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Effects of Movement on Student Achievement

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A Literature Review Presented

in Partial Fulfillment of the Requirements

For the Degree of Master of Education

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Abstract

This literature review explores the effect that movement has on the achievement of elementary aged students. The research provided through scholarly articles, journals, and books, explains why there is a need for movement activities in the classroom and how physical activity effects the engagement and success of children in a positive way. This literature review examines the constructive impact that movement plays on the brain activity of young children in their early developmental stages of life. Studies also provide research that examine how the overall health of children can benefited by the amount of movement that their body receives daily. It also examines how anxiety, stress, and depression can be minimized and the increase it has on increasing on-task behavior in the classroom. The literature provides applications for ways that movement can be added to the daily classroom routine through content learning, recess and times of allowing the brain to take time away from tasks.

Keywords: movement, physical activity, achievement, on-task, engaged, attentive

A Review of Literature: Movements Effect on Student Achievement

Movement, or an act of changing physical location or position, is a typical part of a young child's daily routine. Movement is essential to learning and the phenomenon of life (Hannaford, 2005, p. 107). The movements that the body makes expresses knowledge and enables cognitive function (Hannaford, 2005, p. 16). Children show their emotions through movements such as hopping, skipping, running, and jumping. Using a child's natural need for physical activity is a way to incorporate movement into the classroom and increase their sense of engagement and overall achievement. When a student is engaged, they are attentive to their task, there is little to no fidgeting, they show curiosity and interest, and they have a passion for what they are learning. When a student has a high level of achievement, they are reaching their highest potentials and showing success in the classroom. Research shows that movement, or physical activity, in the classroom has many positive effects on student achievement. The mental ability of an individual is triggered through the form of movement (Hannaford, 2005, pg. 107).

Recess is the time of the school day in which children get to move their bodies and be physically active. While recess does provide an opportunity for movement, research shows that children need more than the fifteen to twenty minutes of activity that recess allows for (Center for Disease and Control Prevention, 2010). Educators can effortlessly provide students with opportunities to move their bodies inside of the classroom through a wide range of ways. Movement can be related to content and go hand and hand with a lesson or activity (Miller & Lindt, 2018). Movements can occur through natural transition times in the classroom as well as in the hallways while moving from one place to another. Times of physical activity can also come in the form of a short time of break in which may or may not be related to subject content (Terada, 2018). Through movement, children are able to connect conceptions to the actions of

their bodies (Dotson-Renta, 2016). These connections result in better retention of information, allowing students to be more successful in daily classroom work as well as during times of assessment.

The natural flow of the classroom can look different from the traditional classroom as movement is incorporated. Teachers are no longer seated at their desks while student's complete work but rather they are moving around the room. In a physically active classroom, students may be able to choose where they sit, provided break times away from instruction and are participating in activities that incorporate purposeful movement. With current technology, sources of movement are unlimited and can be used to fit the needs of current students and their learning and movement styles (Armstrong, 2009). By incorporating times of movement in the daily classroom routine, children are developing physically and cognitively, staying healthy and fit, and showing reduced signs of stress and anxiety (Gorman, 2017, Gao, Chen, Sun, Wen, & Xiang, 2018). These factors contribute to a better understanding of classroom instruction, resulting in increased engagement and achievement. With school being one of the most influential institutions in a child's emotional, social, and cognitive development, educators are able to use movement with their students in order to make a great impact on their lives (Benes, Finn, Sullivan, & Yan, 2016). As children move, they are able to express themselves while also working to fuel their brain and provide the framework for success.

Review of the Literature

Humans are in constant motion. Before even entering the world as a newborn, they feel every movement a mother makes between walking and breathing (Hannaford, 2005, p. 107). Research has shown that children need opportunities to move during both play and times of purposeful learning. The human brain needs to be fueled and movement is one way to increase its function. The sense of memory and movement are closely connected (Dotson-Renta, 2016). Due to the link between the brain's memory and movement, educators are able to use a child's need to move in order to allow them to better recall information. In order to activate one's mental abilities, the human body needs to move (Hannaford, 2005, p. 107). Times of movement improve learning as well as creativity, health and managing stress (Hannaford, 2005, p. 18). As movement occurs, children are able to make connections to concepts due to their actions. Children spend more time in the classroom than any other setting in school, therefore putting the teacher in the leader position to dictate the amount and levels of physical activity that occurs throughout a child's day.

