lesson. You will teach one or two of these lessons during the time of the study. When you are teaching the lesson, the rest of your team will be in the classroom observing the students. You will observe the students when another member of your team is teaching the lesson the group designed.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. It will not be reflected in your teacher evaluation or profile. You may potentially benefit by learning new strategies to use with your students. There are no foreseeable risks or discomforts to your participation.

You will be asked to complete a survey at the beginning of the study and again at the end of the study. You will also be asked for a copy of your lesson plans approximately 5 times during the study. You will be asked to create a code that you will put on your survey and on the lesson plans that you turn in. Your responses will be confidential and the materials will not be shared with the principal or any other personal at the school. The results of this study may be used in reports, presentations, or publications but your name will not be used.

If you have any questions concerning the research study, you can contact me at (602) 882-3409 or Dr. Debby Zambo at (602) 543-6334.

Sincerely,

Linnea Lyding
Doctorial Candidate
Learning and innovation

By signing below, you are giving your consent to participate in the above study.

_____ _____ _____

Signature Printed Name Date

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Using Lesson Study to Help Teachers Design Lessons with Purposeful Planned Movement and Build Efficacy

RECRUITMENT AND LETTER OF PERMISSION

Dear Parent:

I am a teacher at Mirage, and a doctoral candidate under the direction of Associate Professor Debby Zambo in the Mary Lou Fulton Teacher's College at Arizona State University. I am conducting a research study to help teachers design lessons with planned movement.

I am inviting your child's participation, which will involve completing a one-page survey two or three different times during the study. The survey is a one-page, paper and pencil survey that your child will complete during class time at the end of a lesson. The survey should only take a couple of minutes. Your child's participation in this study is voluntary. If you choose not to have your child participate or to withdraw your child from the study at any time, there will be no penalty it will not affect your child's grade. Likewise, if your child chooses not to participate or to withdraw from the study at any time, there will be no penalty. The results of the research study may be published, but your child's name will not be used.

Although there may be no direct benefit to your child, the possible benefit of your child's participation is learning in a different way. There are no foreseeable risks or discomforts to your child's participation.

Your child will be asked to create a code that he/she will write at the top of the survey. This will help me identify if the student's responses are change when different lessons are presented. Responses will be anonymous. The results of this study may be used in reports, presentations, or publications but your child's name will not be known.

If you have any questions concerning the research study or your child's participation in this study, please call me at (602) 882-3409 or Dr. Debby Zambo at (602) 543-6334.

Sincerely,

Linnea Lyding
Doctorial Candidate
Learning and innovation

By signing below, you are giving consent for your child _____ (Child's name) to participate in the above study.

_____ _____ _____

Signature Printed Name Date

If you have any questions about you or your child's rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Office of Research Integrity and Assurance, at (480) 965-6788.

APPENDIX E

STUDENT ENGAGEMENT OBSERVATION PROTOCOL

Student Engagement - Observation Protocol

Record how the students are responding at the beginning and part way through each part of the lesson.

Lesson: **Date:**

Teacher: **Start and Stop Time:**

# of students:

	"Teacher Do" (direct instruction)							**Reflection**
	Student Behavior: *on task attention, strong effort, enduring persistence*			**Student Emotion**: *Positive emotion such as interest and enjoyment.*			**Student Voice:** *participate in and contribute to class discussion*	
Beg.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		
5 min.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		

	"We Do" (teacher and student)							**Reflection**
	Student Behavior: *on task attention, strong effort, enduring persistence*			**Student Emotion**: *Positive emotion such as interest and engagement.*			**Student Voice:** *participate in and contribute to class discussion*	
Beg.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		
5 min.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		

	"You Do" (independent practice)							**Reflection**
	Student Behavior: *on task attention, strong effort, enduring persistence*			**Student Emotion**: *Positive emotion such as interest and engagement.*			**Student Voice:** *participate in and contribute to class discussion*	
Beg.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		
5 min.	*Effort-#of students*			*Emotion-#of students*			Tally comments: *Student voice:*	
	Good	**OK**	**Poor**	**Good**	**OK**	**Poor**		

APPENDIX F

TEACHER SURVEY

Using Lesson Study to Help Teachers Design Lessons with Purposeful Planned Movement and Build Efficacy

---

This questionnaire is designed to help me gain a better understanding of the kinds of things that create difficulties for our teachers. Please indicate your opinions about each of the statements below by checking the appropriate space and responding to the short answer questions. Your answers will be kept strictly confidential and will not be identified by name.