Strengthening The Brain Through Physical Activity

During the ages of three and eleven, brain activity occurs at more than twice the rate than it does in the brain of adults (Stevens-Smith, 2016). Due to this, educators of early childhood and elementary aged children have the ability to use movement to increase brain activity during its most important years. During the very early stages of a child's life, they begin to use eye movements in order to track the movements of those around them. This simple sense of movement is providing the child with the first steps of learning. An individual's vestibular system is activated when the body and head move about which leads to strengthening of the eye muscles and allowing them to work together (Hannaford, 2005, p. 115). The teaming of the eyes

results in students being able to better focus, track and concentrate while reading (Hannaford, 2005, p. 115). One of the first sensory systems to mature is the cerebellar or motor activity (Jensen, 2005). The interaction between the cerebellum and the vestibular, or inner ear, allows one to keep their balance as well as make actions and movements (Jensen, 2005). From the earliest days of a child's life, there is a strong need for physical activity. Being active results in increased development that will apply and assist in all aspects of their lives. As children grow in age, their need for physical movement continues. When simple movement actions such as swinging or jumping occur, they are stimulating this interaction and working the cerebellum, which will also be used when completing mentally rehearsed tasks in the classroom (Jensen, 2005).

In 2005, a study by Hannaford (2005) found through brain scans that children learn best when they are active because movement causes neurons in the brain to better take in information (Stevens-Smith, 2016; Hannaford, 2005). Researchers have found that the brain uses the same connections to move as it does to process reading, writing, and math (Stevens-Smith, 2016; Hannaford, 2005). As a child is moving, they are developing neurological foundations (Stevens-Smith, 2016). These foundations assist with problem solving, creativity, and the development of language.

Shorter times of learning result in higher levels of attentiveness and learning (Godwina, Almeda, Seltmanc, Kaib, Skerbetzd, & Bakerb, 2016). These ten-minute, active lessons allow the brain to boost its function and increase productivity (Godwina, Almeda, Seltmanc, Kaib, Skerbetzd, & Bakerb, 2016). As higher levels of physical activity occur, the brain and cognitive health of a child grows (Erickson, Hillman, Kramer, 2015). There is also an increase in blood

flow and oxygen in the brain, resulting in higher neural connectivity and nerve cell growth, which controls learning and memory (Center for Disease and Control Prevention, 2010).

Research shows that the part of the brain that is worked during movement, is the same part of the brain that is used during learning (Stevens-Smith, 2016). By incorporating physical activity in the classroom daily, children are able to exercise parts of the brain that are otherwise not exercised.

Physically Fit and Healthy

As students are moving and engaging themselves in learning, they are more physically active. Children who are physically fit are more likely to concentrate better than those who are not, which allows them to be able to focus on tasks for longer periods of time (Helgeson, 2011). When a child is unable to focus on content, it is likely that they will miss large amounts of information or direction and later be unable to recall needed information. One way to promote physical activity in children is by incorporating movement into the daily classroom routine. The use of movement can assist in helping the mind to find ways to express creativity. Through creative movement, students show increased understanding, appropriate behavior and positive attitudes towards school (Skoning, 2010). Increasing movement in the classroom can help reach students who do not do well through typical instructional learning (Skoning, 2010).

It is recommended that children participate in physical activity daily, for a minimum of sixty minutes (Center for Disease and Control Prevention, 2010). Participating in physical activity regularly, helps reduce the risk of childhood obesity and chronic diseases (Gao, Chen, Sun, Wen, & Xiang, 2018). Before a child is able to be successful in the classroom, their basic needs need to be met. One of these needs includes being healthy and having a body that works well because it feels good. An obese or ill child, is going to have a harder time being engaged in

their learning due to these troubles with their health. Children who are physically active have higher levels of cardiorespiratory fitness, stronger muscles, lower body fat, and stronger bones (Center for Disease Control and Prevention, 2019). The early school years are a time in which children can learn and practice good health and exercise and allow it to become a lifestyle that will stick with them throughout their childhood and adult life. When children are physically active from an early age, they have a better chance of living a healthy adulthood (Center for Disease Control and Prevention, 2019). As students spend the majority of their waking hours in the classroom, being physically active at school will provide them with much of the daily exercise that is needed to maintain a healthy lifestyle.

Reducing Stress, Anxiety and Depression

In today's society, the pace is fast and the stakes are high. High levels of stress and anxiety in children has led to the need to teach them the ways of living a healthy and physical way of life (Gorman, 2017). Through physical activity, a child is able to increase their strength and self-esteem as they are reducing their anxiety and stress (Gorman, 2017).

Braniff (2011) studied the use and benefits of energizers when students appeared nervous. The energizers lasted from three to five minutes and could occur anywhere in the classroom. Students jogged in place, hopped, played the air guitar, did jumping jacks or basic stretching. As students participated in these energizers, they got their hearts pumping and oxygen flowing. Braniff's findings reported that students felt that exercising kept them from worrying and helped them stay awake and alert (Braniff, 2011). The distraction of the movements allowed the students to drown out the thoughts that were taking over their minds as they focused on the actions that their bodies were creating.

Dance and yoga are two types of ordinary movement that can be used in the classroom. Dance is a form of natural movement that acts as a stress relief and leads to the generation of more creative and constructive thoughts (Furmanek, 2014). Dance breaks can allow students to release the stress of a lesson and recollect their thoughts and feelings all while gaining the advantages of being physical active. Through the movement of structured yoga, educators can get students moving while also teaching a coping skill that will help with mental health. The practice of yoga is commonly used to connect the mind and body. Yoga can be used for both religious and nonreligious purposes (Williamson, 2012). The practice assists in lowering blood pressure and risks of heart disease, increasing balance, and providing guidance in reducing depression (Williamson, 2012). Along with the number of health benefits, Yoga is also a valuable tool to use in the classroom. A third grade teacher at a Title 1 school in Atlantic, needed to find a way to help control the fussing, inability to focus, and overall off-task behavior of her students that took away from their learning. Through simple yoga breathing exercises and poses, Jackson found an instant change in her student's attitudes and behaviors. After the introduction and practice of yoga skills, the students were able to solve their own problems, focus for longer spans of time, participate in lessons that now ran smoothly, and their standardized tests scores were the highest among the school (Williamson, 2012). Guiding students in simple yoga movements provides a natural form of releasing stress and anxiety. Learning new breathing concepts and yoga stretches and poses provides students with a technique releasing negative energy that can be used in other times of need.

The feeling of stress and depression can have a strong impact on the brain and therefore, influence school performance and success. When in a depressed state of mind, cortisol in the body is high and dopamine is low (Hannaford, 2005, p. 181). Dopamine provides the brain with

enthusiasm, so when it is low, motivation lacks and one can become depressed (Hannaford, 2005, p.181). During play and times in which children are active, dopamine levels increase, resulting in learning being able to occur naturally and the brain being filled with motivation (Hannaford, 2005, p. 181).

Content related movement

Due to the large amount of curriculum and assessment that is required of teachers and students, it can be difficult to replace limited instructional time with movement. Research shows that teachers are more likely to think positively of movement activities if the times of movement are related to content (Miller, 2018). In order to remember a thought, a movement must be tied to it (Hannaford, 2005, p. 109). In an elementary classroom, movement related to content can be seen in a number of ways. Simple movement activities can include writing at an easel instead of a desk, practicing spelling words with pool noodles or magnets instead of paper and pencil and working in groups. Rather than going around the circle, reading aloud from a text, students may be up, and acting out the lines, creating a visual and kinesthetic understanding of the story. In math, students can use the manipulating of counters or base ten blocks in order to solve a problem rather than using a calculator or worksheet. These activities allow the brain to be active while not taking away from instructional content. Academic lessons that combine physical activity with academic content better engage students in learning (Miller & Lindt, 2018).

Miller and Lindt (2017) completed a study to determine if a lesson that incorporated movement would create higher levels of student interest. They tested their study by comparing the outcomes of second and third grade math and reading classes when lessons included movement and lessons that included no movement. Following teacher training of how to rate student interest through observation, the classes were taught the same concepts, some classes

with movement and others without. All movement was related to the content but incorporated through different ways such as how the information was presented, how students applied the information and/or through assessment. Lessons that involved movement did not take away from any instructional time. Movement in math was added through dancing to the Macarena while skip counting, learning songs to recall different math concepts and organizing themselves into lines and groups to better understand word problems. Simple movement was also incorporated through allowing students to move around the room to collect materials needed for a lesson. Through trained understanding of rating students through observation, the study concluded in finding that students were far more excited, engaged and attentive during lessons that involved movement compared to lessons that did not (Lindt, & Miller, 2017).

The following year, Miller and Lindt (2018) also studied four elementary classrooms during the last two weeks of the school year. The program involved incorporating physical activity into typical math and reading lessons. During the first week of the study, two classrooms were controlled while the other two classrooms participated in the movement intervention. For the second week, the classrooms switched roles. Each physical activity in the intervention room, included movement that focused on the academic content. Through teacher observation and reflection, it was found that students showed enjoyment, engagement and were learning when lessons incorporated content related physical activity (Miller & Lindt, 2018). When reflecting on lessons involving physical activity, the four teachers were quoted with statements that inquired that, all kids participated, showed excitement and on-task behavior, worked together, and everybody was involved (Miller & Lindt, 2018). When speaking of the week of controlled learning, their statements took a much different focus of students appearing lost, restless and often having their heads down on their desk (Miller & Lindt, 2018). The study's

findings resulted in the understanding that student interest was sparked when there was movement included in the activity which led to an increased engagement in learning.

Skoking (2010) conducted action research in a classroom of 27 fourth and fifth grade students, which ranged from general education, learning disabilities, emotional and behavioral disabilities, cognitive disabilities and autistic students. Time was not taken away from instruction but rather implemented within lessons. Lessons consisted of students moving around the room and acting out characters in books. This resulted in struggling students being able to better remember characters and story lines due to making connections with their body movements (Skoning, 2010).