Instructional Self-Efficacy –
Self-efficacy is defined as "belief that one is capable of executing certain behaviors or reaching certain goals" (Ormrod, 2008, p. G-7).
Please write...the month of your birth in 2 digits (e.g. August would be 08) and the first 2 letters of your middle name. Please use this code for the lesson plans you turn in also. Thanks!*

_____

1) How much can you do to get through to the most difficult students?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

2) How much can you do to promote learning when there is lack of support from home?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

3) How much can you do to keep students on task on difficult assignments?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

4) How much can you do to increase student's memory of what they have been taught in previous lessons?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

5) How much can you do to motivate students who show low interest in schoolwork?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

6) Do you have any additional comments regarding instructional self-efficacy?*
_____

Teacher Beliefs about Instruction and Student Learning
TEACHER BELIEFS about instruction and student learning.

7) How much can you gauge student comprehension of what you have taught?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not At All

8) How much can you do to adjust your lessons to the proper level for individual students?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

9) To what extent can you provide an alternative explanation or example when students are confused?*
( ) A Great Extent
( ) Some Extent
( ) Very Little
( ) Not at All

10) How well can you implement alternative strategies in your classroom?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

11) Do you have any additional comments concerning your beliefs about instruction and student learning?

_____

Lesson Study

LESSON STUDY - This study will be conducted using "lesson study." Lesson study is a method of professional development in which teachers work together to plan a research lesson. Then, one teacher teaches the lesson while the other teachers observe the students for predetermined actions/behaviors. The lesson is then reflected on and revised. These questions are designed to learn more about your perceptions of various aspects of lesson study.

12) To what extent do you believe working with your peers will help you develop better lessons?*

( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

13) To what extent do you look to your peers for support and guidance when trying to implement new instructional strategies?*

( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

14) To what extent do you value observing your peers teach?*

( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

15) To what extent do you reflect on your lessons and make changes based on student retention from a previous lesson?*

( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

16) To what extent do you reflect on your lessons and make changes based on student work?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

17) To what extent do you reflect on your lessons and make changes based on student engagement?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

18) To what extent do you change your lessons based on peer feedback?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

19) To what extent do you believe good lesson planning impacts your teaching?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

20) To what extent are you comfortable having your peers in the classroom during instructional time?*
( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

21) Based on your current understanding, what are your thoughts regarding lesson study?*
_____

Purposeful Movement

PURPOSEFUL MOVEMENT - for the purpose of this survey, purposeful movement is defined as "strategies that use movement and gestures, acting it out, learning with hands on activities, or doing work that gets students out of their seats."

22) In the past month, how frequently have you purposefully planned movement strategies ahead of time in your classroom?*

( ) A Great Deal
( ) Some
( ) Very Little
( ) Not at All

If you used purposefully planned movement, please describe the movement and how often you used it.

_____

23) To what extent do you believe purposeful movement increases an emotional connection to learning?*

( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

24) To what extent do you believe purposeful movement increases retention of knowledge?*

( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

25) To what extent do you believe purposeful movement increases engagement of highly distractible students?*

( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

26) To what extent do you believe purposeful movement increases a student's ability to explain concepts in their own words?*

( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

27) To what extent do you believe purposeful movement helps students understand abstract concepts?*
( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

28) To what extent do you use movement to help yourself learn a new concept?*
( ) A Great Deal
( ) Some Influence
( ) Very Little
( ) Not at All

29) Based on your current knowledge, what are your thoughts about using purposeful planned movement in your classroom?*
_____

30) As you look back at your plans and think about your teaching day, do you use movement more than last year, about the same as last year, or less than last year? If you use it more or less than last year, can you elaborate on why it has changed?*
_____

31) Do you notice a difference in student engagement when you use movement in your instruction? Explain your answer.*
_____

Demographics

32) How many years have you been teaching?*
[ ] 0-5 yrs.
[ ] 6-10 yrs.
[ ] 11-15 yrs.
[ ] 16-20 yrs.
[ ] 21 or more years

33) How many years have you taught at the grade level you are teaching at this year?*
[ ] 0-5 yrs.
[ ] 6-10 yrs.
[ ] 11-15 yrs.
[ ] 16-20 yrs.
[ ] 21 or more yrs.