Children have the tools of their body at their use wherever they go (Armstrong, 2002, p 82). Unlike worksheets or writing utensils, they always have access to their body as it is working to help them with every life move that they make. Howard Gardner's theory of multiple intelligences supports the idea that humans consist of eight intelligences and that are many ways to be smart. Bodily-kinesthetic intelligence is one of Gardner's discovered intelligences and supports the idea of using one's whole body to understand ideas and express feelings (Armstrong, 2002, p. 7). This intelligence involves the movement of the body in order to complete a task or understand an idea. By repeating purposeful physical movements that represent an idea, students with a bodily-kinesthetic intelligence can gain a deeper understanding as their movements allow them to internalize the information (Armstrong, 2002, p 85).

Recess Activity

Recess is a time in the school day that allows children leave the walls of the classroom and make many of their own choices. They can decide to run and exercise their bodies or sit and relax as they visit with their peers. Recess has often been the only time of the school day in

which children were able to move their legs as fast as they can, talk or yell to whomever they want, and take time to be young children with free spirits. Being outside of the classroom brings different sets of rules and opportunities to think and process ideas that are unrelated to academics. Recess is an important part of a child's school day. As they run and play, they are also working on social skills that carry with them into the classroom. This period of movement can greatly affect the rest of their school day success. This period of unstructured learning can contain some of the most important learning a child can do. The time spent at recess has a positive impact on relationships, the ability to concentrate and on-task behavior (Center for Disease and Control Prevention, 2010).

Findley (2017), a fourth grade teacher at a Midwest school, completed action research with her twenty-six students in order to determine the effect of student achievement when recess minutes were increased. Data showed that students were more on task when they had a recess period within forty minutes of a lesson (Findley, 2017). Student's on-task increased when recess was provided (Findley, 2017). The results of the study showed that their minds were able to better focus on the content and stay on-task compared to times in which recess was not provided and more off-task behaviors occurred (Findley, 2017).

Lay (2006), a Midwest kindergarten teacher, posed the question of how will regular movement opportunities impact student engagement in a kindergarten classroom and completed research to better the education of her students. This question developed from her realization that during school day afternoons, there was a decrease in attention and stamina and an increase in the number of behavior reminders she gave her students. These behaviors were greatly affecting the learning and achievement of her students. Using a mixed-methods approach, she studied the number of off-task behaviors during a four-week period. For the first two weeks, students were

given no additional movement opportunities outside of their usual recess period. During the next two weeks, a ten-minute recess and guided movement breaks were added before the afternoon independent work time. The final week added a third movement activity that consisted of having a moving corner that students visit when they felt the need to move their body. During the times when students participated in additional movement, Lay's findings showed a decrease in incomplete tasks, off-task reminders given, and attention seeking behaviors (Lay, 2006). By adding movement to the struggling afternoon, the behaviors of students was greatly impacted in a positive way. This change in behavior resulted in the increase of overall achievement of the students as they were able to focus and complete the tasks at hand.

Recess provides physical activity and a mental break during a long school day (Lay, 2006). This understanding can allow educators to use this period of time out of the classroom to provide students with more self-control when they re-enter the room. Research has revealed that this different type of learning can greatly influence a child's time in the classroom and allow them to be more successful in their learning.

Brain Breaks

A brain break is a brief period of time to let the mind wander away from instruction or direction, and is a necessary part of a child's school day. Breaks keep the human brain healthy and has an impact on cognitive abilities as well as the ability to make sense of ideas (Terada, 2018). These times of taking a break are an important part of a child's learning process. Brief, physical breaks improve behavior, resulting in students putting in more effort and an increased time on-task (Terada, 2018). As these times of break occur, the physical and brain health of students is working and improving.

Weslake and Christian (2015) investigated the impact that three different types of brain breaks have on student enjoyment, engagement and the time it takes for them to refocus following the break. They first studied the impact of a mental break on third grade students. For one week, the twenty-three students completed one five-minute break that involved only breathing exercises. Following this break, it took two to five minutes to get the students back on track and ready for the lesson. Next, they tested the impact that a physical break had on their students. This time of high movement was greatly enjoyed by the students and took an average of five minutes to regain focus following the activity. The third and final week incorporated a break that involved a moderate amount of physical activity, some of which was related to academic content. The average time of refocus following the activity was one minute. Weslake and Christian's study found that a moderate amount of physical movement during a brain break resulted in the least amount of wasted academic time (Weslake & Christian, 2015). This type of break allows students to press pause on the hard work their brain is doing, provides them time to be active and does not require a large amount of time to get them back on track with a lesson. Educators must be aware of the types of brain breaks they use and understand that too much movement may decrease the purpose and hopes of providing a break time.

Hannaford (2005) studied an elementary school teacher in New York City who provided her students with a rhythm break when they appeared to be uninterested in their learning. She led the class in coordinated ways of movement for two minutes. Following this movement break, the students were attentive to the lesson and engaged in the content (Hannaford, 2005, pg. 114). Modeling and promoting simple rhythm breaks provided students with the example of understanding when and how to take a break in order to get back on track.

Camahalan and Ipock (2015) conducted teacher initiated action research in a fifth grade classroom in hopes of improving student learning in math by incorporating physical activity breaks. The students selected for the study all struggled with basic math concepts, three of which have been diagnosed with ADHD. At the start of the study, students appeared out of shape and did what they could to avoid times of movement but by the end of the week, they were excited and showed relief when it was time to move their bodies (Camahalan & Ipock, 2015). Many of the breaks consisted of both the teacher and the students walking around the room and discussing math concepts. Following these times, students appeared more relaxed and rested as they got back to work and the amount of times students got out of their seats during work time dropped (Camahalan & Ipock, 2015). One of the math classes included math stations in which students completed a physical activity and then solved a math problem. Another day involved solving a test review problem, followed by completing a physical exercise. Data collection over the course of the week showed that by adding physical activity breaks during math lessons, off-task behaviors were decreased and the level of academic learning was increased (Camahalan & Ipock, 2015).

Lotta (2015), a fourth grade teacher in a New York State school district, designed a study to determine the effects that GoNoodle movement breaks have on student behavior and learning achievements. GoNoodle is a free, online resource that provides hundreds of short movement videos. These videos range in length, topic and type of physical activity. Lotta's study focused on the use of Zumba videos from the website. Every alternating day, students participated in a two to four minute Zumba between the subject of English Language Arts and math. For six weeks, Lotta observed the behaviors of four randomly selected students on their engagement, attentiveness to the lesson, and all on and off-task behaviors. Lotta also analyzed student work

and test scores during the six-week period. Results of the study showed that students were less tired and more attentive following the break activity, leading them to having more stamina compared to the days in which a movement break did not occur (Lotta, 2015).

The amount of time spent on a brain break can vary based on the time allowed in the classroom or the reason for the break. Research shows that taking a break to allow students to move their bodies does not result in wasted time, but rather sets the tone and energy for a successful time of learning (Camahalan & Ipock, 2015, Lotta, 2015). By implementing times of break and building student stamina, student achievement is increased (Camahalan & Ipock, 2015), Lotta, 2015).

Increasing On-Task Behavior

When students are disengaged in learning, it is natural for off-task behaviors to occur (Helgeson, 2011). If a child is sitting in one place for long periods of time, it is likely for their bodies to begin looking for something new to hold their attention. This is when disruptive behavior can occur and take away from learning. Children in elementary school are required to sit quietly for the majority of lessons that occur in the classroom during a typical six hour school day (Donnelly, Greene, Gibson, Smith, Washburn, Sullivan, DuBose, Mayo, Schmelzle, Ryan, Jacobsen, Williams, 2006). Implementing movement is an effective strategy to keep students attentive and focused (Helgeson, 2011). An effective piece of using movement as a management strategy is that it can be used with any aged child. While the nature of the activity may differ between age groups, the outcome is the same. Movement activities can be chosen depending on the current developmental state that the child is at. As they grow, so can the movement that they are provided. These movement activities engage students physically and mentally, reducing the number of off-task behaviors, resulting in more time spent on-task (Helgeson, 2011). In

Skoning's 2010 study, it was found that when the class was engaged in physical activities, the teachers noticed fewer behavior problems (Skoning, 2010). When finding students are disruptive and off task, adding movement can decrease the off-task behavior, as students are more engaged and attentive.

Braniff (2011), a fourth grade teacher in a Midwest community found that her students showed little to no enthusiasm or personality as they sat at their desks and worked quietly during the school day. She conducted action research to determine the effect that an active classroom would have on her students. Through observation and student journal entries, she found that an active classroom positively affected her classroom management, which resulted in increased student achievement and engagement (Braniff, 2011). Her techniques to an active classroom were simple, yet greatly allowed her to manage student behavior and decrease the times in which students were off-task. Allowing students to move around the room and sit where they pleased, resulted in an increase of on-task behavior and appropriate participation in the learning activities (Braniff, 2011).

Blasberg (2017), a lower elementary teacher at a Montessori school, developed an action research plan to determine the effect that movement lessons and jobs have on the on-task behavior of her students. From the beginning to the end of her six-week observational and data collection period, the average percentage of daily on-task behavior increased when movement was incorporated (Blasberg, 2017). Her findings also showed that during this time of movement intervention, there was a general increase in the productivity of students as well as the attitude that they had towards themselves and their work in the classroom (Blasberg, 2017).