34) Gender*

( ) M
( ) F

35) Age*

( ) less than 25 yrs. old
( ) 26 - 30 yrs. old
( ) 31 - 35 yrs. old
( ) 36 - 40 yrs. old
( ) 41 - 45 yrs. old
( ) 46 - 50 yrs. old
( ) 51 - 55 yrs. old
( ) more than 55 yrs. old

Thank You!

Thank you for taking our survey. Your response is very important to me.

APPENDIX G

STUDENT SURVEY FOR 3RD GRADERS

Read the question and circle the answer that best describes how you felt during today's lesson.

1. When my teacher was teaching, I felt…

interested a little interested not too interested

2. When I was practicing with my teacher, I felt…

interested a little interested not too interested

3. When I was doing my work in my seat, I felt…

interested a little interested not too interested

4. When we move our bodies or use gestures to remember things, I feel…

interested a little interested not too interested

5. Did you use the body movement or gestures you learned today to help you remember what you learned?

6. Explain how you used your body or gestures in your lesson today.

7. Do you like it when your teacher has you get up and do exercises to wake up your brain?

Yes Not really

Why or why not?

8. Please include my answers in the study

Yes No

APPENDIX H

STUDENT SURVEY FOR 1ST AND 2ND GRADERS

Read the question and circle the answer that best describes how you felt during today's lesson.

1. When my teacher was teaching, I felt…

2. When I was practicing with my teacher, I felt…

3. When I was doing my work at my seat, I felt…

4. When we move our bodies or use gestures to remember things, I feel…

5. Do you like it when your teacher has you get up and move?

6. Please include my answers in the study

YES NO

APPENDIX I

RESEARCHER FIELD NOTES

Context:
Meeting #:
Focus:

Date/Time:
Place:
Duration:

Descriptive Notes	Reflective Notes

APPENDIX J

A PRIORI CODES

Research Questions/Theory	A Priori Codes
How and to what extent will lesson study change the teachers' thoughts about lesson planning with purposeful planned movement?	• teacher thinking about movement lessons • teacher shared thinking – lesson study collaboration • teacher thinking about lesson study
To what extent will these lessons foster student engagement, enjoyment, and learning as reflected in their bodies, their words, and their assignments?	• student engagement in movement lessons • student learning from movement lessons
To what extent do lessons with purposeful planned movement developed in lesson study raise teachers' perceived efficacy?	• "before" teacher perceived efficacy • teacher perceived efficacy
Vygotsky Space	• Appropriation – training and vision • Conventionalization – making it their own • Publication – practicing and learning • Transformation- negotiate meaning

APPENDIX K

LESSON PLAN FOR RESEARCH LESSON

Research Lesson for Purposeful Planned Movement

Goal of the Lesson	
Learner Outcomes	
Standards	
What do the students know?	
What do they need to learn to reach the goal?	
How will movement, gestures, or activity breaks be included in this lesson?	
Materials Needed	
Anticipatory Set/ Introduction	
Lesson	
Guided Practice / Instructional Strategies	
Closure	
Independent Practice	

APPENDIX L

PERMISSION TO UTILIZE INSTRUMENT

THE OHIO STATE UNIVERSITY COLLEGE OF EDUCATION AND HUMAN ECOLOGY

ANITA WOOLFOLK HOY, PH.D.

PROFESSOR
PSYCHOLOGICAL STUDIES IN EDUCATION

Dear

You have my permission to use the *Teachers' Sense of Efficacy Scale* in your research. A copy of both the long and short forms of the instrument as well as scoring instructions can be found at:

http://www.coe.ohio-state.edu/ahoy/researchinstruments.htm

Best wishes in your work,

Anita Woolfolk Hoy

Anita Woolfolk Hoy, Ph.D.
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