In 2018, an action research project was established to determine the relationship between movement and student behaviors. Ackerman (2018) conducted the study with her four and five-

year old students during a six-week period as she determined if added movement would increase the amount of on-task behaviors during an afternoon whole group activity. She studied the student's behavior during times of no breaks, ten-minute brain breaks, and fifteen-minute gross motor breaks. During the first two weeks of adding a ten-minute brain break movement to the afternoon, the number of behavior reminders given dropped from 146 to 88 (Ackerman, 2018). When a fifteen-minute recess took the place of the brain break, the number of reminders decreased further from 88 to 46 (Ackerman, 2018). Ackerman's results found that by increasing the amount of movement during the afternoon periods, her students greatly improved their ability to be on-task during learning.

Embling (2011), a student at State University New York, wanted to determine the relationship between physical activity and student on-task behavior. She developed a study that included a range of elementary age children in three different classes among the same school. The physical activity in this study was used only in ways that combined movement into the normal academic routine of sticking to learning objectives. Lessons were adjusted in order to integrate an increased amount of movement within the time of learning. Through observation and student journal entries, she determined that physical education and/or physical activity in all three of the classrooms participating in the study, had a positive effect on the on-task behavior of the students (Embling, 2011). In all three classrooms, on-task behavior increased when movement was incorporated into an academic lesson (Embling, 2011).

By implementing movement lessons and activities into the daily classroom routine, educators are able to increase student time on task as well as create an environment that results in higher student achievement (Embling, 2011, Blasberg, 2017, Ackerman, 2018). Research studies show that as students are able to move while learning, they are able to display more on-

task behaviors (Embling, 2011). Their on-task behaviors result in the ability to be more attentive to the learning, ensuing a deeper understanding and ability to retain the information (Embling, 2011).

Reaching Students with Disabilities

It is likely to see multiple children facing multiple types of disabilities, in classrooms around the country. These disabilities may be clear to the naked eye or may be hidden behind the face of what appears to be just another child going about their daily school routine. Many children today are faced with the struggle of living with a learning disability that interferes with their ability to be successful in school and other aspects of their lives. Movement opportunities can be especially beneficial to students with learning disabilities. As a child moves about, damaged tissue to and from the vestibular system is replaced by new nerves that develop (Hannford, 2005, p. 172).

A child who is in constant motion in class, is filled with an abundant amount of energy (Anderson, Rumsey, 2002). Students with this overwhelming amount of energy will likely benefit from learning while purposefully moving. ADHD, or Attention Deficit Hyperactivity is a disability commonly found in children. Children with ADHD have a deficiency in vestibular system development, leading to low function (Hannaford, 2005, p. 170). If students with ADHD are not encouraged or given the ability to move at a young age, it is possible that there will not have been enough vestibular activation to allow them to develop and grow as they should (Hannaford, 2005, p. 170). It can often be very difficult to reach and hold the attention of students with Attention Deficit Hyperactivity Disorder. If a child with ADHD is keeping their head and body still, the activation of their brain is reduced (Hannaford, 2005, p. 170). This is when it is clear that the child is no longer focused on the learning due to having been still for too

long of a time. By allowing these students times of movement, they have a greater ability to be successful.

Hannaford (2005), worked with a fifth grade student who suffered from brain damage due to physical abuse she encountered at the age of six weeks. Over the years, her development had greatly lacked due to the damage on her brain. She was unable to read, write and communicate and so was placed in a special education classroom. Hannaford worked closely with her on academics as well as many life skills. Throughout times of basic instruction, she participated in five minutes of Brain Gym® activities. These activities consisted of physical movements that focused on activating the frontal lobes (Hannaford, 2005, p. 19). Next, Hannaford and the student would go outside and kick a soccer ball for ten minutes. This pattern carried on day by day. Five months into the physical movement implementation, the student was reading at a second grade level and was not only able to write, but enjoyed writing. At the end of the school year, she was reading near grade level and was able to communicate with others. Through consist times of movement using Brain Gym®, soccer, art, music, and interacting with peers, her abilities grew and succeeded at a rapid pace (Hannaford, 2005, pg. 20).

Autism is a biological disorder caused by dysfunction of the brain, resulting in deficiencies in social development and communication as well as the display of unusual behaviors (Micacchi, Giuliani, Cerbo, Sorge & Valenti, 2006). While there is limited amount of research on the topic, it is believed that children with autism lack in the amount of physical activity needed to assist in their development (Micacchi, Giuliani, Cerbo, Sorge & Valenti, 2006). It is common for children with autism to be excluded from activities or refuse to participate due to their different types of interests and behaviors. The classroom is a safe place in which educators can get children with autism up and moving. Knowing that movement allows

damaged tissue to be overridden, providing times of physical activity to students with autism can be highly beneficial.

Application

Movement in the classroom can take many forms, all of which can be make a different in the increased achievement of students. A simple way to incorporate movement into the daily classroom routine is by allowing stretch breaks and times in which students are able to walk to a new place in the classroom or pick where they would like to sit or lay as they work (Braniff, 2011). Allowing students to stand at their desk while they work is another way to provide them with the opportunity to move and get their blood flowing, without disrupting learning or work time (Terada, 2018). Movement can also be implemented through the use of short times of break provided by a number of developed resources, additional recess periods, and yoga (Terada, 2018). The sky is the limit in choosing or designing movement activities for children.

The online website, GoNoodle, presents a number of videos that provide movement and mindfulness. These movement videos provide physical activity, objective subject learning and an improved sense of community (Lotta, 2015). The videos range in length and can be implemented in ways that seem fit for every classroom. GoNoodles can occur, before, during, or after instruction. The movement activities can relate to academic content or be random and spontaneous. Many GoNoodle videos include a form of dance which helps reduce stress and anxiety (Furmanek, 2014).

Take 10 (2015) is similar online program that was developed by the International Life Sciences Institute Research Foundation with the help of health and education experts that combines academic instruction with physical activity (ILSI Research Foundation, 2015). These 10-minute breaks get students on their feet without taking away from academic time. The program incorporates academic objectives in math, reading, language arts, science, social studies, nutrition and health. Take 10 has been implemented in a number of countries, all in

which have resulted in increased on-task behavior, improved BRI, an increase in physical activity, healthy habits, and nutrition knowledge, and improved academic success (ILSI Research Foundation, 2015).

Another resource for physical activity breaks in the classroom is UNICEF Kid Power. This free, online resource uses short videos to address global issues and life skills while allowing students to make a difference in the lives of malnourished children just by getting their bodies up and moving (UNICEF Kid Power, 2019). Each time a class of students participates in one of the many movement activities provided, they are able to earn points that results in UNICEF sending food to children around the world who are in need.

Cross-lateral movements are a beneficial way to jump start brain function (Hannaford, 2005, p. 125). A cross-lateral movement involves crossing the midline of the body. These movements focus on activating sensory and balance by stimulating the body and mind, allowing learning to occur (Hannaford, 2005, p. 125). By touching the right elbow to the left knee followed by touching the left elbow to the right knee, areas of both brain hemispheres are forced to communicate, resulting in high activation (Hannaford, 2005, p. 131). Other cross-lateral movements can include making a figure eight using the arms, standing across from a peer and touching the left hand to their left hand, and the right hand to their right hand, as well as touching one hand down to the opposite ankle. The simple movements that these actions create assists in helping students become engaged and able to understanding the material (Hannaford, 2005 p. 125, 131).

In appropriate situations, recess minutes can be added to the school day. Before requiring students to sit still for a long period of time, a quick recess break can help to allow the child to be able to concentrate and stay alert as they are seated (Center for Disease and Control Prevention,

2010). Recess minutes can also be added to the day following a time in which they have been required to sit without movement for a period of time. By taking the few minutes to allow students to run and play, their blood and oxygen flow will be jump started once again, permitting them to be on-task and attentive when learning starts back up (Center for Disease and Control Prevention, 2010, Terada, 2018).

Many academic lessons can include times of movement. Incorporating movement during learning can be implemented through Readers Theater in which students work together to act out a story and feel the actions and thoughts of the characters (Hannaford, 2005, p. 109, Skoning, 2010). Another academic movement activity is the use of task cards that are spread out among the classroom. Task cards require students to move around the room and solve the problems on each of the cards as they record the answers on their answer sheets. This movement activity can be used in any subject area and simply allows students to engage their bodies in movement as they think and work. Gallery walks are another way to incorporate simple physical activity into any subject area. Displaying lesson materials among the classroom will permit students with the opportunity to walk around while they observe and analyze ideas independently or with their peers. Stimulations are another way to add movement to an academic lesson. A stimulation is a controlled representation of a real life idea that allows students to imagine as if though they are a part of the context of learning. This type of role-playing allows students to use their body to feel a situation or idea (Hannaford, 2005, p. 109). A stimulation activity could include an activity such as boarding the Mayflower, in which students sit on top of their desks as they travel the ocean as a pilgrim. By physically putting themselves into the role of the context, the body and mind are making connections that will allow them to retain the information through the memory of their actions (Hannaford, 2005, p. 109).

A bodily-kinesthetic approach to learning can be a simple way to incorporate movement in the classroom (Armstrong, 2002, p 85). Rather than asking for students to raise their hands in class, they can be asked to show a number of their fingers, blink their eyes, make motions with their hands and arms, etc. (Armstrong, 2009, p. 83). These body answers allow not only kinesthetic learners but also all learners to incorporate a small amount of movement to get their blood flowing, resulting in increased brain function (Armstrong, 2002, p 83). Movement can also be added to daily lessons through classroom theater which consists of acting or role play (Armstrong, 2009, p. 83). Students can act out a math problem or the scene in a novel in order to allow their body to feel the content of the situation. These actions will permit them to recall the information later on as the movements are connected to their memory (Armstrong, 2002, p. 83). The bodily-kinesthetic approach can also be used to learn the spelling of words through a spatial approach (Armstrong, 2009, p. 163). Students can trace words in sand or clay, manipulate pipe cleaners into words, or form their bodies into letters to spell out a word. The actions of their body will allow their memory to recall the movements and assist in the spelling of the words (Armstrong, 2002, p. 83).

The My Classroom Physical Activity Pyramid (2012) is a teaching tool that was developed for kindergarten through fifth grade school teachers (Lorson, Lyon, Minoughan, Orłowski, 2013). This organizer was created by the Ohio Department of Education, displays and assess the ways in which movement can be implemented in the classroom. Within the pyramid, there are five categories; everyday activities, activity breaks, integrated lessons, active games and celebrations, and physical education. Teachers are able to choose or create movement activities that fit within these areas and then use them as they see fit. The pyramid is used to track the amount of physical activity that occurs in the classroom in order to promote the goal of

reaching sixty minutes of physical activity each week (Lorson, Lyon, Minoughan, Orlowski, 2013).

The ability to incorporate times of movement in the classroom is limitless. The simple movement and actions made by the body plays a large role in the minds ability to recall information (Armstrong, 2002). By finding what works best for the needs and styles of students in the classroom, physical activity will get their blood and oxygen flowing, repair damaged tissue and allowing them to be successful achievers.

Conclusion

The purpose of this literature review was to look at research that has been completed on the effects that movement has on student achievement. This work was needed in order to provide an understanding to the benefits of incorporating movement in the classroom. The research provides an understanding as to the long lasting impact movement can have on the academic success of students.

Research has confirmed that physical activity plays a large role in child development and success (Hannaford, 2005). Regular and purposeful movement opportunities have been shown to have a positive effect on both student engagement and overall achievement (Hannaford, 2005). As movement is incorporated into the daily classroom routine, the brain is able to function at higher levels, reduce stress, anxiety and obesity chances, and increase on-task behavior (Stevens-Smith, 2015, Helgeson, 2011, Gorman, 2017). Incorporating movement into the daily lives of students can come in the form of relation to specific academic content and/or occur through times of transition, brain breaks and recess. Movement activities can be carefully planned and placed into lessons at appropriate and well thought out times, but they also have the ability to be flexible and meet the daily needs of students at the drop of a hat. Research shows that the mind and body are closely connected (Dotson-Renta, 2016). By working the parts of the brain that manage and control learning at a young age, children are gaining benefits that will assist them in years to come (Hannaford, 2005).

As all research topics, learning of the effect of movement on student achievement is ongoing. Future research can be narrowed and focused on specifics of what has already been discovered through studies and action research. The current research from this literature review, shows that allowing children to be physically active results in increased engagement and

learning. Moving forward, it would be beneficial to study and determine the impact that movement has on males versus females. Research can be conducted on the ways in which movement and gender are connected. Studies can focus on the amount of required movement in males and females and if the time spent in movement plays a role in their success in the classroom. Action research can look at whether longer or shorter movement breaks or activities affect learning in different ways. The study can determine if one time of movement makes a difference in the learning or if multiple times of movement are required before a change is seen. Action research can also be used to sample the differences between elementary and secondary students and the ways in which movement influences their achievement at different stages in their development. Additional research can also focus around the types of movement that occur throughout the school day.

There can be limitations to using movement in the classroom. Many teachers have a lack of knowledge and experience with using movement within lessons and learning. Incorporating physical activity into part of the classroom routine requires teachers to make a shift in the way they think about teaching. The need for physical activity has changed over the years as research has begun to show the strong need to be active. It can be difficult for veteran teachers to change their mindset about the way a classroom should look and sound. Additional planning by teachers must occur in order to successfully use movement to benefit student achievement. This can be an intimidating aspect of adding movement to lessons due to the already high standards and requirements that a teacher is held to.

Opposing viewpoints express concern with losing academic time when movement is added to the school day. Some educators fear that with the large amount of curriculum and assessment that is required, there is simply no time to waste. Concern with adding movement to

the daily routine also comes from the fright of over activating students and being unable to regain their focus, thus losing instructional time.

Though there are limitations and opposing viewpoints, the current research has shown that movement has a positive effect on the development of a child and the achievement of their journey as a student. Researchers have worked to determine this finding through action research and studies in elementary schools around the country. Incorporating movement can not only increase student achievement, but also provide students with healthy bodies and habits that will follow them throughout their lives. Assisting in fighting obesity chances as well as anxiety, stress and depression, all contribute to the achievement that students will have in their elementary school experience as well as in many years to come.

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